Former Teutonia Hall 55 Buena Vista Avenue YONKERS, WESTCHESTER, NEW YORK

Site Management Plan

NYSDEC BCP Site Number: C360085

Prepared for:

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Prepared by:

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JULY 2017

CERTIFICATION STATEMENT

I Jonathan B. Ashley certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation (DER-10).

P.E. 7-12-17 DATE

Site Management Flant, Site # C360085

Former Teutonia Hall

Westchester County

Yonkers, New York

SITE MANAGEMENT PLAN

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List of Acronyms

BCA Brownfield Cleanup Agreement
BCP Brownfield Cleanup Program

CERCLA Comprehensive Environmental Response, Compensation and Liability Act

CAMP Community Air Monitoring Plan
CFR Code of Federal Regulation
CLP Contract Laboratory Program
COC Certificate of Completion

DER Division of Environmental Remediation ECL Environmental Conservation Law

ELAP Environmental Laboratory Approval Program

EWP Excavation Work Plan
HASP Health and Safety Plan
IC Institutional Control
EC Engineering Control

NYSDEC New York State Department of Environmental Conservation

NYSDOH New York State Department of Health NYCRR New York Codes, Rules and Regulations

O&M Operation and Maintenance

OM&M Operation, Maintenance and Monitoring

OSHA Occupational Safety and Health Administration

PID Photoionization Detector
PRP Potentially Responsible Party
QA/QC Quality Assurance/Quality Control
QAPP Quality Assurance Project Plan
RAO Remedial Action Objective
RAWP Remedial Action Work Plan

RCRA Resource Conservation and Recovery Act RI/FS Remedial Investigation/Feasibility Study

ROD Record of Decision
SCO Soil Cleanup Objective
SMP Site Management Plan

SSDS Sub-slab Depressurization System

SVE Soil Vapor Extraction
SVI Soil Vapor Intrusion
TAL Target Analyte List
TCL Target Compound List

TCLP Toxicity Characteristic Leachate Procedure
USEPA United States Environmental Protection Agency

UST Underground Storage Tank
VCA Voluntary Cleanup Agreement

VCP

Voluntary Cleanup Program

ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification: Site Identification No. C360085

Former Teutonia Hall 55 Buena Vista Avenue Yonkers, New York

Institutional Controls:

The property may be used for Restricted Residential, commercial or industrial uses in the Track 2 Restricted Residential area and for residential, restricted residential, commercial and industrial uses in the Conditional Track 1 area. All ICs, as listed in **Section 3.2** and identified below, apply to the Track 2 Restricted Residential area. All ICs identified below apply to the Conditional Track 1 area with the exception of Items 2, 8 and 13.

- 1. Implement, maintain and monitor potential ECs;
- 2. Prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination in the Track 2 Restricted Residential Restricted Residential area;
- 3. All potential ECs must be operated and maintained as specified in this SMP.
- 4. All potential ECs must be inspected at a frequency and in a manner defined in the SMP.
- 5. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Westchester County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
- 6. Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
- 7. Data and information pertinent to Site management must be reported at the frequency and in a manner as defined in this SMP;
- 8. All future activities that will disturb remaining contaminated material in the Track 2 Restricted Residential area must be conducted in accordance with this SMP;
- 9. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- 11. Access to the Site must be provided to agents, employees or other

	representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
	12. The potential for vapor intrusion must be evaluated for any buildings developed on the entire Site with provisions for actions including monitoring or mitigation if recommended; and
	 Vegetable gardens and farming on the Site are prohibited in the Track 2 Restricted Residential Restricted Residential area.
Engineering Controls:	 A vapor barrier and passive SSDS will be installed for construction purposes in the future building(s). Based on the results of the SVI evaluation to be conducted after the building is constructed and NYSDEC/ NYSDOH approval, the Track 1 easement can be extinguished.
Inspections:	Frequency
Site Inspection	Annually
Reporting:	
Site Inspection Report	Annually
2. Periodic Review Report	Annually

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

1.0 INTRODUCTION

This document is required as an element of the remedial program at 55 Buena Vista Avenue in Yonkers, New York, (Figure 1) (hereinafter referred to as the "Site") under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The Site was remediated in accordance with Brownfield Cleanup Agreement (BCA) Index# A3-0529-1005, Site #C360085, which was executed on November 21, 2005, and amended on April 16, 2007 to admit the two current Volunteers - Teutonia Buena Vista, LLC and Buena Vista 53, LLC - into the program, remove the original Volunteer, The Urban Group, LLC, and add 53-55 Buena Vista Avenue into the Site boundary. On October 7, 2015, the BCA was again amended to consolidate all prior lots into Tax Lot 11 with an address of 55 Buena Vista Avenue.

1.1 General

Teutonia Buena Vista, LLC and Buena Vista 53, LLC entered into the BCA with the NYSDEC to remediate a 0.788 acre property located in Yonkers, Westchester County, New York. This BCA required the Remedial Parties, Teutonia Buena Vista LLC and Buena Vista 53, LLC, to investigate and remediate contaminated media at the Site. A figure showing the Site location and boundaries of this 0.788-acre Site is provided in **Figure 2**. The boundaries of the Site are more fully described in the metes and bounds Site description that is part of the Environmental Easement included in **Appendix A**.

After completion of the remedial work described in the Remedial Action Work Plan, some contamination was left in the subsurface at this Site, which is hereafter referred to as "remaining contamination." Specifically, the soil left in place is located along Buena Vista Avenue in the Track 2 Restricted Residential area shown on Figure 3. In addition, even though the remainder of the Site achieved a Conditional Track 1 cleanup, post excavation soil vapor samples revealed PCE vapor was still present. This Site Management Plan (SMP) was prepared to manage remaining contamination at the Site in the Track 2 Restricted Residential Restricted Residential area, and to add a vapor barrier and passive SSDS for any buildings constructed throughout the Site in both the Track 1 and Track 2 Restricted Residential Restricted Residential areas. As a result, there are two (2) Environmental Easements that were filed in relation to the Site. If the soil vapor intrusion evaluation shows no threat of soil vapor intrusion, the Environmental Easement in the Track 1 area, which was recorded in December 2016, can be extinguished in accordance with ECL Article 71, Title 36. In the event the remaining contamination exceeding Track 1 Soil Cleanup Objectives (SCOs) in the Track 2 Restricted Residential area is excavated in relation to a future project and that soil vapor monitoring or mitigation is not needed, then the Track 2 Restricted Residential Environmental Easement can be extinguished. All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

This SMP was prepared by HydroEnvironmental Solutions, Inc. and D&K Consulting Engineers, P.C., on behalf of Teutonia Buena Vista, LLC and Buena Vista 53, LLC, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated May 3, 2010 and the guidelines provided by NYSDEC. This SMP addresses the means for implementing the Institutional Controls (ICs) and Engineering Controls (ECs) that are required by the Environmental Easement for the Site.

This SMP was prepared to manage remaining contamination in the Track 2 Restricted Residential Area at the Site and in soil vapor throughout the Site until the Environmental Easements can be extinguished in accordance with ECL Article 71, Title 36. Extinguishment of the easement in the Track 2 Restricted Residential area would require removal of the remaining contamination in the Track 2 Restricted Residential Area, and demonstration (by sampling) that the soil vapor does not require continued monitoring after the soil vapor barrier and passive SSDSs are installed. Extinguishment of the easement in the Track 1 Area only requires a post construction soil vapor evaluation demonstrating that no monitoring is required. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the Site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC);
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the BCA, (Index# A3-0529-1005, Site #C360085) for the Site, and thereby subject to applicable penalties.

All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the Site is provided in **Appendix B** of this SMP.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shut-down of a remedial system, post-remedial removal of contaminated

sediment or soil, or other significant change to the Site conditions. In accordance with the Environmental Easement for the Site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- 60-day advance notice of any proposed changes in Site use that are required under the terms of the BCA 6NYCRR Part 375 and/or Environmental Conservation Law.
- 7-day advance notice of any field activity associated with the remedial program.
- 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan (Appendix C).
- Notice within 48-hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
- Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the Site or the responsibility for implementing this SMP will include the following notifications:

 At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Brownfield Cleanup Agreement (BCA) and all approved work plans and reports, including this SMP. • Within 15 days after the transfer of all or part of the Site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1.3 below includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of Siterelated contact information is provided in **Appendix B**.

Table 1.3: Notifications

Name	Contact Information
Michael J. Haggerty	(518) 402-9768
Whichael J. Haggerty	michael.haggerty@dec.ny.gov
William A. Canavan, PG, LSRP	(914) 276-2560
William A. Canavan, F.G. LSKF	wcanavan@hesny.com
Jonathan B. Ashley, PE	(802) 522-9733
Johannan B. Asiney, FL	jashley@dubois-king.com

^{*} Note: Notifications are subject to change and will be updated as necessary.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

<u>Location</u>: The Teutonia Hall Site is located at 55 Buena Vista Avenue in the City of Yonkers, Westchester County, which were consolidated into one tax lot – Block 512 Lot 11 – in 2015. This Site is bounded to the west by the Metro North/Amtrak active railroad line, to the north by an old railroad repair shop known as the trolley barn building, to the east by Buena Vista Avenue and former residential properties to the south (**Figure 2**). There are no buildings / structures on-site.

<u>Current Zoning</u>: The Site is currently zoned in a downtown overlay district (DMX) which allows for the use of the Site for a high density (i.e. multi-family) residential use, which is consistent with the planned residential project for the Site. This zoning is also consistent with the Track 1 Unrestricted and Track 2 Restricted Residential cleanup tracks that have been achieved at the Site.

<u>Historic Uses</u>: Historically, this Site has been used for a variety of industrial and petroleum-related commercial purposes, including but not limited to: auto repair; a garage with underground storage tanks; a knitting mill; a dry cleaner; a toy manufacturer; a jewelry manufacturer; and a printing facility.

The boundaries of the Site are more fully described in **Appendix A** (Metes and Bounds and survey figure). The owner of the Site parcel at the time of issuance of this SMP is:

Teutonia Buena Vista, LLC.

2.2 Physical Setting

2.2.1 Land Use

The Site consists of the following: a vacant lot. The Site was rezoned as an overlay downtown district (D-MX) which allows for hi-rise residential apartment buildings. It was previously zoned commercial/industrial.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial and residential properties. The properties immediately south of the Site include a daycare center; the properties immediately north of the Site include commercial and residential properties; the properties immediately east of the Site include commercial and residential properties; and the properties to the west of the Site include the Metro North Railroad tracks and residential high rise buildings.

2.2.2 Geology and Hydrogeology

The geology beneath the Site consisted of eight to fifteen feet of fill material. The fill material was generally composed of construction and demolition debris including concrete, brick, and asphalt. Additionally, the fill included fine to medium sand with some fine gravel. The native geologic unit underlying the fill is composed of fine to medium sand with some fine gravel. This layer also contains intermittent silty fine sand, silt, with some clay layers. This fill layer was completely removed from the Site down to the clean native geological layer in the Track 1 area and has been reduced in the Track 2 Restricted Residential area.

According to the Geologic map of New York-Lower Hudson Sheet (Fisher, 1970), the bedrock beneath the Site is comprised of the Upper Proterozoic Fordham Gneiss, an undivided garnet-quartz-plagioclase gneiss. Boreholes advanced to a maximum depth of 47.5 feet below ground surface (ftbgs) during the RI drilling program did not encounter bedrock.

Groundwater was not encountered during any of the test boring and soil sampling activities conducted in 2014. During the RI, saturated conditions were observed in the overburden at 32 ftbgs at SB-7D, and at 44 ftbgs at a temporary groundwater well - MW-Temp. No other locations displayed evidence of saturated soils. The regional groundwater flow direction is presumed to be west towards

the Hudson River. No groundwater was encountered in the overburden material beneath the Site in 2014. Site specific boring logs are provided in **Appendix D**.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site.

A RI was performed to characterize the nature and extent of contamination at the Site. The results of the RI are described in detail in the following report:

 Remedial Investigation Report dated April 2008 revised May 2010 written by Malcolm Pirnie, Inc. (MPI)

Generally, the RI conducted in July-August 2007 by Malcolm Pirnie included soil vapor sampling and analysis, surface soil sampling and analysis, sub-surface soil sampling and analysis, and one groundwater sample. The RI consisted of 14 soil vapor samples, 35 subsurface soil samples, and 1 groundwater sample from a temporary groundwater monitoring well. Analytical results for the RI were compared to the following standards and criteria:

- Subsurface soil was compared to the NYS Recommended Soil Cleanup Objectives (Restricted Residential, and Commercial SCOs) (NYSDEC, 2006)
- Groundwater data were compared to NYSDEC Class GA groundwater standards and guidance values, (6NYCRR Part 360) (NYSDEC, 1998).

The sub-slab soil vapor samples were analyzed for VOCs. PCE, TCE, cis-1,2-dichloroethene, and 1,1,1-trichloroethane were identified in these samples, and mitigative actions were recommended based upon the detections of these VOCs in sub-slab soil vapor and those in indoor air. Sub-surface soil results indicated that no VOCs exceeded NYSDEC Restricted Residential SCOs at any of the sampling locations. Seven SVOCs were detected in the sub-surface soil at concentrations in excess of NYSDEC SCOs for Restricted Residential Use. Elevated concentrations of chromium, lead, manganese, and mercury were found in excess of NYSDEC Restricted Residential SCOs at five locations. Sub-surface soils were also analyzed for PCBs and Pesticides. Concentrations of PCBs and pesticides were found in some of the samples collected; however, none exceeded their respective NYSDEC Restricted Residential SCOs.

Groundwater was not encountered during the soil pre-characterization investigation conducted in 2014 and 2015 and one groundwater sample was collected during the RI; groundwater is not a media of concern for the remedial activities at the Site.

Below is a summary of the RI compares data to NYSDEC unrestricted SCOs:

<u>Soil</u>

Analytical results of surface soil samples previously collected at depths between 0 and 2 feet below ground surface indicated the presence of VOCs (PEC), SVOCs (PAHs) and metals at concentrations that exceeded the NYSDEC unrestricted SCOs. SVOCs detected above the unrestricted SCOs include; naphthalene, acenaphathene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene. Elevated metals concentrations detected in excess of the unrestricted SCO standards include, arsenic, barium, chromium, cadmium, copper, lead, mercury, nickel, silver and zinc.

Xylene, PCE and PAHs were detected in subsurface soils above unrestricted SCOs. Analytical samples from subsurface samples were also found to contain heavy metals in excess of unrestricted SCOs.

Site-Related Groundwater

Groundwater was not a medium of concern during the remedial activities at the Site.

Site-Related Soil Vapor Intrusion

Soil vapor samples collected from beneath the existing on-Site buildings detected PCE and TCE. The highest concentrations of PCE and TCE were detected from soil vapor samples collected beneath Building #53. The concentrations of PCE and TCE were 190,000 micrograms per cubic meter ($\mu g/m^3$) and 9,100 $\mu g/m^3$, respectively.

Based on soil vapor samples collected in August 2007, VOCs in soil gas were determined to have the potential to migrate to indoor air of on-Site and off-Site buildings (note that the on-Site buildings were since demolished in June 2014).

The current approved RAWP required the removal of on-Site soils to a depth of 25 ftbgs. While PCE was only found in one boring, it was anticipated that the proposed Track 1 remedy for the majority of the Site would remove future concerns related to VOC soil vapors. Despite the extensive Site excavation effort performed, a post remediation soil vapor investigation in 2015 revealed PCE soil vapors were still present in four out of eight investigation probes ranging from 32 to 150 μ g/m³, as well as detections of 2-butanone, acetone, chloroform, propylene in the soil vapor. Concentrations of 2-butanone and propylene were detected in each of the eight investigation probes ranging from 11 to 17 μ g/m³ and 34 to 100 μ g/m³, respectively. Additionally, acetone and chloroform were each detected in one out of eight of the investigation probes at a concentration of 2,200 μ g/m³ and 69 μ g/m³, respectively. Therefore, even though the Track 1 SCOs were met based on soil end-point sampling after the RAWP was completed for the majority of the Site, a vapor barrier with sampling ports and the piping for a sub-slab depressurization system (SSDS) will be designed and installed beneath the entire

building footprint once constructed. Subsequent to building construction, a vapor sampling evaluation will be implemented in order to determine if the SSDS should be made active and if the system will need to be maintained.

Underground Storage Tanks

According to the RI, three USTs (underground storage tanks) were located on-Site: two single wall steel 1,000 gallon USTs and one 3,000 gallon UST (**Figure 3**). USTs 2 and 3 formerly stored No. 2 fuel oil, and UST 1 may have stored gasoline and/or No. 2 fuel oil. During the July 2014 remedial action implementation, the three tanks were removed and were properly closed with both NYSDEC and WCDOH oversight.

During the planned UST removal work, NYSDEC Spill Number 1404458 was assigned during the UST 1 and UST 3 removals and contaminated soil had to be separately excavated and stockpiled on polyethylene sheeting. The stockpiled soil was removed from the Site and disposed of properly at a NYSDEC approved facility on January 29, 2015. A total of 61.71 tons of petroleum contaminated soil were removed from the Site and disposed of off-Site at Clean Earth of Carteret, a licensed disposal facility located in Carteret, New Jersey.

A UST Spill Closure Report was compiled by HES and sent to the NYSDEC and WCDOH in February 2015. The open NYSDEC spill number 1404458 related to the UST removal and cleanup was formally closed by the NYSDEC on July 24, 2014.

Additional USTs including three (3) 550-gallon steel and one (1) 1,000-gallon steel tanks were originally discovered during the Remedial Actions in October 2015. The tanks were cut, cleaned and removed on December 8 and 9, 2015 by Dutchess Environmental Construction (Dutchess) of Mahopac, New York. The liquid and sludge encountered in each of the tanks was removed by Envirowaste Oil Recovery Services (Envirowaste) of Mahopac, New York. No bottom or sidewall soil samples were collected from around the tanks as the four tank were all located in the Track 1 soil removal area and all soil around and under the tanks was removed for off-Site disposal.

All discovered USTs were properly closed in the WCDOH Petroleum Bulk Storage (PBS) system under PBS No. 3-600383. The tank closure application for the four USTs discovered in October 2015 was filed with the WCDOH on March 30, 2017. A copy of the application and closure letter is included in **Appendix 4** and the closure certificate will be forwarded to the Department under separate cover upon receipt from the WCDOH. Copies of the WCDOH permit for tank removal along with disposal manifests for tank liquid and sludge are included in **Appendix E**.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the NYSDEC Decision Document dated February 2012 are as follows:

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

Soil Vapor

RAOs for Public Health Protection

 Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the Site.

2.5 Remaining Contamination

2.5.1 Soil

The Track 1 area soil quality results indicate that all endpoint samples achieved the Track 1 cleanup levels except one pesticide sample, specifically, Excavation Bottom-22 (4,4'-DDT), exceeded Track 1 SCOs. This single exceedance, in light of the twenty-three other endpoint samples from the Track 1 area that achieved Track 1 cleanup levels, is not considered statistically significant and compliance with the Track 1 SCOs has been achieved.

The Track 2 Restricted Residential area soil quality results indicate that SVOCs, pesticides and metals exceeded Track 1 SCOs. Specifically, at soil sampling location SS-2 and SB-7 0-5 ftbg, lead and zinc; SB-1 22-24 ftbg, and SB-5 0-2 ftbg, selenium; SB-8 5-10 ftbg, nickel; SB-4 5-7 ftbg, 4,4'-DDT; and SB-6 18-20 ftbg, benzo(k)fluoranthene, chrysene and lead concentrations exceeded Track 1 SCOs. Additionally, SB-6 18-20 ftbg, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene exceeded Track 2 Restricted Residential SCOs.

Table 1A and **1B** and **Figure 4** summarize the results of all soil samples remaining at the Site after completion of Remedial Action that exceed the Track 1 (unrestricted) SCOs.

Table 2 and **Figure 5** summarizes the results of all soil samples remaining at the Site after completion of the remedial action that exceed the SCOs for Restricted Residential use of the Site.

2.5.2 Soil Vapor

Several VOCs, including 2-butanone, acetone, chloroform, propylene and tetrachloroethylene (PCE), were detected in the soil vapor samples collected after the completion of Remedial Action.

Table 3 and **Figure 6** summarize the results of all soil vapor sampling concentrations remaining at the Site after completion of Remedial Action.

3.0 INSTITUTIONAL CONTROL PLAN

3.1 General

Since remaining contaminated soil and soil vapor exists beneath the Site, Institutional Controls (ICs) and potentially Engineering Controls (ECs) are required to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of all ICs at the Site. The IC Plan is one component of the SMP and is subject to revision by NYSDEC.

This plan provides:

- A description of all ICs on the Site;
- The basic implementation and intended role of each /IC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the features to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of ICs/potential ECs, such as the implementation of the Excavation Work Plan (Appendix C) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the Site; and
- Any other provisions necessary to identify or establish methods for implementing the ICs/potential ECs required by the Site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

A series of Institutional Controls is required by the RAWP to: (1) implement, maintain and monitor potential Engineering Control systems; (2) prevent future exposure to remaining

contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the Site to Restricted Residential, Commercial or Industrial uses only in the Track 2 Restricted Residential area and residential, restricted residential, commercial and industrial in the Conditional Track 1 area.

All ICs, as listed in **Section 3.2** and identified below, apply only to the Track 2 Restricted Residential area. All ICs identified below apply to the Conditional Track 1 area with the exception of items 2, 8 and 13.

- 1. Implement, maintain and monitor potential ECs.
- 2. Prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination in the Track 2 Restricted Residential area.
- 3. All potential ECs must be operated and maintained as specified in this SMP.
- 4. All potential ECs must be inspected at a frequency and in a manner defined in the SMP.
- 5. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Westchester County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
- 6. Groundwater and other environmental or public health monitoring must be performed as defined in this SMP.
- 7. Data and information pertinent to Site management must be reported at the frequency and in a manner as defined in this SMP.
- 8. All future activities that will disturb remaining contaminated material in the Track 2 Restricted Residential area must be conducted in accordance with this SMP.
- 9. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP.
- 10. Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP.
- 11. Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
- 12. The potential for vapor intrusion must be evaluated for any buildings developed on the entire Site with provisions for actions including monitoring or mitigation if recommended.
- 13. Vegetable gardens and farming on the Site are prohibited in the Track 2 Restricted Residential area.

3.3 Engineering Controls

3.3.1 Sub-Slab Depressurization System (SSDS) and Vapor Barrier

A vapor barrier and passive SSDS will be installed in the future building(s). Vapors above the DOH standards are still present even after a Track 1 remediation on the majority of the Site. A post construction SVI evaluation will be conducted after the building is constructed to determine the need for a vapor barrier and/or SSDS to be managed long term as an EC. To ensure these specifications meet DEC approval, the DEC will be provided a work plan for the SVI evaluation, installation of vapor barrier, sampling points, communication points and SSDS extraction points/piping once the building's foundation plan is finalized. If an active SSDS is required based on the SVI evaluation, a design document will be submitted for approval and the SMP will be revised to include an O&M plan and asbuilt. It should be noted that all ECs must be eliminated from the site within five years of the COC being issued or the Conditional Track 1 Area will revert back to a Track 2 Residential remedy.

4.0 MONITORING AND SAMPLING PLAN

The Site remedy does not rely on any mechanical systems, such as groundwater treatment systems, or air sparge/soil vapor extraction systems to protect public health and the environment. Therefore, the monitoring and sampling of such components is not included in this SMP.

Based on the results of the post-construction soil vapor intrusion sampling, a sub-slab depressurization system (SSDS) may be required. If a SSDS is required, the SMP will be revised to include a monitoring and sampling plan. As per the approved RAWP, provisions to sample soil vapor beneath the concrete slab in the proposed building will be implemented. This will include installation of a sufficient number of vapor monitoring points throughout the building footprint and collecting soil vapor samples from beneath the building in accordance with NYSDOH soil vapor sampling protocols. A specific work plan for the proposed SVI sampling including proposed sampling locations, methods, and procedures will be submitted for NYSDEC and NYSDOH approval. The samples will be collected using Summa canisters and the samples will be sent to a New York State certified laboratory where they will be analyzed for VOCs using EPA Method TO-15. The results of the sub-slab soil vapor sampling will be used to determine if activation of the SSDS will be required.

5.0 OPERATION AND MAINTENANCE PLAN

The Site remedy does not rely on any mechanical systems, such as groundwater treatment systems, or air sparge/soil vapor extraction systems to protect public health and the environment. Therefore, the operation and maintenance of such components is not included in this SMP.

Depending on the results of the soil vapor intrusion sampling, activation of the SSDS may be required. If an active SSDS is required, the SMP will be revised to include an operation and maintenance plan.

6.0 INSPECTIONS, REPORTING AND CERTIFICATIONS

6.1 Site Inspections

Site-wide inspections will be performed at a minimum on a quarterly basis. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect the remaining contamination at the Site. A comprehensive Site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report.

During an inspection, an inspection form will be completed as provided in **Appendix F** - Site Management Forms. The inspections will determine and document the following:

- Compliance with all ICs, including Site usage;
- General Site conditions at the time of the inspection;
- The Site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- If Site records are complete and up to date.

Reporting requirements are outlined in **Section 7.0** of this plan.

Inspections will also be performed in the event of an emergency. An inspection of the Site will be conducted within 5 days of the event to verify the effectiveness of the ICs implemented at the Site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

7.0. REPORTING REQUIREMENTS

7.1 Site Management Reports

All Site management inspection, maintenance and monitoring events will be recorded on the appropriate Site management forms provided in **Appendix F**. These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the Site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of **Table 7.1** and summarized in the Periodic Review Report.

Table 7.1: Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Inspection Report	Annually
Periodic Review Report	Annually, or as otherwise determined by the Department

^{*} The frequency of events will be conducted as specified until otherwise approved by the NYSDEC.

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air, etc.);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuISTM database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the Department beginning sixteen (16) months after the Certificate of Completion is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the Department or at another frequency as may be required by the Department. In the event that the Site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the Site described in **Appendix A** - Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the Site.
- Results of the required annual Site inspections and severe condition inspections, if applicable.
- All applicable Site management forms and other records generated for the Site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.

- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuISTM database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.
- A Site evaluation, which includes the following:
 - The compliance of the remedy with the requirements of the Site-specific RAWP, ROD or Decision Document;
 - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
 - Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
 - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan; and
 - Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document.
 - The overall performance and effectiveness of the remedy.

7.2.1 Certification of Institutional and Engineering Controls

Certification of Institutional Controls will be included in the Periodic Review Report. At the end of each certifying period, as determined by the NYSDEC, the following certification will be provided to the Department:

"For each institutional control identified for the Site, I certify that all of the following statements are true:

- The institutional control employed at this Site is unchanged from the date the control was put in place, or last approved by the Department;
- Nothing has occurred that would impair the ability of the control to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any Site management plan for this control;
- Access to the Site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;
- If a financial assurance mechanism is required under the oversight document for the Site, the mechanism remains valid and sufficient for the intended purpose under the document;
- Use of the Site is compliant with the environmental easement.
- The information presented in this report is accurate and complete.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Jonathan B. Ashley, of D&K Consulting Engineers, P.C, am certifying as Owner's Designated Site Representative for the Site."

If the remedy includes engineering controls in the future based on the results of the post-construction SVI sampling, certification of Institutional and Engineering Controls will be included in the Periodic Review Report, including the following:

Following the last inspection of the reporting period, a Professional Engineer licensed to practice in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"For each institutional or engineering control identified for the Site, I certify that all of the following statements are true:

• The inspection of the Site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;

- The institutional control and/or engineering control employed at this Site is unchanged from the date the control was put in place, or last approved by the Department;
- Nothing has occurred that would impair the ability of the control to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any Site management plan for this control;
- Access to the Site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;
- If a financial assurance mechanism is required under the oversight document for the Site, the mechanism remains valid and sufficient for the intended purpose under the document;
- Use of the Site is compliant with the environmental easement;
- The engineering control systems are performing as designed and are effective;
- To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the Site remedial program and generally accepted engineering practices; and
- The information presented in this report is accurate and complete.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Jonathan B. Ashley, of D&K Consulting Engineers, P.C., am certifying as Owner's Designated Site Representative for the Site."

Every five years the following certification will be added:

• The assumptions made in the qualitative exposure assessment remain valid.

The signed certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the Site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Periodic Review Report may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or potential engineering control, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC.

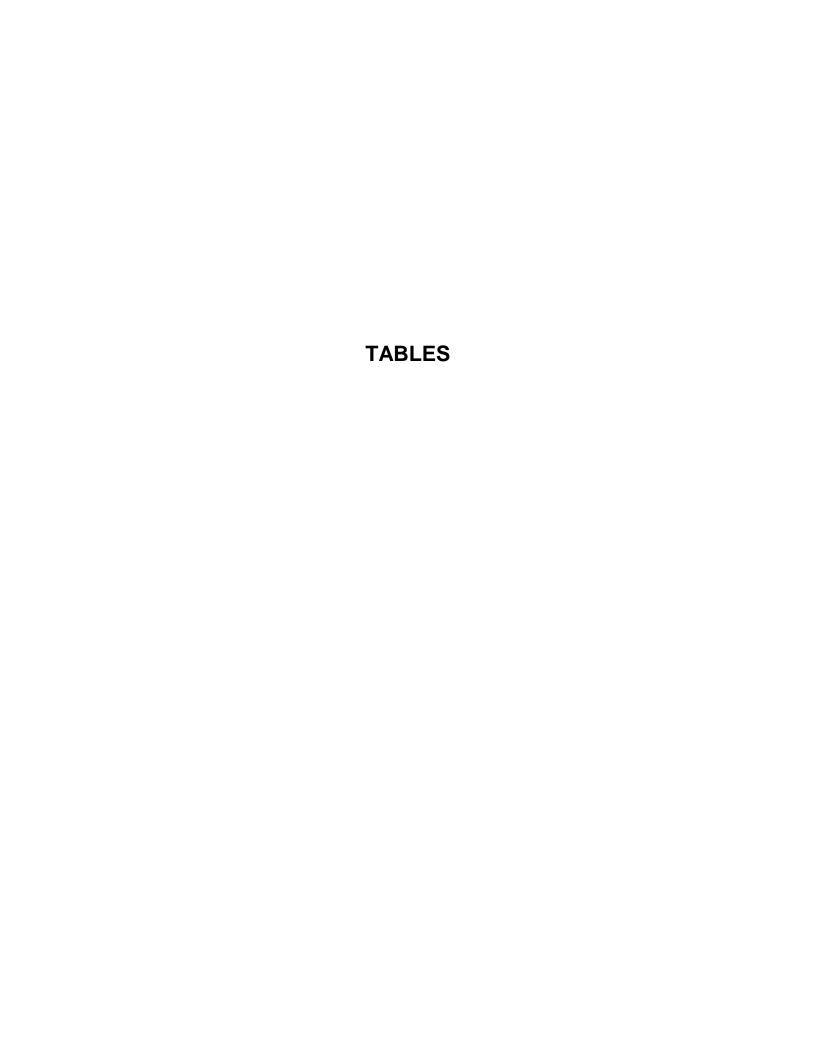
8.0 REFERENCES

6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

Remedial Investigation Report / Former Teutonia Hall Site; Malcolm Pirnie, Inc. April 2008; revised May 2010.



Summary of Remaining Soil Samples Exceeding Unrestricted SCOs

Commis ID			CD 1 22 24	SB-1 22-24			SB-4 5-7		SB-5 0-2		SB-6 18-20		
Sample ID York ID	NYSDEC Part 375	NIVEDEC David 275	14G0689-06		SB-3 0-2 14G0689-13		14G0689-21		14G0689-25		14G0689-35		
	Restricted Use Soil	NYSDEC Part 375	7/16/2014		7/16/2014		7/16/2014		7/16/2014		7/16/2014		
Sampling Date	Cleanup Objectives -	Unrestricted Use Soil Cleanup Objectives	7/16/2014 Soil			Soil Result Q			7/16/2014 Soil		Soil		
Client Matrix	Restricted Residential	Cleanup Objectives										0	
Compound Volatile Organics, NJDEP/TCL/Part 375 List	mg/Vg	mg/Kg	Result	Q		Ų	Result	Q	Result	Q	Result mg/Kg	Q	
Dilution Factor	mg/Kg	IIIg/Ng	mg/Kg 1		mg/Kg 1		mg/Kg 1		mg/Kg 1		111g/Ng 1		
1,1,1,2-Tetrachloroethane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,1,1-Trichloroethane	100	0.68	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,1,2,2-Tetrachloroethane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,1,2-Trichloroethane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,1-Dichloroethane	26	0.27	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,1-Dichloroethylene	100	0.33	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,2,4-Trichlorobenzene	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,2,4-Trimethylbenzene	52	3.6	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,2-Dibromo-3-chloropropane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,2-Dibromoethane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,2-Dichlorobenzene	100	1.1	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,2-Dichloroethane	3.1	0.02	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,2-Dichloropropane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,3,5-Trimethylbenzene	52	8.4	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,3-Dichlorobenzene	49	2.4	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,4-Dichlorobenzene	13	1.8	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
1,4-Dioxane	13	0.1	0.050	U	0.093	U	0.084	U	0.052	U	0.057	U	
2-Butanone	100	0.12	0.0025	U	0.0046	U	0.0078	J	0.0026	U	0.0029	U	
2-Hexanone	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
4-Methyl-2-pentanone	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Acetone	100	0.05	0.0025	U	0.025		0.044	В	0.014	В	0.0069	JB	
Acrolein	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Acrylonitrile	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Benzene	4.8	0.06	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Bromodichloromethane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Bromoform	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Bromomethane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Carbon disulfide	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Carbon tetrachloride	2.4	0.76	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Chlorobenzene	100	1.1	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Chloroethane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Chloroform	49	0.37	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Chloromethane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
cis-1,2-Dichloroethylene	100	0.25	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
cis-1,3-Dichloropropylene	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Dibromochloromethane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Dibromomethane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	

Summary of Remaining Soil Samples Exceeding Unrestricted SCOs

Sample ID			SR-1 22-24	SB-1 22-24			SB-4 5-7		SB-5 0-2		SB-6 18-20		
York ID	NYSDEC Part 375	NYSDEC Part 375	14G0689-06		SB-3 0-2 14G0689-13		14G0689-21		14G0689-25		14G0689-35		
Sampling Date	Restricted Use Soil	Unrestricted Use Soil	7/16/2014		7/16/2014		7/16/2014		7/16/2014		7/16/2014		
Client Matrix	Cleanup Objectives -	Cleanup Objectives	Soil			Soil Result Q			7/10/2014 Soil		Soil		
Compound	Restricted Residential	Cicanap Objectives	Result	Q				Q	Result	Q	Result	Q	
Dichlorodifluoromethane	~	~	0.0025	U	0.0046	U	Result 0.0042	U	0.0026	U	0.0029	U	
Ethyl Benzene	41	1	0.0025	U	0.0046	Ü	0.0042	U	0.0026	U	0.0029	U	
Hexachlorobutadiene	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Isopropylbenzene	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Methyl acetate	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Methyl tert-butyl ether (MTBE)	100	0.93	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Methylene chloride	100	0.05	0.0027	J	0.0046	U	0.0042	U	0.0027	J	0.0029	U	
n-Butylbenzene	100	12	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
n-Propylbenzene	100	3.9	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
o-Xylene	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
p- & m- Xylenes	~	~	0.0050	U	0.0093	U	0.0084	U	0.0052	U	0.0057	U	
p-Isopropyltoluene	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
sec-Butylbenzene	100	11	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Styrene	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
tert-Butyl alcohol (TBA)	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
tert-Butylbenzene	100	5.9	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Tetrachloroethylene	19	1.3	0.0025	U	0.23		0.0042	U	0.0026	U	0.0038	J	
Toluene	100	0.7	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
trans-1,2-Dichloroethylene	100	0.19	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
trans-1,3-Dichloropropylene	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Trichloroethylene	21	0.47	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Trichlorofluoromethane	~	~	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Vinyl Chloride	0.9	0.02	0.0025	U	0.0046	U	0.0042	U	0.0026	U	0.0029	U	
Xylenes, Total	100	0.26	0.0075	U	0.014	U	0.013	U	0.0077	U	0.0086	U	
Semi-Volatiles, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		
Dilution Factor			1		1		10		1		5		
1,1'-Biphenyl	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U	
1,2,4-Trichlorobenzene	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U	
1,2-Dichlorobenzene	100	1.1	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U	
1,2-Diphenylhydrazine (as Azobenzene)	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U	
1,3-Dichlorobenzene	49	2.4	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U	
1,4-Dichlorobenzene	13	1.8	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U	
2,4,5-Trichlorophenol	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U	
2,4,6-Trichlorophenol	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U	
2,4-Dichlorophenol	~	~	0.10	U	0.094	U	0.93	U	0.10	U	0.46	U	
2,4-Dimethylphenol	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U	
2,4-Dinitrophenol	~	~	0.20	U	0.19	U	1.84	U	0.21	U	0.91	U	
2,4-Dinitrotoluene	~	~	0.10	U	0.094	U	0.93	U	0.10	U	0.46	U	
2,6-Dinitrotoluene	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U	

Summary of Remaining Soil Samples Exceeding Unrestricted SCOs

Sample ID			SB-1 22-24		SB-3 0-2		SB-4 5-7		SB-5 0-2		SB-6 18-20	
York ID	NYSDEC Part 375	NYSDEC Part 375	14G0689-06		14G0689-13		14G0689-21		14G0689-25		14G0689-35	
Sampling Date	Restricted Use Soil	Unrestricted Use Soil	7/16/2014		7/16/2014		7/16/2014		7/16/2014		7/16/2014	
Client Matrix	Cleanup Objectives -	Cleanup Objectives	Soil		Soil		Soil		Soil		Soil	
Compound	Restricted Residential		Result	Q	Result Q		Result	Q	Result	Q	Result	Q
2-Chloronaphthalene	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
2-Chlorophenol	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.24	JD
2-Methylnaphthalene	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.28	JD
2-Methylphenol	100	0.33	0.10	U	0.094	U	0.93	U	0.10	U	0.46	U
2-Nitroaniline	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
2-Nitrophenol	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
3- & 4-Methylphenols	~	~	0.10	U	0.094	U	0.93	U	0.10	U	0.46	U
3,3'-Dichlorobenzidine	~	~	0.20	U	0.19	U	1.84	U	0.21	U	0.91	U
3-Nitroaniline	~	~	0.10	U	0.094	U	0.93	U	0.10	U	0.46	U
4,6-Dinitro-2-methylphenol	~	~	0.10	U	0.094	U	0.93	U	0.10	U	0.46	U
4-Bromophenyl phenyl ether	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
4-Chlorophenyl phenyl ether	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
4-Nitroaniline	~	~	0.10	U	0.094	U	0.93	U	0.10	U	0.46	U
4-Nitrophenol	~	~	0.10	U	0.094	U	0.93	U	0.10	U	0.46	U
Acenaphthene	100	20	0.051	U	0.047	U	0.46	U	0.052	U	0.66	JD
Acenaphthylene	100	100	0.051	U	0.047	U	0.46	U	0.052	U	0.42	JD
Acetophenone	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Anthracene	100	100	0.051	U	0.047	U	0.46	U	0.052	U	1.88	D
Atrazine	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Benzaldehyde	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Benzidine	~	~	0.20	U	0.19	U	1.84	U	0.21	U	0.91	U
Benzo(a)anthracene	1	1	0.051	U	0.047	U	0.46	U	0.052	U	4	D
Benzo(a)pyrene	1	1	0.051	U	0.047	U	0.46	U	0.052	U	2.23	D
Benzo(b)fluoranthene	1	1	0.051	U	0.047	U	0.46	U	0.052	U	2.34	D
Benzo(g,h,i)perylene	100	100	0.10	U	0.094	U	0.93	U	0.10	U	0.70	JD
Benzo(k)fluoranthene	3.9	0.8	0.051	U	0.047	U	0.46	U	0.052	U	2.77	D
Benzoic acid	~	~	0.14	U	0.13	U	1.26	U	0.14	U	0.62	U
Benzyl butyl phthalate	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Bis(2-chloroethoxy)methane	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Bis(2-chloroethyl)ether	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Bis(2-chloroisopropyl)ether	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Bis(2-ethylhexyl)phthalate	~	~	0.051	U	0.047	U	0.51	JD	0.052	U	0.33	JD
Caprolactam	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Carbazole	~	~	0.051	U	0.047	U	0.46	U	0.052	U	1.08	D
Chrysene	3.9	1	0.051	U	0.047	U	0.46	U	0.052	U	3.68	D
Dibenzo(a,h)anthracene	0.33	0.33	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Dibenzofuran	59	7	0.051	U	0.047	U	0.46	U	0.052	U	0.69	JD
Diethyl phthalate	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Dimethyl phthalate	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U

Summary of Remaining Soil Samples Exceeding Unrestricted SCOs

Sample ID			SR 1 22 24	SB-1 22-24			SB-4 5-7		SB-5 0-2		SB-6 18-20	
York ID	NYSDEC Part 375	NIVEDEC Down 275	14G0689-06		SB-3 0-2 14G0689-13		14G0689-21		14G0689-25		14G0689-35	
	Restricted Use Soil	NYSDEC Part 375 Unrestricted Use Soil	7/16/2014		7/16/2014		7/16/2014		7/16/2014		7/16/2014	
Sampling Date	Cleanup Objectives -	Cleanup Objectives	7/16/2014 Soil		Soil Result Q		7/16/2014 Soil		7/16/2014 Soil		7/16/2014 Soil	
Client Matrix	Restricted Residential	Cleanup Objectives										
Compound	~	~	Result	Q			Result	Q	Result	Q	Result	Q
Di-n-butyl phthalate	~ ~	~ ~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Di-n-octyl phthalate			0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Fluoranthene	100	100	0.051	U	0.047	U	0.46	U	0.052	J	7.35	D
Fluorene	100	30	0.051	U	0.047	U	0.46	U	0.052	U	0.87	JD
Hexachlorobenzene	1.2	0.33	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Hexachlorobutadiene	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Hexachlorocyclopentadiene	~	~	0.10	U	0.094	U	0.93	U	0.10	U	0.46	U
Hexachloroethane	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.051	U	0.047	U	0.46	U	0.052	U	0.79	JD
Isophorone	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Naphthalene	100	12	0.051	U	0.047	U	0.46	U	0.052	U	0.70	JD
Nitrobenzene	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
N-Nitrosodimethylamine	~	~	0.10	U	0.094	U	0.93	U	0.10	U	0.46	U
N-nitroso-di-n-propylamine	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
N-Nitrosodiphenylamine	~	~	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Pentachlorophenol	6.7	0.8	0.10	U	0.094	U	0.93	U	0.10	U	0.46	U
Phenanthrene	100	100	0.051	U	0.047	U	0.46	U	0.052	U	6.31	D
Phenol	100	0.33	0.051	U	0.047	U	0.46	U	0.052	U	0.23	U
Pyrene	100	100	0.051	U	0.047	U	0.46	U	0.052	U	7.18	D
Herbicides, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Dilution Factor			1		1		1		1		1	
2,4,5-T	~	~	0.024	U	0.022	U	0.022	U	0.025	U	0.022	U
2,4,5-TP (Silvex)	100	3.8	0.024	U	0.022	U	0.022	U	0.025	U	0.022	U
2,4-D	~	~	0.024	U	0.022	U	0.022	U	0.025	U	0.022	U
Pesticides, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Dilution Factor			5		5		5		5		5	
4,4'-DDD	13	0.0033	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U
4,4'-DDE	8.9	0.0033	0.0020	U	0.0018	U	0.0033	D	0.0020	U	0.0018	U
4,4'-DDT	7.9	0.0033	0.0020	U	0.0018	U	0.018	D	0.0020	U	0.0018	U
Aldrin	0.097	0.005	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U
alpha-BHC	0.48	0.02	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U
alpha-Chlordane	4.2	0.094	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U
beta-BHC	0.36	0.036	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U
Chlordane, total	~	~	0.0080	U	0.0074	U	0.0073	U	0.0082	U	0.0072	U
delta-BHC	100	0.04	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U
Dieldrin	0.2	0.005	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U
Endosulfan I	24	2.4	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U
Endosulfan II	24	2.4	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U
Endosulfan sulfate	24	2.4	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U

Summary of Remaining Soil Samples Exceeding Unrestricted SCOs

Sample ID York ID Sampling Date Client Matrix	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	SB-1 22-24 14G0689-06 7/16/2014 Soil		SB-3 0-2 14G0689-13 7/16/2014 Soil		SB-4 5-7 14G0689-21 7/16/2014 Soil		SB-5 0-2 14G0689-25 7/16/2014 Soil		SB-6 18-20 14G0689-35 7/16/2014 Soil		
Compound	Restricted Residential		Result Q		Result	Q	Result	Q	Result	Q	Result	Q	
Endrin	11	0.014	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U	
Endrin aldehyde	~	~	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U	
Endrin ketone	~	~	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U	
gamma-BHC (Lindane)	1.3	0.1	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U	
gamma-Chlordane	~	~	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U	
Heptachlor	2.1	0.042	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U	
Heptachlor epoxide	~	~	0.0020	U	0.0018	U	0.0018	U	0.0020	U	0.0018	U	
Methoxychlor	~	~	0.010	U	0.0092	U	0.0091	U	0.010	U	0.0090	U	
Toxaphene	~	~	0.10	U	0.093	U	0.092	U	0.10	U	0.091	U	
Polychlorinated Biphenyls (PCB)	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		
Dilution Factor			1		1		1		1		1		
Aroclor 1016	~	~	0.021	U	0.019	U	0.019	U	0.021	U	0.019	U	
Aroclor 1221	~	~	0.021	U	0.019	U	0.019	U	0.021	U	0.019	U	
Aroclor 1232	~	~	0.021	U	0.019	U	0.019	U	0.021	U	0.019	U	
Aroclor 1242	~	~	0.021	U	0.019	U	0.019	U	0.021	U	0.019	U	
Aroclor 1248	~	~	0.021	U	0.019	U	0.019	U	0.021	U	0.019	U	
Aroclor 1254	~	~	0.021	U	0.019	U	0.019	U	0.021	U	0.019	U	
Aroclor 1260	~	~	0.021	U	0.019	U	0.019	U	0.021	U	0.019	U	
Total PCBs	1	0.1	0.021	U	0.019	U	0.019	U	0.021	U	0.019	U	
Metals, RCRA	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		
Dilution Factor			1		1		1		1		1		
Arsenic	16	13	2.39		1.59		2.40		2.92		2.98		
Barium	400	350	82.70		72		87		86.70		56.20		
Cadmium	4.3	2.5	0.36	U	0.34	U	0.33	U	0.37	U	0.33	U	
Chromium	180	30	18.90		20.60		16.20		26.60		13.70		
Lead	400	63	9.87		4.01		61.20		4.14		128		
Selenium	180	3.9	5.05		4.32		2.90		4.88		2.27		
Silver	180	2	0.61	U	0.56	U	0.55	U	0.62	U	0.55	U	
Mercury by 7473	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		
Dilution Factor			1		1		1		1		1		
Mercury	0.81	0.18	0.036	U	0.048		0.033	U	0.037	U	0.033	U	
Total Solids			%		%		%		%		%		
Dilution Factor			1		1		1		1		1		
% Solids	~	~	82.30		89.70		90.70		80.90		91.60		

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution
U=analyte not detected at or above the level indicated

NT=this indicates the analyte was not a target for this sample

~=this indicates that no regulatory limit has been established for this analyte

J=analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

B=analyte found in the analysis batch blank

HydroEnvironmental Solutions, Inc.
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Summary of Remaining Soil Samples Exceeding Unrestricted SCOs

Sample ID			SB-7-0-5ftbg-105	15	SB-8-5-10ftbg-105	515	SS-2-92815		Excavation Bottom-22-071416		
York ID	NYSDEC Part 375	NYSDEC Part 375	15J0196-01		15J0196-05		15 1104-02		16G0629-01		
Sampling Date	Restricted Use Soil	Unrestricted Use Soil	10/5/2015		10/5/2015		9/28/2015		7/14/2016 1:00:00 PM	М	
Client Matrix	Cleanup Objectives -	Cleanup Objectives	Soil		Soil		Soil		Soil		
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q	
Volatile Organics, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg				
Dilution Factor			1		1		1				
1,1,1,2-Tetrachloroethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
1,1,1-Trichloroethane	100	0.68	0.0033	U	0.0017	U	0.0031	U	NT		
1,1,2,2-Tetrachloroethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
1,1,2-Trichloroethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
1,1-Dichloroethane	26	0.27	0.0033	U	0.0017	U	0.0031	U	NT		
1,1-Dichloroethylene	100	0.33	0.0033	U	0.0017	U	0.0031	U	NT		
1,2,3-Trichlorobenzene	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
1,2,3-Trichloropropane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
1,2,4-Trichlorobenzene	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
1,2,4-Trimethylbenzene	52	3.6	0.0033	U	0.0017	U	0.0031	U	NT		
1,2-Dibromo-3-chloropropane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
1,2-Dibromoethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
1,2-Dichlorobenzene	100	1.1	0.0033	U	0.0017	U	0.0031	U	NT		
1,2-Dichloroethane	3.1	0.02	0.0033	U	0.0017	U	0.0031	U	NT		
1,2-Dichloropropane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
1,3,5-Trimethylbenzene	52	8.4	0.0033	U	0.0017	U	0.0031	U	NT		
1,3-Dichlorobenzene	49	2.4	0.0033	U	0.0017	U	0.0031	U	NT		
1,4-Dichlorobenzene	13	1.8	0.0033	U	0.0017	U	0.0031	U	NT		
1,4-Dioxane	13	0.1	0.066	U	0.034	U	0.061	U	NT		
2-Butanone	100	0.12	0.0033	U	0.0017	U	0.0031	U	NT		
2-Hexanone	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
4-Methyl-2-pentanone	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
Acetone	100	0.05	0.024		0.024		0.0061	U	NT		
Acrolein	~	~	0.0066	U	0.0034	U	0.0061	U	NT		
Acrylonitrile	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
Benzene	4.8	0.06	0.0033	U	0.0017	U	0.0031	U	NT		
Bromochloromethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
Bromodichloromethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
Bromoform	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
Bromomethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
Carbon disulfide	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
Carbon tetrachloride	2.4	0.76	0.0033	U	0.0017	U	0.0031	U	NT		
Chlorobenzene	100	1.1	0.0033	U	0.0017	U	0.0031	U	NT		
Chloroethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
Chloroform	49	0.37	0.0033	U	0.0017	U	0.0031	U	NT		
Chloromethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT		
cis-1,2-Dichloroethylene	100	0.25	0.0033	U	0.0017	U	0.0031	U	NT		

Summary of Remaining Soil Samples Exceeding Unrestricted SCOs

Sample ID			SB-7-0-5ftbg-10515 15J0196-01		SB-8-5-10ftbg-105	515	SS-2-92815		Excavation Bottom-22-07	1416
York ID	NYSDEC Part 375	NYSDEC Part 375	_		15J0196-05		15 1104-02		16G0629-01	2.120
Sampling Date	Restricted Use Soil	Unrestricted Use Soil	10/5/2015		10/5/2015		9/28/2015		7/14/2016 1:00:00 PN	И
Client Matrix	Cleanup Objectives -	Cleanup Objectives	Soil		Soil		Soil		Soil	
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q
cis-1,3-Dichloropropylene	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
Cyclohexane	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
Dibromochloromethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
Dibromomethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
Dichlorodifluoromethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
Ethyl Benzene	41	1	0.0033	U	0.0017	U	0.0031	U	NT	
Hexachlorobutadiene	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
Isopropylbenzene	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
Methyl acetate	~	~	0.0079		0.0017	U	0.0031	U	NT	
Methyl tert-butyl ether (MTBE)	100	0.93	0.0033	U	0.0017	U	0.0031	U	NT	
Methylcyclohexane	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
Methylene chloride	100	0.05	0.0066	U	0.0034	U	0.0061	U	NT	
n-Butylbenzene	100	12	0.0033	U	0.0017	U	0.0031	U	NT	
n-Propylbenzene	100	3.9	0.0033	U	0.0017	U	0.0031	U	NT	
o-Xylene	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
p- & m- Xylenes	~	~	0.0066	U	0.0034	U	0.0061	U	NT	
p-Isopropyltoluene	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
sec-Butylbenzene	100	11	0.0033	U	0.0017	U	0.0031	U	NT	
Styrene	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
tert-Butyl alcohol (TBA)	~	~	0.0055	J	0.0020	J	0.0047	J	NT	
tert-Butylbenzene	100	5.9	0.0033	U	0.0017	U	0.0031	U	NT	
Tetrachloroethylene	19	1.3	0.0036	J	0.0017	U	0.0031	U	NT	
Toluene	100	0.7	0.0033	U	0.0017	U	0.0031	U	NT	
trans-1,2-Dichloroethylene	100	0.19	0.0033	U	0.0017	U	0.0031	U	NT	
trans-1,3-Dichloropropylene	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
Trichloroethylene	21	0.47	0.0033	U	0.0017	U	0.0031	U	NT	
Trichlorofluoromethane	~	~	0.0033	U	0.0017	U	0.0031	U	NT	
Vinyl Chloride	0.9	0.02	0.0033	U	0.0017	U	0.0031	U	NT	
Xylenes, Total	100	0.26	0.0099	U	0.0051	U	0.0092	U	NT	
Semi-Volatiles, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg			
Dilution Factor			2		2		2			
1,1'-Biphenyl	~	~	0.071	U	0.065	U	0.065	U	NT	
1,2,4,5-Tetrachlorobenzene	~	~	0.14	U	0.13	U	0.13	U	NT	
1,2,4-Trichlorobenzene	~	~	0.071	U	0.065	U	0.065	U	NT	
1,2-Dichlorobenzene	100	1.1	0.071	U	0.065	U	0.065	U	NT	
1,2-Diphenylhydrazine (as Azobenzene)	~	~	0.071	U	0.065	U	0.065	U	NT	
1,3-Dichlorobenzene	49	2.4	0.071	U	0.065	U	0.065	U	NT	
1,4-Dichlorobenzene	13	1.8	0.071	U	0.065	U	0.065	U	NT	
2,3,4,6-Tetrachlorophenol	~	~	0.14	U	0.13	U	0.13	U	NT	

Summary of Remaining Soil Samples Exceeding Unrestricted SCOs

Sample ID		NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	SB-7-0-5ftbg-10515		SB-8-5-10ftbg-10515		SS-2-92815		Excavation Bottom-22-03	71416
York ID	NYSDEC Part 375		15J0196-01 10/5/2015 Soil		15J0196-05 10/5/2015 Soil		15I1104-02 9/28/2015 Soil		16G0629-01 7/14/2016 1:00:00 PM Soil	
Sampling Date	Restricted Use Soil									
Client Matrix	Cleanup Objectives -									
Compound	Restricted Residential	, ,	Result	Q	Result	Q	Result	Q	Result	Q
2,4,5-Trichlorophenol	~	~	0.071	U	0.065	U	0.065	U	NT	
2,4,6-Trichlorophenol	~	~	0.071	U	0.065	U	0.065	U	NT	
2,4-Dichlorophenol	~	~	0.071	U	0.065	U	0.065	U	NT	
2,4-Dimethylphenol	~	~	0.071	U	0.065	U	0.065	U	NT	
2,4-Dinitrophenol	~	~	0.14	U	0.13	U	0.13	U	NT	
2,4-Dinitrotoluene	~	~	0.071	U	0.065	U	0.065	U	NT	
2,6-Dinitrotoluene	~	~	0.071	U	0.065	U	0.065	U	NT	
2-Chloronaphthalene	~	~	0.071	U	0.065	U	0.065	U	NT	
2-Chlorophenol	~	~	0.071	U	0.065	U	0.065	U	NT	
2-Methylnaphthalene	~	~	0.071	U	0.065	U	0.065	U	NT	
2-Methylphenol	100	0.33	0.071	U	0.065	U	0.065	U	NT	
2-Nitroaniline	~	~	0.14	U	0.13	U	0.13	U	NT	
2-Nitrophenol	~	~	0.071	U	0.065	U	0.065	U	NT	
3- & 4-Methylphenols	~	~	0.071	U	0.065	U	0.065	U	NT	
3,3'-Dichlorobenzidine	~	~	0.071	U	0.065	U	0.065	U	NT	
3-Nitroaniline	~	~	0.14	U	0.13	U	0.13	U	NT	
4,6-Dinitro-2-methylphenol	~	~	0.14	U	0.13	U	0.13	U	NT	
4-Bromophenyl phenyl ether	~	~	0.071	U	0.065	U	0.065	U	NT	
4-Chloro-3-methylphenol	~	~	0.071	U	0.065	U	0.065	U	NT	
4-Chloroaniline	~	~	0.071	U	0.065	U	0.065	U	NT	
4-Chlorophenyl phenyl ether	~	~	0.071	U	0.065	U	0.065	U	NT	
4-Nitroaniline	~	~	0.14	U	0.13	U	0.13	U	NT	
4-Nitrophenol	~	~	0.14	U	0.13	U	0.13	U	NT	
Acenaphthene	100	20	0.071	U	0.065	U	0.065	U	NT	
Acenaphthylene	100	100	0.071	U	0.065	U	0.065	U	NT	
Acetophenone	~	~	0.071	U	0.065	U	0.065	U	NT	
Aniline	~	~	0.28	U	0.26	U	0.26	U	NT	
Anthracene	100	100	0.071	U	0.065	U	0.065	U	NT	
Atrazine	~	~	0.071	U	0.065	U	0.065	U	NT	
Benzaldehyde	~	~	0.071	U	0.065	U	0.065	U	NT	
Benzidine	~	~	0.28	U	0.26	U	0.26	U	NT	
Benzo(a)anthracene	1	1	0.12	JD	0.065	U	0.14	D	NT	
Benzo(a)pyrene	1	1	0.10	JD	0.065	U	0.14	D	NT	
Benzo(b)fluoranthene	1	1	0.12	JD	0.065	U	0.11	JD	NT	
Benzo(g,h,i)perylene	100	100	0.071	U	0.065	U	0.12	JD	NT	
Benzo(k)fluoranthene	3.9	0.8	0.090	JD	0.065	U	0.15	D	NT	
Benzoic acid	~	~	0.071	U	0.065	U	0.065	U	NT	
Benzyl alcohol	~	~	0.071	U	0.065	U	0.065	U	NT	
Benzyl butyl phthalate	~	~	0.071	U	0.065	U	0.065	U	NT	
Bis(2-chloroethoxy)methane	~	~	0.071	U	0.065	U	0.065	U	NT	

TABLE 1B 55 Buena Vista Avenue Yonkers, New York NYSDEC BCP Site C360085

Summary of Remaining Soil Samples Exceeding Unrestricted SCOs

Sample ID			SB-7-0-5ftbg-105	15	SB-8-5-10ftbg-105	:15	SS-2-92815		Excavation Bottom-22-0	71/16	
York ID	NYSDEC Part 375	NVCDEC Dowt 275	15J0196-01	13	15J0196-05	113	15I1104-02		16G0629-01	/1410	
	Restricted Use Soil	NYSDEC Part 375 Unrestricted Use Soil	10/5/2015		10/5/2015		9/28/2015		7/14/2016 1:00:00 P	D.A	
Sampling Date Client Matrix	Cleanup Objectives -	Cleanup Objectives	10/3/2013 Soil		10/5/2015 Soil		9/28/2013 Soil		Soil		
Compound	Restricted Residential	Cleanup Objectives	Result	Q	Result	Q	Result	Q	Result	Q	
Bis(2-chloroethyl)ether	~	~	0.071	U	0.065	U	0.065	U	NT	Q	
Bis(2-chloroisopropyl)ether	~	~	0.071	U	0.065	U	0.065	U	NT		
Bis(2-ethylhexyl)phthalate	~	~	0.071	U	0.065	U	0.065	U	NT		
Caprolactam	~	~	0.14	U	0.13	U	0.13	U	NT		
Carbazole	~	~	0.071	U	0.065	U	0.065	U	NT		
Chrysene	3.9	1	0.14	JD	0.065	U	0.16	D	NT NT		
Dibenzo(a,h)anthracene	0.33	0.33	0.071	U	0.065	U	0.16	U	NT		
Dibenzofuran	59	0.33 7	0.071	U	0.065	U	0.065	U	NT NT		
Diethyl phthalate	~	~	0.071	U	0.065		0.065	_	NT NT		
Dimethyl phthalate	~	~	0.071	U	0.065	U	0.065	U	NT NT		
Di-n-butyl phthalate	~	~	0.071	U	0.065		0.065	U	NT NT		
• •	~	~				U		_			
Di-n-octyl phthalate			0.071	U	0.065	U	0.065	U	NT		
Fluoranthene	100	100	0.22	D	0.065	U	0.27	D	NT		
Fluorene	100	30	0.071	U	0.065	U	0.065	U	NT		
Hexachlorobenzene	1.2	0.33	0.071	U	0.065	U	0.065	U	NT NT		
Hexachlorobutadiene	~		0.071	U	0.065	U	0.065	U	NT		
Hexachlorocyclopentadiene		~	0.071	U	0.065	U	0.065	U	NT		
Hexachloroethane	~	~	0.071	U	0.065	U	0.065	U	NT		
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.071	U	0.065	U	0.11	JD	NT		
Isophorone	~	~	0.071	U	0.065	U	0.065	U	NT		
Naphthalene	100	12	0.071	U	0.065	U	0.065	U	NT		
Nitrobenzene	~	~	0.071	U	0.065	U	0.065	U	NT		
N-Nitrosodimethylamine	~	~	0.071	U	0.065	U	0.065	U	NT		
N-nitroso-di-n-propylamine	~	~	0.071	U	0.065	U	0.065	U	NT		
N-Nitrosodiphenylamine	~	~	0.071	U	0.065	U	0.065	U	NT		
Pentachlorophenol	6.7	0.8	0.071	U	0.065	U	0.065	U	NT		
Phenanthrene	100	100	0.14	D	0.065	U	0.13	D	NT		
Phenol	100	0.33	0.071	U	0.065	U	0.065	U	NT		
Pyrene	100	100	0.19	D	0.065	U	0.23	D	NT		
Pesticides, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		
Dilution Factor			5		5		5		5		
4,4'-DDD	13	0.0033	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
4,4'-DDE	8.9	0.0033	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
4,4'-DDT	7.9	0.0033	0.0019	U	0.0017	U	0.0017	U	0.0066	D	
Aldrin	0.097	0.005	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
alpha-BHC	0.48	0.02	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
alpha-Chlordane	4.2	0.094	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
beta-BHC	0.36	0.036	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
Chlordane, total	~	~	0.075	U	0.068	U	0.068	U	0.067	U	

TABLE 1B 55 Buena Vista Avenue Yonkers, New York NYSDEC BCP Site C360085

Summary of Remaining Soil Samples Exceeding Unrestricted SCOs

Sample ID			SR 7.0 Eftha 10E	1 5	CD 0 F 10ftha 10F	16	SS-2-92815		Excavation Bottom-22-07	11116	
Sample ID York ID	NYSDEC Part 375	NIVEDEC David 275	SB-7-0-5ftbg-105 15J0196-01	13	SB-8-5-10ftbg-105 15J0196-05	012	55-2-92815 15l1104-02		16G0629-01		
	Restricted Use Soil	NYSDEC Part 375 Unrestricted Use Soil	10/5/2015		10/5/2015		9/28/2015		7/14/2016 1:00:00 PM		
Sampling Date Client Matrix	Cleanup Objectives -	Cleanup Objectives	Soil		10/3/2013 Soil		9/28/2013 Soil		7/14/2016 1.00.00 PM Soil	VI	
Compound	Restricted Residential	Cicanap Objectives	Result	Q	Result	Q	Result	Q	Result	Q	
delta-BHC	100	0.04	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
Dieldrin	0.2	0.005	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
Endosulfan I	24	2.4	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
Endosulfan II	24	2.4	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
Endosulfan sulfate	24	2.4	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
Endrin	11	0.014	0.0019	U	0.0017	U	0.0017	Ü	0.0017	U	
Endrin aldehyde	~	~	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
Endrin ketone	~	~	0.0019	U	0.0017	U	0.0017	Ü	0.0017	U	
gamma-BHC (Lindane)	1.3	0.1	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
gamma-Chlordane	~	~	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
Heptachlor	2.1	0.042	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
Heptachlor epoxide	~	~	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
Methoxychlor	~	~	0.0019	U	0.0017	U	0.0017	U	0.0017	U	
Toxaphene	~	~	0.19	U	0.17	U	0.17	U	0.085	U	
Polychlorinated Biphenyls (PCB)	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg	Ŭ	0.003		
Dilution Factor	6/6	6/8	1		1		1				
Aroclor 1016	~	~	0.019	U	0.017	U	0.017	U	NT		
Aroclor 1221	~	~	0.019	U	0.017	U	0.017	Ü	NT		
Aroclor 1232	~	~	0.019	U	0.017	U	0.017	U	NT		
Aroclor 1242	~	~	0.019	U	0.017	U	0.017	U	NT		
Aroclor 1248	~	~	0.019	U	0.017	U	0.017	U	NT		
Aroclor 1254	~	~	0.019	U	0.017	U	0.017	U	NT		
Aroclor 1260	~	~	0.019	U	0.017	U	0.017	U	NT		
Total PCBs	1	0.1	0.019	U	0.017	U	0.017	U	NT		
Metals, Target Analyte	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg				
Dilution Factor	G, G	3. 3	1		1		1				
Aluminum	~	~	14,100		13,500		10,200		NT		
Antimony	~	~	0.57	U	0.52	U	0.52	U	NT		
Arsenic	16	13	5.83		1.03	U	5.15		NT		
Barium	400	350	93.10		39.60		66.60		NT		
Beryllium	72	7.2	0.11	U	0.10	U	0.10	U	NT		
Cadmium	4.3	2.5	0.34	U	0.31	U	1.43		NT		
Calcium	~	~	6,340		7,880		14,800		NT		
Chromium	180	30	22.20		17.30		18.80		NT		
Cobalt	~	~	9.31		9.18		7.47		NT		
Copper	270	50	44.10		47.60		23.90		NT		
Iron	~	~	20,500		11,000		18,100		NT		
Lead	400	63	94.60		2.27		195		NT		
Magnesium	~	~	5,920		4,590		3,520		NT		

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TABLE 1B 55 Buena Vista Avenue Yonkers, New York

NYSDEC BCP Site C360085

Summary of Remaining Soil Samples Exceeding Unrestricted SCOs

Sample ID York ID Sampling Date Client Matrix	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	SB-7-0-5ftbg-10515 SB-8-5-10ftbg-10515 15J0196-01 15J0196-05 10/5/2015 10/5/2015 Soil Soil				SS-2-92815 1511104-02 9/28/2015 Soil	Excavation Bottom-22-071416 16G0629-01 7/14/2016 1:00:00 PM Soil		
Compound			Result	Q	Result	Q	Result	Q	Result	Q
Manganese	2000	1600	406		134		336		NT	
Nickel	310	30	23.90		30.10		17		NT	
Potassium	~	~	954	В	1,120	В	1,250		NT	
Selenium	180	3.9	3.07		1.08		1.50		NT	
Silver	180	2	0.57	U	0.52	U	0.52	U	NT	
Sodium	~	~	208		1,390		243		NT	
Thallium	~	~	1.13	U	1.03	U	1.03	U	NT	
Vanadium	~	~	33		46.60		22.60		NT	
Zinc	10000	109	113		18.80		329		NT	
Mercury by 7473	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg			
Dilution Factor			1		1		1			
Mercury	0.81	0.18	0.16		0.031	U	0.11		NT	
Total Solids			%		%		%		%	
Dilution Factor			1		1		1		1	
% Solids	~	~	88.50		96.80		96.60		98.10	

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

NT=this indicates the analyte was not a target for this sample

~=this indicates that no regulatory limit has been established for this analyte

HydroEnvironmental Solutions, Inc.
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55 Buena Vista Avenue

Yonkers, New York NYSDEC BCP Site C360085

Summary of Remaining Soil Exceeding Restricted Residential SCOs

Sample ID	NYSDEC Part 375		SB-6 18-20	
York ID	Restricted Use Soil	NYSDEC Part 375	14G0689-35	
Sampling Date Client Matrix	Cleanup Objectives -	Unrestricted Use Soil Cleanup Objectives	7/16/2014 Soil	
Compound	Restricted Residential	Ciculiup Objectives	Result	Q
Volatile Organics, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg	Q
Dilution Factor			1	
1,1,1,2-Tetrachloroethane	~	~	0.0029	U
1,1,1-Trichloroethane	100	0.68	0.0029	U
1,1,2,2-Tetrachloroethane	~	~	0.0029	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	~	~	0.0029	U
1,1,2-Trichloroethane	~	~	0.0029	U
1,1-Dichloroethane	26	0.27	0.0029	U
1,1-Dichloroethylene	100	0.33	0.0029	U
1,2,4-Trichlorobenzene	~	~	0.0029	U
1,2,4-Trimethylbenzene 1,2-Dibromo-3-chloropropane	52 ~	3.6 ~	0.0029 0.0029	U
1,2-Dibromoethane	~	~	0.0029	U
1,2-Dichlorobenzene	100	1.1	0.0029	U
1,2-Dichloroethane	3.1	0.02	0.0029	U
1,2-Dichloropropane	~	~	0.0029	U
1,3,5-Trimethylbenzene	52	8.4	0.0029	U
1,3-Dichlorobenzene	49	2.4	0.0029	U
1,4-Dichlorobenzene	13	1.8	0.0029	U
1,4-Dioxane	13	0.1	0.057	U
2-Butanone	100	0.12	0.0029	U
2-Hexanone	~	~	0.0029	U
4-Methyl-2-pentanone	~	~	0.0029	U
Acetone	100	0.05	0.0069	JB
Acrolein	~	~	0.0029	U
Acrylonitrile Benzene	4.8	0.06	0.0029 0.0029	U
Bromodichloromethane	4.0 ~	0.06 ~	0.0029	U
Bromoform	~	~	0.0029	U
Bromomethane	~	~	0.0029	U
Carbon disulfide	~	~	0.0029	U
Carbon tetrachloride	2.4	0.76	0.0029	U
Chlorobenzene	100	1.1	0.0029	U
Chloroethane	~	~	0.0029	U
Chloroform	49	0.37	0.0029	U
Chloromethane	~	~	0.0029	U
cis-1,2-Dichloroethylene	100	0.25	0.0029	U
cis-1,3-Dichloropropylene	~	~	0.0029	U
Dibromochloromethane	~	~	0.0029	U
Dibromomethane	~	~	0.0029	U
Dichlorodifluoromethane	~		0.0029	U
Ethyl Benzene Hexachlorobutadiene	41 ~	1 ~	0.0029 0.0029	U
Isopropylbenzene	~	~	0.0029	U
Methyl acetate	~	~	0.0029	U
Methyl tert-butyl ether (MTBE)	100	0.93	0.0029	U
Methylene chloride	100	0.05	0.0029	U
n-Butylbenzene	100	12	0.0029	U
n-Propylbenzene	100	3.9	0.0029	U
o-Xylene	~	~	0.0029	U
p- & m- Xylenes	~	~	0.0057	U
p-Isopropyltoluene	~	~	0.0029	U
sec-Butylbenzene	100	11	0.0029	U
Styrene	~	~	0.0029	U
tert-Butyl alcohol (TBA)	~	~	0.0029	U
tert-Butylbenzene	100	5.9	0.0029	U
Tetrachloroethylene Teluono	19	1.3	0.0038	J ,,
Toluene trans-1,2-Dichloroethylene	100	0.7 0.19	0.0029 0.0029	U
trans-1,2-Dichloropetnylene trans-1,3-Dichloropropylene	100 ~	0.19 ~	0.0029	U
Trichloroethylene	21	0.47	0.0029	U
Trichlorofluoromethane	~	~	0.0029	U
Vinyl Chloride	0.9	0.02	0.0029	U
Xylenes, Total	100	0.26	0.0086	U
Semi-Volatiles, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg	
Dilution Factor			5	
1,1'-Biphenyl	~	~	0.23	U
1,2,4-Trichlorobenzene	~	~	0.23	U
1,2-Dichlorobenzene	100	1.1	0.23	U
1,2-Diphenylhydrazine (as Azobenzene)	~	~	0.23	U
1,3-Dichlorobenzene	49	2.4	0.23	U

55 Buena Vista Avenue

Yonkers, New York NYSDEC BCP Site C360085

Summary of Remaining Soil Exceeding Restricted Residential SCOs

Sample ID	NYSDEC Part 375		SB-6 18-20				
York ID	Restricted Use Soil	NYSDEC Part 375	14G0689-35 7/16/2014				
Sampling Date Client Matrix	Cleanup Objectives -	Unrestricted Use Soil Cleanup Objectives	7/16/2014 Soil				
Compound	Restricted Residential	Cleanup Objectives	Result	Q			
1,4-Dichlorobenzene	13	1.8	0.23	U			
2,4,5-Trichlorophenol	~	~	0.23	U			
2,4,6-Trichlorophenol	~	~	0.23	U			
2,4-Dichlorophenol	~	~	0.46	U			
2,4-Dimethylphenol	~	~	0.23	U			
2,4-Dinitrophenol	~	~	0.91	U			
2,4-Dinitrotoluene	~	~	0.46	U			
2,6-Dinitrotoluene	~	~	0.23	U			
2-Chloronaphthalene	~	~	0.23	U			
2-Chlorophenol	~	~	0.24	JD			
2-Methylnaphthalene			0.28	JD			
2-Methylphenol 2-Nitroaniline	100	0.33 ~	0.46 0.23	U			
z-Nitroaniine 2-Nitrophenol	~	~	0.23	U			
2-Ntrophenol 3- & 4-Methylphenols	~	~	0.25	U			
3,3'-Dichlorobenzidine	~	~	0.40	U			
3-Nitroaniline	~	~	0.46	U			
4,6-Dinitro-2-methylphenol	~	~	0.46	U			
4-Bromophenyl phenyl ether	~	~	0.23	U			
4-Chlorophenyl phenyl ether	~	~	0.23	U			
4-Nitroaniline	~	~	0.46	U			
4-Nitrophenol	~	~	0.46	U			
Acenaphthene	100	20	0.66	JD			
Acenaphthylene	100	100	0.42	JD			
Acetophenone	~	~	0.23	U			
Anthracene	100	100	1.88	D			
Atrazine	~	~	0.23	U			
Benzaldehyde	~	~	0.23	U			
Benzidine	~	~	0.91	U			
Benzo(a)anthracene	1	1	4	D			
Benzo(a)pyrene	1	1	2.23	D			
Benzo(b)fluoranthene	1	1	2.34	D			
Benzo(g,h,i)perylene	100	100	0.70	JD			
Benzo(k)fluoranthene	3.9	0.8	2.77	D			
Benzoic acid	~	~	0.62	U			
Benzyl butyl phthalate	~	~	0.23	U			
Bis(2-chloroethoxy)methane	~	~	0.23	U			
Bis(2-chloroethyl)ether	~	~	0.23	U			
Bis(2-chloroisopropyl)ether	~	~	0.23	U			
Bis(2-ethylhexyl)phthalate	~	~	0.33	JD			
Caprolactam	~	~	0.23	U			
Carbazole	~	~	1.08	D			
Chrysene	3.9	1	3.68	D			
Dibenzo(a,h)anthracene	0.33	0.33	0.23	U			
Dibenzofuran	59 ~	7	0.69	JD			
Diethyl phthalate	~	~ ~	0.23	U			
Dimethyl phthalate	~	~	0.23 0.23	U			
Di-n-butyl phthalate Di-n-octyl phthalate	~	~	0.23	_			
טו-ח-остуו pntnaiate Fluoranthene	100	100	0.23 7.35	U D			
Fluoranthene Fluorene	100	30	7.35 0.87	JD			
Hexachlorobenzene	1.2	0.33	0.87	U			
Hexachlorobenzene Hexachlorobutadiene	~	~	0.23	U			
Hexachlorocyclopentadiene	~	~	0.46	U			
Hexachloroethane	~	~	0.23	U			
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.79	JD			
Isophorone	~	~	0.23	U			
Naphthalene	100	12	0.70	JD			
Nitrobenzene	~	~	0.23	U			
N-Nitrosodimethylamine	~	~	0.46	U			
N-nitroso-di-n-propylamine	~	~	0.23	U			
N-Nitrosodiphenylamine	~	~	0.23	U			
Pentachlorophenol	6.7	0.8	0.46	U			
Phenanthrene	100	100	6.31	D			
Phenol	100	0.33	0.23	U			
Pyrene	100	100	7.18	D			
Herbicides, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg				
Dilution Factor			1	ĺ			
2,4,5-T	~	~	0.022	U			
2,4,5-TP (Silvex)	100	3.8	0.022	U			

55 Buena Vista Avenue Yonkers, New York

NYSDEC BCP Site C360085

Summary of Remaining Soil Exceeding Restricted Residential SCOs

Sample ID			SB-6 18-20	
York ID	NYSDEC Part 375	NYSDEC Part 375	14G0689-35	
Sampling Date	Restricted Use Soil	Unrestricted Use Soil	7/16/2014	
Client Matrix	Cleanup Objectives -	Cleanup Objectives	Soil	
Compound	Restricted Residential	. ,	Result	Q
2,4-D	~	~	0.022	U
Pesticides, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg	
Dilution Factor	1116/11/6	1116/116	5	
4,4'-DDD	13	0.0033	0.0018	U
4,4'-DDE	8.9	0.0033	0.0018	U
4,4'-DDT	7.9	0.0033	0.0018	U
Aldrin	0.097	0.005	0.0018	U
alpha-BHC	0.48	0.02	0.0018	U
alpha-Chlordane	4.2	0.094	0.0018	U
beta-BHC	0.36	0.034	0.0018	U
Chlordane, total	~	~	0.0072	U
delta-BHC	100	0.04	0.0072	U
Dieldrin	0.2	0.005	0.0018	U
Endosulfan I	24	2.4	0.0018	U
Endosulfan II	24	2.4	0.0018	U
Endosulfan sulfate	24	2.4	0.0018	U
Endrin	11	0.014	0.0018	U
Endrin aldehyde	~	~	0.0018	U
Endrin ketone	~	~	0.0018	U
gamma-BHC (Lindane)	1.3	0.1	0.0018	U
gamma-Chlordane	~	~	0.0018	U
Heptachlor	2.1	0.042	0.0018	U
Heptachlor epoxide	~	~	0.0018	U
Methoxychlor	~	~	0.0090	U
Toxaphene	~	~	0.091	U
Polychlorinated Biphenyls (PCB)	mg/Kg	mg/Kg	mg/Kg	J
Dilution Factor	6/8	6/8	1	
Aroclor 1016	~	~	0.019	U
Aroclor 1221	~	~	0.019	U
Aroclor 1232	~	~	0.019	U
Aroclor 1242	~	~	0.019	U
Aroclor 1248	~	~	0.019	U
Aroclor 1254	~	~	0.019	U
Aroclor 1260	~	~	0.019	U
Total PCBs	1	0.1	0.019	U
Metals, RCRA	mg/Kg	mg/Kg	mg/Kg	
Dilution Factor	0, 0	c, o	1	
Arsenic	16	13	2.98	
Barium	400	350	56.20	
Cadmium	4.3	2.5	0.33	U
Chromium	180	30	13.70	
Lead	400	63	128	
Selenium	180	3.9	2.27	
Silver	180	2	0.55	U
Mercury by 7473	mg/Kg	mg/Kg	mg/Kg	
Dilution Factor		6/6	1	
Mercury	0.81	0.18	0.033	U
Total Solids	0.01	0.10	%	
Dilution Factor			1	
% Solids	~	~	91.60	
NOTES:			51.00	

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

NT=this indicates the analyte was not a target for this sample

 \sim =this indicates that no regulatory limit has been established for this analyte

TABLE 3 55 Buena Vista Avenue Yonkers, New York NYSDEC BCP Site C360085

Summary of Post-Remediation Soil Vapor Sampling

Sample ID	SV-1		SV-2		SV-3		SV-4		SV-5		SV-6		SV-7		SV-8		SV-9	
York ID	16C0249-01		16C0249-02		16C0249-03		16C0249-04		16C0249-05		16C0249-06		16C0249-07		16C0249-08		16C0249-09	
Sampling Date	3/4/2016		3/4/2016		3/4/2016		3/4/2016		3/4/2016		3/4/2016		3/4/2016		3/4/2016		3/4/2016	
Client Matrix	Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organics, EPA TO15 Full List	ug/m3	Ų	ug/m3	Ų	ug/m3	Q	ug/m3	Q	ug/m3	Ų	ug/m3	Q	ug/m3	Q	ug/m3	<u> </u>	ug/m3	Q
Dilution Factor	33.72		35.12		37.06		20.16		35		37.06		36.26		36.8		35.62	
1,1,1,2-Tetrachloroethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,1,1-Trichloroethane	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,1,2,2-Tetrachloroethane	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,1,2-Trichloroethane	ND	U	ND	U	ND	U	ND	U	ND ND	U	ND ND	U	ND ND	U	ND	U	ND	U
1,1-Dichloroethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND ND	U	ND	U	ND	U	ND	U
1,1-Dichloroethylene	ND	U	ND	U	ND	U	ND	U	ND ND	U	ND	U	ND	U	ND	U	ND	U
1,2,4-Trichlorobenzene	ND	U	ND	U	ND	U	ND	U	ND ND	U	ND	U	ND	U	ND	U	ND	U
1,2,4-Trichioroberizene 1,2,4-Trimethylbenzene	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,2-Dibromoethane	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,2-Dioromoetriane 1,2-Dichlorobenzene	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,2-Dichlorobenzene 1,2-Dichloroethane	ND ND	U	ND ND	U	ND ND	U	ND ND	IJ	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,2-Dichloropropane	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,2-Dichlorotetrafluoroethane	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,3,5-Trimethylbenzene	ND ND	U	ND ND	U	ND ND	U	ND ND	IJ	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,3-Butadiene	ND ND	U	ND ND	U	ND ND	U		U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,3-Butaulerie 1,3-Dichlorobenzene	ND ND	U	ND ND	U	ND ND	U	ND ND	IJ	ND ND	U	ND ND	U	ND ND	U	ND ND		ND ND	U
1,3-Dichloropropane	ND ND	U	ND ND	U	ND ND	U	ND ND	IJ	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,4-Dichlorobenzene	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1,4-Dictiloroberizerie 1,4-Dioxane	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND		ND ND	U
2-Butanone	13	D	ND 11	D	17	D	17	D	17	D	11	D	14	D	11	U D	ND 17	D
2-Butanone 2-Hexanone	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
3-Chloropropene		U		U		U		U		U	ND ND	U		U				U
· ·	ND		ND		ND	U	ND ND	U	ND ND				ND	U	ND	U	ND	
4-Methyl-2-pentanone Acetone	ND ND	U D	ND ND	U D	ND ND	D	2,200	D	ND ND	U D	ND ND	U D	ND ND	D	ND ND	U D	ND ND	U DE
Accylonitrile	ND ND	U		U	ND ND	U		U		U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
1 '	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U		U	ND ND	U
Benzene Benzyl chloride	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
Bromodichloromethane	ND ND	U	ND ND		ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND		ND ND	U
Bromoform	ND ND	U	ND ND	U	ND ND	U	ND ND	IJ	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
Bromomethane	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
Carbon disulfide	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
Carbon disdiffde Carbon tetrachloride	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
Chlorobenzene	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
Chloroethane	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
Chloroform		U		U		U		U	69		ND ND	U		U				
Chloromethane	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND	D U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
cis-1,2-Dichloroethylene		U												U			ND ND	
	ND ND		ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND		ND ND	U		U
cis-1,3-Dichloropropylene Cyclohexane	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
Dibromochloromethane	ND ND	U		U	ND ND		ND ND	U	ND ND			U	ND ND	U		U	ND ND	U
		_	ND ND		ND ND	U	ND ND		ND ND	U	ND ND	_	ND ND		ND ND	U		U
Dichlorodifluoromethane	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
Ethyl Bonzone	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
Ethyl Benzene	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U	ND ND	U
Hexachlorobutadiene	ND	U	ND	U	ND ND	U	ND	U	ND ND	U	ND	U	ND	U	ND	U	ND	U
Isopropanol	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U

55 Buena Vista Avenue

Yonkers, New York

NYSDEC BCP Site C360085

Summary of Post-Remediation Soil Vapor Sampling

Sample ID	SV-1		SV-2		SV-3		SV-4		SV-5		SV-6		SV-7		SV-8		SV-9	
York ID	16C0249-01		16C0249-02		16C0249-03		16C0249-04		16C0249-05		16C0249-06		16C0249-07		16C0249-08		16C0249-09	9
Sampling Date	3/4/2016		3/4/2016		3/4/2016		3/4/2016		3/4/2016		3/4/2016		3/4/2016		3/4/2016		3/4/2016	
Client Matrix	Soil Vapor																	
Compound	Result	Q																
Methyl Methacrylate	ND	U																
Methyl tert-butyl ether (MTBE)	ND	U																
Methylene chloride	ND	U																
n-Heptane	ND	U																
n-Hexane	ND	U																
o-Xylene	ND	U																
p- & m- Xylenes	ND	U																
p-Ethyltoluene	ND	U																
Propylene	68	D	100	D	73	D	34	D	79	D	67	D	72	D	70	D	83	D
Styrene	ND	U																
Tetrachloroethylene	ND	U	32	D	110	D	ND	U	32	D	150	D	ND	U	ND	U	ND	U
Tetrahydrofuran	ND	U																
Toluene	ND	U																
trans-1,2-Dichloroethylene	ND	U																
trans-1,3-Dichloropropylene	ND	U																
Trichloroethylene	ND	U																
Trichlorofluoromethane (Freon 11)	ND	U																
Vinyl acetate	ND	U																
Vinyl bromide	ND	U																
Vinyl Chloride	ND	U																

NOTES:

Result Detected =

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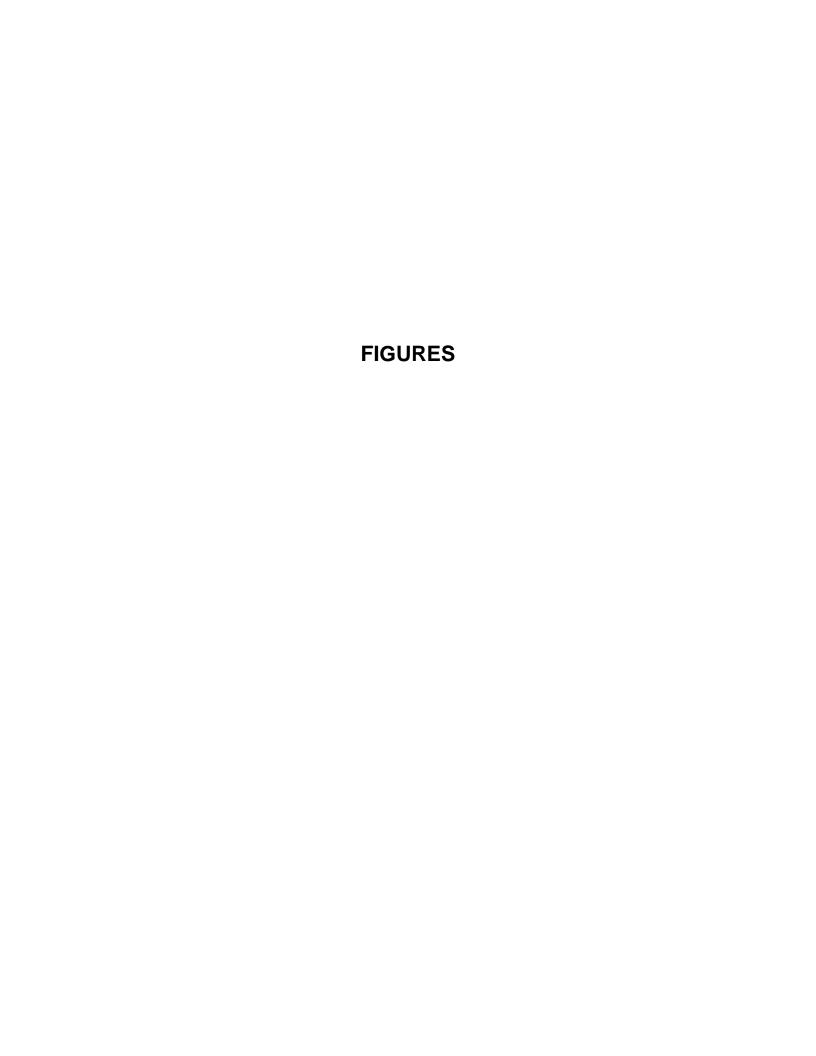
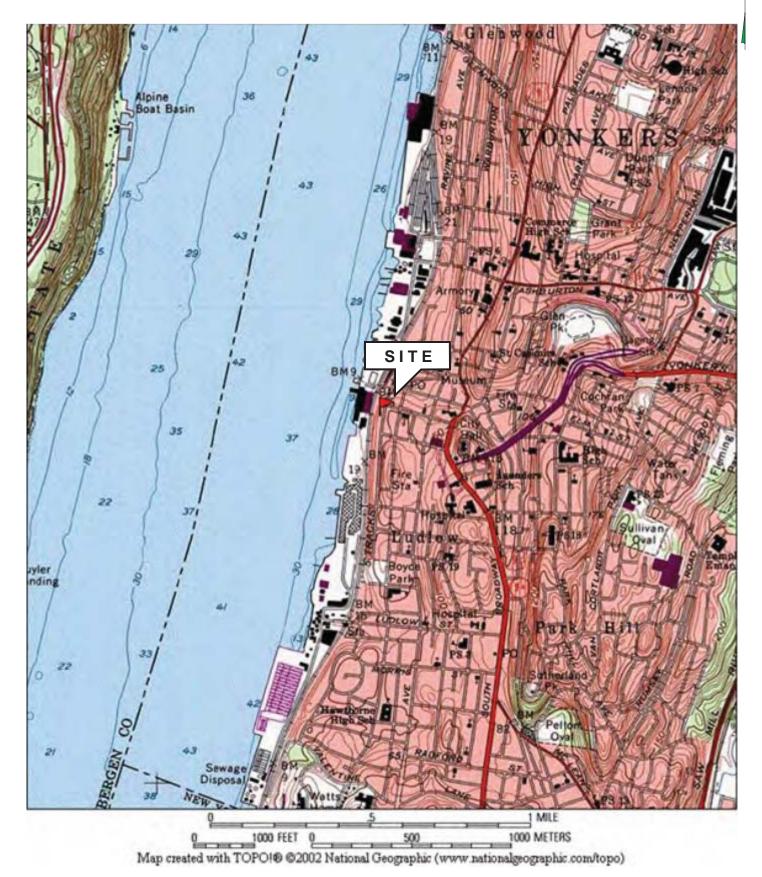
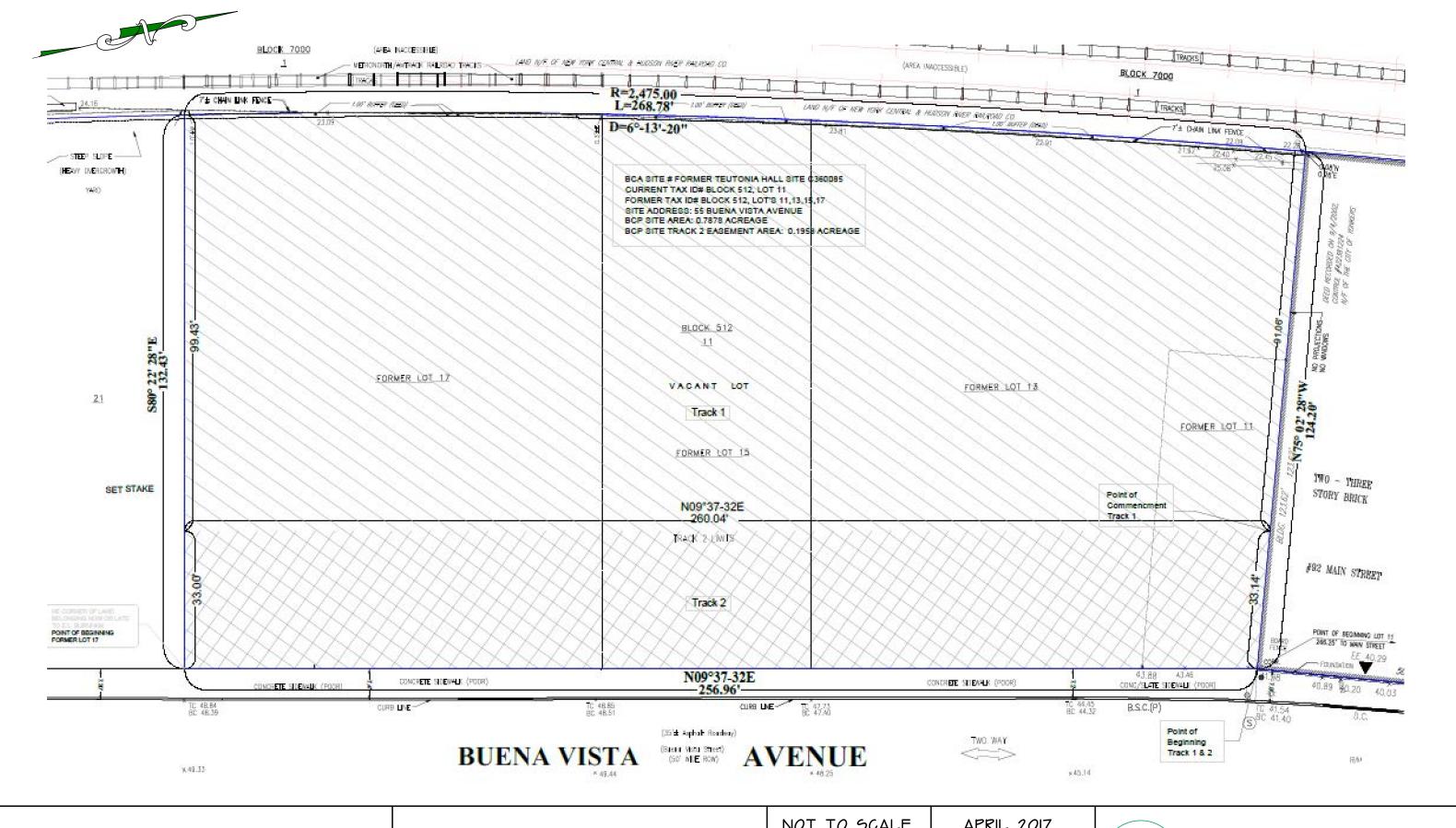


FIGURE 1 SITE LOCATION MAP

55 BUENA VISTA AVENUE YONKERS, NEW YORK







55 BUENA VISTA AVENUE YONKERS, NEW YORK

SITE PLAN SHOWING TRACK I & TRACK 2 AREAS NOT TO SCALE

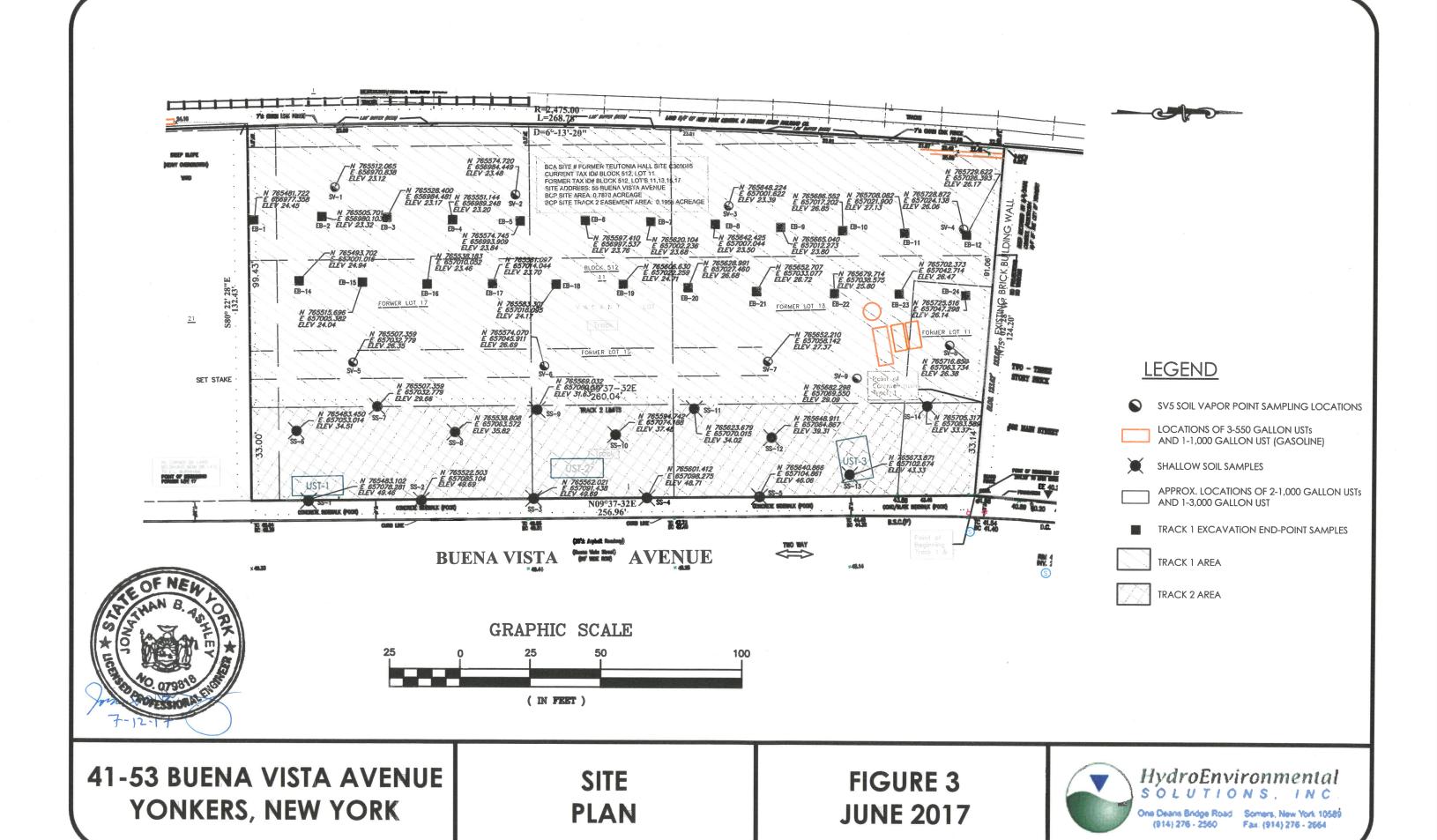
APRIL 2017

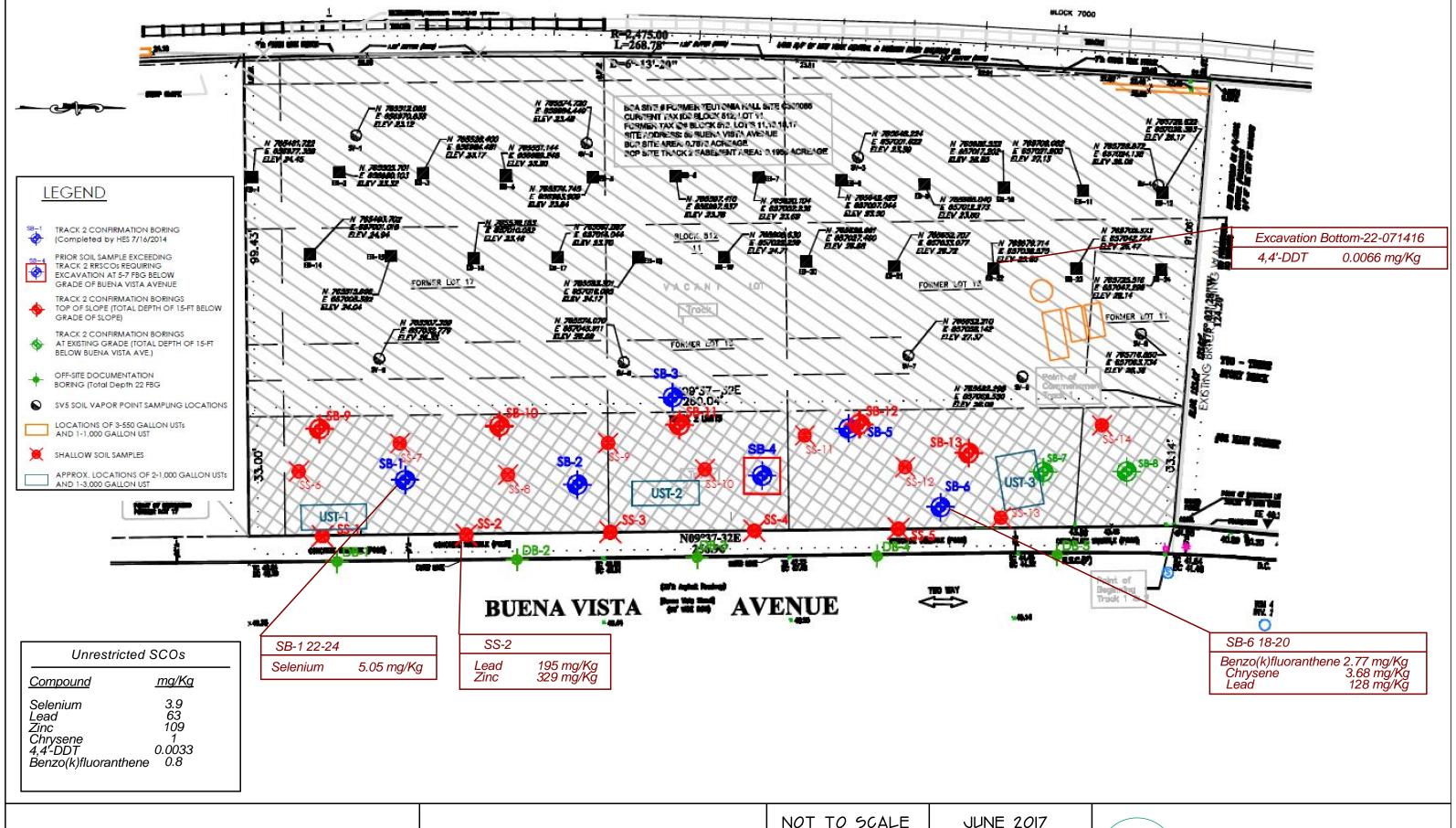
FIGURE 2



HydroEnvironmental solutions, inc.

One Deans Bridge Road Somers, New York 10589





55 BUENA VISTA AVENUE YONKERS, NEW YORK

REMAINING SOIL ABOVE UNRESTRICTED SCOS

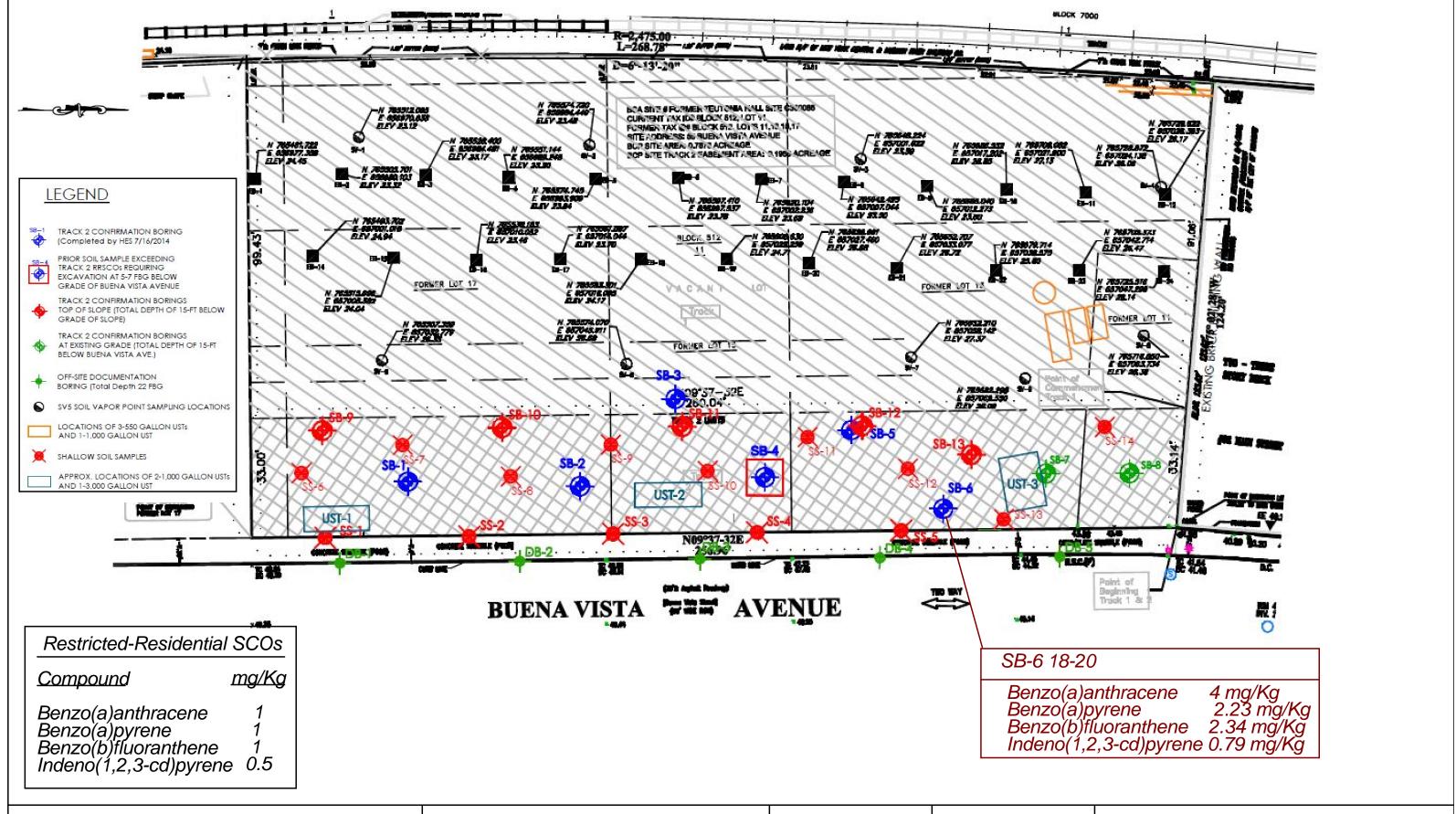
JUNE 2017

FIGURE 4



HydroEnvironmental SOLUTIONS, INC

One Deans Bridge Road Somers, New York 10589



55 BUENA VISTA AVENUE YONKERS, NEW YORK REMAINING SOIL ABOVE RESTRICTED RESIDENTIAL SCOS NOT TO SCALE

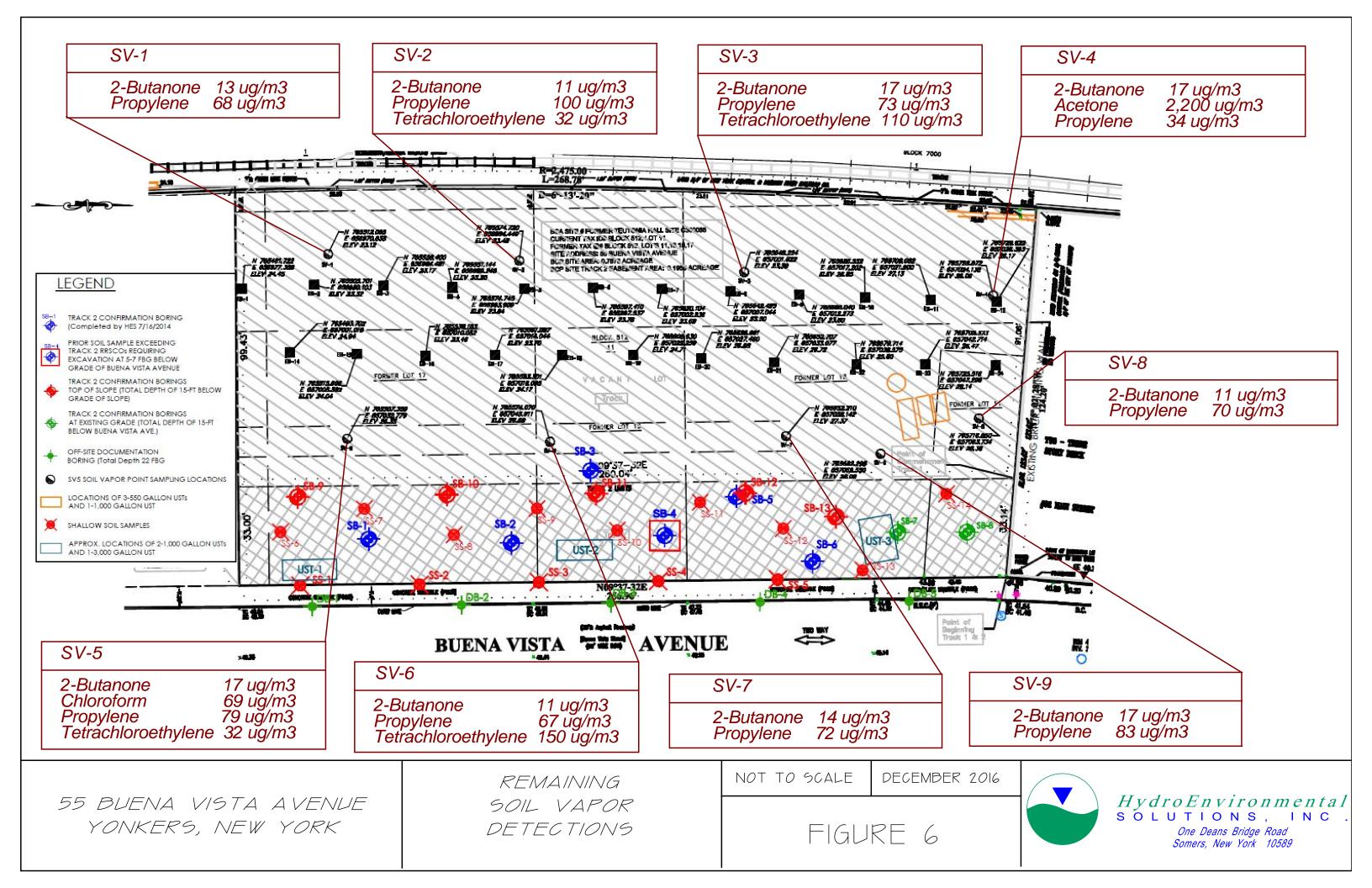
APRIL 2017

FIGURE 5



HydroEnvironmental solutions, inc.

One Deans Bridge Road Somers, New York 10589





APPENDIX A:

Environmental Easements

The Office of the Westchester County Clerk: This page is part of the instrument; the County Clerk will rely on the information provided on this page for purposes of indexing this instrument. To the best of submitter's knowledge, the information contained on this Recording and Endorsement Cover Page is consistent with the information contained in the attached document



563193526EAS0034

Westchester County Recording & Endorsement Page Submitter Information Main Street Title Agency, Inc. 201-457-3460 Phone: Name: Address 1: 190 Main Street Fax: 201-457-7405 Address 2: Suite 306 Email: jcallirgos@mainsttitle.com City/State/Zip: Hackensack NJ 07601 Reference for Submitter: Teutonia **Document Details** Control Number: 563193526 Document Type: Easement (EAS) Package ID: 2016111400262001001 Document Page Count: 10 Total Page Count: 11 **Parties** Additional Parties on Continuation page 1st PARTY 2nd PARTY 1: - Other 1: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL C - Other TEUTONIA BUENA VISTA LLC 2: 2: NEW YORK STATE OF **Property** Additional Properties on Continuation page Street Address: 55 BUENA VISTA AVENUE Tax Designation: 1-512-11 City/Town: YONKERS Village: Additional Cross-Refs on Continuation page **Cross-References** 2: 4: 1: **Supporting Documents** 1: TP-584 **Recording Fees Mortgage Taxes** Document Date: \$40.00 Statutory Recording Fee: Mortgage Amount: \$55.00 Page Fee: Cross-Reference Fee: \$0.00 Basic: \$0.00 Mortgage Affidavit Filing Fee: \$0.00 Westchester: \$0.00 RP-5217 Filing Fee: \$0.00 Additional: \$0.00 TP-584 Filing Fee: \$5.00 MTA: \$0.00 Total Recording Fees Paid: \$100.00 \$0.00 Special: Transfer Taxes \$0.00 Yonkers: Consideration: \$0.00 Total Mortgage Tax: \$0.00 Transfer Tax: \$0.00 Exempt: \square Mansion Tax: Dwelling Type: \$0.00 Serial #: Transfer Tax Number: 7427 **Record and Return To** RECORDED IN THE OFFICE OF THE WESTCHESTER COUNTY CLERK ☐ Pick-up at County Clerk's office Recorded: 12/30/2016 at 10:08 AM Control Number: **563193526** Witness my hand and official seal MAIN STREET TITLE AGENCY, INC. 190 MAIN STREET **SUITE 305** Timothy C.Idoni HACKENSACK, NJ 07601 Westchester County Clerk Attn: ATTN: NY POLICY DEPT. (SP1078)

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 55 Buena Vista Avenue in the City of Yonkers, County of Westchester and State of New York, known and designated on the tax map of the County Clerk of Westchester as tax map parcel numbers: Block 512 Lot 11, being a portion of the property conveyed to Grantor by deeds dated June 12, 2009 and December 28, 2012 and recorded in the Westchester County Clerk's Office as Control #'s 492010752 and 523623640, respectively. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.5920 +/- acres, and is hereinafter more fully described in the Land Title Survey dated July 24, 2015 prepared by Patrick Benedict Jones, NYSLLS of New York City Land Surveyors, P.C., which will be attached to the Site Management Plan. The Controlled Property description, identified as the Conditional Track 1 portion of the Site, is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the

protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: A3-0529-1005 as amended October 7, 2015, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

- 1. <u>Purposes</u>. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.
- 2. <u>Institutional and Engineering Controls</u>. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.
 - A. (1) The Controlled Property may be used for:

Residential as described in 6 NYCRR Part 375-1.8(g)(2)(i), Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

- (2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);
- (3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;
- (4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Westchester County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;
- (5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

- (6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;
- (7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;
- (8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;
- (9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;
- (10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.
- B. The Controlled Property shall not be used for raising livestock or producing animal products for human consumption, and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.
- C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

- D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.
- E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

- F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.
- G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:
- (1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).
 - (2) the institutional controls and/or engineering controls employed at such site:
 - (i) are in-place;
- (ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and
- (iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;
- (3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;
- (4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;
- (5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;
- (6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and
 - (7) the information presented is accurate and complete.
- 3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.
- 4. <u>Reserved Grantor's Rights</u>. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:
- A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

- A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.
- B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.
- C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.
- D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.
- 6. <u>Notice</u>. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: C360085

Office of General Counsel NYSDEC

625 Broadway

Albany New York 12233-5500

With a copy to:

Site Control Section

Division of Environmental Remediation

NYSDEC 625 Broadway

Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

- 7. <u>Recordation</u>. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.
- 8. <u>Amendment</u>. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.
- 9. <u>Extinguishment.</u> This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.
- 10. <u>Joint Obligation</u>. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

Remainder of Page Intentionally Left Blank

County: Westchester Site No: C360085 Brownfield Cleanup Agreement Index: A3-0529-1005 as amended October 7, 2015

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Grantor's Acknowledgment

STATE OF NEW YORK) ss:

Notary Public - State of New York

MELISSA MARIE SLAUGHTER
NOTARY PUBLIC, State of New York
Registration No. 02SL6335805
Qualified in Monroe County
My Commission Expires January 19, 2020





County: Westchester Site No: C360085 Brownfield Cleanup Agreement Index: A3-0529-1005 as amended October 7, 2015

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of

Environmental Conservation as Designee of the Commissioner,

By:

Robert W. Schick, Director

Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)) ss: COUNTY OF ALBANY)

On the day of North, in the year 2016, before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Notary ublic state of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County)

Qualified in Schenectady County, Commission Expires August 22, 20 10





County: Westchester Site No: C360085 Brownfield Cleanup Agreement Index: A3-0529-1005 as amended October 7, 2015

SCHEDULE "A" PROPERTY DESCRIPTION

CONDITIONAL TRACK 1 LEGAL DESCRIPTION

Commencing at a point along the southerly lot line of Lot 1 in Block 512, and a distance of 33.00 feet westerly from the Point of Beginning. Point of beginning being a point along the westerly side of Buena Vista Avenue distant 266.25 feet southerly from the corner formed by the intersection of the said westerly line of Buena Vista Avenue with the southerly line of Main Street;

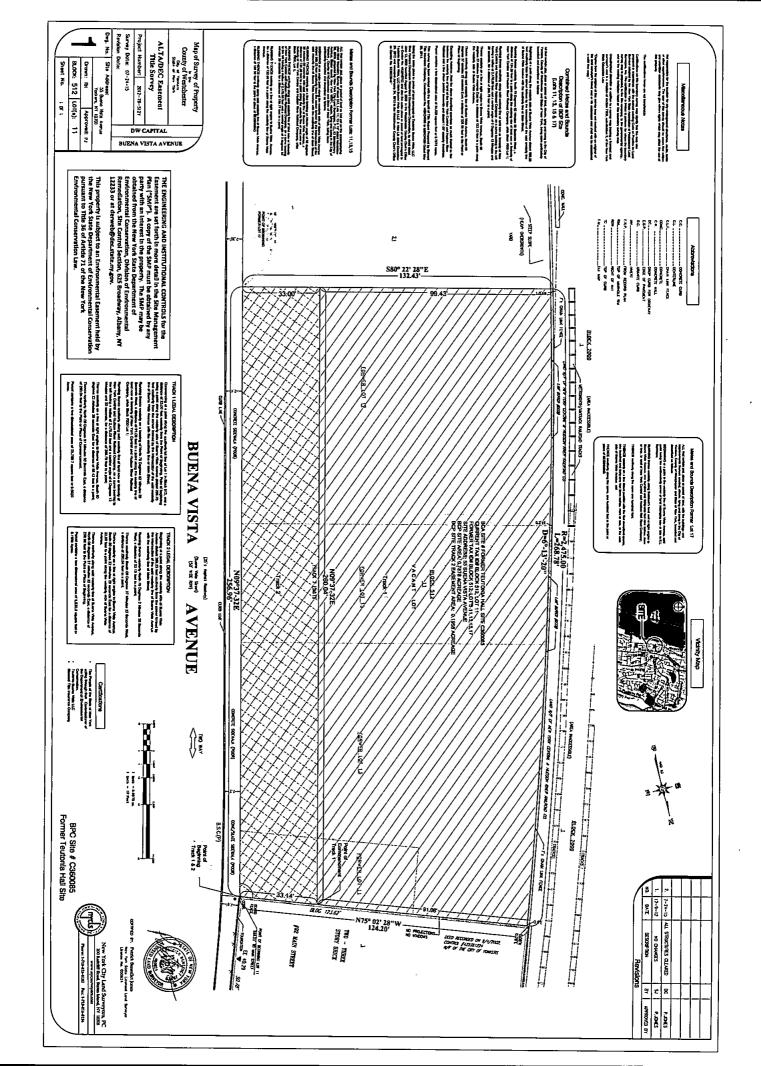
Running thence westerly on a bearing of North 75 Degrees 02 Minutes 28 Seconds West, a distance of 91.06 feet to a point along the easterly line of land now or formerly of New York Central and Hudson River Railroad Company, a/k/a Block 7000 Lot 1;

Running thence southerly along said easterly line of land now or formerly of New York Central and Hudson River Railroad Company, on a curve bearing to the left having a radius of 2,475.00 feet and a central angle of 6 degrees 13 Minutes and 20 seconds, for a distance of 268.78 feet to a point;

Thence easterly on a line at right angles to Buena Vista Avenue, South 80 degrees 22 minutes 28 seconds East for a distance of 99.43 feet to a point;

Thence northerly North 09 Degrees 37 Minutes 32 Seconds East, a distance of 260.04 feet to the Point or Place of Commencement.

Parcel contains a two dimensional area of 25,789.7 square feet or 0.5920 Acres.



The Office of the Westchester County Clerk: This page is part of the instrument; the County Clerk will rely on the information provided on this page for purposes of indexing this instrument. To the best of submitter's knowledge, the information contained on this Recording and Endorsement Cover Page is consistent with the information contained in the attached document.



553233255EAS001X

	Westchester County Recording & Endorsement Page												
		Submitter	Infor	mation									
Name:	Main Street Title Agency, Inc.			Phone:		201-457-3460							
Address 1:	190 Main Street			Fax:		201-457-7405							
Address 2:	Suite 306			Email:		jcallirgos@mair	nsttitle.com						
City/State/Zip:	Hackensack NJ 07601			Reference for Su	ıhmitter:		iottitic.00111						
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2: BUENA VIST	A 53 LLC	- Other	2:										
		Prop	-		L	Additional Prop	erties on Continuation page						
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City/Town:	YONKERS		_	Village:	,								
		Cross- Re	efere	nces		Additional Cros	s-Refs on Continuation page						
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1: TP-584													
	Recording Fees				Mortg	age Taxes							
Statutory Record	ling Fee:	\$40.00	Do	cument Date:									
Page Fee:		\$50.00	Мо	rtgage Amount:									
Cross-Reference	Fee:	\$0.00											
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Transfer Tax:	\$0.00						_						
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The Office of the Westchester County Clerk: This page is part of the instrument; the County Clerk will rely on the information provided on this page for purposes of indexing this instrument. To the best of submitter's knowledge, the information contained on this Recording and Endorsement Cover Page is consistent with the information contained in the attached document.

553233255EAS001X

Westchester County Recording & Endorsement Page

Document Details

Control Number: 553233255

Document Type: Easement (EAS)

Package ID:

2015111900108001001

Document Page Count: 9

Total Page Count: 11

1st PARTY Addendum

2nd PARTY Addendum

WOLF ERIC E

Individual

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this day of November, 2015, between Owner(s) Teutonia Buena Vista, LLC, having an office at 225 North Route 303, Suite 101, Congers, New York, County of Rockland, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 55 Buena Vista Avenue (a/k/a 41-59 Buena Vista Avenue) in the City of Yonkers, County of Westchester and State of New York, known and designated on the tax map of the County Clerk of Westchester as tax map parcel numbers: Block 512 Lot 11, being a portion of the property conveyed to Grantor by deeds dated June 12, 2009 and December 28, 2012 and recorded in the Westchester County Clerk's Office as Control #'s 492010752 and 523623640, respectively. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.1958 +/- acres, and is hereinafter more fully described in the Land Title Survey dated July 24, 2015 prepared by Patrick Benedict Jones, NYSLLS of New York City Land Surveyors, PC, which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the

protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: A3-0529-1105 as amended October 7, 2015, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

- 1. <u>Purposes</u>. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.
- 2. <u>Institutional and Engineering Controls</u>. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.
 - A. (1) The Controlled Property may be used for:

Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

- (2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);
- (3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;
- (4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Westchester County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;
- (5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;
 - (6) Data and information pertinent to Site Management of the Controlled

Property must be reported at the frequency and in a manner defined in the SMP;

- (7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;
- (8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;
- (9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP:
- (10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.
- B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.
- C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

- D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.
- E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held

by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

- F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.
- G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:
- (1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).
 - (2) the institutional controls and/or engineering controls employed at such site:
 - (i) are in-place;
- (ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and
- (iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;
- (3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;
- (4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;
- (5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;
- (6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and
 - (7) the information presented is accurate and complete.
- 3. <u>Right to Enter and Inspect</u>. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.
- 4. <u>Reserved Grantor's Rights</u>. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:
- A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;
- B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

- A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.
- B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.
- C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.
- D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.
- 6. <u>Notice</u>. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: C360085

Office of General Counsel

NYSDEC 625 Broadway

Albany New York 12233-5500

With a copy to:

Site Control Section

Division of Environmental Remediation

NYSDEC 625 Broadway Albany, NY 12233 All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

- 7. <u>Recordation</u>. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.
- 8. <u>Amendment</u>. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.
- 9. <u>Extinguishment.</u> This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.
- 10. <u>Joint Obligation</u>. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

Remainder of Page Intentionally Left Blank

County: Westchester Site No: C360085 Brownfield Cleanup Agreement Index : Λ3-0529-1105 as amended October 7, 2015

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Teutonia Buena Vista, LLC:
By: W
Print Name: ERIC E. Wolf
Title: AS MEMBER Date: 10.13-15
Grantor's Acknowledgment
STATE OF NEW YORK)) ss: COUNTY OF)
On the day of day of personally appeared day of personally appeared day of personally appeared day of personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon benalfiebushe individual(s) acted, executed the instrument. Notary Public, State of New York No. 01RO6243316 Qualified in Bronx County Notary Public - State of New York Notary Public - State of New York
Gba Crenfeld

County: Westchester Site No: C360085 Brownfield Cleanup Agreement Index : A3-0529-1105 as amended October 7, 2015

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By:

Robert W. Schick, Director

Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
COLDIEN OF ALDANN) ss
COUNTY OF ALBANY)

On the day of Neventer, in the year 2015, before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 20

SCHEDULE "A" PROPERTY DESCRIPTION

TRACK 2 LEGAL DESCRIPTION

All that certain plot, piece or parcel of land, situate, lying and being in the City of Yonkers, County of Westchester and State of New York, being more particularly bounded and described as follows:

Beginning at a point along the westerly side of Buena Vista Avenue distant 266.25 feet southerly from the corner formed by the intersection of the said westerly line of Buena Vista Avenue with the southerly line of Main Street;

Running thence westerly North 75 Degrees 2 Minutes 28 Seconds West, a distance of 33.14 feet to a point;

Thence southerly South 09 Degrees 37 Minutes 32 Seconds West a distance of 260.04 feet to a point;

Thence easterly on a line at right angles to Buena Vista Avenue, South 80 Degrees 22 Minutes 28 Seconds East for a distance of 33.00 feet to a point along the westerly side of Buena Vista Avenue;

Thence northerly along said westerly line of Buena Vista Avenue North 09 Degrees 37 Minutes 32 Seconds East, a distance of 256.96 feet to the Point or Place of Beginning.

Said property being a portion of Block 512, Lot 11 (formerly Lots 11, 13, 15 and 17).

Parcel contains a two dimensional area of 8,530.3 square feet or 0.1958 acres.

Recording office time stamp

Combined Real Estate Transfer Tax Return, Credit Line Mortgage Certificate, and Certification of Exemption from the Payment of Estimated Personal Income Tax

Р	R	E	F
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See Form TP-584-I, Ins	tructions for Form T	P-584, before completing t	his form. Print or type	9.		
Schedule A — Inform Grantor/Transferor	r	· · · · · · · · · · · · · · · · · · ·				
Individual	Name (if individual: last, first, middle initial) (check if more than one grantor) TEUTONIA BUENA VISTA LLC Social security number					
☐ Corporation ☐ Partnership	Mailing address 225 NORTH ROUTE	33 SUITE 101			Social security number	
Estate/Trust	City CONGERS	State NY	1	ZIP code 10920	Federal EIN 20-8175624	
Single member LLC				10920		
⊠ Other	Single member's name if grantor is a single member LLC (see instructions) Single member EIN or SSN					
Grantee/Transferee		Name (if individual: last, first, middle initial) (check if more than one grantee) THE PEOPLE OF THE STATE OF NEW YORK THROUGH THE NYSDEC				
Individual		IE STATE OF NEW YORK TH	ROUGH THE NYSDEC			
Corporation	Mailing address 625 BROADWAY, 14	TH FLOOR			Social security number	
Partnership	City	State		ZIP code	Endows Elbi	
☐ Estate/Trust☐ Single member LLC	ALBANY	NY		12233	Federal EIN 14-6013200	
✓ Other		e if grantee is a single membe	r I I C (occ instructions)		Single member EIN or SSN	
☑ Other	Cingle member 3 num	c ii diantee is a single membe	LLC (see instructions)		Suidie member FIM of 22M	
Location and description	n of property convey	red		<u></u>		
Tax map designation – Section, block & lot (include dots and dashes)	SWIS code (six digits)	Street address		City, town, or villa	ge County	
1-512-11	551800	53-55 BUENA VISTA AVEN	NUE	YONKERS	Westchester	
- 7						
§ 11			,	1		
Type of property convey	ed (check applicable b	l vovi				
- Box		ri .	5	_		
1 U One- to three-fami 2 Residential cooper		Commercial/Industrial	Date of conveyar		entage of real property	
3 Residential condo		☐ Apartment building☐ Office building	11 6	ZU15	eyed which is residential	
month day year			property 0 %			
- Tacant land		E Other English			(see instructions)	
Condition of conveyance a. Conveyance of fee		f. Conveyance which of mere change of iden	tity or form of	I. Option assignr	ment or surrender	
b. Acquisition of a cont		ownership or organiz Form TP-584.1, Schedu		n. 🔲 Leasehold ass	ignment or surrender	
percentage acquired		g. Conveyance for which previously paid will be	ch credit for tax	n. 🔲 Leasehold grai	nt	
c. Transfer of a contro	olling interest (state	Form TP-584.1, Schedi	ule G)	o. 🗖 Conveyance of	f an easement	
percentage transferred%) h. Conveyance of cooperative apartment(s) p. Conveyance for which exemption						
d. Conveyance to coo	operative housing	i. Syndication	•	from transfer to Schedule B, Pa	ax claimed (complete	
e. Conveyance pursu	ant to or in lieu of	j. Conveyance of air rig development rights	ghts or c	q. Conveyance of and partly outs	f property partly within side the state	
foreclosure or enfor interest (attach Form	rcement of security	k. Contract assignment		• •	rsuant to divorce or separation	
For recording officer's use	Amount received		Date received		ansaction number	
38%	Schedule B., Part	1 \$				
19.7	Schedule B., Part					

Part I - Computation of tax due

Schedule B - Real estate transfer tax return (Tax Law, Article 31)

1 Enter amount of consideration for the conveyance (if you are claiming a total exemption from tax, check the

2 Continuing lien deduction (see instructions if property is taken subject to mortgage or lien)

3 Taxable consideration (subtract line 2 from line 1)

4 Tax: \$2 for each \$500, or fractional part thereof, of consideration on line 3

5 Amount of credit claimed for tax previously paid (see instructions and attach Form TP-584.1, Schedule G)

6 Total tax due* (subtract line 5 from line 4)

Part II - Computation of additional tax due on the conveyance of residential real property for \$1 million or more

0.00

0.00

0.00

0.00

0.00

0.00

2.

4.

		1 Enter amount of consideration for conveyance (from Part I, line 1)		
		2 Taxable consideration (multiply line 1 by the percentage of the premises which is residential real property, as shown in Schedule A) 2.		
		3 Total additional transfer tax due* (multiply line 2 by 1% (.01))		~~~~~~
		3.		
	Р	art III – Explanation of exemption claimed on Part I, line 1 (check any boxes that apply)		
	TI	the conveyance of real property is exempt from the real estate transfer tax for the following reason:		
	a.	Conveyance is to the United Nations, the United States of America, the state of New York, or any of their instrumentalities,		
		agencies, or political subdivisions (or any public corporation, including a public corporation created pursuant to agreement or		
		compact with another state or Canada)	а	×
	_	Company to the second of the s		
	D.	Conveyance is to secure a debt or other obligation	b	Ш
	_	Conveyance is without additional and the state of		
	U.	Conveyance is without additional consideration to confirm, correct, modify, or supplement a prior conveyance	С	Ш
က	а	Convoyance of real property is without associate at the second se		
ĕ	u.	Conveyance of real property is without consideration and not in connection with a sale, including conveyances conveying		
553233255-003		realty as bona fide gifts	d	Ш
ဗ္ဗ	_	Conveyance is given in connection with a tax and		$\overline{}$
32	С.	Conveyance is given in connection with a tax sale	е	
55				
	f.	Conveyance is a mere change of identity or form of ownership or organization where there is no change in beneficial		
		ownership. (This exemption cannot be claimed for a conveyance to a cooperative housing corporation of real property		
		comprising the cooperative dwelling or dwellings.) Attach Form TP-584.1, Schedule F	f	LJ
	_			
	g.	Conveyance consists of deed of partition	g	Ш
	n.	Conveyance is given pursuant to the federal Bankruptcy Act	h	
	;	Conveyence consists of the survey through the state of the survey through the survey thro		
	1.	Conveyance consists of the execution of a contract to sell real property, without the use or occupancy of such property, or		
		the granting of an option to purchase real property, without the use or occupancy of such property	İ	Ш
		Conveyence of an autien as a state of the st		
	J.	Conveyance of an option or contract to purchase real property with the use or occupancy of such property where the		
		consideration is less than \$200,000 and such property was used solely by the grantor as the grantor's personal residence		
		and consists of a one-, two-, or three-family house, an individual residential condominium unit, or the sale of stock		
		in a cooperative housing corporation in connection with the grant or transfer of a proprietary leasehold covering an		

*The total tax (from Part I, line 6 and Part II, line 3 above) is due within 15 days from the date conveyance. Please make check(s) payable to the county clerk where the recording is to take place. If the recording is to take place in New York City, make check(s) payable to the **NYC Department of Finance.** If a recording is not required, send this return and your check(s) made payable to the **NYS Department of Taxation and Finance**, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-5045.

supporting such claim) k

k. Conveyance is not a conveyance within the meaning of Tax Law, Article 31, section 1401(e) (attach documents

Schedule C — Credit Line Mortgage Certificate (Tax Law, Article 11)
Complete the following only if the interest being transferred is a fee simple interest. Certify that: (check the appropriate box)
1. The real property being sold or transferred is not subject to an outstanding credit line mortgage.
2. The real property being sold or transferred is subject to an outstanding credit line mortgage. However, an exemption from the tax is claimed for the following reason:
The transfer of real property is a transfer of a fee simple interest to a person or persons who held a fee simple interest in the real property (whether as a joint tenant, a tenant in common or otherwise) immediately before the transfer.
The transfer of real property is (A) to a person or persons related by blood, marriage or adoption to the original obligor or to one or more of the original obligors or (B) to a person or entity where 50% or more of the beneficial interest in such real property after the transfer is held by the transferor or such related person or persons (as in the case of a transfer to a trustee for the benefit of a minor or the transfer to a trust for the benefit of the transferor).
The transfer of real property is a transfer to a trustee in bankruptcy, a receiver, assignee, or other officer of a court.
The maximum principal amount secured by the credit line mortgage is \$3,000,000 or more, and the real property being sold or transferred is not principally improved nor will it be improved by a one- to six-family owner-occupied residence or dwelling.
Please note: for purposes of determining whether the maximum principal amount secured is \$3,000,000 or more as described above, the amounts secured by two or more credit line mortgages may be aggregated under certain circumstances. See TSB-M-96(6)-R for more information regarding these aggregation requirements.
Other (attach detailed explanation).
The real property being transferred is presently subject to an outstanding credit line mortgage. However, no tax is due for the following reason:
A certificate of discharge of the credit line mortgage is being offered at the time of recording the deed.
A check has been drawn payable for transmission to the credit line mortgagee or his agent for the balance due, and a satisfaction of such mortgage will be recorded as soon as it is available.
The real property being transferred is subject to an outstanding credit line mortgage recorded in
ignature (both the grantor(s) and grantee(s) must sign)
he undersigned certify that the above information contained in schedules A, B, and C, including any return, certification, schedule, or
tachment, is to the best of his/her knowledge, true and complete, and authorize the person(s) submitting such form on their behalf to ceive a copy for purposes of recording the deed or other instrument effecting the conveyance.
Car 6-1-15 (100/11) H. John 559
ERICE Grantor signature Title Grantor signature Title Grantor signature Title Andrew Sugliclini Andrew Andrew
Grantor signature Title Grantee signature Title
indow Did you governed to all fitting to the state of the

inder: Did you complete all of the required information in Schedules A, B, and C? Are you required to complete Schedule D? If you checked e, f, or g in Schedule A, did you complete Form TP-584.1? Have you attached your check(s) made payable to the county clerk where recording will take place or, if the recording is in the New York City boroughs of Manhattan, Bronx, Brooklyn, or Queens, to the NYC Department of Finance? If no recording is required, send your check(s), made payable to the Department of Taxation and Finance, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-5045.

Schedule D - Certification of exemption from the payment of estimated personal income tax (Tax Law, Article 22, section 663)

Complete the following only if a fee simple interest or a cooperative unit is being transferred by an individual or estate or trust.

If the property is being conveyed by a referee pursuant to a foreclosure proceeding, proceed to Part II, and check the second box under Exemptions for nonresident transferor(s)/seller(s) and sign at bottom.

Part I - New York State residents

If you are a New York State resident transferor(s)/seller(s) listed in Schedule A of Form TP-584 (or an attachment to Form TP-584), you must sign the certification below. If one or more transferors/sellers of the real property or cooperative unit is a resident of New York State, each resident transferor/seller must sign in the space provided. If more space is needed, please photocopy this Schedule D and submit as many schedules as necessary to accommodate all resident transferors/sellers.

feror(s)/seller(s)				
This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) as signed below was a resident of New York State, and therefore is not required to pay estimated personal income tax under Tax Law, section 663(a) upon the sale or transfer of this real property or cooperative unit.				
Print full name	Date			
Print full name	Date			
Print full name	Date			
Print full name	Date			
	the sale or transfer of the real property or cooperative herefore is not required to pay estimated personal incoor cooperative unit. Print full name Pr			

Note: A resident of New York State may still be required to pay estimated tax under Tax Law, section 685(c), but not as a condition of recording a deed.

Part II - Nonresidents of New York State

If you are a nonresident of New York State listed as a transferor/seller in Schedule A of Form TP-584 (or an attachment to Form TP-584) but are not required to pay estimated personal income tax because one of the exemptions below applies under Tax Law, section 663(c), check the box of the appropriate exemption below. If any one of the exemptions below applies to the transferor(s)/seller(s), that transferor(s)/seller(s) is not required to pay estimated personal income tax to New York State under Tax Law, section 663. **Each** nonresident transferor/seller who qualifies under one of the exemptions below must sign in the space provided. If more space is needed, please photocopy this Schedule D and submit as many schedules as necessary to accommodate all nonresident transferors/sellers.

If none of these exemption statements apply, you must complete Form IT-2663, Nonresident Real Property Estimated Income Tax Payment Form, or Form IT-2664, Nonresident Cooperative Unit Estimated Income Tax Payment Form. For more information, see Payment of estimated personal income tax, on page 1 of Form TP-584-I.

Exemption for nonresident	Trans	teror	1e1/e	allarie	

his is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) (grantor) of this real
roperty or cooperative unit was a nonresident of New York State, but is not required to pay estimated personal income tax under Tax Law
ection 663 due to one of the following exemptions:
and the one of the following exemptions.

The real property or cooperative unit being sold or transferred quality	fies in tot	al as t	he transf	feror's/seller's principal residence
(within the meaning of Internal Revenue Code, section 121) from	Date	to	Date	(see instructions).
The transferor/seller is a mortgagor conveying the mortgaged proper no additional consideration.	erty to a r	nortga	gee in fo	preclosure, or in lieu of foreclosure with
The transferor or transferee is an agency or authority of the United S New York, the Federal National Mortgage Association, the Federal H Mortgage Association, or a private mortgage insurance company.	States of Home Loa	Amerio an Mor	ca, an ag tgage Co	ency or authority of the state of orporation, the Government National

Signature	Print full name	Date
Signature		
Oignature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

TP584 Addendum (Parent Document Control Number 553233255)

Additional Parties					
Party	Last Name	First Name, MI	SSN/EIN	Address	
Grantor and	BUENA VISTA 53 LLC		20-8175624	C/O KOHLS PARTNERS 405 CEDAR LANE, TEANECK, NJ 07666	

APPENDIX B:

List of Site Contacts

APPENDIX B – LIST OF SITE CONTACTS

Name Phone/Email Address

Teutonia Beuna Vista, LLC Eric Wolf

(914) 450-7794

ewolf@dwcap.com

HydroEnvironmental Solutions, Inc. William A. Canavan

(914) 276-2560

wcanavan@hesny.com

D&K Consulting Engineers, P.C. Jonathan B. Ashley

(802) 431-1422

jashley@dubois-king.com

NYSDEC DER Project Manager Michael J. Haggerty

(518) 402-9768

Michael.haggerty@dec.ny.gov

Knauf Shaw, LLP Linda R. Shaw

(585) 546-8430

<u>Ishaw@nyenvlaw.com</u>

APPENDIX C:

Excavation Work Plan

APPENDIX C – EXCAVATION WORK PLAN (EWP)

C-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the NYSDEC. **Table C-1** includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in **Appendix B**.

Table C-1: Notifications

Michael J. Haggerty	(518) 402-9768,
The first of the Beauty	michael.haggerty@dec.ny.gov
William A. Canavan, PG, LSRP	(914) 276-2560
William A. Canavan, i G, LSM	wcanavan@hesny.com
Jonathan B. Ashley, PE	(802) 522-9733
Johannan B. Ashley, FE	jashley@dubois-king.com

^{*} Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal
 extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities
 to be installed below the soil cover, estimated volumes of contaminated soil to be
 excavated and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;

- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in **Appendix G** of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

C-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in **Section C-6** and **C-7** of this Appendix.

C-3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

C-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of offsite soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

C-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are as follows: Trucks coming from Interstate Route 87 will approach the Site from the north at the intersection of Main Street and Buena Vista Ave. While heading in the southerly direction on Buena Vista Ave., trucks will enter the Site at a southern driveway, drive north in front of the work site, turn west at the northern Site boundary, then head south then east, exiting the Site at the same point as they entered, and then head north away from the Site to avoid sensitive areas to the south. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport; [(g) community input [where necessary].

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

C-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

C-7 MATERIALS REUSE ON-SITE

On-Site reuse of excavated materials is not anticipated.

C-8 FLUIDS MANAGEMENT

All liquids to be removed from the site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

C-9 RESERVED

C-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in **Table 10** of this SMP. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Table 10: Allowable Constituent Levels for Imported Soil/Fill

Contaminant	Unrestricted Use AllowableMaximum Concentration Metals					
Arsenic	13					
Barium	350					
Beryllium	7.2					
Cadmium	2.5					
	13					
Chromium, Hexavalent ¹	30					
Chromium, Trivalent ¹	50					
Copper Cyanide	27					
Lead	63					
	1600					
Manganese						
Mercury (total) Nickel	0.18					
Selenium	30					
	3.9					
Silver	2					
Zinc	109					
	s/Pesticides					
2,4,5-TP Acid (Silvex)	3.8					
4,4'-DDE	0.0033 3					
4,4'- DDT	0.0033 3					
4,4'- DDD	0.0033 ³					
Aldrin	0.005					
Alpha-BHC	0.02					
Beta-BHC	0.036					
Chlordane (alpha)	0.094					
Delta BHC	0.04					
Dibenzofuran	7					
Dieldrin	0.005					
Endosulfan I	2.42					
Endosulfan II	2.4 2					
Endosulfan Sulfate	2.42					
Endrin	0.014					

Contaminant	Unrestricted Use Allowable Maximum Concentration					
Heptachlor	0.042					
Lindane	0.1					
Total Polychlorinated biphenyls	0.1					
Sen	ni-volatiles					
Acenaphthene	20					
Acenapthylene	100					
Anthracene	100					
Benz(a)anthracene	1					
Benzo(a)pyrene	1					
Benzo(b)fluoranthene	1					
Benzo(g,h,i)perylene	100					
Benzo(k)fluoranthene	0.8					
Chrysene	1					
Dibenz(a,h)anthracene	0.33 3					
Fluoranthene	100					
Fluorene	30					
Indeno(1,2,3-cd)pyrene	0.5					
m-Cresol	0.33 3					
Naphthalene	12					
o-Cresol	0.333					
p-Cresol	0.33					
Pentachlorophenol	0.83					
Phenanthrene	100					
Phenol	0.333					
Pyrene	100					
,	/olatiles					
1,1,1-Trichloroethane	0.68					
1,1-Dichloroethane	0.27					
1,1-Dichloroethene	0.33					
1,2-Dichlorobenzene	1.1					
1,2-Dichloroethane	0.02					
cis-1,2-Dichloroethene	0.25					
trans-1,2-Dichloroethene	0.19					
1,3-Dichlorobenzene	2.4					
1,4-Dichlorobenzene	1.8					
1,4-Dioxane	0.13					
Acetone	0.05					
Benzene	0.06					

Contaminant	Unrestricted Use Allowable Maximum Concentration				
Butylbenzene	12				
Carbon tetrachloride	0.76				
Chlorobenzene	1.1				
Chloroform	0.37				
Ethylbenzene	1				
Hexachlorobenzene	0.33				
Methyl ethyl ketone	0.12				
Methyl tert-butyl ether	0.93				
Methylene chloride	0.05				
n-Propylbenzene	3.9				
sec-Butylbenzene	11				
tert-Butylbenzene	5.9				
Tetrachloroethene	1.3				
Toluene	0.7				
Trichloroethene	0.47				
1,2,4-Trimethylbenzene	3.6				
1,3,5-Trimethylbenzene	8.4				
Vinyl chloride	0.02				
Xylene (mixed)	0.26				

NOTES:

All soil cleanup objectives (SCOs) are in units of parts per million (ppm).

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

Off-site borrow soils will be documented as having originated from locations having no evidence of disposal or release of hazardous, toxic or radioactive substances, wastes or petroleum products. Off-site borrow soils intended for use as Site backfill cannot otherwise be defined as a solid waste in accordance with 6NYCRR Part 360-1.2(a).

If the contractor designates a source as "virgin" soil, it shall be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development or agricultural use. Virgin soils should be subject to collection of one representative composite sample per source. The sample should be analyzed for TCL VOCs,

¹ The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the SCO for Hex Chrom.

² The SCO is the sum of endosulfan I, endosulfan II, and endosulfan sulfate.

³ For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.

SVOCs, pesticides, PCBs, and the metals arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver plus cyanide. The soil will be acceptable for use as backfill provided that all parameters meet the Allowable Constituent Levels for Imported Fill or Soil, provided as Appendix 5 of DER- 10 (May 2010).

Non-virgin soils will be tested via collection of a combination of grab samples for VOC analysis and composite samples for analysis of SVOCs, PCBs, Pesticides, and Metals as specified in DER-10 subdivision 5.4(e)10. Table A-1 provides the sample frequency by volume and analyses to be performed for non-virgin soils prior to use on Site. For borrow sources greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, provided all earlier samples met the Allowable Constituent Levels for Imported Fill or Soil, provided as Appendix 5 of DER- 10 (May 2010).

C-11 STORMWATER POLLUTION PREVENTION

When remedial actions require the disturbance of more than one acre of land, federal and state laws require that the project obtain coverage under the NYSDEC SPDES General Permit for Storm Water Discharges from Construction Activities Permit #GP-0-10-001 (Construction Storm Water General Permit). Although the BCP Site is 0.78 acres, the overall project will affect a total of 1.0+ contiguous acres. Requirements for coverage under the Construction Storm Water General Permit include the submittal and NYSDEC approval of a Notice of Intent Form and a Storm Water Pollution Prevention Plan (SWPPP). For this project, Municipal Separate Storm Sewer System (MS4) approval of the SWPPP will be required prior to submission of the NOI to NYSDEC. The SWPPP for the Site will be prepared by the Construction Contractor in accordance with the New York State Storm Water Management Design Manuel (2010) The SWPPP will provide the following information:

- A background discussion of the scope of the construction project.
- A statement of the storm water management objectives.
- An evaluation of post-development runoff conditions.
- A description of proposed storm water control measures.
- A description of the type and frequency of maintenance activities required to support the control measure.

The SWPPP will also address issues such as erosion prevention, sedimentation control, hydraulic loading, pollutant loading, ecological protection, physical site characteristics that impact design, and site management planning. The SWPPP will also include a contingency plan to be implemented in the event that heavy rain events are determined to be impacting water

quality in the Site due to closure or redevelopment activities. All descriptions of proposed features and structures at the Site includes structure placement, supporting engineering data and calculations, construction scheduling, and references to established detailed design criteria.

The use of appropriate temporary erosion control measures such as silt fencing and/or hay bales will be required around all soil/fill stockpiles and unvegetated soil surfaces during redevelopment activities. Stockpiles shall be graded and compacted as necessary for positive surface water runoff and dust control. Stockpiles of soil/fill will be placed a minimum of ten feet from the nearest property boundary.

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

C-12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager.

Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

C-13 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 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 <u>non-intrusive</u> 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** basis 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 be 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.

Locations of air sampling stations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations. Due to the presence of a day care adjacent to the site, a fixed monitoring station should be located at the south site perimeter, regardless of wind direction, and discussed in the text.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers on the day of exceedance. All data is to be reported in the final report for the excavation activity.

C-14 ODOR CONTROL PLAN

Based on the primary constituents of concern, metals, VOCs and BAPs, having no odor, as well as the field experience that odors were not observed on-site, odors are not anticipated to be an issue or concern.

Nevertheless, if odors are encountered, the following should be followed:

This odor control plan is capable of controlling emissions of nuisance odors off-site. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events within one day of the odor event and notified of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Excavation Activities Report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

C-15 DUST CONTROL PLAN

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

C-16 OTHER NUISANCES

If buried drums or previously unknown underground storage tanks are encountered during soil excavation activities, excavation will cease and NYSDEC will be immediately notified. All drums and/or underground storage tanks encountered will be evaluated and a removal plan will be submitted for NYSDEC approval. Appropriately trained personnel will excavate all of the drums and/or underground storage tanks while following all applicable federal, state, and local regulations. Removed drums and storage tanks will be properly characterized and disposed off-site. The soil/fill surrounding the buried drums or underground storage tanks will be considered as potentially contaminated and will be stockpiled and characterized.

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

C-17 REPORTING

A report is to be submitted to the NYSDEC within 90 days of completion of the activities performed under this EWP. This report shall contain a summary of the activities performed; a summary of all data gathered and results; information about any media that was removed from the site: volume, contamination levels, area from which removed; and any other information that may be indicate a change to the "remaining contamination" that is at the site. Such changes may require revision of the SMP.

APPENDIX D:

Geologic Logs

CLIENT: Kohl Construction Group **GEOLOGIC LOG** WELL NO.: HA-1 HydroEnvironmental PAGE 1 OF 1 PAGES SOLUTIONS, INC. SITE LOCATION: 41-53 Buena Vista Avenue SCREEN SIZE & TYPE: None Yonkers, New York SLOT NO.: SETTING: **DATE COMPLETED**: July 16, 2014 SAND PACK SIZE & TYPE: None DRILLING COMPANY: HES, Inc. **SETTING: CASING SIZE & TYPE: None DRILLING METHOD**: Hand auger **SETTING: SAMPLING METHOD**: 3-inch steel bucket **SEAL TYPE:** None **OBSERVER**: ANE/WAC SETTING: REFERENCE POINT (RP): Grade **BACKFILL TYPE: ELEVATION OF RP: STATIC WATER LEVEL: DEVELOPMENT METHOD:** STICK-UP: **SURFACE COMPLETION:** DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

REC = Recovery PPM = parts per million ftbg = feet below grade MC = macro core sampler

DEPTH	H (FEET)		H (FEET) SAMPLE BLOW		PI OW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION		
0	0.167	G		< 0.5	12.5	SAND (medium to coarse) and SILT; brown; moist; no odor		
0	0.5	G		< 0.5	13.1	SAND (medium to coarse) and SILT; brown; moist; no odor		

GEOLOGIC LOG HydroEnvironmental SOLUTIONS, INC. SITE LOCATION: 41-53 Buena Vista Avenue Yonkers, New York

CLIENT: Kohl Construction Group

WELL NO.: HA-2

PAGE 1 OF 1 PAGES

CASING SIZE & TYPE: None

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: July 16, 2014 SAND PACK SIZE & TYPE: None

DRILLING COMPANY: HES, Inc. **SETTING:**

DRILLING METHOD: Hand auger **SETTING:**

SAMPLING METHOD: 3-inch steel bucket **SEAL TYPE:** None

OBSERVER: ANE/WAC **SETTING:**

REFERENCE POINT (RP): Grade **BACKFILL TYPE:**

STATIC WATER LEVEL: ELEVATION OF RP:

DEVELOPMENT METHOD: STICK-UP:

SURFACE COMPLETION: DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

REC = Recovery PPM = parts per million ftbg = feet below grade MC = macro core sampler

DEDTU	\/FFFT\					
FROM	TO	SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
0	0.167	G		< 0.5	6.5	SAND (medium to coarse) and SILT, some GRAVEL (fine, subrounded); brown; moist; no odor
0	0.5	G		< 0.5	14.3	SAND (medium to coarse) and SILT; brown; moist; no odor

CLIENT: Kohl Construction Group **GEOLOGIC LOG** WELL NO.: HA-3 HydroEnvironmental PAGE 1 OF 1 PAGES SOLUTIONS, INC. SITE LOCATION: 41-53 Buena Vista Avenue SCREEN SIZE & TYPE: None Yonkers, New York SLOT NO.: SETTING: **DATE COMPLETED**: July 16, 2014 SAND PACK SIZE & TYPE: None DRILLING COMPANY: HES, Inc. **SETTING: CASING SIZE & TYPE: None DRILLING METHOD**: Hand auger **SETTING: SAMPLING METHOD**: 3-inch steel bucket **SEAL TYPE:** None **OBSERVER**: ANE/WAC SETTING: REFERENCE POINT (RP): Grade **BACKFILL TYPE: STATIC WATER LEVEL: ELEVATION OF RP: DEVELOPMENT METHOD:** STICK-UP: **SURFACE COMPLETION:** DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

REC = Recovery PPM = parts per million ftbg = feet below grade MC = macro core sampler

DEPTH	H (FEET)		FEET) SAMPLE BLOW		PID	
FROM	то	TYPE	COUNT	REC. (FEET)	READING (PPM)	DESCRIPTION
0	0.167	G		< 0.5	13.5	SAND (medium to coarse) and SILT; brown; moist; no odor
0	0.5	G		< 0.5	14.6	SAND (medium to coarse) and SILT; brown; moist; no odor

CLIENT: Kohl Construction Group **GEOLOGIC LOG** WELL NO.: HA-4 *HydroEnvironmental* PAGE 1 OF 1 PAGES SOLUTIONS, INC. SITE LOCATION: 41-53 Buena Vista Avenue **SCREEN SIZE & TYPE:** None Yonkers, New York SLOT NO.: SETTING: **DATE COMPLETED**: July 16, 2014 SAND PACK SIZE & TYPE: None DRILLING COMPANY: HES, Inc. SETTING: **CASING SIZE & TYPE:** None **DRILLING METHOD**: Hand auger **SETTING: SAMPLING METHOD**: 3-inch steel bucket **SEAL TYPE:** None **OBSERVER**: ANE/WAC SETTING: **REFERENCE POINT (RP)**: Grade **BACKFILL TYPE**: STATIC WATER LEVEL: **ELEVATION OF RP: DEVELOPMENT METHOD:** STICK-UP: SURFACE COMPLETION: DURATION: - YIELD: -

	ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = Recovery PPM = parts per million ftbg = feet below grade MC = macro core sampler							
DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	2502055		
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION		
0	0.167	G		< 0.5	15.3	SAND (medium to coarse) and SILT; brown; moist; no odor		
0	0.5	G		< 0.5	21.1	SAND (medium to coarse) and SILT; brown; moist; no odor		

NOTES:

CLIENT: Kohl Construction Group **GEOLOGIC LOG WELL NO.:** HA-5 HydroEnvironmental PAGE 1 OF 1 PAGES SOLUTIONS, INC. SITE LOCATION: 41-53 Buena Vista Avenue SCREEN SIZE & TYPE: None Yonkers, New York SLOT NO.: **SETTING: DATE COMPLETED**: July 16, 2014 SAND PACK SIZE & TYPE: None DRILLING COMPANY: HES, Inc. **SETTING: CASING SIZE & TYPE: None DRILLING METHOD**: Hand auger **SETTING: SAMPLING METHOD**: 3-inch steel bucket **SEAL TYPE:** None **OBSERVER**: ANE/WAC SETTING: REFERENCE POINT (RP): Grade **BACKFILL TYPE: STATIC WATER LEVEL: ELEVATION OF RP: DEVELOPMENT METHOD:** STICK-UP: **SURFACE COMPLETION:** DURATION: -YIELD: -

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

REC = Recovery PPM = parts per million ftbg = feet below grade MC = macro core sampler

NOTES:

DEPTH	(FEET)	SAMPLE BLOW REC.		REC	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	0.167	G		< 0.5	16.2	SAND (medium to coarse) and SILT; brown; moist; no odor
0	0.5	G		< 0.5	12.1	SAND (medium to coarse) and SILT; brown; moist; no odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: SB-1

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: **SETTING:**

SAND PACK SIZE & TYPE: None

DATE COMPLETED: July 16, 2014

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7720DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

SETTING:

OBSERVER: ANE/WAC

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab ST = shelby tube

REC = Recovery PPM = parts per million ftbg = feet below grade MC = macro core sampler

DEPTH (FEET)		SAMPLE	SAMPLE BLOW REC.	PID		
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	5	МС		2.0	0	Fill, composed of concrete, brick, asphalt, some SAND, grades to SAND (fine to medium); brown; no odor
5	10	МС		3.5	0	Fill, composed of concrete, brick, asphalt, some SAND, grades to SAND (fine to medium); brown; no odor
10	15	МС		3.6	0	Fill, composed of concrete, brick, asphalt, some SAND, grades to SAND (medium to coarse), some GRAVEL (fine); brown; no odor
15	20	MC		4.0	0	(15-17.5 ftbgs) SAND (fine to medium); dark brown; no odor
						(17.5-19 ftbgs) SAND (coarse) and GRAVEL (fine); brown; no odor
						(19-20 ftbgs) SILT; brown; moist; no odor
20	25	МС		4.0	0	(20-22 ftbgs) SAND (coarse), some GRAVEL (fine); brown; dry; no odor
						(22-24.5 ftbgs) SILT; brown; wet; no odor
						(24.5-25 ftbgs) SAND (coarse), some GRAVEL (fine); brown; no odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: SB-2

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: **SETTING:**

DATE COMPLETED: July 16, 2014

SETTING:

DRILLING COMPANY: Zebra Environmental 30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

SAND PACK SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7720DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

OBSERVER: ANE/WAC **SETTING:**

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

REC = Recovery

ABBREVIATIONS: SS = split spoon W = wash **PPM** = parts per million

C = cuttings G = grab ftbg = feet below grade

ST = shelby tube

MC = macro core sampler

DEPTH (FEET)		SAMPLE	BLOW	OW REC	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	5	МС		3.5	0	Fill, composed of concrete, grades to SAND (medium to coarse); brown; dry; no odor
5	10	MC		4.0	0	Fill SAND (medium to coarse); brown and tan; dry; no odor
10	15	MC		3.5	0	Fill SAND (medium to coarse); brown and tan; dry; no odor
15	20	МС		4.0	0	(15-18.5 ftbgs) SAND (fine to medium), grades to SAND (medium to coarse) (18.5-20 ftbgs) SAND (medium to coarse) grades to SILT; brown; wet; no odor
20	25	MC		4.0	0	SAND (medium to coarse), grades to SAND (fine) at 24 ftbgs; light brown to red; no odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: SB-3

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: **SETTING:**

SAND PACK SIZE & TYPE: None

DATE COMPLETED: July 16, 2014

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7720DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

OBSERVER: ANE/REG

SETTING:

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP: 8 ft below street level

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

REC = Recovery

ABBREVIATIONS: SS = split spoon W = wash **PPM** = parts per million

C = cuttings G = grab ftbg = feet below grade

ST = shelby tube

MC = macro core sampler

DEPTH (FEET)		SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	5	MC		3.5	10.2	(0-2 ftbgs) Concrete and ASH' brwn to black; dry; no odor
					2.8	(2-5 ftbgs) SAND (medium to coarse) and SILT; brown; dry; no odor
5	10	MC		3.5	4.3	(5-6 ftbgs) SAND (medium to coarse); brown to tan; dry; no odor
					3.7	(6-6.2 ftbgs) ASH; black; dry; slight burnt odor
					5.0	(6.2-10 ftbgs) SAND (medium to coarse); brown to tan; dry; no odor
10	15	MC		2.0	2.3	(10-14 ftbgs) SAND (medium to coarse), some GRAVEL (fine, round); brown to tan; dry; no odor
					8.5	(14-14.5 ftbgs) SAND (medium to coarse); black to dark brown; dry; no odor
					4.0	(14.5-15 ftbgs) SAND (fine_ and SILT, some CLAY; red to brown; moist; no odor
15	20	MC		4.0	8.8	(15-16 ftbgs) SAND (medium to coarse); red to dark brown; dry; no odor
					11.5	(16-16.5 ftbgs) SAND (medium to coarse) and GRAVEL (fine, subangular); dark brown; dry; no odor
					4.7	(16.5-18.5 ftbgs) SAND (medium to coarse); red to brown; dry; no odor
					16.3	(18.5-19 ftbgs) SILT and CLAY, some GRAVEL (medium, subangular); moist; no odor
					13.6	(19-20 ftbgs) SAND (medium to coarse); red to brown; dry; no odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: SB-4

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: **SETTING:**

SAND PACK SIZE & TYPE: None

DATE COMPLETED: July 16, 2014

SETTING:

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7720DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

OBSERVER: ANE/REG **SETTING:**

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP: 8 ft below street level

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

MC = macro core sampler

DEPTH (FEET)		SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	5	МС		2.0	12.8	(0-2 ftbgs) SAND (medium to coarse), concrete; brown to gray; dry; no odor
					14.6	(2-4 ftbgs) SAND (medium to coarse); brown; dry; no odor
					12.9	(4-5 ftbgs) SAND (fine), SILT and CLAY; brown; moist; no odor
5	10	MC		4.0	11.3	(5-6 ftbgs) SAND (medium to coarse) and GRAVEL (medium, round); brown to gray; dry; no odor
					4.9	(6-10 ftbgs) SAND (medium to coarse) and GRAVEL; red to brown; dry; no odor
10	15	MC		4.5	9.3	(10-12 ftbgs) SAND (medium to coarse); red t brown; dry; no hydrocarbon odor
					8.0	(12-13 ftbgs) SILT and CLAY; red; moist; no odor
					9.4	(13-15 ftbgs) SAND (medium to coarse); red to brown; dry; no odor
15	20	MC		5.0	4.7	(15-16 ftbgs) SAND (fine) and SILT, some CLAY; red to brown; moist; no odor
					6.7	(16-20 ftbgs) SAND (medium to coarse) and SILT; brown to red; dry; no odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: SB-5

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: **SETTING:**

DATE COMPLETED: July 16, 2014

SAND PACK SIZE & TYPE: None

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7720DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

SETTING:

OBSERVER: ANE/REG

SETTING:

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP: 12 ft below street level

STATIC WATER LEVEL: **DEVELOPMENT METHOD:**

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

STICK-UP:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	5	МС		4.0	9.9	(0-1 ftbgs) Concrete and SAND (medium to coarse); gray to brown; dry; no odor
					10.8	(1-3 ftbgs) SAND (fine) and SILT and CLAY; brown; moist; no odor
					8.1	(3-5 ftbgs) SAND (fine) and SILT; brown; dry; no odor
5	10	MC			20.6	(5-5.5 ftbgs) SILT and CLAY; brown; moist; no odor
					4.0	(5.5-10 ftbgs) SAND (medium to coarse), some GRAVEL (medium, subangular); brown; dry; no odor
10	15	MC			17.1	(10-12 ftbgs) SAND (fine to medium) and SILT, some GRAVEL (medium, angular); brown; dry; no odor
					15.8	(12-14 ftbgs) SA hydrocarbon odor
					9.1	(14-14.5 ftbgs) SILT and CLAY; brown to red; moist; no odor
15	20	MC			8.6	(14.5-15 ftbgs) SAND (medium to coarse); brown to red; dry; no odor
	_		_		9.4	(15-18 ftbgs) SAND (medium to coarse) and SILT, some GRAVEL; brown to red; dry; no odor
					6.7	(18-20 ftbgs) SAND (medium to coarse); brown to red; dry; no odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: SB-6

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: **SETTING:**

DATE COMPLETED: July 16, 2014

SAND PACK SIZE & TYPE: None

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe[®] 7720DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

SETTING:

OBSERVER: ANE/REG **SETTING:**

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

REC = Recovery

ABBREVIATIONS: SS = split spoon W = wash PPM = parts per million

C = cuttings G = grab ftbg = feet below grade

ST = shelby tube

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	5	МС		2	15	(0-1 ftbgs) Concrete and ash; grey to black; dry; slight burnt odor
					13	(1-5 ftbgs) Sand (fine to medium) and SILT; brown; moist; no odor
5	10	MC		1.5	13.2	(5-6 ftbgss) SAND (fien to medium) and SILT; brown; moist; no odor
						(6-7 ftbgs) ASH; grey; dry; slight burnt odor
						(7-10 ftbgs) SAND (fine) and SILT; brown; moist; no odor
10	15	MC		3.0	0	(10-11 ftbgs) Brick; red; dry; no odor
					15.1	(11-13 ftbgs) SAND (fine) and SILT; brown; moist; no odor
					23.1	(13-15 ftbgs) SAND (fine to coarse); brown to tan; dry; no odor
15	20	MC		1.0	7.6	(15-17 ftbgs) SAND (medium to coarse) and SILT; brown; dry; no odor
					0	(17-18 ftbgs) Brick; red; dry; no odor
					14.6	(18-19.5 ftbgs) SAND (medium to coarse) and GRAVEL (fine, angular); brown; dry; no odor
20	25	MC		2	0	SAND (medium to coarse) and GRAVEL (fine, angular); brown; dry; no odor

HydroEnvironmental SOLUTIONS, INC.

CLIENT: Kohl Construction Group

WELL NO.: TB-A1

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: April 22, 2014 SAND PACK SIZE & TYPE: None

DRILLING COMPANY: HES SETTING:

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 54DT SETTING:

SAMPLING METHOD: 2.25-inch MC SEAL TYPE: None

DRILLER and/or OBSERVER:TAB/ANESETTING:

REFERENCE POINT (RP): Grade BACKFILL TYPE:

ELEVATION OF RP: STATIC WATER LEVEL:

STICK-UP: DEVELOPMENT METHOD:

SURFACE COMPLETION: DURATION: – YIELD: –

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	4	MC		3	0	SAND (fine to medium); brown; dry; no fuel oil odor
4	8	MC		4	0	SAND (fine to medium); brown; dry; no fuel oil odor
8	12	MC		4	0	(8-10 ftbg) SAND (fine to medium); brown; dry; no fuel oil odor
					0	(10-12 ftbg) SAND (medium to coarse); brown; dry; no fuel oil odor
12	16	MC		4	0	SAND (medium to coarse); brown; dry; no fuel oil odor
16	20	MC		4	0	(16-19.5 ftbg) SAND (medium to coarse); brown; dry; no fuel oil odor
						(19.5-20 ftbg) SILT with little SAND (fine to medium); brown; moist; no fuel oil odor
20	24	MC		4	0	(20-21.5 ftbg) SAND (medium to coarse); brown; dry; no fuel oil odor
						(21.5-24 ftbg) SILT with little SAND (fine to medium); brown; moist; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC.

CLIENT: Kohl Construction Group

WELL NO.: TB-A2

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: April 21, 2014 SAND PACK SIZE & TYPE: None

DRILLING COMPANY: HES SETTING:

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 54DT SETTING:

SAMPLING METHOD: 2.25-inch MC SEAL TYPE: None

DRILLER and/or OBSERVER: TAB/ANE SETTING:

REFERENCE POINT (RP): Grade BACKFILL TYPE:

ELEVATION OF RP: STATIC WATER LEVEL:

STICK-UP: DEVELOPMENT METHOD:

SURFACE COMPLETION: DURATION: - YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	4	MC		3	0	SAND (medium to coarse); brown and tan; dry; no fuel oil odor
4	8	MC		4	0	SAND (fine to medium); tan; dry; no fuel oil odor
8	12	MC		4	0	SAND (medium to coarse) brown and tan; dry; no fuel oil odor
12	16	MC		3	0	SAND (medium to coarse) brown and tan; dry; no fuel oil odor
16	20	MC		4	0	(16-18 ftbg) SAND (medium to coarse) brown and tan; dry; no fuel oil odor
						(18-20 ftbg) SILT with little SAND (fine to medium); brown; moist; no fuel oil odor
20	22.5	MC		4	0	SILT with little SAND (fine to medium); brown; moist; no fuel oil odor
						Refusal at 22.5 ftbg

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: TB-A3

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SAND PACK SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: May 1, 2014

SETTING:

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

OBSERVER: ANE **SETTING:**

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	5	MC		2	0	SAND (medium to coarse); tan; moist; no fuel oil odor
5	10	MC		3	0	SAND (medium to fine); tan; dry; no fuel oil odor
10	15	MC		2.5	0	SAND (medium to fine); tan; dry; no fuel oil odor
15	20	MC		3	0	(17-19 ftbg) SAND (medium to fine); tan; dry; no fuel oil odor
					0	(19-20 ftbg) SAND (medium to coarse); tan; dry; no fuel oil odor
20	25	MC		2	0	(23-24 ftbg) SAND (medium to coarse); tan; dry; no fuel oil odor
						(24-25 ftbg) SILT with little CLAY; brown; moist; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: TB-B1

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: **SETTING:**

SAND PACK SIZE & TYPE: None

DATE COMPLETED: May 2, 2014

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SETTING:

SEAL TYPE: None

OBSERVER: ANE

SETTING:

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
5	10	MC		0.25	0	CONCRETE
10	15	MC		2	0	SAND (fine to medium) with GRAVEL (small, round); tan; dry; no fuel oil odor
15	20	МС		2.5	0	SAND (fine to medium) with CONCRETE, BRICK, and STONE; brown, white, and red; dry; no fuel oil odor
20	25	MC		2.5	0	SAND (medium to coarse); brown and red; dry; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: TB-B2

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SAND PACK SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: May 2, 2014

DRILLING COMPANY: Zebra Environmental **SETTING:**

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

OBSERVER: ANE **SETTING:**

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	5	MC		1.5	0	CONCRETE with SAND (fine to medium); brown; dry; no fuel oil odor
5	10	MC		1	0	SAND (fine to medium); brown; dry; no fuel oil odor
10	15	MC		1.5	0	SAND (fine to medium); brown; dry; no fuel oil odor
15	19	МС		2	0	SAND (medium to coarse); brown and red; dry; no fuel oil odor
						Refusal at 19 ftbg

HydroEnvironmental SOLUTIONS, INC.

CLIENT: Kohl Construction Group

WELL NO.: TB-B3

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SAND PACK SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: May 1, 2014

DRILLING COMPANY: Zebra Environmental SETTING:

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

OBSERVER: ANE

SETTING:

SETTING:

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: - YIELD: -

NOTES: 10 ftbg

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab

ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
10	15	MC		0.5	0	CONCRETE and STONE and DEBRIS with little SAND (medium to coarse); brown; dry; no fuel oil odor
15	20	MC		0.5	0	CONCRETE and STONE and DEBRIS with little SAND (medium to coarse); brown; dry; no fuel oil odor
20	25	MC		0	-	No recovery

HydroEnvironmental SOLUTIONS, INC.

CLIENT: Kohl Construction Group

WELL NO.: TB-C1

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: April 22, 2014 SAND PACK SIZE & TYPE: None

DRILLING COMPANY: HES SETTING:

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 54DT SETTING:

SAMPLING METHOD: 2.25-inch MC SEAL TYPE: None

DRILLER and/or OBSERVER:TAB/ANESETTING:

REFERENCE POINT (RP): Grade BACKFILL TYPE:

ELEVATION OF RP: STATIC WATER LEVEL:

STICK-UP: DEVELOPMENT METHOD:

SURFACE COMPLETION: DURATION: - YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	_	READING (PPM)	DESCRIPTION
0	4	МС		2.5	0	SAND (medium to coarse); brown; dry; no fuel oil odor
4	8	MC		4	0	SAND (medium to coarse); brown; dry; no fuel oil odor
8	12	MC		4	0	(8-10 ftbg) SAND (fine to medium); brown; dry; no fuel oil odor
					0	(10-12 ftbg) SAND (medium to coarse); brown; dry; no fuel oil odor
12	16	MC		4	0	(12-14 ftbg) SAND (fine to medium); brown; dry; no fuel oil odor
						(14-16 ftbg) SAND (medium to coarse); brown; dry; no fuel oil odor
16	20	MC		4	0	(16-18 ftbg) SAND (fine to medium); brown; dry; no fuel oil odor
						(18-20 ftbg) SAND (medium to coarse); brown; dry; no fuel oil odor
20	24	MC		4	0	SAND (medium to coarse); brown; dry; no fuel oil odor

HydroEnvironmental solutions, inc.

CLIENT: Kohl Construction Group

WELL NO.: TB-C2

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: April 22, 2014 SAND PACK SIZE & TYPE: None

DRILLING COMPANY: HES SETTING:

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 54DT SETTING:

SAMPLING METHOD: 2.25-inch MC SEAL TYPE: None

DRILLER and/or OBSERVER: TAB/ANE SETTING:

REFERENCE POINT (RP): Grade BACKFILL TYPE:

ELEVATION OF RP: STATIC WATER LEVEL:

STICK-UP: DEVELOPMENT METHOD:

SURFACE COMPLETION: DURATION: - YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	4	MC		3.5	0	SAND (medium to coarse); brown; dry; no fuel oil odor
4	8	MC		4	0	(4-5 ftbg) SAND (medium to coarse); brown; dry; no fuel oil odor
						(5-8 ftbg) SAND (fine to medium); brown; dry; no fuel oil odor
8	12	MC		4	0	SAND (fine to medium); brown; dry; no fuel oil odor
12	16	MC		4	0	SAND (fine to medium); brown; dry; no fuel oil odor
16	20	MC		4	0	SAND (fine to medium); brown; dry; no fuel oil odor
20	24	MC		4	0	SAND (medium to coarse); brown; dry; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: TB-C3

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SAND PACK SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: May 1, 2014

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SETTING:

SEAL TYPE: None

OBSERVER: ANE

SETTING:

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	5	MC		2	0	SILT with little SAND (fine); brown; moist; no fuel oil odor
5	10	МС		3	0	SILT with little SAND (fine); brown; wet; no fuel oil odor
10	15	MC		4	0	SILT with little SAND (fine); brown; wet; no fuel oil odor
15	20	МС		5	0	(15-19 ftbg) SILT with little SAND (fine); brown; wet; no fuel oil odor
						(19-20 ftbg) SAND (medium to coarse); tan; moist; no fuel oil odor
20	25	MC		4	0	SAND (medium to coarse); tan; moist; no fuel oil odor

HydroEnvironmental solutions, inc.

CLIENT: Kohl Construction Group

WELL NO.: TB-D1

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: May 2, 2014

DRILLING COMPANY: Zebra Environmental SETTING:

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

SAND PACK SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

BACKFILL TYPE:

SETTING:

OBSERVER: ANE SETTING:

REFERENCE POINT (RP): Grade

ELEVATION OF RP: STATIC WATER LEVEL:

STICK-UP: DEVELOPMENT METHOD:

SURFACE COMPLETION: DURATION: - YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

то	SAMPLE TYPE	BLOW	REC. PID	D-0001D-011	
	1117	COUNT	(FEET)	READING (PPM)	DESCRIPTION
10	MC		1	0	SAND (fine to medium) with SILT; brown; wet; no fuel oil odor
15	МС		1	0	SAND (medium to coarse) with GRAVEL (medium, round) and STONE; brown; dry; no fuel oil odor
20	MC		3	0	SILT with SAND (fine to medium); moist; brown; no fuel oil odor
25	МС		3	0	SILT with SAND (fine to medium); moist; brown; no fuel oil odor
	15 20	15 MC 20 MC	15 MC 20 MC	15 MC 1 20 MC 3	15 MC 1 0 20 MC 3 0

HydroEnvironmental solutions, inc.

CLIENT: Kohl Construction Group

WELL NO.: TB-D2

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

SAND PACK SIZE & TYPE: None

DATE COMPLETED: May 1, 2014

DRILLING COMPANY: Zebra Environmental SETTING:

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe[®] 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

OBSERVER: ANE SETTING:

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: - YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings

G = grab

ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE		(FEET) READING (PPM)	DESCRIPTION	
5	10	MC		1	0	SAND (fine to medium) with CONCRETE; brown; moist; no fuel oil odor
10	15	МС		2	0	SAND (fine to medium) with some SILT; brown; moist; no fuel oil odor
15	20	МС		1	0	SAND (medium to coarse) with GRAVEL (small, round); tan; dry; no fuel oil odor
						Refusal at 20 ftbg
	-					

HydroEnvironmental solutions, inc.

CLIENT: Kohl Construction Group

WELL NO.: TB-D3

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SAND PACK SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: May 1, 2014

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

OBSERVER: ANE

SETTING:

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:
SURFACE COMPLETION:

DEVELOPMENT METHOD:

DURATION: - YIELD: -

NOTES: 10 ftbg

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab

ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH	DEPTH (FEET)		BLOW	REC.	PID	
FROM	то	SAMPLE BLOW REC. READING (FEET) READING (PPM)	READING (PPM)	DESCRIPTION		
10	15	MC		1.5	0	SAND (medium to coarse); brown; wet; no fuel oil odor
15	20	МС		2	0	SAND (medium to coarse) with CONCRETE and STONE; brown; dry; no fuel oil odor
20	25	MC		2.5	0	SAND (medium to coarse) with CONCRETE and STONE; brown; dry; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC.

CLIENT: Kohl Construction Group

WELL NO.: TB-E1

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: April 23, 2014 SAND PACK SIZE & TYPE: None

DRILLING COMPANY: HES SETTING:

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 54DT SETTING:

SAMPLING METHOD: 2.25-inch MC SEAL TYPE: None

DRILLER and/or OBSERVER: TAB/SMV SETTING:

REFERENCE POINT (RP): Grade BACKFILL TYPE:

ELEVATION OF RP: STATIC WATER LEVEL:

STICK-UP: DEVELOPMENT METHOD:

SURFACE COMPLETION: DURATION: - YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	4	MC		2.25	0	(0-2 ftbg) SILT; brown; moist; no fuel oil odor
					0	(2-4 ftbg) SAND with little SILT; moist; brown; no fuel oil odor
4	8	MC		4	0	SAND (fine to medium); light brown; moist; no fuel oil odor
8	12	MC		4	0	SAND (fine) with little GRAVEL (small, sub-angular); light brown; moist; no fuel oil odor
12	16	MC		4	0	(12-13.5 ftbg) SAND (fine) with little GRAVEL (small, subangular); light brown; moist; no fuel oil odor
					0	(13.5-16 ftbg) SAND (medium to coarse); light grey and brown; moist; no fuel oil odor
16	20	MC		4	0	(16-16.5 ftbg) SAND (fine) with little GRAVEL (small, subangular); light brown; moist; no fuel oil odor
						(16.5-20 ftbg) SAND (medium to coarse); light grey and brown; moist; no fuel oil odor
						Refusal at 20 ftbg

HydroEnvironmental SOLUTIONS, INC.

CLIENT: Kohl Construction Group

WELL NO.: TB-E2

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: April 23, 2014 SAND PACK SIZE & TYPE: None

DRILLING COMPANY: HES SETTING:

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 54DT SETTING:

SAMPLING METHOD: 2.25-inch MC SEAL TYPE: None

DRILLER and/or OBSERVER:TAB/SMVSETTING:

REFERENCE POINT (RP): Grade BACKFILL TYPE:

ELEVATION OF RP: STATIC WATER LEVEL:

STICK-UP: DEVELOPMENT METHOD:

SURFACE COMPLETION: DURATION: - YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	4	МС		2.5	0	Compacted SILT grading to SAND (fine to medium) and GRAVEL (small to medium, sub-angular); brown; moist; no fuel oil odor
4	8	MC		3	0	SAND (fine to coarse) with some SILT; light brown; moist; no fuel oil odor
8	12	MC		4	0	SAND (fine to coarse) with trace SILT and trace GRAVEL (small, sub-angular); light brown; moist; no fuel oil odor
12	16	MC		4	0	SAND (fine) with trace GRAVEL (small, sub-angular); brown; moist; no fuel oil odor
16	20	MC		4	0	(16-17 ftbg) SAND (fine) with trace GRAVEL (small, subangular); brown; moist; no fuel oil odor
						(17-20 ftbg) SAND (coarse) with some GRAVEL (small to medium, sub-angular); light grey and brown; moist; no fuel oil odor
20	24	MC		4	0	(20-21.5 ftbg) SAND (fine) with trace GRAVEL (small, subangular); brown; moist; no fuel oil odor
						(21.5-24 ftbg) SAND (coarse) with some GRAVEL (small to medium, sub-angular); light grey and brown; moist; no fuel oil odor

HydroEnvironmental solutions, inc.

CLIENT: Kohl Construction Group

WELL NO.: TB-E3

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: May 1, 2014

DRILLING COMPANY: Zebra Environmental SETTING:

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

SAND PACK SIZE & TYPE: None

DRILLING METHOD: Geoprobe[®] 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

OBSERVER: ANE SETTING:

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STICK-UP:

STATIC WATER LEVEL:
DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: - YIELD: -

NOTES: 10 ftbg

REC = Recovery

ABBREVIATIONS: SS = split spoon W = wash C = cut

PPM = parts per million

C = cuttings G = grab ST = shelby tube

ftbg = feet below grade MC = macro core sampler

DEPTH	DEPTH (FEET)		BLOW	REC.	PID	
FROM	то	SAMPLE TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	5	MC		2	0	SAND (medium to coarse); brown; moist; no fuel oil odor
5	10	МС		3.5	0	SAND (fine to medium); tan; dry; no fuel oil odor
10	15	MC		4	0	SAND (fine to medium); tan; dry; no fuel oil odor
15	20	MC		3	0	SAND (medium to coarse); tan; dry; no fuel oil odor
20	25	MC		4	0	(21-24 ftbg) SAND (medium to coarse); tan; dry; no fuel oil odor
						(24-25 ftbg) SILT with some CLAY; brown; moist; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: TB-F1

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

SAND PACK SIZE & TYPE: None

DATE COMPLETED: May 2, 2014

SETTING:

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

OBSERVER: ANE **SETTING:**

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH	DEPTH (FEET)		BLOW	REC.	PID	
FROM	то		(FEET)		DESCRIPTION	
5	10	МС		2	0	SAND (fine to medium) with SILT; brown; moist; no fuel oil odor
10	15	MC		2	0	SAND (medium to coarse); brown; moist; no fuel oil odor
15	20	MC		0.25	0	SAND (medium to coarse) with GRAVEL (small, round); brown; dry; no fuel oil odor
20	25	MC		1.5	0	SAND (fine to medium) with SILT; brown; moist; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: TB-F2

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SAND PACK SIZE & TYPE: None

SLOT NO.: **SETTING:**

DATE COMPLETED: May 1, 2014

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

SETTING:

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

OBSERVER: ANE

SETTING:

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL: **DEVELOPMENT METHOD:**

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

STICK-UP:

REC = Recovery

ABBREVIATIONS: SS = split spoon W = wash **PPM** = parts per million

C = cuttings G = grab ST = shelby tube

ftbg = feet below grade MC = macro core sampler

DEPTH (FEET)		SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
5	10	MC		0.25	0	ASPHALT
10	15	МС		2.5	0	SAND (medium to coarse) with some SILT and STONE; brown and tan; moist; no fuel oil odor
15	20	МС		2	0	SAND (medium to coarse) with BRICK and CONCRETE; tan, white, and red; dry; no fuel oil odor
20	25	МС		2	0	SAND (fine to medium) with GRAVEL (small, round); brown; dry; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: TB-F3

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: **SETTING:**

SAND PACK SIZE & TYPE: None

DATE COMPLETED: May 1, 2014

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

SETTING:

OBSERVER: ANE

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL: **DEVELOPMENT METHOD:**

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

STICK-UP:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
5	10	МС		1	0	SAND (medium to coarse) with BRICK and WOOD DEBRIS; brown and red; wet; no fuel oil odor
10	15	МС		2	0	SAND (medium to coarse) with BRICK; brown and red; wet; no fuel oil odor
15	20	MC		2	0	SAND (medium to coarse) with BRICK and CONCRETE; brown and red; wet; no fuel oil odor
20	25	MC		2	0	SAND (medium to coarse) with BRICK and CONCRETE; brown and red; wet; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC.

CLIENT: Kohl Construction Group

WELL NO.: TB-G1

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: April 23, 2014 SAND PACK SIZE & TYPE: None

DRILLING COMPANY: HES SETTING:

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 54DT SETTING:

SAMPLING METHOD: 2.25-inch MC SEAL TYPE: None

DRILLER and/or OBSERVER: TAB/SMV SETTING:

REFERENCE POINT (RP): Grade BACKFILL TYPE:

ELEVATION OF RP: STATIC WATER LEVEL:

STICK-UP: DEVELOPMENT METHOD:

SURFACE COMPLETION: DURATION: - YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	4	МС		2.5	1.5	ORGANICS with SILT, CONCRETE, and some SAND (fine); dark brown; wet; no fuel oil odor
4	8	MC		3.75	0.5	SAND (fine to coarse) with some ORGANICS; dark brown and light brown; wet; no fuel oil odor
8	12	MC		3.75	0	SAND (fine to medium); brown and dark brown; wet; no fuel oil odor
12	16	MC		4	0.7	SAND (fine to medium); brown and dark brown; wet; no fuel oil odor
16	19.25	МС		3.5	0	SAND (fine to medium); brown and dark brown; wet; no fuel oil odor
						Refusal at 19.25 ftbg

HydroEnvironmental SOLUTIONS, INC.

CLIENT: Kohl Construction Group

WELL NO.: TB-G2

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

DATE COMPLETED: April 23, 2014 SAND PACK SIZE & TYPE: None

DRILLING COMPANY: HES SETTING:

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 54DT SETTING:

SAMPLING METHOD: 2.25-inch MC SEAL TYPE: None

DRILLER and/or OBSERVER: TAB/SMV SETTING:

REFERENCE POINT (RP): Grade BACKFILL TYPE:

ELEVATION OF RP: STATIC WATER LEVEL:

STICK-UP: DEVELOPMENT METHOD:

SURFACE COMPLETION: DURATION: - YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	4	МС		2.5	0	Fill consisting of SILT, crushed ROCK, BRICK, and ASPHALT; brown, red, black, and grey; dry; no fuel oil odor
4	8	MC		2.25	0	SAND (fine to coarse) with little GRAVEL (small, sub- angular); brown; moist; no fuel oil odor
8	12	MC		4	0.9	SAND (fine) with some SILT; brown; moist; no fuel oil odor
12	16	MC		4	0	SAND (fine) with some SILT; brown; moist; no fuel oil odor
16	20	МС		4	0	(16-17 ftbg) SAND (fine to medium) with some SILT; brown; moist; no fuel oil odor
						(17-20 ftbg) SAND (medium to coarse) with some GRAVEL (small, sub-angular); light grey; moist; no fuel oil odor
20	24	MC		4	0	SAND (medium to coarse) with some GRAVEL (small, subangular); light grey; moist; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: TB-G3

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

SAND PACK SIZE & TYPE: None

DATE COMPLETED: May 1, 2014

SETTING:

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

OBSERVER: ANE **SETTING:**

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH	(FEET)	SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
0	5	MC		2	0	SILT with some CLAY; moist; brown; no fuel oil odor
5	10	MC		1	0	SILT with some CLAY; moist; brown; no fuel oil odor
10	15	MC		3.5	0	(10.5-14 ftbg) SILT with some CLAY; moist; brown; no fuel oil odor
						(14-15 ftbg) SAND (fine to medium); tan; dry; no fuel oil odor
15	20	MC		3.5	0	SAND (medium to coarse); tan; moist; no fuel oil odor
20	25	MC		3.5	0	SAND (medium to coarse); tan; moist; no fuel oil odor

HydroEnvironmental solutions, inc.

CLIENT: Kohl Construction Group

WELL NO.: TB-H1

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

SAND PACK SIZE & TYPE: None

DATE COMPLETED: May 2, 2014

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT SETTING:

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

OBSERVER: ANE SETTING:

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:
SURFACE COMPLETION:

DEVELOPMENT METHOD:

DURATION: - YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings

G = grab

ST = shelby tube

REC = Recovery PPM = parts per million

ftbg = feet below grade

DEPTH	DEPTH (FEET)		BLOW	REC.	PID	
FROM	то	SAMPLE TYPE	COUNT		READING (PPM)	DESCRIPTION
5	10	МС		1	0	CONCRETE with SAND (medium to coarse); brown; dry; no fuel oil odor
10	15	МС		0.75	0	SAND (fine to medium) with SILT; brown; moist; no fuel oil odor
15	20	MC		3	0	(17-18 ftbg) SAND (medium to coarse); brown; moist; no fuel oil odor
						(18-20 ftbg) SILT with CLAY; brown; moist; no fuel oil odor
20	25	МС		4	0	SAND (fine to medium) with SILT; brown; moist; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: TB-H2

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

SAND PACK SIZE & TYPE: None

DATE COMPLETED: May 1, 2014

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

OBSERVER: ANE

SETTING:

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab

ST = shelby tube

REC = Recovery

PPM = parts per million

ftbg = feet below grade

DEPTH (FEET)		SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
5	10	MC		1	0	ASPHALT with SAND (fine to medium); brown and black; dry; no fuel oil odor
10	15	МС		2.5	0	SAND (fine to medium) with little STONE; brown; dry; no fuel oil odor
15	20	МС		2	0	SAND (fine to medium) with little STONE and CONCRETE; brown; dry; no fuel oil odor
20	25	MC		2	0	SAND (fine to medium) with little STONE; brown; dry; no fuel oil odor

HydroEnvironmental SOLUTIONS, INC. **CLIENT**: Kohl Construction Group

WELL NO.: TB-H3

PAGE 1 OF 1 PAGES

SITE LOCATION: 41-53 Buena Vista Avenue

Yonkers, New York

SCREEN SIZE & TYPE: None

SLOT NO.: SETTING:

SAND PACK SIZE & TYPE: None

DATE COMPLETED: May 1, 2014

SETTING:

DRILLING COMPANY: Zebra Environmental

30 North Prospect Avenue

Lynbrook, New York

CASING SIZE & TYPE: None

DRILLING METHOD: Geoprobe® 7822DT

SAMPLING METHOD: 2.25-inch MC

SEAL TYPE: None

SETTING:

SETTING:

OBSERVER: ANE

REFERENCE POINT (RP): Grade

BACKFILL TYPE:

ELEVATION OF RP:

STATIC WATER LEVEL:

STICK-UP:

DEVELOPMENT METHOD:

SURFACE COMPLETION:

DURATION: -YIELD: -

NOTES:

REC = Recovery

ABBREVIATIONS: SS = split spoon W = wash

C = cuttings G = grab ST = shelby tube

PPM = parts per million

ftbg = feet below grade

DEPTH (FEET)		SAMPLE	BLOW	REC.	PID	
FROM	то	TYPE	COUNT	(FEET)	READING (PPM)	DESCRIPTION
5	10	МС		1	0	SAND (medium to coarse) with CONCRETE; brown and white; dry; no fuel oil odor
10	15	MC		1	0	SAND (medium to coarse) with CONCRETE and BRICK; brown, red, and white; dry; no fuel oil odor
15	20	MC		2	0	SAND (medium to coarse); brown; dry; no fuel oil odor
20	25	MC		3	0	SAND (medium to coarse); brown; dry; no fuel oil odor

APPENDIX E:

USTs Removal Permit and Disposal Manifests

279 Route 6 • P.O. Box 747 Mahopac, NY 10541 (845) 279-0263 Ph:

Fax: (845) 621-3075



STANDARD COLLECTION

NAME:

DATE:

ORDER FORM 056815

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	GENERATOR/LOCATION		BIL	L TO (IF DIFFERE	NT FROM L	OCATION)						
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782	DRUM DISPOSAL				ANY INV	DICES THAT ARE N	OT PAID					
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783	OIL FILTER REMOVAL				COLLECT	TO RECOVER CO TION, INCLUDING P						
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746	VACUUM SERVICE					1						
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750	TRANSPORTATION] [· · · · · · · · · · · · · · · · · · ·	1					
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279 Route 6 • P.O. Box 747 Mahopac, NY 10541 Ph: (845) 279-0263

Fax: (845) 621-3075



STANDARD COLLECTION ORDER FORM 056813

1-866-WASTE-OIL

ORDER FO 0568

	GENERATOR/LOCATION		BILL	TO (IF DIFFERE	NT FROM LOCATION)						
NAME			NAME								
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ADDRESS_	279 276 Mariupac	<u>NY</u>	USA EPA ID NO	NY0044	825636						
SALES CODE	DESCRIPTION	QUANTITY	UNIT PRICE	LINE TOTAL							
721	USED OIL REMOVAL				TRANSACTION UNLESS OTHERWISE						
713	ANTI-FREEZE REMOVAL				INVOICES REFLECTING CHARGES						
700	OILY WATER DISPOSAL	660 W.			ARE SUBJECT TO AN INTEREST RATE OF THE LESSER OF 1-1/2% PER						
742	SLUDGE DISPOSAL	380 H.			MONTH (18% PER ANNUM) OR THE						
782	DRUM DISPOSAL				ANY INVOICES THAT ARE NOT PAID						
800	PAD & BROOM REMOVAL				DEFAULT, ENVIRO WASTE SHALL BE						
783	OIL FILTER REMOVAL				COLLECTION, INCLUDING REASON-						
810	PARTS WASHER SERVICE	<u>.</u>			ABLE ATTORNEY'S FEED.						
746	VACUUM SERVICE	/									
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Westchester County Department of

Office of Environmental Health Risk 145 Huguen New Rochelle, N Telephone: 914-8 24-hour Emergency Phone: 914-8

PETROLEUM BULK STORAGE **WORK PERMIT**

In accordance with Articles XXV and XXVI of the Westchester County Sanitary Code, this work permit grants permission to modify the referenced Petroleum Bulk Storage facility in the manner listed below.

FACILITY PBS No. 3-600383 **TEUTONIA HALL** 41-53 Buena Vista Avenue Yonkers, NY 10701

Contact: John Litt

Telephone: (845) 450-5150

CONTRACTOR (responsible for PBS compliance and environmental assessment)

Dutchess Environmental 936 Route 6 MAHOPAC, NY 10541 Contact: dutchess

Telephone: (845) 628-3610

		WORK	TO BE PERFO	RMED	
Type of Work		•	Tank ID	Capacity	Product
Remove tank			4	550	7. Gasoline
Remove tank			5	550	7. Gasoline
Remove tank	•		6	550	7. Gasoline
Remove tank	.*	٠	7	1000	7. Gasoline

- THAT this permit is valid for 90 days from issue date.
- THAT the petroleum bulk storage tank(s) and/or piping shall be installed in accordance with Chapter 873, Articles XXV and XXVI, respectively, of the
- Laws of Westchester County NY.

 THAT the facility owner and contractor shall be responsible for the proper installation of the petroleum bulk storage tank(s) and/or piping in accordance with Chapter 873, Articles XXV and XXVI, respectively, of the Laws of Westchester County NY.
- THAT any changes or modifications to the Petroleum Bulk Storage Work Permit requires filing an application and obtaining a revised work permit to reflect said changes.

 THAT upon installation of the petroleum bulk storage tank(s) and/or piping, the tank(s) shall remain out of service until such time as a tank testing report (s) satisfactory to the department is received, and an "as built" plan prepared by professional engineer or registered architect in the State of New York is filled with the department which certifies that installation complies with Chapter 873, Articles XXV and XXVI, respectively, of the Laws of Westchester

Issued by:	Westchester County Department of Health	Issue Date	Expiration Date
	Sherlita Amler, M.D.	12/01/2015	00/04/0040
	Commissioner of Health	12/01/2015	03/01/2016

ZONE DISTRICT: DWD

THE THEFT STATES IN CALCULAR

SBL: 1.-512-11

Permission is granted to owner or lesse: TEUTONIA BUENA VISTA LLC

IMPORTANT, PLEASE READ: UPON RECEIVING LETTER PERMIT, NO WORK SHALL BEGIN UNTIL OWNER, CONTRACTOR, LESSEE, LESSOR CONTACTS BUILDING INSPECTOR Joseph Ferrotta, phone 914-377-6529.

TO:

REMOVAL OF THREE 550 GALLON & ONE 1,000 GALLON UNDERGROUND STORAGE TANKS.

JOB ADDRESS: 41 BUENA VISTA AVENUE

In accordance with approved plans and as specified in the application on file at the office of the Department of Buildings and in accordance with all applicable city ordinances and state laws affecting such construction.

CONDITIONS:

PROVIDE PDF OF APPROVED CONSTRUCTION DOCUMENTS BEFORE CERTIFICATE OF OCCUPANCY/CERTIFICATE OF COMPLETION CAN BE ISSUED.

- 1. PROVIDE A CLOSURE REPORT DOCUMENTING THAT ALL CONTAMINATED MATERIAL HAS BEEN REMOVED FROM THE SITE.
- 2. PROVIDE MANIFEST OF DISPOSED MATERIALS.
- 3. CONTACT FIRE DEPARTMENT WITH DATE OF TANK REMOVAL TO SCHEDULE REMOVAL INSPECTION AND COMPLY WITH FIRE DEPARTMENT REQUIREMENTS.

4. UPON COMPLETION OF ALL WORK CONTACT INSPECTOR JOE FERROTTA AT 377-6529 FOR PERMIT CLOSE OVT.

William . Schneider, P.E.

Commissioner

Department of Housing and Buildings

POST IN A CONSPICUOUS PLACE



March 28, 2017

Westchester County Department of Health 7th Floor – PBS Section 145 Huguenot Street New Rochelle, New York 10801

RE: WCDOH PBS - Tanks 4-7 Closure Letter

41 Buena Vista Avenue Yonkers, New York 10701

WCDOH PBS No. 3-600383

Brownfield Cleanup Program No. C360085

To whom it may concern:

On behalf of Teutonia Buena Vista, LLC., please find the formal application (**Appendix 1**) and documentation for the closure of Tanks 4 through 7 located at the Westchester County Department of Health (WCDOH) Petroleum Bulk Storage (PBS) facility number 3-600383. This report pertains to the Former Teutonia Hall site managed under Brownfield Cleanup Program No. C360085.

On December 8, 2015, four previously unknown underground storage tanks (USTs) were removed after being discovered during planned soil excavation activities. The information related to the closure of these tanks, which included three 550-gallon USTs (Tanks 4-6) and one 1,000-gallon UST (Tank 7), is included in **Appendix 2** and their locations are shown on **Figure 1** both of which are attached at the end of this letter. In accordance with the request of the New York State Department of Environmental Conservation (NYSDEC) (**Appendix 3**), no tank bottom end-point soil samples were collected from the tank graves as the tanks were located in the Track 1 area, where end-point soil samples were collected as part of the approved Remedial Action Work Plan (RAWP) for the Brownfield Cleanup Program (BCP). The end-point soil samples collected from this area were Track 1 unrestricted use compliant for all parameters and are summarized on **Tables 1A** through **1E** which are attached at the end of this letter.

One Deans Bridge Road • Somers, New York 10589

WCDOH PBS – Tanks 4-7 Closure Letter WCDOH PBS No. 3-600383 March 28, 2017 Page 2 of 2

Please contact HES at (914) 276-2560 if you have any questions regarding this update or the attached Petroleum Bulk Storage Application.

Very truly yours, HydroEnvironmental Solutions, Inc.

William A. Canavan, PG, LSRP President

Jan School

Willeam A. Conevan

Dylan K. Schuck Environmental Scientist

Enclosures

cc: Michael Haggerty, NYSDEC
Eric Wolf, Teutonia Buena Vista, LLC.
Jonathan Litt, Teutonia Buena Vista, LLC.
Jonathan Ashley, D&K Consulting Engineers, P.C.
Linda Shaw, Knauf Shaw LLP
File





TABLE 1A 41-53 Buena Vista Avenue Yonkers, New York BCP Site C360085

Summary of Excavation End Point Samples - EB-1 to EB-5

NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential mg/Kg	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	EB-1-101515 15J0652-01 10/15/2015 8:2	7	EB-2-101515 15J0652-02		EB-3-101515 15J0652-03		EB-4-101515 15J0652-04		EB-5-101515	
Cleanup Objectives - Restricted Residential	Unrestricted Use Soil	10/15/2015 8:2	7	1910095-05		1010024-03					
Restricted Residential			, ,	10/15/2015 8:34:00 AM		10/15/2015 8:37:00 AM		10/15/2015 8:42:00 AM		15J0652-05 10/15/2015 8:47:00 AM	
	Cleanup Objectives				U AIVI		U AIVI		O AIVI		O AIVI
mg/Kg		Soil		Soil		Soil		Soil		Soil	
mg/Kg	/14	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
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100	1.1	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
3.1	0.02	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
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52	8.4	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
49	2.4	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
13	1.8	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
13	0.1	0.048	U	0.050	U	0.048	U	0.052	U	0.058	U
100	0.12	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
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HydroEnvironmental Solutions, Inc.

TABLE 1A 41-53 Buena Vista Avenue Yonkers, New York BCP Site C360085

Summary of Excavation End Point Samples - EB-1 to EB-5

Sample ID			EB-1-101515		EB-2-101515		EB-3-101515		EB-4-101515		EB-5-101515	
York ID	NYSDEC Part 375	NYSDEC Part 375	15J0652-01		15J0652-02		15J0652-03		15J0652-04		15J0652-05	
Sampling Date	Restricted Use Soil	Unrestricted Use Soil	10/15/2015 8:2	27	10/15/2015 8:34:		10/15/2015 8:37:0	NA NA	10/15/2015 8:42:0	10 AM	10/15/2015 8:47:0	NA NC
Client Matrix	Cleanup Objectives -	Cleanup Objectives	10/15/2015 8.2 Soil	_,	10/13/2013 8:34.5 Soil	DO AIVI	10/13/2013 8.37.0 Soil	O AIVI	10/13/2013 8.42.0 Soil	O AIVI	Soil	O AIVI
Compound	Restricted Residential	Cicanap Objectives	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
cis-1,3-Dichloropropylene	~	~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
Cyclohexane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
Dibromochloromethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	IJ
Dibromomethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0026		0.0029	U
Dichlorodifluoromethane	~	~	0.0024		0.0025	U	0.0024	U	0.0026	U	0.0029	U
Ethyl Benzene		1	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	IJ
Hexachlorobutadiene	41 ~	1 ~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	IJ
	~	~	0.0024		0.0025	U	0.0024	U	0.0026	U	0.0029	IJ
Isopropylbenzene	~	~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	IJ
Methyl test butyl other (MTDE)	100			U				_		U		IJ
Methyl tert-butyl ether (MTBE)	100	0.93 ~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	
Methylcyclohexane			0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
Methylene chloride	100	0.05	0.0048	U	0.0050	U	0.0048	U	0.0052	U	0.0058	U
n-Butylbenzene	100	12	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
n-Propylbenzene	100	3.9 ~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
o-Xylene	~		0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
p- & m- Xylenes	~	~	0.0048	U	0.0050	U	0.0048	U	0.0052	U	0.0058	U
p-Isopropyltoluene	~	~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
sec-Butylbenzene	100	11	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
Styrene	~	~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
tert-Butyl alcohol (TBA)	~	~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
tert-Butylbenzene	100	5.9	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
Tetrachloroethylene	19	1.3	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
Toluene	100	0.7	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
trans-1,2-Dichloroethylene	100	0.19	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
trans-1,3-Dichloropropylene	~	~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
Trichloroethylene	21	0.47	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
Trichlorofluoromethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
Vinyl Chloride	0.9	0.02	0.0024	U	0.0025	U	0.0024	U	0.0026	U	0.0029	U
Xylenes, Total	100	0.26	0.0072	U	0.0075	U	0.0072	U	0.0078	U	0.0087	U
Semi-Volatiles, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Dilution Factor			2		2		2		2		2	
1,1'-Biphenyl	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
1,2,4,5-Tetrachlorobenzene	~	~	0.16	U	0.13	U	0.14	U	0.16	U	0.15	U
1,2,4-Trichlorobenzene	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
1,2-Dichlorobenzene	100	1.1	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
1,2-Diphenylhydrazine (as Azobenzene)	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
1,3-Dichlorobenzene	49	2.4	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
1,4-Dichlorobenzene	13	1.8	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
2,3,4,6-Tetrachlorophenol	~	~	0.16	U	0.13	U	0.14	U	0.16	U	0.15	U

HydroEnvironmental Solutions, Inc.

Summary of Excavation End Point Samples - EB-1 to EB-5

Sample ID			EB-1-101515		EB-2-101515		EB-3-101515		EB-4-101515		EB-5-101515	
York ID	NYSDEC Part 375	NYSDEC Part 375	15J0652-01		15J0652-02		15J0652-03		15J0652-04		15J0652-05	
Sampling Date	Restricted Use Soil	Unrestricted Use Soil	10/15/2015 8:2	27	10/15/2015 8:34:0		10/15/2015 8:37:0		10/15/2015 8:42:0	00 AM	10/15/2015 8:47:0	
Client Matrix	Cleanup Objectives -	Cleanup Objectives	Soil		Soil		Soil		Soil		Soil	
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
2,4,5-Trichlorophenol	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
2,4,6-Trichlorophenol	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
2,4-Dichlorophenol	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
2,4-Dimethylphenol	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
2,4-Dinitrophenol	~	~	0.16	U	0.13	U	0.14	U	0.16	U	0.15	U
2,4-Dinitrotoluene	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
2,6-Dinitrotoluene	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
2-Chloronaphthalene	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
2-Chlorophenol	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
2-Methylnaphthalene	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
2-Methylphenol	100	0.33	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
2-Nitroaniline	~	~	0.16	U	0.13	U	0.14	U	0.16	U	0.15	U
2-Nitrophenol	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
3- & 4-Methylphenols	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
3,3'-Dichlorobenzidine	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
3-Nitroaniline	~	~	0.16	U	0.13	U	0.14	U	0.16	U	0.15	U
4,6-Dinitro-2-methylphenol	~	~	0.16	U	0.13	U	0.14	U	0.16	U	0.15	U
4-Bromophenyl phenyl ether	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
4-Chloro-3-methylphenol	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
4-Chloroaniline	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
4-Chlorophenyl phenyl ether	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
4-Nitroaniline	~	~	0.16	U	0.13	U	0.14	U	0.16	U	0.15	U
4-Nitrophenol	~	~	0.16	U	0.13	U	0.14	U	0.16	U	0.15	U
Acenaphthene	100	20	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Acenaphthylene	100	100	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Acetophenone	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Aniline	~	~	0.32	U	0.26	U	0.28	U	0.31	U	0.30	U
Anthracene	100	100	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Atrazine	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Benzaldehyde	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Benzidine	~	~	0.32	U	0.26	U	0.28	U	0.31	U	0.30	U
Benzo(a)anthracene	1	1	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Benzo(a)pyrene	1	1	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Benzo(b)fluoranthene	1	1	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Benzo(g,h,i)perylene	100	100	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Benzo(k)fluoranthene	3.9	0.8	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Benzoic acid	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Benzyl alcohol	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Benzyl butyl phthalate	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Bis(2-chloroethoxy)methane	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U

Summary of Excavation End Point Samples - EB-1 to EB-5

Sample ID York ID Sampling Date Client Matrix	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives -	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	EB-1-101515 15J0652-01 10/15/2015 8: Soil		EB-2-101515 15J0652-02 10/15/2015 8:34:0 Soil		EB-3-101515 15J0652-03 10/15/2015 8:37:0 Soil		EB-4-101515 15J0652-04 10/15/2015 8:42:0 Soil		EB-5-101515 15J0652-05 10/15/2015 8:47:0 Soil	
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Bis(2-chloroethyl)ether	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Bis(2-chloroisopropyl)ether	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Bis(2-ethylhexyl)phthalate	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Caprolactam	~	~	0.16	U	0.13	U	0.14	U	0.16	U	0.15	U
Carbazole	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Chrysene	3.9	1	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
, Dibenzo(a,h)anthracene	0.33	0.33	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Dibenzofuran	59	7	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Diethyl phthalate	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Dimethyl phthalate	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Di-n-butyl phthalate	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Di-n-octyl phthalate	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Fluoranthene	100	100	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Fluorene	100	30	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Hexachlorobenzene	1.2	0.33	0.079	Ü	0.064	U	0.070	U	0.078	U	0.074	U
Hexachlorobutadiene	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Hexachlorocyclopentadiene	~	~	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Hexachloroethane	~	~	0.079	Ü	0.064	U	0.070	U	0.078	U	0.074	U
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Isophorone	~	~	0.079	Ü	0.064	U	0.070	U	0.078	U	0.074	U
Naphthalene	100	12	0.079	Ü	0.064	U	0.070	U	0.078	U	0.074	U
Nitrobenzene	~	~	0.079	Ü	0.064	U	0.070	U	0.078	U	0.074	U
N-Nitrosodimethylamine	~	~	0.079	Ü	0.064	U	0.070	U	0.078	U	0.074	U
N-nitroso-di-n-propylamine	~	~	0.079	Ü	0.064	U	0.070	U	0.078	U	0.074	U
N-Nitrosodiphenylamine	~	~	0.079	Ü	0.064	U	0.070	U	0.078	U	0.074	U
Pentachlorophenol	6.7	0.8	0.079	Ü	0.064	U	0.070	U	0.078	U	0.074	U
Phenanthrene	100	100	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Phenol	100	0.33	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Pyrene	100	100	0.079	U	0.064	U	0.070	U	0.078	U	0.074	U
Pesticides, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg	Ť	mg/Kg	Ŭ	mg/Kg	Ť	mg/Kg	Ť	mg/Kg	—
Dilution Factor	6/6	6/6	5		5		5		5		5	
4,4'-DDD	13	0.0033	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
4,4'-DDE	8.9	0.0033	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
4,4'-DDT	7.9	0.0033	0.0021	U	0.0017	U	0.0030	D	0.0020	U	0.0020	U
Aldrin	0.097	0.005	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
alpha-BHC	0.48	0.02	0.0021	Ü	0.0017	U	0.0018	U	0.0020	U	0.0020	U
alpha-Chlordane	4.2	0.094	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
beta-BHC	0.36	0.034	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Chlordane, total	~	~	0.083	U	0.068	U	0.073	U	0.082	U	0.078	U

Summary of Excavation End Point Samples - EB-1 to EB-5

Sample ID			EB-1-101515		EB-2-101515		EB-3-101515		EB-4-101515		EB-5-101515	
York ID	NYSDEC Part 375	NYSDEC Part 375	15J0652-01		15J0652-02		15J0652-03		15J0652-04		15J0652-05	
Sampling Date	Restricted Use Soil	Unrestricted Use Soil	10/15/2015 8:2	7	10/15/2015 8:34:0		10/15/2015 8:37:0	0.004	10/15/2015 8:42:0	0.004	10/15/2015 8:47:0	00 004
	Cleanup Objectives -	Cleanup Objectives	10/13/2013 8.2 Soil	- /	10/13/2013 8.54.0 Soil	JU AIVI	10/13/2013 8.37.0 Soil	U AIVI	10/13/2013 8.42.0 Soil	O AIVI	10/13/2013 8.47.0 Soil	O AIVI
Client Matrix	Restricted Residential	Cleanup Objectives		0	Result			Q		0	Result	
Compound	100	0.04	Result	Q		Q	Result		Result	Q		Q
delta-BHC	100	0.04	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Dieldrin	0.2	0.005	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Endosulfan I	24	2.4	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Endosulfan II	24	2.4	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Endosulfan sulfate	24	2.4	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Endrin	11	0.014 ~	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Endrin aldehyde	~	~	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Endrin ketone			0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
gamma-BHC (Lindane)	1.3	0.1 ~	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
gamma-Chlordane			0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Heptachlor	2.1	0.042	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Heptachlor epoxide	~	~	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Methoxychlor	~	~	0.0021	U	0.0017	U	0.0018	U	0.0020	U	0.0020	U
Toxaphene	~	~	0.21	U	0.17	U	0.18	U	0.20	U	0.20	U
Polychlorinated Biphenyls (PCB)	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Dilution Factor			1		1		1		1		1	
Aroclor 1016	~	~	0.021	U	0.017	U	0.019	U	0.021	U	0.020	U
Aroclor 1221	~	~	0.021	U	0.017	U	0.019	U	0.021	U	0.020	U
Aroclor 1232	~	~	0.021	U	0.017	U	0.019	U	0.021	U	0.020	U
Aroclor 1242	~	~	0.021	U	0.017	U	0.019	U	0.021	U	0.020	U
Aroclor 1248	~	~	0.021	U	0.017	U	0.019	U	0.021	U	0.020	U
Aroclor 1254	~	~	0.021	U	0.017	U	0.019	U	0.021	U	0.020	U
Aroclor 1260	~	~	0.021	U	0.017	U	0.019	U	0.021	U	0.020	U
Total PCBs	1	0.1	0.021	U	0.017	U	0.019	U	0.021	U	0.020	U
Metals, Target Analyte	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Dilution Factor			1		1		1		1		1	
Aluminum	~	~	12,500		3,150		4,070		9,620		10,000	
Antimony	~	~	0.63	U	0.51	U	0.55	U	0.62	U	0.59	U
Arsenic	16	13	1.87		1.03	U	1.11	U	2.27		2.27	
Barium	400	350	81.80		20.40		28.40		66.60		99.10	
Beryllium	72	7.2	0.51		0.10	U	0.11	U	0.28		0.36	
Cadmium	4.3	2.5	0.38	U	0.31	U	0.33	U	0.37	U	0.36	U
Calcium	~	~	2,340		809		2,500		4,510		18,900	
Chromium	~	~	20.30		6.53		8.34		18.10		17.60	
Cobalt	~	~	12.50		3.65		4.10		9.89		9.56	
Copper	270	50	23.60		11.60		9.51		21.70		23.30	
Iron	~	~	24,800		7,540		8,640		20,500		20,100	
Lead	400	63	14.40		3.96		6.91		11.50		13.30	
Magnesium	~	~	4,860		1,710		2,460		5,200		8,070	

TABLE 1A 41-53 Buena Vista Avenue Yonkers, New York

BCP Site C360085

Summary of Excavation End Point Samples - EB-1 to EB-5

Sample ID York ID Sampling Date Client Matrix	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives -	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	EB-1-101515 15J0652-01 10/15/2015 8:2 Soil		EB-2-101515 15J0652-02 10/15/2015 8:34:0 Soil		EB-3-101515 15J0652-03 10/15/2015 8:37:0 Soil		EB-4-101515 15J0652-04 10/15/2015 8:42:0 Soil		EB-5-101515 15J0652-05 10/15/2015 8:47:0 Soil	
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Manganese	2000	1600	621		296		325		478		491	
Nickel	310	30	26.40		12.80		9.86		21.90		21	
Potassium	~	~	2,930		548		848		2,960		2,760	
Selenium	180	3.9	3.47		1.03	U	1.13		2.54		2.71	
Silver	180	2	0.63	U	0.51	U	0.55	U	0.62	U	0.59	U
Sodium	~	~	235		84.50		167		306		354	
Thallium	~	~	1.26	U	1.03	U	1.11	U	1.24	U	1.18	U
Vanadium	~	~	30.20		8.78		12.40		24.40		23.50	
Zinc	10000	109	54.50		15.60		19		41.50		44.10	
Mercury by 7470/7471	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Dilution Factor			1		1		1		1		1	
Mercury	0.81	0.18	0.042	U	0.034	U	0.037	U	0.041	U	0.039	U
Total Solids			%		%		%		%		%	
Dilution Factor			1		1		1		1		1	
% Solids	~	~	79.30		97.50		90.20		80.90		84.40	

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

NT=this indicates the analyte was not a target for this sample

~=this indicates that no regulatory limit has been established for this analyte

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TABLE 1B 41-53 Buena Vista Avenue Yonkers, New York

BCP Site C360085

Summary of Excavation End Point Samples - EB-6 to EB-10

Commis ID			EB-6-101515		EB-7-101515		EB-8-101515		EB-9-101515		EB-10-101515	c .
Sample ID	NYSDEC Part 375	NIVEDEC Down 275										
York ID	Restricted Use Soil	NYSDEC Part 375	15J0652-07		15J0652-08		15J0652-09		15J0652-10		15J0652-11	
Sampling Date	Cleanup Objectives -	Unrestricted Use Soil	10/15/2015 8:54:0	U AIVI	10/15/2015 8:59:0	O AIVI	10/15/2015 9:45:0	JU AIVI	10/15/2015 9:04:0	JU AIVI	10/15/2015 9:10:0	JU AIVI
Client Matrix	Restricted Residential	Cleanup Objectives	Soil		Soil		Soil		Soil		Soil	
Compound			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organics, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Dilution Factor	~	~	1		1		1		1	l	1	1 !
1,1,1,2-Tetrachloroethane			0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,1,1-Trichloroethane	100	0.68 ~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,1,2,2-Tetrachloroethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,1,2-Trichloroethane			0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,1-Dichloroethane	26	0.27	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,1-Dichloroethylene	100	0.33 ~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,2,3-Trichlorobenzene	~		0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,2,3-Trichloropropane	~	~ ~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,2,4-Trichlorobenzene	~		0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,2,4-Trimethylbenzene	52	3.6	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,2-Dibromo-3-chloropropane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,2-Dibromoethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,2-Dichlorobenzene	100	1.1	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,2-Dichloroethane	3.1	0.02	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,2-Dichloropropane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,3,5-Trimethylbenzene	52	8.4	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,3-Dichlorobenzene	49	2.4	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,4-Dichlorobenzene	13	1.8	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
1,4-Dioxane	13	0.1	0.049	U	0.051	U	0.048	U	0.045	U	0.056	U
2-Butanone	100	0.12	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
2-Hexanone	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
4-Methyl-2-pentanone	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Acetone	100	0.05	0.0067	J	0.0089	J	0.0060	J	0.0070	J	0.0056	U
Acrolein	~	~	0.0049	U	0.0051	U	0.0048	U	0.0045	U	0.0056	U
Acrylonitrile	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Benzene	4.8	0.06	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Bromochloromethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Bromodichloromethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Bromoform	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Bromomethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Carbon disulfide	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Carbon tetrachloride	2.4	0.76	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Chlorobenzene	100	1.1	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Chloroethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Chloroform	49	0.37	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Chloromethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
cis-1,2-Dichloroethylene	100	0.25	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
cis-1,3-Dichloropropylene	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Cyclohexane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Dibromochloromethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U

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TABLE 1B 41-53 Buena Vista Avenue Yonkers, New York

BCP Site C360085

Summary of Excavation End Point Samples - EB-6 to EB-10

Sample ID			EB-6-101515		EB-7-101515		EB-8-101515		EB-9-101515		EB-10-10151	E
York ID	NYSDEC Part 375	NYSDEC Part 375	15J0652-07		15J0652-08		15J0652-09	1	15J0652-10		15J0652-11	
	Restricted Use Soil	Unrestricted Use Soil	10/15/2015 8:54:0	0.004	10/15/2015 8:59:0	00 004	10/15/2015 9:45:0	00 004	10/15/2015 9:04:0		10/15/2015 9:10:0	
Sampling Date Client Matrix	Cleanup Objectives -	Cleanup Objectives	10/15/2015 8.54.0 Soil	U AIVI	10/13/2013 8.33.0 Soil	O AIVI	10/13/2013 9.43.0 Soil	JU AIVI	10/13/2013 9.04.0 Soil	JU AIVI	10/13/2013 9.10.0 Soil	JU AIVI
Compound	Restricted Residential	Cleanup Objectives	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Dibromomethane	~	~	0.0024	U	0.0025	U	0.0024	U	0.0023	U	0.0028	U
Dichlorodifluoromethane	~	~	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	Ü
Ethyl Benzene	41	1	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	U	0.0028	U
Hexachlorobutadiene	~	~	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	Ü
Isopropylbenzene	~	~	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	U	0.0028	U
Methyl acetate	~	~	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	U
Methyl tert-butyl ether (MTBE)	100	0.93	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	U
Methylcyclohexane	~	~	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	Ü
Methylene chloride	100	0.05	0.0049	Ü	0.0051	Ü	0.0048	Ü	0.0045	U	0.0056	U
n-Butylbenzene	100	12	0.0043	Ü	0.0031	U	0.0024	Ü	0.0023	U	0.0038	U
n-Propylbenzene	100	3.9	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	U
o-Xylene	~	~	0.0024	Ü	0.0025	U	0.0024	Ü	0.0023	U	0.0028	U
p- & m- Xylenes	~	~	0.0049	Ü	0.0051	Ü	0.0048	Ü	0.0045	U	0.0056	U
p-Isopropyltoluene	~	~	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	U
sec-Butylbenzene	100	11	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	Ü
Styrene	~	~	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	U	0.0028	IJ
tert-Butyl alcohol (TBA)	~	~	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	U	0.0028	U
tert-Butylbenzene	100	5.9	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	U
Tetrachloroethylene	19	1.3	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	Ü
Toluene	100	0.7	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	U
trans-1,2-Dichloroethylene	100	0.19	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	U	0.0028	U
trans-1,3-Dichloropropylene	~	~	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	Ü	0.0028	Ü
Trichloroethylene	21	0.47	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	U	0.0028	U
Trichlorofluoromethane	~	~	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	U	0.0028	U
Vinyl Chloride	0.9	0.02	0.0024	Ü	0.0025	Ü	0.0024	Ü	0.0023	U	0.0028	U
Xylenes, Total	100	0.26	0.0073	Ü	0.0076	Ü	0.0072	Ü	0.0068	U	0.0084	U
Semi-Volatiles, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Dilution Factor	<i>3,</i> 3	Ci G	2		2		2		2		2	
1,1'-Biphenyl	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
1,2,4,5-Tetrachlorobenzene	~	~	0.16	U	0.14	U	0.16	U	0.13	U	0.13	U
1,2,4-Trichlorobenzene	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
1,2-Dichlorobenzene	100	1.1	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
1,2-Diphenylhydrazine (as Azobenzene)	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
1,3-Dichlorobenzene	49	2.4	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
1,4-Dichlorobenzene	13	1.8	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
2,3,4,6-Tetrachlorophenol	~	~	0.16	U	0.14	U	0.16	U	0.13	U	0.13	U
2,4,5-Trichlorophenol	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
2,4,6-Trichlorophenol	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
2,4-Dichlorophenol	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
2,4-Dimethylphenol	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
2,4-Dinitrophenol	~	~	0.16	U	0.14	U	0.16	U	0.13	U	0.13	U
2,4-Dinitrotoluene	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
2,6-Dinitrotoluene	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U

TABLE 1B 41-53 Buena Vista Avenue Yonkers, New York

BCP Site C360085

Summary of Excavation End Point Samples - EB-6 to EB-10

Compile ID			EB-6-101515		EB-7-101515		EB-8-101515		EB-9-101515		EB-10-10151	E
Sample ID York ID	NYSDEC Part 375	NYSDEC Part 375	15J0652-07		15J0652-08		15J0652-09	1	15J0652-10		15J0652-11	
	Restricted Use Soil	Unrestricted Use Soil	10/15/2015 8:54:0	0.004	10/15/2015 8:59:0	00 004	10/15/2015 9:45:0	00 004	10/15/2015 9:04:0		10/15/2015 9:10:0	
Sampling Date Client Matrix	Cleanup Objectives -	Cleanup Objectives	10/15/2015 8.54.0 Soil	U AIVI	10/15/2015 8.59.0 Soil	JU AIVI	10/13/2013 9:43:0 Soil	JU AIVI	10/13/2013 9.04.0 Soil	JU AIVI	10/13/2013 9:10.0 Soil	UU AIVI
Compound	Restricted Residential	Cleanup Objectives	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
2-Chloronaphthalene	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
2-Chlorophenol	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
2-Methylnaphthalene	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
2-Methylphenol	100	0.33	0.078	U	0.072	Ü	0.080	Ü	0.065	Ü	0.064	U
2-Nitroaniline	~	~	0.16	U	0.14	U	0.16	Ü	0.13	U	0.13	Ü
2-Nitrophenol	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	Ü	0.064	Ü
3- & 4-Methylphenols	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	Ü
3,3'-Dichlorobenzidine	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	Ü	0.064	U
3-Nitroaniline	~	~	0.16	U	0.14	U	0.16	Ü	0.13	U	0.13	U
4,6-Dinitro-2-methylphenol	~	~	0.16	U	0.14	Ü	0.16	Ü	0.13	U	0.13	U
4-Bromophenyl phenyl ether	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
4-Chloro-3-methylphenol	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
4-Chloroaniline	~	~	0.078	U	0.072	U	0.080	Ü	0.065	U	0.064	U
4-Chlorophenyl phenyl ether	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	Ü	0.064	U
4-Nitroaniline	~	~	0.16	U	0.14	Ü	0.16	Ü	0.13	Ü	0.13	U
4-Nitrophenol	~	~	0.16	U	0.14	Ü	0.16	Ü	0.13	U	0.13	Ü
Acenaphthene	100	20	0.078	U	0.072	U	0.080	Ü	0.065	U	0.064	U
Acenaphthylene	100	100	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
Acetophenone	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	Ü	0.064	U
Aniline	~	~	0.31	U	0.29	Ü	0.32	Ü	0.26	U	0.26	Ü
Anthracene	100	100	0.078	U	0.072	U	0.080	Ü	0.065	U	0.064	U
Atrazine	~	~	0.078	U	0.072	U	0.080	Ü	0.065	U	0.064	U
Benzaldehyde	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
Benzidine	~	~	0.31	U	0.29	Ü	0.32	Ü	0.26	U	0.26	Ü
Benzo(a)anthracene	1	1	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
Benzo(a)pyrene	1	1	0.078	Ü	0.072	Ü	0.080	Ü	0.065	U	0.064	Ü
Benzo(b)fluoranthene	1	1	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
Benzo(g,h,i)perylene	100	100	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
Benzo(k)fluoranthene	3.9	0.8	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Benzoic acid	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	Ü
Benzyl alcohol	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
Benzyl butyl phthalate	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	Ü
Bis(2-chloroethoxy)methane	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
Bis(2-chloroethyl)ether	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	Ü
Bis(2-chloroisopropyl)ether	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Bis(2-ethylhexyl)phthalate	~	~	0.078	U	0.072	Ü	0.080	U	0.065	U	0.064	U
Caprolactam	~	~	0.16	U	0.14	U	0.16	Ü	0.13	U	0.13	Ü
Carbazole	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	Ü
Chrysene	3.9	1	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	Ü
Dibenzo(a,h)anthracene	0.33	0.33	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	Ü
Dibenzofuran	59	7	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	U
Diethyl phthalate	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	Ü
Dimethyl phthalate	~	~	0.078	U	0.072	Ü	0.080	Ü	0.065	U	0.064	Ü

Summary of Excavation End Point Samples - EB-6 to EB-10

Comple ID			EB-6-101515		EB-7-101515		EB-8-101515		EB-9-101515		EB-10-101515	E
Sample ID	NYSDEC Part 375	NYSDEC Part 375	15J0652-07		15J0652-08		15J0652-09		15J0652-10		15J0652-11	
York ID	Restricted Use Soil			0.484				20. 4 8 4		0.004		
Sampling Date	Cleanup Objectives -	Unrestricted Use Soil	10/15/2015 8:54:0	U AIVI	10/15/2015 8:59:0	JU AIVI	10/15/2015 9:45:0	JU AIVI	10/15/2015 9:04:0	U AIVI	10/15/2015 9:10:0	JU AIVI
Client Matrix	Restricted Residential	Cleanup Objectives	Soil		Soil		Soil		Soil		Soil	
Compound Di-n-butyl phthalate	~	~	Result 0.078	Q U	Result 0.072	Q U	Result 0.080	Q U	Result	Q U	Result 0.064	Q U
•	~	~		_		_		_	0.065			_
Di-n-octyl phthalate	100		0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Fluoranthene	100	100 30	0.078	U	0.072	U	0.080	U	0.065	U	0.099	JD
Fluorene	100		0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Hexachlorobenzene	1.2	0.33 ~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Hexachlorobutadiene	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	
Hexachlorocyclopentadiene	~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Hexachloroethane			0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Indeno(1,2,3-cd)pyrene	0.5	0.5 ~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Isophorone			0.078	U	0.072	U	0.080	U	0.065	U	0.064	
Naphthalene	100	12 ~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Nitrobenzene	2:	2 2	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
N-Nitrosodimethylamine	~ ~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
N-nitroso-di-n-propylamine	~ ~	~	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
N-Nitrosodiphenylamine	~ C 7		0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Pentachlorophenol	6.7	0.8	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Phenanthrene	100	100	0.078	U	0.072		0.080	U	0.065	U	0.064	U
Phenol	100	0.33	0.078	U	0.072	U	0.080	U	0.065	U	0.064	U
Pyrene	100	100	0.078	U	0.072	U	0.080	U	0.065	U	0.075	JD
Pesticides, NJDEP/TCL/Part 375 List Dilution Factor	mg/Kg	mg/Kg	mg/Kg		mg/Kg 5		mg/Kg 5		mg/Kg		mg/Kg	
4,4'-DDD	13	0.0033	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
4,4'-DDE	8.9	0.0033	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
4,4'-DDT	7.9	0.0033	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
Aldrin	0.097	0.005	0.0021	U	0.0019		0.0021	U	0.0017	U	0.0017	U
alpha-BHC	0.48	0.005	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
alpha-Chlordane	4.2	0.094	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
beta-BHC	0.36	0.036	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
Chlordane, total	0.50 ~	0.030 ~	0.082	U	0.075	U	0.084	Ü	0.069	U	0.067	U
delta-BHC	100	0.04	0.0021	U	0.0019	U	0.0021	U	0.003	U	0.007	U
Dieldrin	0.2	0.005	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
Endosulfan I	24	2.4	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
Endosulfan II	24	2.4	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
Endosulfan sulfate	24	2.4	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	IJ
Endosulian sunate Endrin	11	0.014	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
Endrin aldehyde	~	0.014 ~	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
Endrin aldenyde Endrin ketone	~	~	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
gamma-BHC (Lindane)	1.3	0.1	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
gamma-Chlordane	~	~	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
Heptachlor	2.1	0.042	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
Heptachlor epoxide	~	0.042 ~	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
Methoxychlor	~	~	0.0021	U	0.0019	U	0.0021	U	0.0017	U	0.0017	U
Toxaphene	~	~	0.0021	U	0.19	U	0.0021	U	0.0017	U	0.0017	U

Summary of Excavation End Point Samples - EB-6 to EB-10

6 1 10			FD C 101F1F		ED 7 101E1E		ED 0 101E1E		ED 0 101E1E		ED 10 101E1E	
Sample ID	NYSDEC Part 375	NYSDEC Part 375	EB-6-101515		EB-7-101515 15J0652-08		EB-8-101515		EB-9-101515		EB-10-101515	
York ID	Restricted Use Soil		15J0652-07				15J0652-09		15J0652-10		15J0652-11	
Sampling Date	Cleanup Objectives -	Unrestricted Use Soil	10/15/2015 8:54:0	U AIVI	10/15/2015 8:59:0	U AIVI	10/15/2015 9:45:0	O AIVI	10/15/2015 9:04:0	U AIVI	10/15/2015 9:10:0	U AIVI
Client Matrix	Restricted Residential	Cleanup Objectives	Soil		Soil		Soil		Soil		Soil	
Compound Polychlorinated Biphenyls (PCB)	ma/Va	ma/Va	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Dilution Factor	mg/Kg	mg/Kg	mg/Kg 1		mg/Kg 1		mg/Kg 1		mg/Kg 1		mg/Kg 1	
Aroclor 1016	~	~	0.021	U	0.019	U	0.021	U	0.017	U	0.017	U
Aroclor 1016 Aroclor 1221	~	~	0.021	U	0.019	U	0.021	_	0.017	_	0.017	U
	CV.	~				_		U		U		
Aroclor 1232 Aroclor 1242	 N	~	0.021 0.021	U	0.019	U	0.021	U	0.017 0.017	U	0.017	U
	 N	~		U	0.019	U	0.021	U		U	0.017	U
Aroclor 1248		~	0.021	U	0.019	U	0.021	U	0.017	U	0.017	U
Aroclor 1254			0.021	U	0.019	U	0.021	U	0.017	U	0.017	U
Aroclor 1260		~	0.021	U	0.019	U	0.021	U	0.017	U	0.017	U
Total PCBs	1	0.1	0.021	U	0.019	U	0.021	U	0.017	U	0.017	U
Metals, Target Analyte	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Dilution Factor			1		1		1		1		1	
Aluminum	~	~ ~	11,000	l	8,610		12,100		4,400		5,910	l l
Antimony			0.62	U	0.57	U	0.64	U	0.52	U	0.51	U
Arsenic	16	13	1.75		1.73		2.69		1.04	U	1.07	
Barium	400	350	66.90		52		64.50		24.10		36.60	
Beryllium	72	7.2	0.47		0.27		0.31		0.10	U	0.10	U
Cadmium	4.3	2.5	0.37	U	0.34	U	0.38	U	0.31	U	0.31	U
Calcium	~	~	2,500		2,500		2,770		12,600		7,950	
Chromium	~	~	19		15.70		19.10		10.10		13.30	
Cobalt	~	~	10.90		8.16		11.20		4.58		7.06	
Copper	270	50	20.50		18.20		23.80		18.50		29.40	
Iron	~	~	23,500		17,000		23,800		8,470		10,800	
Lead	400	63	13.20		9.11		13.70		4.78		10.20	
Magnesium	~	~	4,810		4,740		4,870		8,930		6,020	
Manganese	2000	1600	540		478		529		251		204	
Nickel	310	30	24.50		17.10		23		12.50		16.90	
Potassium	~	~	2,700		2,270		3,220		702		1,110	
Selenium	180	3.9	3.26		2.17		3.70		1.04	U	1.50	
Silver	180	2	0.62	U	0.57	U	0.64	U	0.52	U	0.51	U
Sodium	~	~	178		195		188		213		231	
Thallium	~	~	1.25	U	1.14	U	1.27	U	1.04	U	1.02	U
Vanadium	~	~	26.80		22.40		30.90		14.60		17.50	
Zinc	10000	109	44.70		33.40		48.10		16.20		26.10	
Mercury by 7470/7471	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Dilution Factor			1		1		1		1		1	
Mercury	0.81	0.18	0.041	U	0.038	U	0.042	U	0.034	U	0.034	U
Total Solids			%		%		%		%		%	
Dilution Factor			1		1		1		1		1	
% Solids	~	~	80.20		87.60		78.50		96.20		98.40	

NOTES:

Any Regulatory Exceedences are color coded by Regulation

TABLE 1B

41-53 Buena Vista Avenue

Yonkers, New York BCP Site C360085

Summary of Excavation End Point Samples - EB-6 to EB-10

Sample ID	NYSDEC Part 375		EB-6-101515		EB-7-101515		EB-8-101515		EB-9-101515		EB-10-101515	5
York ID	Restricted Use Soil	NYSDEC Part 375	15J0652-07		15J0652-08		15J0652-09		15J0652-10		15J0652-11	
Sampling Date	Cleanup Objectives -	Unrestricted Use Soil	10/15/2015 8:54:0	0 AM	10/15/2015 8:59:0	0 AM	10/15/2015 9:45:0	00 AM	10/15/2015 9:04:0	00 AM	10/15/2015 9:10:0	MA 00
Client Matrix	Restricted Residential	Cleanup Objectives	Soil		Soil		Soil		Soil		Soil	
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

NT=this indicates the analyte was not a target for this sample

~=this indicates that no regulatory limit has been established for this analyte

HydroEnvironmental Solutions, Inc.
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Summary of Excavation End Point Samples - EB-11 to EB-15

Sample ID			EB-11-10151	5	EB-12-10151	5	EB-13-10151!	5	EB-14-101515		EB-15-101515
York ID	NYSDEC Part 375	NYSDEC Part 375	15J0652-12		15J0652-13		15J0652-14		15J0652-15		15J0652-17
Sampling Date	Restricted Use Soil	Unrestricted Use	10/15/2015 9:24:0		10/15/2015 9:30:0	00 AM	10/15/2015 9:32:0	00 AM	10/15/2015 9:38:0	ο ΔΜ	10/15/2015 10:02:0
Client Matrix	Cleanup Objectives -	Soil Cleanup	Soil	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Soil	7	Soil	, , , , , ,	Soil		Soil
Compound	Restricted Residential	Objectives	Result	Q	Result	Q	Result	Q	Result	Q	Result
Volatile Organics, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg
Dilution Factor		S. C	1		1		1		1		1
1,1,1,2-Tetrachloroethane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,1,1-Trichloroethane	100	0.68	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,1,2,2-Tetrachloroethane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,1,2-Trichloroethane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,1-Dichloroethane	26	0.27	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,1-Dichloroethylene	100	0.33	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,2,3-Trichlorobenzene	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,2,3-Trichloropropane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,2,4-Trichlorobenzene	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,2,4-Trimethylbenzene	52	3.6	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,2-Dibromo-3-chloropropane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,2-Dibromoethane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,2-Dichlorobenzene	100	1.1	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,2-Dichloroethane	3.1	0.02	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,2-Dichloropropane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,3,5-Trimethylbenzene	52	8.4	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,3-Dichlorobenzene	49	2.4	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,4-Dichlorobenzene	13	1.8	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
1,4-Dioxane	13	0.1	0.044	U	0.048	U	0.068	U	0.049	U	0.048
2-Butanone	100	0.12	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
2-Hexanone	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
4-Methyl-2-pentanone	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Acetone	100	0.05	0.0044	U	0.0048	U	0.0073	J	0.030		0.0048
Acrolein	~	~	0.0044	U	0.0048	U	0.0068	U	0.0049	U	0.0048
Acrylonitrile	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Benzene	4.8	0.06	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Bromochloromethane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Bromodichloromethane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Bromoform	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Bromomethane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Carbon disulfide	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Carbon tetrachloride	2.4	0.76	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Chlorobenzene	100	1.1	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Chloroethane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Chloroform	49	0.37	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Chloromethane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
cis-1,2-Dichloroethylene	100	0.25	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024

Summary of Excavation End Point Samples - EB-11 to EB-15

Sample ID			EB-11-10151	ξ	EB-12-101515		EB-13-101515		EB-14-101515	5	EB-15-101515
York ID	NYSDEC Part 375	NYSDEC Part 375	15J0652-12	,	15J0652-13	•	15J0652-14	•	15J0652-15	,	15J0652-17
Sampling Date	Restricted Use Soil	Unrestricted Use	10/15/2015 9:24:0	00 484	10/15/2015 9:30:0	0 00	10/15/2015 9:32:0	00 004	10/15/2015 9:38:0	00 4 8 4	10/15/2015 10:02:0
Client Matrix	Cleanup Objectives -	Soil Cleanup	10/13/2013 9.24.0 Soil	JU AIVI	10/13/2013 9.30.0 Soil	O AIVI	10/13/2013 9.32.0 Soil	JU AIVI	10/13/2013 9.38.0 Soil	JU AIVI	10/15/2015 10.02.0 Soil
Compound	Restricted Residential	Objectives	Result	Q	Result	Q	Result	Q	Result	Q	Result
cis-1,3-Dichloropropylene	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Cyclohexane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Dibromochloromethane	~	~	0.0022	U	0.0024	U	0.0034	Ü	0.0024	U	0.0024
Dibromomethane	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Dichlorodifluoromethane	~	~	0.0022	U	0.0024	U	0.0034	Ü	0.0024	U	0.0024
Ethyl Benzene	41	1	0.0022	U	0.0024	U	0.0034	Ü	0.0024	U	0.0024
Hexachlorobutadiene	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Isopropylbenzene	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Methyl acetate	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Methyl tert-butyl ether (MTBE)	100	0.93	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Methylcyclohexane	~	0.93 ~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Methylene chloride	100	0.05	0.0022	U	0.0024	U	0.0068	U	0.0024	U	0.0024
n-Butylbenzene	100	12	0.0044	U	0.0048	U	0.0034	U	0.0049	U	0.0048
n-Propylbenzene	100	3.9	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
	~	5.9 ~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
o-Xylene p- & m- Xylenes	~	~						U			
	~	~	0.0044 0.0022	U	0.0048 0.0024	U	0.0068 0.0034	U	0.0049 0.0024	U	0.0048 0.0024
p-Isopropyltoluene	100		0.0022		0.0024	U	0.0034	U	0.0024	U	0.0024
sec-Butylbenzene	100	11 ~		U		U				U	
Styrene	~	~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
tert-Butyl alcohol (TBA)			0.0022	U	0.0024	U	0.0068	U	0.0049	U	0.0048
tert-Butylbenzene	100	5.9	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Tetrachloroethylene	19	1.3	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Toluene	100	0.7	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
trans-1,2-Dichloroethylene	100	0.19 ~	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
trans-1,3-Dichloropropylene			0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Trichloroethylene	21	0.47	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Trichlorofluoromethane	0.0	0.00	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Vinyl Chloride	0.9	0.02	0.0022	U	0.0024	U	0.0034	U	0.0024	U	0.0024
Xylenes, Total	100	0.26	0.0066	U	0.0072	U	0.010	U	0.0073	U	0.0072
Semi-Volatiles, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg
Dilution Factor	21	~	2	l	2	l	2	l	2		2
1,1'-Biphenyl	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
1,2,4,5-Tetrachlorobenzene	~	~	0.13	U	0.13	U	0.15	U	0.14	U	0.13
1,2,4-Trichlorobenzene			0.065	U	0.065	U	0.077	U	0.072	U	0.065
1,2-Dichlorobenzene	100	1.1 ~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
1,2-Diphenylhydrazine (as Azobenzene)	40		0.065	U	0.065	U	0.077	U	0.072	U	0.065
1,3-Dichlorobenzene	49	2.4	0.065	U	0.065	U	0.077	U	0.072	U	0.065
1,4-Dichlorobenzene	13	1.8	0.065	U	0.065	U	0.077	U	0.072	U	0.065
2,3,4,6-Tetrachlorophenol	~	~	0.13	U	0.13	U	0.15	U	0.14	U	0.13

Summary of Excavation End Point Samples - EB-11 to EB-15

Sample ID			EB-11-101515 15J0652-12		EB-12-10151	ξ	EB-13-10151	5	EB-14-101515		EB-15-101515
York ID	NYSDEC Part 375	NYSDEC Part 375			15J0652-13	,	15J0652-14	,	15J0652-15	,	15J0652-17
Sampling Date	Restricted Use Soil	Unrestricted Use	10/15/2015 9:24:0		10/15/2015 9:30:0	00 4 8 4	10/15/2015 9:32:0	O A N/I	10/15/2015 9:38:0	00 004	10/15/2015 10:02:0
. •	Cleanup Objectives -	Soil Cleanup	10/13/2013 9.24.0 Soil	JU AIVI	10/13/2013 9.30.0 Soil	O AIVI	10/13/2013 9.32.0 Soil	JU AIVI	10/13/2013 9.38.0 Soil	O AIVI	10/13/2013 10.02.0 Soil
Client Matrix	Restricted Residential	Objectives								0	
Compound	~	~	Result	Q	Result	Q	Result	Q	Result	Q	Result
2,4,5-Trichlorophenol	-	~ ~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
2,4,6-Trichlorophenol	~	~ ~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
2,4-Dichlorophenol	~		0.065	U	0.065	U	0.077	U	0.072	U	0.065
2,4-Dimethylphenol	~	٠ ،	0.065	U	0.065	U	0.077	U	0.072	U	0.065
2,4-Dinitrophenol	~	2 ~	0.13	U	0.13	U	0.15	U	0.14	U	0.13
2,4-Dinitrotoluene	~		0.065	U	0.065	U	0.077	U	0.072	U	0.065
2,6-Dinitrotoluene	~	2 2	0.065	U	0.065	U	0.077	U	0.072	U	0.065
2-Chloronaphthalene	~		0.065	U	0.065	U	0.077	U	0.072	U	0.065
2-Chlorophenol	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
2-Methylnaphthalene		~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
2-Methylphenol	100	0.33	0.065	U	0.065	U	0.077	U	0.072	U	0.065
2-Nitroaniline	~	~	0.13	U	0.13	U	0.15	U	0.14	U	0.13
2-Nitrophenol	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
3- & 4-Methylphenols	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
3,3'-Dichlorobenzidine	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
3-Nitroaniline	~	~	0.13	U	0.13	U	0.15	U	0.14	U	0.13
4,6-Dinitro-2-methylphenol	~	~	0.13	U	0.13	U	0.15	U	0.14	U	0.13
4-Bromophenyl phenyl ether	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
4-Chloro-3-methylphenol	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
4-Chloroaniline	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
4-Chlorophenyl phenyl ether	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
4-Nitroaniline	~	~	0.13	U	0.13	U	0.15	U	0.14	U	0.13
4-Nitrophenol	~	~	0.13	U	0.13	U	0.15	U	0.14	U	0.13
Acenaphthene	100	20	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Acenaphthylene	100	100	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Acetophenone	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Aniline	~	~	0.26	U	0.26	U	0.31	U	0.29	U	0.26
Anthracene	100	100	0.14	D	0.065	U	0.077	U	0.072	U	0.065
Atrazine	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Benzaldehyde	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Benzidine	~	~	0.26	U	0.26	U	0.31	U	0.29	U	0.26
Benzo(a)anthracene	1	1	0.23	D	0.065	U	0.077	U	0.072	U	0.065
Benzo(a)pyrene	1	1	0.20	D	0.065	U	0.077	U	0.072	U	0.065
Benzo(b)fluoranthene	1	1	0.18	D	0.065	U	0.077	U	0.072	U	0.065
Benzo(g,h,i)perylene	100	100	0.16	D	0.065	U	0.077	U	0.072	U	0.065
Benzo(k)fluoranthene	3.9	0.8	0.22	D	0.065	U	0.077	U	0.072	U	0.065
Benzoic acid	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Benzyl alcohol	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Benzyl butyl phthalate	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Bis(2-chloroethoxy)methane	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065

Summary of Excavation End Point Samples - EB-11 to EB-15

Sample ID			EB-11-10151	F	EB-12-10151	F	EB-13-101515	•	EB-14-101515	•	EB-15-101515
York ID	NYSDEC Part 375	NYSDEC Part 375	15J0652-12		15J0652-13	•	15J0652-14	•	15J0652-15	•	15J0652-17
	Restricted Use Soil	Unrestricted Use	10/15/2015 9:24:0		10/15/2015 9:30:0	20. 484	10/15/2015 9:32:0	0.004	10/15/2015 9:38:0	0 004	10/15/2015 10:02:0
Sampling Date Client Matrix	Cleanup Objectives -	Soil Cleanup	10/13/2013 9.24.0 Soil	JU AIVI	10/13/2013 9.30.0 Soil	JU AIVI	10/13/2013 9.32.0 Soil	O AIVI	10/13/2013 9.38.0 Soil	O AIVI	10/13/2013 10.02.0 Soil
Compound	Restricted Residential	Objectives	Result	Q	Result	Q	Result	Q	Result	Q	Result
Bis(2-chloroethyl)ether	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Bis(2-chloroisopropyl)ether	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Bis(2-ethylhexyl)phthalate	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Caprolactam	~	~	0.003	U	0.13		0.15	U	0.14		0.003
Carbazole	~	~	0.13	JD	0.13	U	0.13	U	0.14	U	0.13
	3.9	1	0.25	D	0.065	U	0.077	U	0.072	U	0.065
Chrysene		_				U				U	
Dibenzo(a,h)anthracene	0.33	0.33	0.12	JD	0.065	U	0.077	U	0.072	U	0.065
Dibenzofuran	59 ~	7 ~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Diethyl phthalate	~		0.065	U	0.065	U	0.077	U	0.072	U	0.065
Dimethyl phthalate		~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Di-n-butyl phthalate	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Di-n-octyl phthalate	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Fluoranthene	100	100	0.50	D	0.065	U	0.077	U	0.072	U	0.065
Fluorene	100	30	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Hexachlorobenzene	1.2	0.33	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Hexachlorobutadiene	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Hexachlorocyclopentadiene	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Hexachloroethane	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.15	D	0.065	U	0.077	U	0.072	U	0.065
Isophorone	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Naphthalene	100	12	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Nitrobenzene	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
N-Nitrosodimethylamine	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
N-nitroso-di-n-propylamine	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
N-Nitrosodiphenylamine	~	~	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Pentachlorophenol	6.7	0.8	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Phenanthrene	100	100	0.42	D	0.065	U	0.077	U	0.072	U	0.065
Phenol	100	0.33	0.065	U	0.065	U	0.077	U	0.072	U	0.065
Pyrene	100	100	0.37	D	0.065	U	0.077	U	0.072	U	0.065
Pesticides, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg
Dilution Factor			5		5		5		5		5
4,4'-DDD	13	0.0033	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
4,4'-DDE	8.9	0.0033	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
, 4,4'-DDT	7.9	0.0033	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Aldrin	0.097	0.005	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
alpha-BHC	0.48	0.02	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
alpha-Chlordane	4.2	0.094	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
beta-BHC	0.36	0.036	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Chlordane, total	~	~	0.068	U	0.068	U	0.081	U	0.076	U	0.068

Summary of Excavation End Point Samples - EB-11 to EB-15

Sample ID			EB-11-10151	E	EB-12-101515		EB-13-101515		EB-14-101515		EB-15-101515
York ID	NYSDEC Part 375	NYSDEC Part 375	15J0652-12	,	15J0652-13	•	15J0652-14	•	15J0652-15	,	15J0652-17
Sampling Date	Restricted Use Soil	Unrestricted Use	10/15/2015 9:24:0	OO ANA	10/15/2015 9:30:0	0.00	10/15/2015 9:32:0	0 00	10/15/2015 9:38:0	00 004	10/15/2015 10:02:0
Client Matrix	Cleanup Objectives -	Soil Cleanup	10/13/2013 9.24.0 Soil	JU AIVI	10/13/2013 9.30.0 Soil	O AIVI	10/13/2013 9.32.0 Soil	O AIVI	10/13/2013 9.38.0 Soil	JU AIVI	10/13/2013 10.02.0 Soil
Compound	Restricted Residential	Objectives	Result	Q	Result	Q	Result	Q	Result	Q	Result
delta-BHC	100	0.04	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Dieldrin	0.2	0.005	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Endosulfan I	24	2.4	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Endosulfan II	24	2.4	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Endosulfan sulfate	24	2.4	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Endrin	11	0.014	0.0017	U	0.0017	U	0.0020	Ü	0.0019	U	0.0017
Endrin aldehyde	~	~	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Endrin ketone	~	~	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
gamma-BHC (Lindane)	1.3	0.1	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
gamma-Chlordane	~	~	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Heptachlor	2.1	0.042	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Heptachlor epoxide	~	0.042	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Methoxychlor	~	~	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.0017
Toxaphene	~	~	0.0017	U	0.0017	U	0.0020	U	0.0019	U	0.17
Polychlorinated Biphenyls (PCB)	ma/Va	mg/Kg	mg/Kg	0	mg/Kg	0	mg/Kg	0		0	mg/Kg
Dilution Factor	mg/Kg	IIIg/Ng	111g/Ng 1		111g/Ng 1		111g/ Ng 1		mg/Kg 1		111g/ Ng 1
Aroclor 1016	~	~	0.017	U	0.017	U	0.021	U	0.019	U	0.017
Aroclor 1010 Aroclor 1221	~	~	0.017	U	0.017	U	0.021	U	0.019	U	0.017
Aroclor 1221 Aroclor 1232	~	~	0.017	U	0.017	U	0.021	U	0.019	U	0.017
Aroclor 1232 Aroclor 1242	~	~	0.017	U	0.017	U	0.021	U	0.019	U	0.017
Aroclor 1242	~	~	0.017	U	0.017	U	0.021	U	0.019	U	0.017
Aroclor 1246 Aroclor 1254	~	~	0.017	U	0.017	U	0.021	U	0.019	U	0.017
Aroclor 1254 Aroclor 1260	~	~	0.017	U	0.017	U	0.021	U	0.019	U	0.017
Total PCBs	1	0.1	0.017	U	0.017	U	0.021	U	0.019	U	0.017
Metals, Target Analyte	mg/Kg	mg/Kg	mg/Kg		mg/Kg	Ŭ	mg/Kg	Ü	mg/Kg		mg/Kg
Dilution Factor	1116/116	1116/116	1		1		1		1		1
Aluminum	~	~	5,220		5,230		12,900		7,200		3,320
Antimony	~	~	0.52	U	0.52	U	0.61	U	0.58	U	0.52
Arsenic	16	13	1.03	U	1.03	U	2.03	ľ	1.62	ľ	1.03
Barium	400	350	31.20		62.90	ľ	86.80		43.80		22.10
Beryllium	72	7.2	0.10	U	0.10	U	0.38		0.16		0.10
Cadmium	4.3	2.5	0.31	U	0.31	U	0.37	U	0.35	U	0.31
Calcium	4.5 ~	~	2,600		3,310	ľ	1,910	ľ	1,620	ľ	1,050
Chromium	~	~	10.50		10.60		20.80		12		5.54
Cobalt	~	~	6.26		4.84		13		7.13		3.24
Copper	270	50	23.20		16.60		21.50		17.80		8.30
Iron	~	~	10,700		8,660		24,400		14,400		6,350
Lead	400	63	6.34		6.18		16.80		9		5.98
Magnesium	~	~	3,480		3,510		4,940		3,150		1,730
iviagnesiani			3,400		3,310		4,340		3,130	I	1,730

Summary of Excavation End Point Samples - EB-11 to EB-15

Sample ID York ID Sampling Date Client Matrix	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	EB-11-101515 15J0652-12 10/15/2015 9:24:0 Soil		EB-12-101515 15J0652-13 10/15/2015 9:30:00 A Soil		EB-13-101515 15J0652-14 10/15/2015 9:32:0 Soil		EB-14-101515 15J0652-15 10/15/2015 9:38:0 Soil		EB-15-101515 15J0652-17 10/15/2015 10:02:0 Soil
Compound			Result	Q	Result	Q	Result	Q	Result	Q	Result
Manganese	2000	1600	232		263		529		398		304
Nickel	310	30	14		10.70		23.30		14.40		8.08
Potassium	~	~	942		983		2,600		1,650		675
Selenium	180	3.9	1.21		1.03	U	2.49		1.86		1.03
Silver	180	2	0.52	U	0.52	U	0.61	U	0.58	U	0.52
Sodium	~	~	183		138		253		183		121
Thallium	~	~	1.03	U	1.03	U	1.23	U	1.15	U	1.03
Vanadium	~	~	17.40		13.50		30.30		18.80		7.74
Zinc	10000	109	21.40		20.60		47.30		30.90		14.50
Mercury by 7470/7471	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg
Dilution Factor			1		1		1		1		1
Mercury	0.81	0.18	0.034	U	0.034	U	0.041	U	0.038	U	0.034
Total Solids			%		%		%		%		%
Dilution Factor			1		1		1		1		1
% Solids	~	~	97.10		97		81.40		86.60		97.10

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

NT=this indicates the analyte was not a target for this sample

~=this indicates that no regulatory limit has been established for this analyte

HydroEnvironmental Solutions, Inc.
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BCP Site C360085

Summary of Excavation End Point Samples - EB-16 to EB-19

	•		EB-16-101515 EC Part 375 15J0652-18			-			EB-19-101515		
Sample ID	NYSDEC Part 375				EB-17-101515	5	EB-18-101515	5		5	
York ID	Restricted Use Soil	NYSDEC Part 375			15J0652-19		15J0652-20		15J0652-21		
Sampling Date	Cleanup Objectives -	Unrestricted Use Soil	10/15/2015 10:16:0	00 AM	10/15/2015 10:21:	00 AM	10/15/2015 10:32:0	00 AM	10/15/2015 10:36:	00 AM	
Client Matrix	Restricted Residential	Cleanup Objectives	Soil		Soil		Soil		Soil		
Compound			Result	Q	Result	Q	Result	Q	Result	Q	
Volatile Organics, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		
Dilution Factor			1		1		1		1		
1,1,1,2-Tetrachloroethane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,1,1-Trichloroethane	100	0.68	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,1,2,2-Tetrachloroethane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,1,2-Trichloroethane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,1-Dichloroethane	26	0.27	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,1-Dichloroethylene	100	0.33	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,2,3-Trichlorobenzene	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,2,3-Trichloropropane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,2,4-Trichlorobenzene	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,2,4-Trimethylbenzene	52	3.6	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,2-Dibromo-3-chloropropane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,2-Dibromoethane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,2-Dichlorobenzene	100	1.1	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,2-Dichloroethane	3.1	0.02	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,2-Dichloropropane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,3,5-Trimethylbenzene	52	8.4	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,3-Dichlorobenzene	49	2.4	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,4-Dichlorobenzene	13	1.8	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
1,4-Dioxane	13	0.1	0.049	U	0.044	U	0.057	U	0.048	U	
2-Butanone	100	0.12	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
2-Hexanone	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
4-Methyl-2-pentanone	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Acetone	100	0.05	0.0049	U	0.014		0.026		0.021		
Acrolein	~	~	0.0049	U	0.0044	U	0.0057	U	0.0048	U	
Acrylonitrile	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Benzene	4.8	0.06	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Bromochloromethane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Bromodichloromethane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Bromoform	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Bromomethane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Carbon disulfide	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Carbon tetrachloride	2.4	0.76	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Chlorobenzene	100	1.1	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Chloroethane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Chloroform	49	0.37	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Chloromethane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
cis-1,2-Dichloroethylene	100	0.25	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
cis-1,3-Dichloropropylene	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Cyclohexane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	
Dibromochloromethane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U	

Summary of Excavation End Point Samples - EB-16 to EB-19

Comple ID		Part 375					EB-18-101515		EB-19-101515	_
Sample ID York ID	NYSDEC Part 375	NIVEDEC Dort 275		•	EB-17-101515 15J0652-19	•	15J0652-20	•	15J0652-21	
	Restricted Use Soil	Unrestricted Use Soil	10/15/2015 10:16:	20. 484	10/15/2015 10:21:	00 484		20.484	10/15/2015 10:36:	00 4 5 4
Sampling Date	Cleanup Objectives -	Cleanup Objectives	10/15/2015 10:16:0 Soil	JU AIVI	10/15/2015 10:21:0 Soil	UU AIVI	10/15/2015 10:32:0 Soil	JU AIVI	10/15/2015 10:36:0 Soil	JU AIVI
Client Matrix	Restricted Residential	Cleanup Objectives		_		0		0		
Compound Dibromomethane	~	~	Result 0.0024	Q U	Result 0.0022	Q U	Result 0.0028	Q U	Result 0.0024	Q U
Dichlorodifluoromethane	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U
Ethyl Benzene	41	1	0.0024	U	0.0022	U	0.0028	U	0.0024	U
Hexachlorobutadiene	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U
Isopropylbenzene	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U
Methyl acetate	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U
•	100	0.93		U	0.0022		0.0028	_	0.0024	U
Methyl tert-butyl ether (MTBE)	100	0.93 ~	0.0024 0.0024	U	0.0022	U	0.0028	U	0.0024	U
Methylogo shlorida								_		
Methylene chloride	100 100	0.05 12	0.0049 0.0024	U	0.0044 0.0022	U	0.0057 0.0028	U	0.0048 0.0024	U
n-Butylbenzene		12 3.9	0.0024	U	0.0022	U	0.0028 0.0028	U	0.0024 0.0024	U
n-Propylbenzene	100	3.9 ~	0.0024	U		U	0.0028 0.0028	U		U
o-Xylene	~	~		U	0.0022	U		U	0.0024	U
p- & m- Xylenes	~	~	0.0049	_	0.0044	U	0.0057	U	0.0048	U
p-Isopropyltoluene			0.0024	U	0.0022	U	0.0028	U	0.0024	U
sec-Butylbenzene	100	11 ~	0.0024	U	0.0022	U	0.0028	U	0.0024	U
Styrene	~	~	0.0024	U	0.0022	U	0.0028	U	0.0024	U
tert-Butyl alcohol (TBA)			0.0049	U	0.0044	U	0.0028	U	0.0024	U
tert-Butylbenzene	100	5.9	0.0024	U	0.0022	U	0.0028	U	0.0024	U
Tetrachloroethylene	19	1.3	0.0024	U	0.0022	U	0.0028	U	0.0024	U
Toluene	100	0.7	0.0024	U	0.0022	U	0.0028	U	0.0024	U
trans-1,2-Dichloroethylene	100	0.19 ~	0.0024	U	0.0022	U	0.0028	U	0.0024	U
trans-1,3-Dichloropropylene			0.0024	U	0.0022	U	0.0028	U	0.0024	U
Trichloroethylene	21	0.47 ~	0.0024	U	0.0022	U	0.0028	U	0.0024	U
Trichlorofluoromethane			0.0024	U	0.0022	U	0.0028	U	0.0024	U
Vinyl Chloride	0.9	0.02	0.0024	U	0.0022	U	0.0028	U	0.0024	U
Xylenes, Total	100	0.26	0.0073	U	0.0066	U	0.0085	U	0.0073	U
Semi-Volatiles, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg	•
Dilution Factor	~	~	2	l	2		2		2	
1,1'-Biphenyl	~	~	0.066	U	0.068	U	0.073	U	0.070	U
1,2,4,5-Tetrachlorobenzene	~	~	0.13	U	0.14	U	0.15	U	0.14	U
1,2,4-Trichlorobenzene			0.066	U	0.068	U	0.073	U	0.070	U
1,2-Dichlorobenzene	100	1.1 ~	0.066	U	0.068	U	0.073	U	0.070	U
1,2-Diphenylhydrazine (as Azobenzene)			0.066	U	0.068	U	0.073	U	0.070	U
1,3-Dichlorobenzene	49	2.4	0.066	U	0.068	U	0.073	U	0.070	U
1,4-Dichlorobenzene	13 ~	1.8 ~	0.066	U	0.068	U	0.073	U	0.070	U
2,3,4,6-Tetrachlorophenol	~	~	0.13	U	0.14	U	0.15	U	0.14	U
2,4,5-Trichlorophenol	~	~	0.066	U	0.068	U	0.073	U	0.070	U
2,4,6-Trichlorophenol	~ ~	~	0.066	U	0.068	U	0.073	U	0.070	U
2,4-Dichlorophenol	~ ~	~	0.066	U	0.068	U	0.073	U	0.070	U
2,4-Dimethylphenol	~ ~	~	0.066	U	0.068	U	0.073	U	0.070	U
2,4-Dinitrophenol		~	0.13	U	0.14	U	0.15	U	0.14	U
2,4-Dinitrotoluene	~	~	0.066	U	0.068	U	0.073	U	0.070	U
2,6-Dinitrotoluene	~	~	0.066	U	0.068	U	0.073	U	0.070	U

Summary of Excavation End Point Samples - EB-16 to EB-19

Sample ID	NYSDEC Part 375	NVSDEC Part 375 1510652-18 1510		EB-17-10151		EB-18-10151	5	EB-19-10151		
York ID	Restricted Use Soil				15J0652-1 9		15J0652-20		15J0652-21	
Sampling Date	Cleanup Objectives -	Unrestricted Use Soil	10/15/2015 10:16:	00 AM	10/15/2015 10:21	:00 AM	10/15/2015 10:32:	00 AM	10/15/2015 10:36	:00 AM
Client Matrix	Restricted Residential	Cleanup Objectives	Soil		Soil		Soil		Soil	
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q
2-Chloronaphthalene	~	~	0.066	U	0.068	U	0.073	U	0.070	U
2-Chlorophenol	~	~	0.066	U	0.068	U	0.073	U	0.070	U
2-Methylnaphthalene	~	~	0.066	U	0.068	U	0.073	U	0.070	U
2-Methylphenol	100	0.33	0.066	U	0.068	U	0.073	U	0.070	U
2-Nitroaniline	~	~	0.13	U	0.14	U	0.15	U	0.14	U
2-Nitrophenol	~	~	0.066	U	0.068	U	0.073	U	0.070	U
3- & 4-Methylphenols	~	~	0.066	U	0.068	U	0.073	U	0.070	U
3,3'-Dichlorobenzidine	~	~	0.066	U	0.068	U	0.073	U	0.070	U
3-Nitroaniline	~	~	0.13	U	0.14	U	0.15	U	0.14	U
4,6-Dinitro-2-methylphenol	~	~	0.13	U	0.14	U	0.15	U	0.14	U
4-Bromophenyl phenyl ether	~	~	0.066	U	0.068	U	0.073	U	0.070	U
4-Chloro-3-methylphenol	~	~	0.066	U	0.068	U	0.073	U	0.070	U
4-Chloroaniline	~	~	0.066	U	0.068	U	0.073	U	0.070	U
4-Chlorophenyl phenyl ether	~	~	0.066	U	0.068	U	0.073	U	0.070	U
4-Nitroaniline	~	~	0.13	U	0.14	U	0.15	U	0.14	U
4-Nitrophenol	~	~	0.13	U	0.14	U	0.15	U	0.14	U
Acenaphthene	100	20	0.066	U	0.068	U	0.073	U	0.070	U
Acenaphthylene	100	100	0.066	U	0.068	U	0.073	U	0.070	U
Acetophenone	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Aniline	~	~	0.26	U	0.27	U	0.29	U	0.28	U
Anthracene	100	100	0.066	U	0.068	U	0.073	U	0.070	U
Atrazine	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Benzaldehyde	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Benzidine	~	~	0.26	U	0.27	U	0.29	U	0.28	U
Benzo(a)anthracene	1	1	0.066	U	0.068	U	0.073	U	0.070	U
Benzo(a)pyrene	1	1	0.066	U	0.068	U	0.073	U	0.070	U
Benzo(b)fluoranthene	1	1	0.066	U	0.068	U	0.073	U	0.070	U
Benzo(g,h,i)perylene	100	100	0.066	U	0.068	U	0.081	JD	0.070	U
Benzo(k)fluoranthene	3.9	0.8	0.066	U	0.068	U	0.073	U	0.070	U
Benzoic acid	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Benzyl alcohol	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Benzyl butyl phthalate	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Bis(2-chloroethoxy)methane	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Bis(2-chloroethyl)ether	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Bis(2-chloroisopropyl)ether	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Bis(2-ethylhexyl)phthalate	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Caprolactam	~	~	0.13	U	0.14	U	0.15	U	0.14	U
Carbazole	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Chrysene	3.9	1	0.066	U	0.068	U	0.073	U	0.070	U
Dibenzo(a,h)anthracene	0.33	0.33	0.066	Ü	0.068	Ü	0.081	JD	0.070	Ü
Dibenzofuran	59	7	0.066	Ü	0.068	Ü	0.073	U	0.070	U
Diethyl phthalate	~	~	0.066	Ü	0.068	Ü	0.073	Ü	0.070	Ü
Dimethyl phthalate	~	~	0.066	Ü	0.068	Ü	0.073	Ü	0.070	Ü

Summary of Excavation End Point Samples - EB-16 to EB-19

Comple ID						•	EB-18-101515		EB-19-101515	
Sample ID York ID	NYSDEC Part 375	NYSDEC Part 375	15J0652-18	•	EB-17-101515 15J0652-19	•	15J0652-20		15J0652-21	
	Restricted Use Soil	Unrestricted Use Soil	10/15/2015 10:16:	00 484	10/15/2015 10:21:0	00 484		20.484	10/15/2015 10:36:0	
Sampling Date	Cleanup Objectives -			JU AIVI		JU AIVI	10/15/2015 10:32:0	JU AIVI		JU AIVI
Client Matrix	Restricted Residential	Cleanup Objectives	Soil		Soil		Soil	0	Soil	
Compound Displayed white late	~	~	Result	Q	Result	Q	Result	Q	Result	Q
Di-n-butyl phthalate	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Di-n-octyl phthalate			0.066	U	0.068	U	0.073	U	0.070	U
Fluoranthene	100	100	0.066	U	0.068	U	0.073	U	0.070	U
Fluorene	100	30	0.066	U	0.068	U	0.073	U	0.070	U
Hexachlorobenzene	1.2	0.33 ~	0.066	U	0.068	U	0.073	U	0.070	U
Hexachlorobutadiene		~	0.066	U	0.068	U	0.073	U	0.070	U
Hexachlorocyclopentadiene	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Hexachloroethane			0.066	U	0.068	U	0.073	U	0.070	U
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.066	U	0.068	U	0.085	JD	0.070	U
Isophorone	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Naphthalene	100	12	0.066	U	0.068	U	0.073	U	0.070	U
Nitrobenzene			0.066	U	0.068	U	0.073	U	0.070	U
N-Nitrosodimethylamine	~	~	0.066	U	0.068	U	0.073	U	0.070	U
N-nitroso-di-n-propylamine	~	~	0.066	U	0.068	U	0.073	U	0.070	U
N-Nitrosodiphenylamine	~	~	0.066	U	0.068	U	0.073	U	0.070	U
Pentachlorophenol	6.7	0.8	0.066	U	0.068	U	0.073	U	0.070	U
Phenanthrene	100	100	0.066	U	0.068	U	0.073	U	0.070	U
Phenol	100	0.33	0.066	U	0.068	U	0.073	U	0.070	U
Pyrene	100	100	0.066	U	0.068	U	0.073	U	0.070	U
Pesticides, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg -		mg/Kg -		mg/Kg -		mg/Kg -	
Dilution Factor			5		5		5		5	
4,4'-DDD	13	0.0033	0.0017	U	0.0018	U	0.0019	U	0.0019	U
4,4'-DDE	8.9	0.0033	0.0017	U	0.0018	U	0.0019	U	0.0019	U
4,4'-DDT	7.9	0.0033	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Aldrin	0.097	0.005	0.0017	U	0.0018	U	0.0019	U	0.0019	U
alpha-BHC	0.48	0.02	0.0017	U	0.0018	U	0.0019	U	0.0019	U
alpha-Chlordane	4.2	0.094	0.0017	U	0.0018	U	0.0019	U	0.0019	U
beta-BHC	0.36	0.036	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Chlordane, total	~	~	0.069	U	0.072	U	0.077	U	0.074	U
delta-BHC	100	0.04	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Dieldrin	0.2	0.005	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Endosulfan I	24	2.4	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Endosulfan II	24	2.4	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Endosulfan sulfate	24	2.4	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Endrin	11	0.014	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Endrin aldehyde	~	~	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Endrin ketone	~	~	0.0017	U	0.0018	U	0.0019	U	0.0019	U
gamma-BHC (Lindane)	1.3	0.1	0.0017	U	0.0018	U	0.0019	U	0.0019	U
gamma-Chlordane	~	~	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Heptachlor	2.1	0.042	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Heptachlor epoxide	~	~	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Methoxychlor	~	~	0.0017	U	0.0018	U	0.0019	U	0.0019	U
Toxaphene	~	~	0.17	U	0.18	U	0.19	U	0.19	U

Summary of Excavation End Point Samples - EB-16 to EB-19

c			EB-16-101515	EB-17-101515		EB-18-101515		EB-19-101515		
Sample ID	NYSDEC Part 375	NYSDEC Part 375)		•		•		
York ID	Restricted Use Soil		15J0652-18		15J0652-19	00 484	15J0652-20		15J0652-21	20.444
Sampling Date	Cleanup Objectives -	Unrestricted Use Soil	10/15/2015 10:16:0	JU AIVI	10/15/2015 10:21:0	JU AIVI	10/15/2015 10:32:0	JU AIVI	10/15/2015 10:36:0	JU AIVI
Client Matrix	Restricted Residential	Cleanup Objectives	Soil		Soil		Soil		Soil	
Compound			Result	Q	Result	Q	Result	Q	Result	Q
Polychlorinated Biphenyls (PCB)	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg	1 1
Dilution Factor	~	~	1		1		1 0.019		1	l l
Aroclor 1016	~	~	0.017	U	0.018	0.018 U 0.018 U		U	0.019	U
Aroclor 1221	· ·	~	0.017	U			0.019	U	0.019	U
Aroclor 1232 Aroclor 1242	~	~	0.017	U	0.018	U	0.019	U	0.019	U
	~	 N	0.017	U	0.018	U	0.019 0.019	U	0.019	U
Arcelor 1254	~	 N	0.017	U		0.018 U		U	0.019	U
Aroclor 1254	· ·	~	0.017 U		0.018 U		0.019	U	0.019	U
Aroclor 1260	4		0.017 U		0.018 U 0.018 U		0.019	U	0.019	U
Total PCBs	1	0.1	0.017	U	mg/Kg		0.019	U	0.019	U
Metals, Target Analyte	mg/Kg	mg/Kg	mg/Kg		1 1		mg/Kg		mg/Kg	1
Dilution Factor	.	~	1				1		1	1 1
Aluminum	~	~	3,100		5,970		7,970		5,280	l l
Antimony			0.52	U	0.54	U	0.58 1.74	U	0.56	U
Arsenic	16	13	1.05	U		1.09 U			1.12	U
Barium	400	350	19.20		34.20		242		29.80	1 1
Beryllium	72	7.2	0.12		0.14		0.17	l	0.16	l l
Cadmium	4.3	2.5	0.31	U	0.33	U	0.35	U	0.34	U
Calcium	~	~	12,200		1,540		2,980		1,450	1 1
Chromium	~	~	5.89		10.10		14.30		9.92	1 1
Cobalt	~	~	3.17		5.46		7.53		4.69	1
Copper	270	50	6.39		11.30		18.50		10	1 1
Iron	~	~	6,380		11,000		15,000		10,000	1 1
Lead	400	63	3.85		8.87		33.20		5.74	1 1
Magnesium	~	~	7,120		2,680		3,540		2,330	1 1
Manganese	2000	1600	275		320		444		328	1 1
Nickel	310	30	7.26		11.10		17.30		10.50	1 1
Potassium	~	~	822		1,450		1,820		1,400	1 1
Selenium	180	3.9	1.05	U	1.13		2.21		1.24	1 1
Silver	180	2	0.52	U	0.54	U	0.58	U	0.56	U
Sodium	~	~	150		144		204		141	1 1
Thallium	~	~	1.05	U	1.09	U	1.16	U	1.12	U
Vanadium	~	~	8.74		14.50		19.40		13.90	1 1
Zinc	10000	109	11.40		23.60		39.30		18.60	igspace
Mercury by 7470/7471	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg	1 I
Dilution Factor			1		1		1		1	1 I
Mercury	0.81	0.18	0.035	U	0.036	U	0.038	U	0.037	U
Total Solids			%		%		%		%	1 I
Dilution Factor			1		1		1		1	1 1
% Solids	~	~	95.70		92.10		86.10		89.40	

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Summary of Excavation End Point Samples - EB-16 to EB-19

Sample ID York ID Sampling Date Client Matrix	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives -	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	EB-16-101515 15J0652-18 10/15/2015 10:16:0 Soil		EB-17-101515 15J0652-19 10/15/2015 10:21:0 Soil		EB-18-101515 15J0652-20 10/15/2015 10:32:0 Soil		EB-19-101515 15J0652-21 10/15/2015 10:36:0 Soil	
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

NT=this indicates the analyte was not a target for this sample

~=this indicates that no regulatory limit has been established for this analyte

HydroEnvironmental Solutions, Inc.
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Summary of Excavation End Point Samples - EB-20 to EB-24

Sample ID			EB-20-020916		EB-21-020916	j	EB-22-02091	6	Excavation Bottom-22-07	1416	EB-23-02091	6	EB-24-02091	.6
York ID	NYSDEC Part 375	NYSDEC Part 375	16B0346-01		16B0346-03		16B0346-04		16G0629-01		16B0346-05		16B0346-06	
Sampling Date	Restricted Use Soil	Unrestricted Use Soil	2/9/2016 9:45:00	AM	2/9/2016 9:58:00	AM	2/9/2016 10:18:0		7/14/2016 1:00:00 PM	И	2/9/2016 10:35:0		2/9/2016 10:40:0	
Client Matrix	Cleanup Objectives -	Cleanup Objectives	Soil		Soil		Soil		Soil		Soil		Soil	
Compound	Restricted Residential	ordinap oxygonico	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organics, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg				mg/Kg		mg/Kg	+
Dilution Factor	3, 0	<i>a, a</i>	1		1		1				1		1	1
1,1,1,2-Tetrachloroethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,1,1-Trichloroethane	100	0.68	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,1,2,2-Tetrachloroethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,1,2-Trichloroethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,1-Dichloroethane	26	0.27	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,1-Dichloroethylene	100	0.33	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,2,3-Trichlorobenzene	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,2,3-Trichloropropane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,2,4-Trichlorobenzene	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,2,4-Trimethylbenzene	52	3.6	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,2-Dibromo-3-chloropropane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,2-Dibromoethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,2-Dichlorobenzene	100	1.1	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,2-Dichloroethane	3.1	0.02	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,2-Dichloropropane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,3,5-Trimethylbenzene	52	8.4	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,3-Dichlorobenzene	49	2.4	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,4-Dichlorobenzene	13	1.8	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
1,4-Dioxane	13	0.1	0.050	U	0.039	U	0.042	U	NT		0.041	U	0.041	U
2-Butanone	100	0.12	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
2-Hexanone	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
4-Methyl-2-pentanone	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Acetone	100	0.05	0.0050	U	0.0039	U	0.0064	J	NT		0.0041	U	0.0041	U
Acrolein	~	~	0.0050	U	0.0039	U	0.0042	U	NT		0.0041	U	0.0041	U
Acrylonitrile	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Benzene	4.8	0.06	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Bromochloromethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Bromodichloromethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Bromoform	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Bromomethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Carbon disulfide	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Carbon tetrachloride	2.4	0.76	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Chlorobenzene	100	1.1	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Chloroethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Chloroform	49	0.37	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Chloromethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
cis-1,2-Dichloroethylene	100	0.25	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
cis-1,3-Dichloropropylene	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Cyclohexane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U

Summary of Excavation End Point Samples - EB-20 to EB-24

Sample ID			EB-20-020916		EB-21-020916	j	EB-22-02091	6	Excavation Bottom-22-07	1416	EB-23-020916	5	EB-24-020916	.6
York ID	NYSDEC Part 375	NYSDEC Part 375	16B0346-01		16B0346-03		16B0346-04		16G0629-01		16B0346-05		16B0346-06	
Sampling Date	Restricted Use Soil	Unrestricted Use Soil	2/9/2016 9:45:00	AM	2/9/2016 9:58:00	AM	2/9/2016 10:18:0	0 AM	7/14/2016 1:00:00 PM	M	2/9/2016 10:35:0	0 AM	2/9/2016 10:40:0	O AM
Client Matrix	Cleanup Objectives -	Cleanup Objectives	Soil		Soil		Soil		Soil		Soil		Soil	
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Dibromochloromethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Dibromomethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Dichlorodifluoromethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Ethyl Benzene	41	1	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Hexachlorobutadiene	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Isopropylbenzene	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Methyl acetate	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Methyl tert-butyl ether (MTBE)	100	0.93	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Methylcyclohexane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Methylene chloride	100	0.05	0.0050	U	0.0039	U	0.0042	U	NT		0.0041	U	0.0041	U
n-Butylbenzene	100	12	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
n-Propylbenzene	100	3.9	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
o-Xylene	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
p- & m- Xylenes	~	~	0.0050	U	0.0039	U	0.0042	U	NT		0.0041	U	0.0041	U
p-Isopropyltoluene	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
sec-Butylbenzene	100	11	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Styrene	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
tert-Butyl alcohol (TBA)	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
tert-Butylbenzene	100	5.9	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Tetrachloroethylene	19	1.3	0.0025	U	0.0072		0.0049		NT		0.0021	U	0.0020	U
Toluene	100	0.7	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
trans-1,2-Dichloroethylene	100	0.19	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
trans-1,3-Dichloropropylene	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Trichloroethylene	21	0.47	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Trichlorofluoromethane	~	~	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Vinyl Chloride	0.9	0.02	0.0025	U	0.0020	U	0.0021	U	NT		0.0021	U	0.0020	U
Xylenes, Total	100	0.26	0.0075	U	0.0059	U	0.0063	U	NT		0.0062	U	0.0061	U
Semi-Volatiles, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg				mg/Kg		mg/Kg	
Dilution Factor			2		2		2				2		2	
1,1'-Biphenyl	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
1,2,4,5-Tetrachlorobenzene	~	~	0.089	U	0.090	U	0.094	U	NT		0.087	U	0.087	U
1,2,4-Trichlorobenzene	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
1,2-Dichlorobenzene	100	1.1	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
1,2-Diphenylhydrazine (as Azobenzene)	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
1,3-Dichlorobenzene	49	2.4	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
1,4-Dichlorobenzene	13	1.8	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
2,3,4,6-Tetrachlorophenol	~	~	0.089	U	0.090	U	0.094	U	NT		0.087	U	0.087	U
2,4,5-Trichlorophenol	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
2,4,6-Trichlorophenol	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
2,4-Dichlorophenol	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
2,4-Dimethylphenol	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
2,4-Dinitrophenol	~	~	0.089	U	0.090	U	0.094	U	NT		0.087	U	0.087	U

Summary of Excavation End Point Samples - EB-20 to EB-24

Sample ID			EB-20-020916		EB-21-020916	j	EB-22-020916	5	Excavation Bottom-22-07	1416	EB-23-02091	6	EB-24-02091	.6
York ID	NYSDEC Part 375	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	16B0346-01		16B0346-03		16B0346-04		16G0629-01		16B0346-05		16B0346-06	
Sampling Date	Restricted Use Soil		2/9/2016 9:45:00) AM	2/9/2016 9:58:00	AM	2/9/2016 10:18:0	0 AM	7/14/2016 1:00:00 PN	И	2/9/2016 10:35:0	0 AM	2/9/2016 10:40:0	00 AM
Client Matrix	Cleanup Objectives -		Soil		Soil		Soil		Soil		Soil		Soil	
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
2,4-Dinitrotoluene	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
2,6-Dinitrotoluene	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
2-Chloronaphthalene	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
2-Chlorophenol	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
2-Methylnaphthalene	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
2-Methylphenol	100	0.33	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
2-Nitroaniline	~	~	0.089	U	0.090	U	0.094	U	NT		0.087	U	0.087	U
2-Nitrophenol	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
3- & 4-Methylphenols	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
3,3'-Dichlorobenzidine	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
3-Nitroaniline	~	~	0.089	U	0.090	U	0.094	U	NT		0.087	U	0.087	U
4,6-Dinitro-2-methylphenol	~	~	0.089	U	0.090	U	0.094	U	NT		0.087	U	0.087	U
4-Bromophenyl phenyl ether	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
4-Chloro-3-methylphenol	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
4-Chloroaniline	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
4-Chlorophenyl phenyl ether	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
4-Nitroaniline	~	~	0.089	U	0.090	U	0.094	U	NT		0.087	U	0.087	U
4-Nitrophenol	~	~	0.089	U	0.090	U	0.094	U	NT		0.087	U	0.087	U
Acenaphthene	100	20	0.045	U	0.045	U	0.13	D	NT		0.044	U	0.044	U
Acenaphthylene	100	100	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Acetophenone	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Aniline	~	~	0.18	U	0.18	U	0.19	U	NT		0.18	U	0.17	U
Anthracene	100	100	0.045	U	0.064	JD	0.35	D	NT		0.044 U		0.044	U
Atrazine	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Benzaldehyde	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Benzidine	~	~	0.18	U	0.18	U	0.19	U	NT		0.18	U	0.17	U
Benzo(a)anthracene	1	1	0.045	U	0.18	D	0.66	D	NT		0.044	U	0.12	D
Benzo(a)pyrene	1	1	0.045	U	0.099	D	0.27	D	NT		0.044	U	0.081	JD
Benzo(b)fluoranthene	1	1	0.045	U	0.087	JD	0.23	D	NT		0.044	U	0.069	JD
Benzo(g,h,i)perylene	100	100	0.045	U	0.045	U	0.12	D	NT		0.044	U	0.044	U
Benzo(k)fluoranthene	3.9	0.8	0.045	U	0.095	D	0.32	D	NT		0.044	U	0.077	JD
Benzoic acid	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Benzyl alcohol	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Benzyl butyl phthalate	~ ~		0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Bis(2-chloroethoxy)methane		~	0.045	U	0.045	U	0.047	U 	NT		0.044	U	0.044	U
Bis(2-chloroethyl)ether	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Bis(2-chloroisopropyl)ether	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Bis(2-ethylhexyl)phthalate	~ ~	6:	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Carlorada	~	~	0.089	U	0.090	U	0.094	U	NT		0.087	U	0.087	U
Carbazole		~	0.045	U	0.045	U	0.14	D	NT		0.044	U	0.044	U
Chrysene	3.9	1	0.045	U	0.17	D	0.67	D	NT		0.044	U	0.12	D
Dibenzo(a,h)anthracene	0.33	0.33	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U

Summary of Excavation End Point Samples - EB-20 to EB-24

Sample ID			EB-20-020916		EB-21-020916		EB-22-020916	5	Excavation Bottom-22-07	1416	EB-23-02091	6	EB-24-020916	6
York ID	NYSDEC Part 375	NYSDEC Part 375	16B0346-01		16B0346-03		16B0346-04		16G0629-01		16B0346-05		16B0346-06	
Sampling Date	Restricted Use Soil	Unrestricted Use Soil	2/9/2016 9:45:00		2/9/2016 9:58:00	AM	2/9/2016 10:18:0		7/14/2016 1:00:00 PI	M	2/9/2016 10:35:0		2/9/2016 10:40:0	
Client Matrix	Cleanup Objectives -	Cleanup Objectives	Soil		Soil		Soil		Soil		Soil		Soil	
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Dibenzofuran	59	7	0.045	U	0.045	U	0.099	D	NT		0.044	U	0.044	U
Diethyl phthalate	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Dimethyl phthalate	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Di-n-butyl phthalate	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Di-n-octyl phthalate	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Fluoranthene	100	100	0.045	U	0.35	D	1.46	D	NT		0.050	JD	0.22	D
Fluorene	100	30	0.045	U	0.045	U	0.16	D	NT		0.044	U	0.044	U
Hexachlorobenzene	1.2	0.33	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Hexachlorobutadiene	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Hexachlorocyclopentadiene	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Hexachloroethane	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.045	U	0.045	U	0.13	D	NT		0.044	U	0.044	U
Isophorone	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Naphthalene	100	12	0.045	U	0.045	U	0.093	JD	NT		0.044	U	0.044	U
Nitrobenzene	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
N-Nitrosodimethylamine	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
N-nitroso-di-n-propylamine	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
N-Nitrosodiphenylamine	~	~	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Pentachlorophenol	6.7	0.8	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Phenanthrene	100	100	0.045	U	0.26	D	1.38	D	NT		0.044	U	0.12	D
Phenol	100	0.33	0.045	U	0.045	U	0.047	U	NT		0.044	U	0.044	U
Pyrene	100	100	0.045	U	0.35	D	1.69	D	NT		0.044	U	0.22	D
Pesticides, NJDEP/TCL/Part 375 List	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Dilution Factor			5		5		5		5		5		5	
4,4'-DDD	13	0.0033	0.0018	U	0.0018	U	0.0098	D	0.0017	U	0.0017	U	0.0017	U
4,4'-DDE	8.9	0.0033	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
4,4'-DDT	7.9	0.0033	0.0018	U	0.0018	U	0.0040	D	0.0066	D	0.0017	U	0.0017	U
Aldrin	0.097	0.005	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
alpha-BHC	0.48	0.02	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
alpha-Chlordane	4.2	0.094	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
beta-BHC	0.36	0.036	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
Chlordane, total	~	~	0.070	U	0.071	U	0.074	U	0.067	U	0.069	U	0.069	U
delta-BHC	100	0.04	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
Dieldrin	0.2	0.005	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
Endosulfan I	24	2.4	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
Endosulfan II	24	2.4	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
Endosulfan sulfate	24	2.4	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
Endrin	11	0.014	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
Endrin aldehyde	~	~	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
Endrin ketone	~	~	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
gamma-BHC (Lindane)	1.3	0.1	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
gamma-Chlordane	~	~	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U

Summary of Excavation End Point Samples - EB-20 to EB-24

Sample ID York ID Sampling Date Client Matrix	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives -	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	EB-20-020916 16B0346-01 2/9/2016 9:45:00 AM Soil		EB-21-020916 16B0346-03 2/9/2016 9:58:00 AM Soil		EB-22-020916 16B0346-04 2/9/2016 10:18:00 AM Soil		Excavation Bottom-22-071416 16G0629-01 7/14/2016 1:00:00 PM Soil		EB-23-02091 16B0346-05 2/9/2016 10:35:0 Soil	EB-24-020916 16B0346-06 2/9/2016 10:40:00 AM Soil		
Compound	Restricted Residential		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Heptachlor	2.1	0.042	0.0018	U	0.0018	U	0.0019	U	0.0017	U	0.0017	U	0.0017	U
Heptachlor epoxide	~	~	0.0018	U	0.0018	U	0.0019	Ü	0.0017	U	0.0017	U	0.0017	U
Methoxychlor	~	~	0.0018	U	0.0018	U	0.0019	U	0.0084	U	0.0017	U	0.0017	U
Toxaphene	~	~	0.18	U	0.18	U	0.19	U	0.085	U	0.17	U	0.17	U
Polychlorinated Biphenyls (PCB)	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg				mg/Kg		mg/Kg	1
Dilution Factor		J. 0	1		1		1				1		1	
Aroclor 1016	~	~	0.018	U	0.018	U	0.019	U	NT		0.017	U	0.017	U
Aroclor 1221	~	~	0.018	U	0.018	U	0.019	U	NT		0.017	U	0.017	U
Aroclor 1232	~	~	0.018	U	0.018	U	0.019	U	NT		0.017	U	0.017	U
Aroclor 1242	~	~	0.018	U	0.018	U	0.019	U	NT		0.017	U	0.017	U
Aroclor 1248	~	~	0.018	U	0.018	U	0.019	U	NT		0.017	U	0.017	U
Aroclor 1254	~	~	0.018	U	0.018	U	0.019	U	NT		0.017	U	0.017	U
Aroclor 1260	~	~	0.018	U	0.018	U	0.019	U	NT		0.017	U	0.017	U
Total PCBs	1	0.1	0.018	U	0.018	U	0.019	U	NT		0.017	U	0.017	U
Metals, Target Analyte	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg				mg/Kg		mg/Kg	1
Dilution Factor			1		1		1				1		1	
Aluminum	~	~	6,590		6,890		7,590		NT		6,730		6,210	
Antimony	~	~	0.53	U	0.54	U	0.56	U	NT		0.52	U	0.52	U
Arsenic	16	13	1.07	U	1.92		1.76		NT		1.05	U	1.04	U
Barium	400	350	67.30		65.40		58.60		NT		56.40		48.90	
Beryllium	72	7.2	0.11	U	0.11	U	0.11	U	NT		0.11	U	0.10	U
Cadmium	4.3	2.5	0.32	U	0.32	U	0.34	U	NT		0.31	U	0.31	U
Calcium	~	~	2,940		2,920		6,940		NT		3,930		2,600	
Chromium	~	~	14.80		15.90		16.90		NT		19.50		16.80	
Cobalt	~	~	6.56		8.34		7.60		NT		8.28		7.90	
Copper	270	50	30.60		38.60		23.30		NT		36.40		32.50	
Iron	~	~	11,300		13,500		14,000		NT		12,800		13,300	
Lead	400	63	12.20		50.60		26.80		NT		6.35		9.43	
Magnesium	~	~	3,850		4,280		4,890		NT		4,940		3,970	
Manganese	2000	1600	567		330		305		NT		385		353	
Nickel	310	30	15.40		17.10		15.50		NT		19.30		19.50	
Potassium	~	~	1,200		1,050		1,520		NT		1,060		1,140	
Selenium	180	3.9	1.50		1.88		1.69		NT		2.03		1.97	
Silver	180	2	0.53	U	0.54	U	0.56	U	NT		0.52	U	0.52	U
Sodium 	~	~	247		177		148		NT		320		194	
Thallium	~	~	1.07	U	1.07	U	1.13	U	NT		1.05	U	1.04	U
Vanadium 	~	~	15.30		25.90		22.80		NT		23.60		21.30	
Zinc	10000	109	37.90		55		74.80		NT		21.90		23.70	+
Mercury by 7473	mg/Kg	mg/Kg	mg/Kg		mg/Kg		mg/Kg				mg/Kg		mg/Kg	
Dilution Factor		0.12	1	l	1		1		.		1		1	
Mercury Total Solids	0.81	0.18	0.032 %	U	0.078 %		0.069 %		NT %		0.031 %	U	0.044 %	—

TABLE 1E 41-53 Buena Vista Avenue

Yonkers, New York BCP Site C360085

Summary of Excavation End Point Samples - EB-20 to EB-24

Sample ID York ID Sampling Date Client Matrix	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	EB-20-020916 16B0346-01 2/9/2016 9:45:00 AM Soil		EB-21-020916 16B0346-03 2/9/2016 9:58:00 AM Soil		EB-22-020916 16B0346-04 2/9/2016 10:18:00 AM Soil		Excavation Bottom-22-071416 16G0629-01 7/14/2016 1:00:00 PM Soil		EB-23-020916 16B0346-05 2/9/2016 10:35:00 AM Soil		EB-24-020916 16B0346-06 2/9/2016 10:40:00 AM Soil	
Compound			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Dilution Factor			1		1		1		1		1		1	
% Solids	~	~	93.90		93.10		88.80		98.10		95.70		96.10	

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

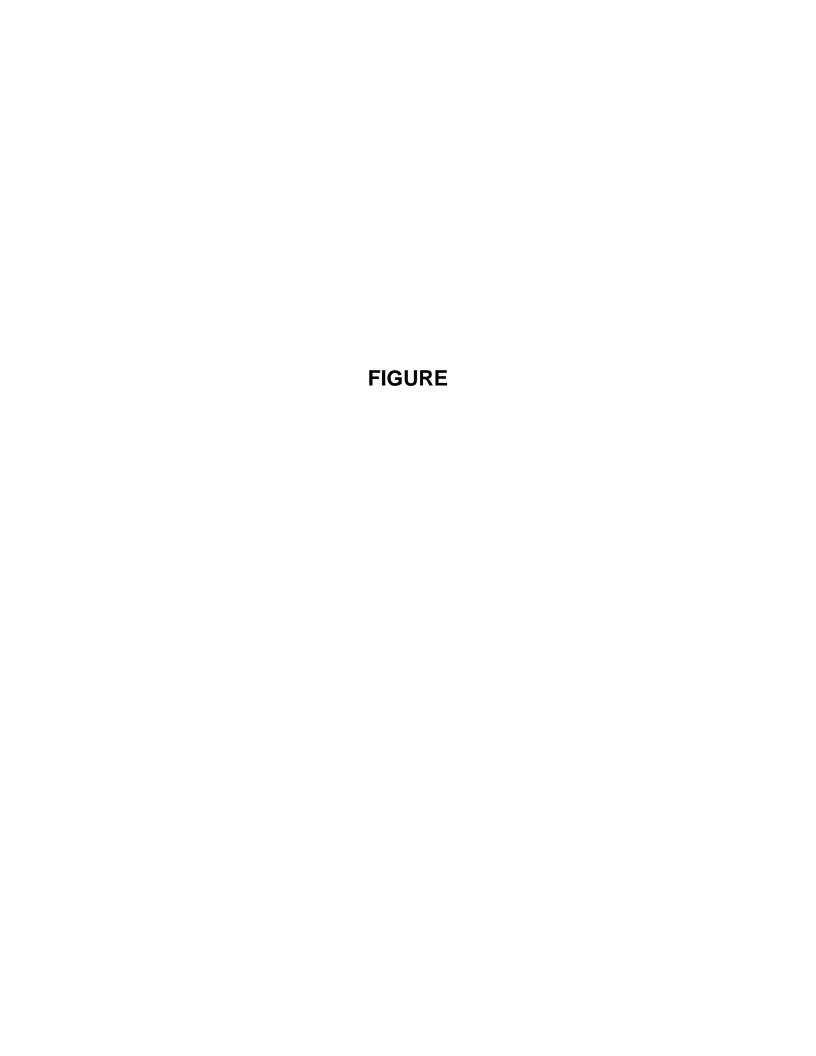
B=analyte found in the analysis batch blank

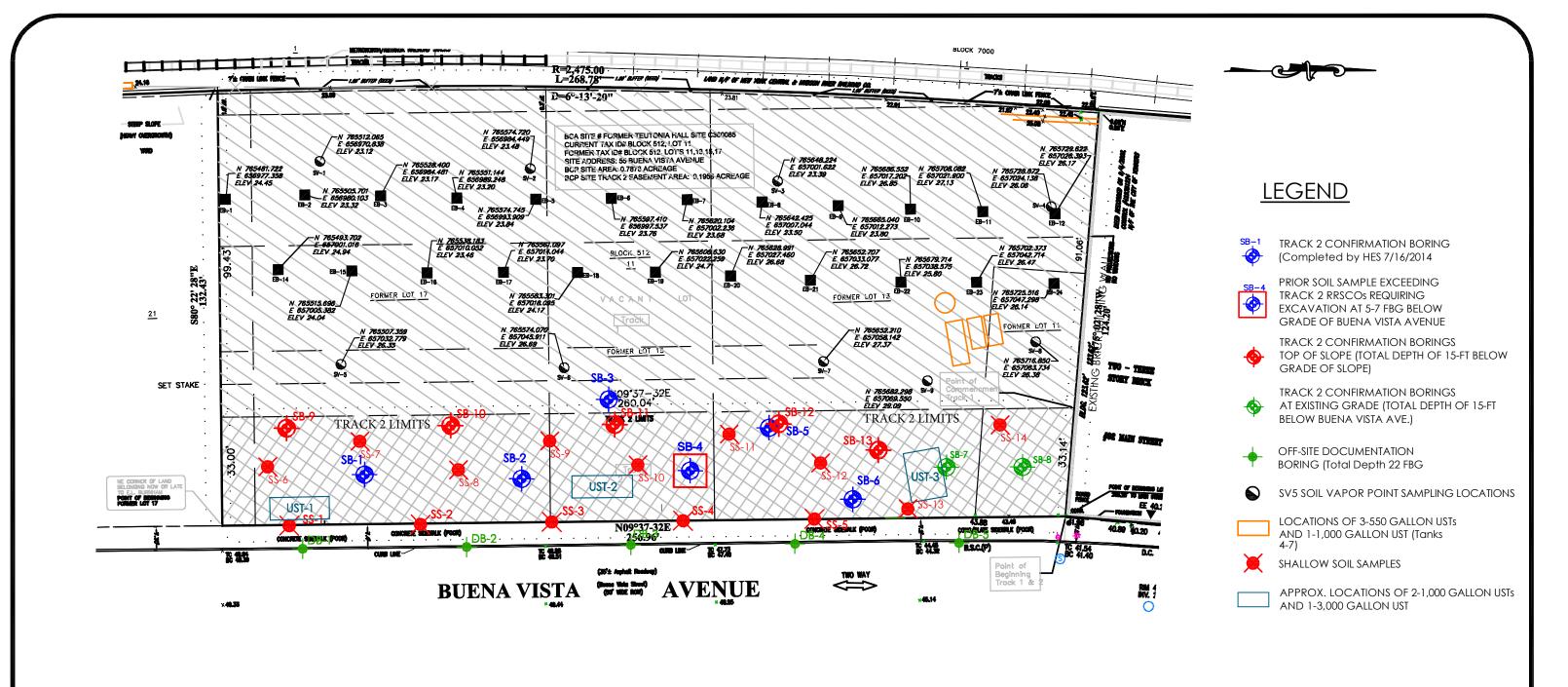
E=result is estimated and cannot be accurately reported due to levels encountered or interferences

NT=this indicates the analyte was not a target for this sample

~=this indicates that no regulatory limit has been established for this analyte

HydroEnvironmental Solutions, Inc.
Page 6 of 6





SCALE: 1" = 30'

41-53 BUENA VISTA AVENUE YONKERS, NEW YORK

SITE **PLAN**

FIGURE 1 OCTOBER 2016



HydroEnvironmental SOLUTIONS, INC.

(914) 276 - 2560

One Deans Bridge Road Somers, New York 10589 Fax: (914) 276 - 2664



APPENDIX 1:

PBS Closure Application



WESTCHESTER COUNTY DEPARTMENT OF HEALTH PETROLEUM BULK STORAGE/GASOLINE DISPENSING SITES APPLICATION

Pursuant to the Petroleum Bulk Storage Law, Articles XXV and XXVI of the Westchester County Sanifary Code

Westchester County Dept. of Health 7th Floor - PBS Section 145 Huguenot Street New Rochelle, NY 10801 Phone: 914-813-5161

		neconmonoccues:	"Authorized Representative for Multiple Owners Form" for each	Ves No	at this facility?	TANK OWNERSHIP	*Registration fee required.		Stage Vapor Collection System Stage Vapor Collection		*GASOLINE DISPENSING		*Registration fee required. For a change of ownership.	Change/correction	Substantial Modification	☐ Initial/New Facility* ☐ Change of Ownership*	(check all that apply)	TRANSACTION TYPE	VAPOR RECOVERY ID:		PBS NUMBER:
	ON HOLDER MADE	AMIS rc	##X050#0X00#0#	OWN ⊲	-50000000000000000000000000000000000000				ensononinin'in)RES	ON DESCRIPTION AND	zl		<i>e</i> 10	OCCUMENDATION OF	CILI	OTY O			<u>,</u> T
Corporate/Commercial Local Government	check	Federal Tax ID Nc.	City/Town/Village	Address	Address 225 Nan Bute	Owner Name	elephone No. Email Address	ige	Address	Address 205 North Post	y Name Teutonio O	Attention Tono Hoon Litt	Name of Class A Operator (Primary)	Ċ	Operator (business entity)	WESTCHESTER	6255	City/Town/Village	Location (continued)	er and	Facility Name
<u>xi</u>	-	Owner	State					State		a)			Prima	On-Si	Facility	I WO I	4	State	Ž		
Uning Uning	Partn				Y.					5			iry Oper	ite Opera		Ship/City	: [_	(•	
Unincorporated Association	Partnership	elephone No.	Zip 10000			K		Zip CSCC	***		TA IK		Primary Operator DEC No.	On-Site Operator DEC No.	lelephone No.	l ownsnip/city (geographical location)	670	Zip			1 12000000
00.00 F	Amount Enclosed	Signature	Paes Devit	Name of Owner or Legally F	pursuant to Section 2	hereby certify under	Amount	Check Date	Check No.			OFFICIAL USE ONLY Last Updated: 7/11	Emergency Contact	Other, specify:	☐ Hospital/nursing hor ☐ Cemetery/memorial	☐ Auto service/repa ☐ Storage terminal. ☐ Religious (church	School	☐ Trucking/transportation☐ Apartment/office building	☐ Manufacturing ☐ Utility	☐ Retail gasoline sales	(Check only one)
E & 1	Date	in a disease		wthorized	statements made nerein are punishable as pursuant to Section 210.45 of the Penal Law.	er penalty of perjury the to the best of my known	Reviewed by	Date Processed	Issued By			.~			Hospital/nursing home/health care	Auto servicerrepair (no gasoline sales) Storage terminal/petroleum distributor Religious (church, synagogue, mosque, temple, etc)		ortation building		ales	EUM FACILITY:
3/14/17	ite			Secondative Two.	statements made nerein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law.	In hereby certify under penalty of perjury that the information provided on this form is true to the best of my knowledge and belief. False							Emergency Phone No.			temple etc)		Railroad	Chemical distributor Municipality	Private residence Airline/air taxi/airport	•

SECTION B TANK INFORMATION

Provide details for each regulated active (in service or temporarily out of service) tank. See "Section B – Tank Information" of the "Application Instructions" for direction on the information to be provided. Refer to "Key Codes for Section B" for the selection numbers to enter in the columns. Complete one line per tank; use secondary choice. additional forms as necessary. Enter one choice per column. listed by Tank ID. Leave one column blank if there is no second choice. Two entries may be made in columns with dotted separators, you may indicate a primary and For all entries of "99. Other", a description must be provided on a separate sheet of paper

Owner in Section A

Action (if tank already exists leave blank) Tank ID Ľ Tank Location w w (8) Status Circle which (MMYY) Permanent Closure Date (Action 3) Installation Date (Action 1,2,4,5) () () () Capacity (Gallons) 8 6 8 Product Stored % (if gas w/ ethanol or biodiesel) Tank Type 8 Tank Internal Protection 8 Tank External Protection 8 Tank Secondary Containment 8 Tank Leak Detection Tank Overfill Prevention 8 Tank Spill Prevention 8 Pumping/Dispensing Method 8 Piping Location 8 Piping Type 0 Piping External Protection 8 Piping Secondary Containment 0 Piping Leak Detection Check box if UDC (Under Dispenser Containment) is Check box if tank is owned by party other than listed as

APPENDIX 2:

Tanks 4 through 7 Closure Supporting Documentation

279 Route 6 • P.O. Box 747 Mahopac, NY 10541 (845) 279-0263 Ph:

Fax: (845) 621-3075



STANDARD COLLECTION

NAME:

DATE:

ORDER FORM 056815

		* •			, , y								
	GENERATOR/LOCATION		BIL	L TO (IF DIFFERE	NT FROM L	OCATION)							
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TIME IN	TIME OUT	****	MANIFEST NUMBER										
		17	· · · · · · · · · · · · · · · · · · ·										
DESIGNATE	D FACILITY ZHOULD VOLUME CA	1 Recovery	STATE ID NO										
ADDRESS ,	ED FACILITY Enviro Waste CA 19 Rt 6 Malagor, M	10541	USA EPA ID NO _	NYDO448	2563	35							
SALES CODE	DESCRIPTION	QUANTITY	UNIT PRICE	LINE TOTAL									
721	USED OIL REMOVAL				TRANSAC	E MY ACCOUNT FO CTION UNLESS OTH	IERWISE						
713	ANTI-FREEZE REMOVAL					DINTHE PAYMENTS S REFLECTING CH							
700	OILY WATER DISPOSAL		ARE SUBJECT TO AN INTEREST RAT OF THE LESSER OR 1-1/2% PE										
742	SLUDGE DISPOSAL		MONTH (18% PER ANNUM) OR THE MAXIMUM RATE ALLOWED BY LAW ON										
782	DRUM DISPOSAL	ANY INVOICES THAT ARE NOT PAID WITHIN 30 DAYS. IN THE EVENT OF											
800	PAD & BROOM REMOVAL	DEFAULT,	ENVIRO WASTE SI	HALL BE									
783	OIL FILTER REMOVAL	COLLECT	D TO RECOVER CO FION, INCLUDING R										
810	PARTS WASHER SERVICE	ABLE ATT	ORNEY'S FEED.										
746	VACUUM SERVICE												
760	TRUCK HOURLY RATE	(Ω)			INITIAL								
750	TRANSPORTATION] [1						
	appelline touch Vallous + Water	12,950als] \$								
		Lud.			1								
	SPORTER 1 ID NO USEPA TRANSPORTER 2 ID NO	GENERATOR USE	PAID NO GENER	ATOR STATE ID NO		VENT OF AN EME							
	44825636					LL: (866) 927-836	4						
OS DOLDE	SCRIPTION				CONTAINERS NO. TYPE	TOTAL QUANTITY	WIVOT						
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				<u>55, 7500, 107</u>									
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SIGNATURE		12/8/15		EST RESULTS	GREAT	ER THAN 2,200 LBS/MOI	итн						
MICHAI CHE	GENERATOR/CUSTOMER	DATE /	PPM	71000	1	INITIALS	30,30						

279 Route 6 • P.O. Box 747 Mahopac, NY 10541 Ph: (845) 279-0263

Fax: (845) 621-3075

NAME:



STANDARD COLLECTION ORDER FORM 056813

1-866-WASTE-OIL

DATE: 12/9/15

	GENERATOR/LOCATION			L TO (IF DIFFEREI	NT FROM LOCATION)
NAME			NAME		
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TIME IN	TIME OUT	*********	MANIFEST NUMBER		
	· · · · · · · · · · · · · · · · · · ·				
DESIGNATE	ED FACILITY ENGIRO WASTE	012	STATE ID NO		
ADDRESS_	279 DT 6 MAHUPIE	NY.	USA EPA ID NO	NY0044	725636
SALES CODE	DESCRIPTION	QUANTITY	UNIT PRICE	LINE TOTAL	
721	USED OIL REMOVAL				CHARGE MY ACCOUNT FOR THIS TRANSACTION UNLESS OTHERWISE
713	ANTI-FREEZE REMOVAL				INDICATED IN THE PAYMENT SECTION. INVOICES REFLECTING CHARGES
700	OILY WATER DISPOSAL	660 11.			ARE SUBJECT TO AN INTEREST RATE OF THE LESSER OR 1-1/2% PER
742	SLUDGE DISPOSAL	380 01.			MONTH (18% PER ANNUM) OR THE
782	DRUM DISPOSAL				MAXIMUM RATE ALLOWED BY LAW ON ANY INVOICES THAT ARE NOT PAID
800	PAD & BROOM REMOVAL				WITHIN 30 DAYS. IN THE EVENT OF DEFAULT, ENVIRO WASTE SHALL BE
783	OIL FILTER REMOVAL				ENTITLED TO RECOVER COSTS OF COLLECTION, INCLUDING REASON.
810	PARTS WASHER SERVICE				ABLE ATTORNEY'S FEED.
746	VACUUM SERVICE	/			Salar Sa
760	TRUCK HOURLY RATE	4.	5 9 9 9 9 9 9		INITIAL 33
750	TRANSPORTATION				
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ENVIRO WAST APPLICABLE LA	E, ITS AGENTS AND CONTRACTORS HAVE THE CAPACIT WS AND REGULATIONS, TO TRANSPORT, ACCEPT, STORE, I	Y AND ARE AUTHORIZE RECLAIM OR AND/OR DIS	ED AND PERMITTED IN ACSPOSE OF THE WASTE LIST	CCORDANCE WITH ALL ED ON THIS DOCUMENT.	0 TO 220 J. BS/MONTH
GENERATOR C	ERTIFIES THAT THE WASTE IS: DUSED OIL DUSED ANT	I-FREEZE QOILY WATE	R POTHER 5	12	TAITIALS
	Trocolin 7	~		APSYALL OR A	220 LBS TO 2,200 LBS/MONTH INITIALS
PRINT NAME	a della commencia	TITLE		EXSIL CDT ST RESULTS	GREATER THAN 2,200 LBSAMONTH
SIGNATURE	ATTENDED TO TO THE TOTAL	DATE / 19/1		1000	INITIALS
	GENERATOR/CUSTOMER		PPM		WHITMES



Westchester County Department of

Office of Environmental Health Risk 145 Huguen New Rochelle, N Telephone: 914-8 24-hour Emergency Phone: 914-8

PETROLEUM BULK STORAGE **WORK PERMIT**

In accordance with Articles XXV and XXVI of the Westchester County Sanitary Code, this work permit grants permission to modify the referenced Petroleum Bulk Storage facility in the manner listed below.

FACILITY PBS No. 3-600383 **TEUTONIA HALL** 41-53 Buena Vista Avenue Yonkers, NY 10701 Contact: John Litt

Telephone: (845) 450-5150

CONTRACTOR (responsible for PBS compliance and environmental assessment)

Dutchess Environmental 936 Route 6 MAHOPAC, NY 10541 Contact: dutchess

Telephone: (845) 628-3610

WORK TO BE PERFORMED					
Type of Work		•	Tank ID	Capacity	Product
Remove tank			4	550	7. Gasoline
Remove tank			5	550	7. Gasoline
Remove tank			6	550	7. Gasoline
Remove tank		•	7	1000	7. Gasoline

- THAT this permit is valid for 90 days from issue date.
- THAT the petroleum bulk storage tank(s) and/or piping shall be installed in accordance with Chapter 873, Articles XXV and XXVI, respectively, of the
- Laws of Westchester County NY.

 THAT the facility owner and contractor shall be responsible for the proper installation of the petroleum bulk storage tank(s) and/or piping in accordance with Chapter 873, Articles XXV and XXVI, respectively, of the Laws of Westchester County NY.
- THAT any changes or modifications to the Petroleum Bulk Storage Work Permit requires filing an application and obtaining a revised work permit to reflect said changes.

 THAT upon installation of the petroleum bulk storage tank(s) and/or piping, the tank(s) shall remain out of service until such time as a tank testing report (s) satisfactory to the department is received, and an "as built" plan prepared by professional engineer or registered architect in the State of New York is filled with the department which certifies that installation complies with Chapter 873, Articles XXV and XXVI, respectively, of the Laws of Westchester

Issued by: Westchester County Department of Health	Issue Date	Expiration Date
Sherlita Amler, M.D. Commissioner of Health	12/01/2015	03/01/2016

ZONE DISTRICT: DWD

THE THEFT STATES IN CALCULAR

SBL: 1.-512-11

Permission is granted to owner or lesse: TEUTONIA BUENA VISTA LLC

IMPORTANT, PLEASE READ: UPON RECEIVING LETTER PERMIT, NO WORK SHALL BEGIN UNTIL OWNER, CONTRACTOR, LESSEE, LESSOR CONTACTS BUILDING INSPECTOR Joseph Ferrotta, phone 914-377-6529.

TO:

REMOVAL OF THREE 550 GALLON & ONE 1,000 GALLON UNDERGROUND STORAGE TANKS.

JOB ADDRESS: 41 BUENA VISTA AVENUE

In accordance with approved plans and as specified in the application on file at the office of the Department of Buildings and in accordance with all applicable city ordinances and state laws affecting such construction.

CONDITIONS:

PROVIDE PDF OF APPROVED CONSTRUCTION DOCUMENTS BEFORE CERTIFICATE OF OCCUPANCY/CERTIFICATE OF COMPLETION CAN BE ISSUED.

- 1. PROVIDE A CLOSURE REPORT DOCUMENTING THAT ALL CONTAMINATED MATERIAL HAS BEEN REMOVED FROM THE SITE.
- 2. PROVIDE MANIFEST OF DISPOSED MATERIALS.
- 3. CONTACT FIRE DEPARTMENT WITH DATE OF TANK REMOVAL TO SCHEDULE REMOVAL INSPECTION AND COMPLY WITH FIRE DEPARTMENT REQUIREMENTS.

4. UPON COMPLETION OF ALL WORK CONTACT INSPECTOR JOE FERROTTA AT 377-6529 FOR PERMIT CLOSE OVT.

William J. Schneider, P.E.

Commissioner

Department of Housing and Buildings

POST IN A CONSPICUOUS PLACE

APPENDIX 3:

NYSDEC End-point Sampling Approval

William A. Canavan

From:

Haggerty, Michael J (DEC) <michael.haggerty@dec.ny.gov>

Sent:

Wednesday, October 28, 2015 4:09 PM

To:

Alyssa N. Epstein

Cc:

William A. Canavan; 'jashley@dubois-king.com'; Rachel Griffiths; Patricia A. Clause;

Dewes, Sally (DEC)

Subject:

RE: Buena Vista UST Locations

Alyssa,

It appears the 4 USTs are in the Track 1 area from your figure but please confirm that for me. Specific end-point samples for the tanks are not required because you are excavating that material out anyway per the approved work plans. All other tank-related information must be collected and included in the FER (disposal manifests, registration). If the tanks are registered they must be closed out, if they aren't registered that must be registered and closed. Please take pictures once soil is excavated to the required depths for the FER and contact me if contaminated soil is encountered which may affect your client's ability to achieve their BCP Tracks. Also, collect a soil vapor sample direct below these tanks. That is critical to determine of Track 1 is achieved. Let me know if you have any questions.

Thanks, Mike

----Original Message----

From: Alyssa N. Epstein [mailto:aepstein@hesny.com]

Sent: Wednesday, October 28, 2015 3:05 PM

To: Haggerty, Michael J (DEC)

Cc: William A. Canavan; 'jashley@dubois-king.com'; Rachel Griffiths; Patricia A. Clause

Subject: Buena Vista UST Locations

Hi Mike,

Attached are photos of the four USTs we have found on-site. After uncovering them further we have found there are three 550-gallon USTs and one 1,000-gallon UST. Also attached is a site map showing the approximate locations of these tanks. Please let me know if you need anything else.

Thanks

Alyssa N. Epstein Environmental Scientist

HydroEnvironmental Solutions, Inc.

One Deans Bridge Road Somers, New York 10589 Phone: (914) 276-2560

Fax: (914) 276-2664 Cell: (914) 774-7346 www.hesny.com

APPENDIX F:

Site Management Forms

Site Inspection Form

Inspection Date:	<u> </u>
Inspector:	<u>_</u>
Company:	
Title (with company):	
Description of Activities:	
Approximate Location of Problems/Incide	ents Noted:
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	

^{**}Section 7.0 of the Site Management Plan outlines all required information**

APPENDIX G:

Health and Safety Plan

DIAL 911 FOR ANY POLICE, FIRE, OR MEDICAL EMERGENCY!!!

January 8, 2014

SITE SPECIFIC HEALTH & SAFETY PLAN

Brownfield Cleanup Program #360085 Site Activities at

41-53 Buena Vista Avenue Yonkers, New York

Prepared by:

William A. Canavan, CPG, PG HydroEnvironmental Solutions, Inc. One Deans Bridge Road

Somers, New York 10589

DIAL 911 FOR ANY POLICE, FIRE, OR MEDICAL EMERGENCY!!!

1.0 INTRODUCTION

This site specific Health & Safety Plan (HASP) was prepared by HydroEnvironmental Solutions Engineering Services, P.C. (HEES) on behalf of Teutonia Buena Vista, LLC (Teutonia) for hazardous waste operations work to be completed at the Brownfield Cleanup Program (BCP) Site located at 41-53 Buena Vista Avenue in Yonkers, New York. The site currently consists of open land with demolition debris that formerly contained multistory brick and concrete buildings. This plan outlines the following:

- ➤ The work to be completed by HydroEnvironmental Engineering Services, P.C. (HEES),
- Key personnel and contractors involved in the project including a clear chain-of-command,
- > The level of training necessary to complete the outlined hazardous waste operations work,
- ➤ A summary of HEES's Medical Surveillance program,
- > Results of a hazard analysis.
- Site Access,
- > Established work zones to be used during the project,
- Action Levels.
- The required levels of personal protective equipment (PPE),
- > Decontamination procedures,
- Important notes on safe work practices,
- Air monitoring,
- Confined Space Entry Program,
- An emergency/contingency plan, and
- ➤ A spill containment program.

This HASP is based on requirements of the Occupational Safety & Health Administration (OSHA) including, 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER) and 29 CFR 1910.134, Respiratory Protection Standard. This site is under the jurisdiction of the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation and the NYSDOH.

This HASP was developed with the express purpose of informing site workers of site specific hazards that may be encountered during hazardous waste operations on the Brownfield site. These procedures were developed to ensure a safe work place, and to provide guidance on how to respond effectively in case of an emergency. This HASP is intended as a 'living document' to be modified and updated as the project work requires or as new hazards are identified.

KEY PERSONNEL AND CHAIN OF COMMAND

2.1 HEES Project Manager

The HEES Project Manager will have direct authority to issue the necessary 'work orders' for personnel to enter the property for purposes of completing hazardous waste operations on the project. The Project Manager will also be responsible for issuing a 'stop work' order if it becomes necessary because of logistics.

The name and contact information of the Project Manager in direct charge of this project is listed below:

Mr. William A. Canavan, PG, CPG
HydroEnvironmental Engineering Services, P.C.
One Deans Bridge Road
Somers, New York 10589
(914) 276-2560 (office number)
(914) 774-3084 (cell)
(914) 276-2664 (fax)

2.2 HEES Safety Officer

While the Project Manager will have authority to issue 'work orders' and 'stop work' orders, he will not be responsible for the daily implementation of this HASP. This responsibility will fall to the HEES Safety Officer. It will be the Safety Officer's job to maintain this HASP during the project, insuring that it is modified as necessary. It is also the responsibility of the Safety Officer to disseminate the HASP to all HEES personnel, contractors, and subcontractors involved with the project. Additionally, the safety officer will keep the HEES Project Manager, HEES staff (air monitoring service), and the HEES field staff performing the work informed. A project level organizational chart showing the relationship between the Safety Officer and all other HEES staff is attached as **Table 1**.

The HEES Safety Officer's contact information is provided below:

Ms. Alyssa N. Epstein
Safety Officer
HydroEnvironmental Engineering Services, P.C.
One Deans Bridge Road
Somers, New York 10589
(914) 276-2560 (office)
(914) 774-3084 (24 hr. Emergency Number – William Canavan)
(914) 774-7346 (cell phone)



2.3 HEES Field Staff

Field staff will be responsible for implementing the field work plans.

The contact information for HEES is as follows:

Mr. William A. Canavan, PG, LSRP HydroEnvironmental Engineering Services, P.C. One Deans Bridge Road Somers, New York 10589 (914) 276-2560 (office number) (914) 774-3084 (cell) (914) 276-2664 (fax)

All field staff will be familiar with, and conform to, the provisions outlined in the HASP, ensure that they are well informed of the potential hazards in the work place, report any accidents or hazardous conditions to the on-site safety officer, and have complete familiarity with their job and the health and safety procedures involved. A project level organizational chart showing the relationship between field staff and all other HEES staff is attached as **Table 1**.

The following HEES field staff will be involved with the project:

1.	Ms. Alyssa N. Epstein	(914) 774-7346 (cell phone)
2.	Ms. Rachel E. Griffiths	(914) 512-0779 (cell phone)
3.	Mr. Tom J. Brant	(914) 224-6060 (cell phone)
4.	Mr. Jonathan B. Ashley	(802) 349-8855 (cell phone)

2.4 Queens City Carting Site Superintendent

Mr. Frank Miceli Junior Owner and Site Superintendent Queen City Carting 19 Cliff Street New Rochelle, New York 10801 (914) 576-9051 (Office) (914) 497-0444 (Cell phone)

Mr. Brian Dreeland Site Superintendent/Equipment Operator AC Landworks



19 Cliff Street New Rochelle, New York 10801 (914) 576-9051 (Office) (914) 290-2301 (cell phone) (845) 440-3912 (After-hours emergency contact) (914) 576-6480 (Fax)

2.5 Queens City Carting Site Office Manager

Ms. Nicole Supino Queens City Carting (914) 483-7711 (cell phone)

2.6 Queens City Carting Site Laborer

Mr. Anthony Petrie Queens City Carting (845) 242-5923 (cell phone)

The following Queen City Carting staff will also be involved in the project:

1. Mr. Ephrain Corona – Equipment Operator	(914) 437-1545 (Cell)
2. Mr. Raul Corona – Equipment Operator	(914) 224-9837 (Cell)
3. Mr. Francisco Corona – Laborer	(914) 576-9051 (Office)
4. Mr. Elijah Fredericks – Laborer	(914) 576-9051 (Office)
5. Mr. Jose Cohoa – Laborer	(914) 576-9051 (Office)
6. Ms. Dawn Randazzo – Office Manager	(914) 490-5625 (Cell)

3.0 SITE REMEDIATION WORK SCOPE

As per the Remedial Design for BCP Site No. 360085 prepared by Arcadis, the following general hazardous waste operations work tasks identified within this site specific HASP include, but are not limited to:

- Work area preparation including construction of an access driveway,
- Excavation, loading, stockpiling, transportation, and disposal of approximately 20,000 tons of soil,
- Dewatering and structural stabilization needed to maintain a safe excavation,
- Removal of foundations within areas of contaminated soil.
- Collection of post-excavation soil samples.

The location of the Site is depicted on **Figure 1**.

The following sections of this HASP discuss the hazards associated with each work task, the recommended personal protective equipment (PPE) necessary to perform each task, and other pertinent health and safety related issues.

4.0 HAZARD ANALYSIS

Chemical, biological, and mechanical hazards may potentially be present during each phase of this work. In this regard, attached **Table 2** includes the identified hazards associated with performing each project task.

4.1 Chemical Hazards

Chemical hazards that have been identified at the site include No. 2 fuel oil, gasoline, lead, mercury, selenium, DDT, DDD, DDE, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene. indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, acetone. alpha-chlordane. endrin aldehyde, methylene chloride, trichloroethylene, tetrachlorethylene, 1,1,1cis-1,2-dichloroethene, tetrachloroethane, trichloroethane. trichloroethene. arsenic, barium, cadmium, chromium, copper, manganese, nickel, silver, and zinc.

4.1.1 No. 2 Fuel Oil

Chemical compounds of significant concern present in No. 2 Fuel Oil (Diesel Fuel) which may have been previously stored at the property include:

- naphthalene,
- nonane,
- hexane,
- n-heptane,
- octane,
- ethylbenzene,
- cylcohexane,
- hydrogen sulfide,
- toluene,
- acenaphthene,
- xylene, and
- benzene.

These compounds represent a risk to workers as an inhalation hazard and a potential dermal hazard which will have to be minimized with personal protective equipment.

The constituent of greatest concentration and concern in fuel oil at the site is naphthalene. The lowest short term exposure limit (STEL) and time weighted average (TWA) exposure concentration is 1 part per million (ppm) and 0.1 ppm for benzene, respectively. However, benzene does not make up more than 0.5% of fuel oils. Naphthalene, toluene, and benzene are also known as potential human carcinogens.

Hazard communication data on each of the listed compounds is provided in **Table 3** below. A copy of a material safety data sheet (MSDS) for No. 2 fuel oil is attached in **Appendix A**.

Table 3 – Fuel Oil Constituent Hazard Data

Chemical Compound	% in Fuel Oil	Short Term Exposure Limit (STEL)(15 Min) (ppm)	8 Hour Time Weighted Average (ppm)
Naphthalene	0 to 3	15	10*
Nonane	0 to 3	-	200*
Hexane (other)	0 to 3	1,000	500
n-Hexane	0 to 2	-	50*
n-Heptane	0 to 2	500	400
Octane	0 to 1	385**	300
Ethylbenzene	0 to 1	125	100*
Cycohexane	0 to 1	-	300*
Hydrogen sulfide	0 to 1	15	10
Toluene	0 to 1	300**	200
Xylene	0 to 1	150	100
Benzene	0 to 0.5	1	0.1

Bold= potential human carcinogen

The flammable limit of fuel oil vapor is between 0.4% and 8% gas.

Exposure/over exposure symptoms for fuel oil include:

"Nasal and respiratory tract irritation, central nervous system effects including excitation, euphoria, contracted eye pupils, dizziness, drowsiness, blurred vision, fatigue, nausea, headache, loss of reflexes, tremors, convulsions, seizures, loss of consciousness, coma, respiratory arrest or sudden death could occur as a result of long term and/or high concentration exposure to vapors. May also cause anemia and irregular heart rhythm (Valero MSDS, Appendix A)"

^{*=10} hour TWA

^{**=}Ceiling limit for 10 minutes

4.1.2 Gasoline

Chemical Compounds of significant concern present in gasoline, which may have been previously stored at the property include:

- benzene
- ethanol
- ethyl benzene
- n-hexane
- hexane, mixed isomers
- methyl-tertiary butyl ether (MTBE)
- tertiary-amyl methyl ether (TAME)
- toluene
- 1,2,4-trimethylbenzene
- xylene, mixed isomers

The above mentioned compounds represent an inhalation hazard, and a potential dermal hazard which will be minimized with personal protective equipment.

The constituents with the greatest concern in gasoline are benzene and toluene. The lowest STEL and TWA exposure concentration is 1 ppm and 0.1 ppm for benzene and 300 ppm and 200 ppm for toluene, respectively.

Hazard communication data on each of the listed compounds is provided in **Table 4** presented below. A copy of an MSDS for gasoline is attached in **Appendix A**.

Table 4 – Gasoline Constituents Hazard Data

Chemical Compound	% in Gasoline	Short Term Exposure Limit (STEL)(15 Min) (ppm)	8 Hour Time Weighted Average (ppm)
Benzene	0.1 to 4.9	1	0.1
Ethanol	0 to 10	-	1000
Ethylbenzene	< 3	125	100*
n-Hexane	0.5 to 4	-	50*
Hexane (other)	5 to 25	1,000	500
MTBE	0 to 15	-	50
TAME	0 to 17.2	-	20

Toluene	1 to 25	300**	200
1,2,4-trimethylbenzene	< 6	-	25
Xylene	1 to 15	150	100

Bold= potential human carcinogen

The flammable limit of gasoline vapor is between 1.4% and 7.6%.

Exposure/over exposure symptoms include:

"Nasal and respiratory tract irritation, central nervous system effects including excitation, euphoria, contracted eye pupils, dizziness, drowsiness, blurred vision, fatigue, nausea, headache, loss of reflexes, tremors, convulsions, seizures, loss of consciousness, coma, respiratory arrest or sudden death could occur as a result of long term and/or high concentration exposure to vapors. May also cause anemia and irregular heart rhythm (Valero MSDS, Appendix A)"

An MSDS for gasoline is attached in **Appendix A**.

Section 10.0 includes the necessary PPE for each work task outlined in **Table 2**.

4.1.3 Lead

Lead is present at the site as a RCRA metal. Lead may be slightly hazardous in case of skin contact (irritant), eye contact (irritant), ingestion, and inhalation. Lead is classified as a carcinogen. Lead may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Hazard communication data on lead is provided in **Table 5** presented below. A copy of an MSDS for lead is attached in **Appendix A**.

Table 5 – Lead Hazard Data

Chemical Name	Short Term Exposure Limit (STEL)(15 Min)	8 Hour Time Weighted Average
Lead	N/A	0.05 mg/m ³

4.1.4 Mercury



^{*=10} hour TWA

^{**=}Ceiling limit for 10 minutes

Mercury is present at the site as a RCRA metal. Mercury is corrosive. This substance has caused adverse reproductive and fetal effects in animals. Mercury may be absorbed through intact skin. Mercury may cause central nervous system effects, liver, and kidney damage. Inhalation of fumes may cause metal-fume fever, and it is toxic if inhaled. Mercury causes irritation and possible burns by all routes of exposure.

Hazard communication data on mercury is provided in **Table 6** presented below. A copy of an MSDS for mercury is attached in **Appendix A**.

Table 6 – Mercury Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Mercury	I II II ZA ma/mo	0.05 mg/m ³ TWA 10 mg/m ³ IDLH	0.1 mg/m³ TWA

4.1.5 Selenium

Selenium is present at the site as a RCRA metal. Selenium is a carcinogen. This substance can cause adverse effects if it is ingested, inhaled, comes in contact with the eye or skin. Selenium may be combustible at high temperatures.

Hazard communication data on selenium is provided in **Table 7** presented below. A copy of an MSDS for selenium is attached in **Appendix A**.

Table 7 – Selenium Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Selenium	0.2 mg/m ³	0.2 mg/m ³ TWA 1 mg/m ³ IDLH	0.2 mg/m ³ TWA

4.1.6 4,4'-DDT

4,4'-DDT is present at the site as a pesticide. 4,4'-DDT is a carcinogen. This substance can cause adverse effects if it is ingested, inhaled, comes in contact with the eye or skin. 4,4'-DDT can cause damage to the central nervous system, kidneys, liver, skin, and peripheral nervous system.

Hazard communication data on 4,4'-DDT is provided in **Table 8** presented below. A copy of an MSDS for 4,4'-DDT is attached in **Appendix A**.

Table 8 – 4,4'-DDT Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
4,4'-DDT	1 mg/m ³	0.5 mg/m ³ TWA 500 mg/m ³ IDLH	1 mg/m ³ TWA

4.1.7 Benzo(a)anthracene

Benzo(a)anthracene is present at the site as an SVOC. Benzo(a)anthracene is a carcinogen. This substance is a mild irritant when it comes in contact with eyes or skin and can be absorbed through the skin. Its dust is explosive with air, and can be ignited by a spark.

Hazard communication data on benzo(a)anthracene is provided in **Table 9** presented below. A copy of an MSDS for benzo(a)anthracene is attached in **Appendix A**.

Table 9 – Benzo(a)anthracene Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Benzo(a)anthracene	Lowest level possible	0.1mg/m ³ TWA	0.2 mg/m ³ TWA

4.1.8 Benzo(a)pyrene

Benzo(a)pyrene is present at the site as an SVOC. Benzo(a)pyrene is a carcinogen. This substance may cause irritation when in contact with eyes or skin, and is an irritant when inhaled or ingested. Exposure to benzo(a)pyrene may cause cancer and have detrimental effects to the reproductive system.

Hazard communication data on benzo(a)pyrene is provided in **Table 10** presented below. A copy of an MSDS for benzo(a)pyrene is attached in **Appendix A**.

Table 10 – Benzo(a)pyrene Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Benzo(a)pyrene		0.1 mg/m ³ TWA 0.8 mg/m ³ IDLH	0.2 mg/m ³ TWA

4.1.9 Benzo(b)fluoranthene

Benzo(b)fluoranthene is present at the site as an SVOC. Benzo(b)fluoranthene is a carcinogen. This substance may cause irritation when



in contact with eyes or skin, and is an irritant when inhaled or ingested. Exposure to benzo(b)fluoranthene may cause cancer.

Hazard communication data on benzo(b)fluoranthene is provided in **Table 11** presented below. A copy of an MSDS for benzo(b)fluoranthene is attached in **Appendix A**.

Table 11 – Benzo(b)fluoranthene Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Benzo(b)fluoranthene	0.2 mg/m ³ TWA	0.1 mg/m ³ TWA	0.2 mg/m ³ TWA

4.1.10 Benzo(k)fluoranthene

Benzo(k)fluoranthene is present at the site as an SVOC. Benzo(k)fluoranthene is a carcinogen. This substance causes skin and eye irritation, digestive and respiratory tract irritation, and may be fatal if inhaled, ingested, or absorbed through skin.

Hazard communication data on benzo(k)fluoranthene is provided in **Table 12** presented below. A copy of an MSDS for benzo(k)fluoranthene is attached in **Appendix A**.

Table 12 – Benzo(b)fluoranthene Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Benzo(k)fluoranthene	None established	None established	None established

4.1.11 Chrysene

Chrysene is present at the site as an SVOC. Chrysene is a carcinogen. Chrysene may cause skin and eye irritation, and respiratory tract irritation if inhaled. If ingested, this substance may cause irritation with nausea, vomiting, and diarrhea.

Hazard communication data on chrysene is provided in **Table 13** presented below. A copy of an MSDS for chrysene is attached in **Appendix A**.

Table 13 – Chrysene Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
---------------	-------	-------	--------------------

Chrysene	0.2 mg/m ³ TWA	0.1 mg/m ³ TWA	0.2 mg/m ³ TWA
----------	------------------------------	---------------------------	---------------------------

4.1.12 Dibenz(a,h)anthracene

Dibenz(a,h)anthracene is present at the site as an SVOC. Dibenz(a,h)anthracene is a suspected carcinogen. Dibenz(a,h)anthracene may cause respiratory tract irritation if inhaled. This substance may cause eye and skin irritation, and may irritate the digestive tract if ingested.

Hazard communication data on dibenz(a,h)anthracene is provided in **Table 14** presented below. A copy of an MSDS for dibenz(a,h)anthracene is attached in **Appendix A**.

Table 14 – Dibenz(a,h)anthracene Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Dibenz(a,h)anthracene	None listed	None listed	None listed

4.1.13 Indeno(1,2,3-cd)pyrene

Indeno(1,2,3-cd)pyrene is present at the site as an SVOC. Indeno(1,2,3-cd)pyrene is a carcinogen. Indeno(1,2,3-cd)pyrene can cause respiratory irritation if inhaled, digestive tract irritation if ingested, and irritation to eyes and skin upon contact. This substance is harmful if absorbed through the skin.

Hazard communication data on indeno(1,2,3-cd)pyrene is provided in **Table 15** presented below. A copy of an MSDS for indeno(1,2,3-cd)pyrene is attached in **Appendix A**.

Table 15 – Indeno(1,2,3-cd)pyrene Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Indeno(1,2,3- cd)pyrene	None listed	None listed	None listed

4.1.14 Acetone

Acetone is present at the site as an SVOC. Acetone is an irritant in the case of eye or skin contact, and is hazardous if case of ingestion or inhalation. This substance is slightly hazardous in case of skin contact and acts as a permeator. Acetone is toxic to the central nervous system and may be toxic to kidneys, reproductive system, liver, and skin.

Hazard communication data on acetone is provided in **Table 16** presented below. A copy of an MSDS for acetone is attached in **Appendix A**.

Table 16 – Acetone Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Acetone	250 ppm STEL	I 6 UUU NNM II II H	200 ppm TWA 260 mg/m ³ TWA

4.1.15 Alpha-Chlordane

Alpha-Chlordane is present at the site as a pesticide. Alpha-Chlordane is toxic if swallowed, in contact with skin, or inhaled. This substance is highly flammable. Alpha-Chlordane can cause damage to organs

Hazard communication data on alpha-Chlordane is provided in **Table 17** presented below. A copy of an MSDS for alpha-Chlordane is attached in **Appendix A**.

Table 17 – Alpha-Chlordane Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Alpha-Chlordane	Not available	590 mg/m ³ TWA	2,400 mg/m ³ TWA

4.1.16 Endrin Aldehyde

Endrin Aldehyde is present at the site as a pesticide. Endrin Aldehyde is harmful if swallowed. This substance can be absorbed through the skin. Endrin Aldehyde can cause damage to the central nervous system if ingested or absorbed through the skin.

Hazard communication data on Endrin Aldehyde is provided in **Table 18** presented below. A copy of an MSDS for Endrin Aldehyde is attached in **Appendix A**.

Table 18 – Endrin Aldehyde Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Endrin Aldehyde	Not available	Not available	Not available

4.1.17 4,4'-DDD

4,4'-DDD is present at the site as a pesticide. 4,4'-DDD is toxic if swallowed and harmful in contact with skin. 4,4'-DDD is a suspected carcinogen.



This substance can be absorbed through the skin.

Hazard communication data on 4,4'-DDD is provided in **Table 19** presented below. A copy of an MSDS for 4,4'-DDD is attached in **Appendix A**.

Table 19 – 4,4'-DDD Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
4,4'-DDD	Not available	Not available	Not available

4.1.18 4,4'-DDE

4,4'-DDE is present at the site as a pesticide. 4,4'-DDE is toxic if swallowed, inhaled, or in contact with skin. 4,4'-DDE is highly flammable in liquid and vapor form. This substance causes organ damage.

Hazard communication data on 4,4'-DDE is provided in **Table 20** presented below. A copy of an MSDS for 4,4'-DDE is attached in **Appendix A**.

Table 20 – 4,4'-DDE Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
4,4'-DDE	Not available	Not available	Not available

4.1.19 Methylene Chloride

Methylene chloride (or dichloromethane) is present at the site as a VOC. Methylene chloride is very hazardous in case of eye contact, ingestion, and inhalation. It is an irritant in case of eye or skin contact, and is also classified as a permeator with regard to skin contact. Methylene chloride is Class 2B carcinogen (possible human carcinogen). It is toxic to lungs, liver, mucous membranes, and central nervous system.

Hazard communication data on methylene chloride is provided in **Table 21** presented below. A copy of an MSDS for methylene chloride is attached in **Appendix A**.

Table 21 – Methylene Chloride Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Methylene chloride	50 ppm	2 KUU NNM II JI H	25 ppm TWA 125 ppm STEL

4.1.20 Trichloroethylene

Trichloroethylene is present at the site as a VOC. Trichloroethylene is an irritant and causes skin, respiratory tract irritation and serious eye irritation. This substance is a carcinogen. Trichloroethylene may cause drowsiness if inhaled. This substance causes genetic defects.

Hazard communication data on trichloroethylene is provided in **Table 22** presented below. A copy of an MSDS for trichloroethylene is attached in **Appendix A**.

Table 22 – Trichloroethylene Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Trichloroethylene	100 ppm STEL	25 nnm IVVA	100 ppm TWA 300 ppm STEL

4.1.21 Tetrachloroethylene

Tetrachloroethylene is present at the site as a VOC. Tetrachloroethylene is an irritant in case of skin contact, ingestion, eye contact, or inhalation. This substance is slightly hazardous in case of skin contact as a permeator. Trichloroethylene is a probable carcinogen.

Hazard communication data on tetrachloroethylene is provided in **Table 23** presented below. A copy of an MSDS for tetrachloroethylene is attached in **Appendix A**.

Table 23 – Tetrachloroethylene Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Tetrachloroethylene	100 ppm TWA	Lowest level possible	100 ppm TWA

4.1.22 1,1,1-Trichloroethane

1,1,1-Trichloroethane is present at the site as a VOC. 1,1,1-Trichloroethane is very hazardous in case of eye contact or ingestion. This substance is an irritant when in contact with eyes, skin, or when inhaled.

Hazard communication data on 1,1,1-Trichloroethane is provided in **Table 24** presented below. A copy of an MSDS for 1,1,1-Trichloroethane is attached in **Appendix A**.

Table 24 – 1,1,1-Trichloroethane Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
1,1,1-Trichloroethane	Not available	Not available	Not available

4.1.23 Cis-1,2-Dichloroethene

Cis-1,2-Dichloroethene is present at the site as a VOC. Cis-1,2-Dichloroethene is harmful if inhaled. Cis-1,2-Dichloroethene is highly flammable in liquid and vapor form.

Hazard communication data on Cis-1,2-Dichloroethene is provided in **Table 25** presented below. A copy of an MSDS for Cis-1,2-Dichloroethene is attached in **Appendix A**.

Table 25 – Cis-1,2-Dichloroethene Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Cis-1,2- Dichloroethene	200 ppm TWA	Not available	Not available

4.1.24 Tetrachloroethane

Tetrachloroethane is present at the site as a VOC. Tetrachloroethane is very hazardous if ingested, inhaled, or in contact with eyes or skin as an irritant and permeator. Tetrachloroethane is a carcinogen.

Hazard communication data on Tetrachloroethane is provided in **Table 26** presented below. A copy of an MSDS for Tetrachloroethane is attached in **Appendix A**.

Table 26 – Tetrachloroethane Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Tetrachloroethane	7 mg/m ³ TWA	690 mg/m ³ IDLH	35 mg/m ³ TWA

4.1.25 Trichloroethane

Trichloroethane is present at the site as a VOC. Trichloroethane is irritating to eyes and skin, respiratory tract, and is harmful if ingested. Trichloroethane is a carcinogen. This substance may cause central nervous system effects.

Hazard communication data on Trichloroethane is provided in **Table 27**

presented below. A copy of an MSDS for Trichloroethane is attached in **Appendix A**.

Table 27 - Trichloroethane Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Trichloroethane	350 ppm TWA 250 ppm STEL	/UU nnm II JI H	350 ppm TWA 450 ppm STEL

4.1.26 Arsenic

Arsenic is present at the site as a metal. Arsenic is very hazardous in case of ingestion or inhalation and is slightly hazardous in case of skin or eye contact as an irritant. Arsenic is a carcinogen and is toxic to kidneys, lungs, nervous system, and mucous membranes.

Hazard communication data on Arsenic is provided in **Table 28** presented below. A copy of an MSDS for Arsenic is attached in **Appendix A**.

Table 28 – Arsenic Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Arsenic	10 mg/m ³ TLV	2 mg/m ³ STEL	10 mg/m ³ TWA

4.1.27 Barium

Barium is present at the site as a metal. Barium is harmful if inhaled or swallowed. This substance may cause eye, skin, and respiratory tract irritation. Barium may cause irritation of the digestive tract.

Hazard communication data on Barium is provided in **Table 29** presented below. A copy of an MSDS for Barium is attached in **Appendix A**.

Table 29 – Barium Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Barium	Not available	Not available	Not available

4.1.28 Cadmium

Cadmium is present at the site as a RCRA metal. Cadmium may be a carcinogen. It is toxic to kidneys, lungs, and liver. Cadmium is hazardous in cases of ingestion and inhalation, and is a skin irritant.

Hazard communication data on Cadmium is provided in **Table 30** presented below. A copy of an MSDS for Cadmium is attached in **Appendix A**.

Table 30 – Cadmium Hazard Data

Chemical Name	Short Term Exposure Limit (STEL)(15 Min)	8 Hour Time Weighted Average
Cadmium	200 mg/m ³	50 mg/m ³

4.1.29 Chromium

Chromium is present at the site as a RCRA metal. Chromium may cause allergic skin reactions, liver damage, kidney damage, lung damage, eye and skin irritation, and severe respiratory tract irritation.

Hazard communication data on Chromium is provided in **Table 31** presented below. A copy of an MSDS for Chromium is attached in **Appendix A**.

Table 31 – Chromium Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Chromium	Chromium 0.5 mg/m ³		1 mg/m³ TWA

4.1.30 Copper

Copper is present at the site as a metal. Copper is very hazardous in case of ingestion, inhalation, or eye contact. This substance is an irritant and is slightly hazardous in case of skin contact. Copper is toxic to lungs and mucous membranes.

Hazard communication data on Copper is provided in **Table 32** presented below. A copy of an MSDS for Copper is attached in **Appendix A**.

Table 32 – Copper Hazard Data

Chemical Name ACGIH		NIOSH	OSHA-Final PELs
Copper	1 mg/m ³ TWA	1 mg/m ³ TWA	1 mg/m ³ TWA

4.1.31 Manganese

Manganese is present at the site as a metal. Manganese is hazardous in case of inhalation. This substance is slightly hazardous and an irritant in case of eye or skin contact, and slightly hazardous in case of ingestion. Manganese may be toxic to blood, lungs, brain, or central nervous system.

Hazard communication data on Manganese is provided in **Table 33** presented below. A copy of an MSDS for Manganese is attached in **Appendix A**.

Table 33 – Manganese Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Manganese	0.1 mg/m ³ TWA	1 mg/m³ TWA 3 mg/m³ STEL	5 mg/m³ TWA

4.1.32 Nickel

Nickel is present at the site as a metal. Nickel is hazardous in case of inhalation and slightly hazardous in case of skin or eye contact as an irritant, and in case of ingestion. This substance is also a sensitizer in case of skin contact or inhalation. Nickel may be a carcinogen, and is toxic to skin.

Hazard communication data on Nickel is provided in **Table 34** presented below. A copy of an MSDS for Nickel is attached in **Appendix A**.

Table 34 - Nickel Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Nickel	1 mg/m ³ TWA	Not available	1 mg/m ³ TWA

4.1.33 Silver

Silver is present at the site as a metal. Silver is very toxic in case of eye contact as an irritant, of ingestion, or of inhalation. Severe overexposure can result in death. Repeated exposure to silver may produce general deterioration of health by an accumulation of the metal in one or many organs.

Hazard communication data on Silver is provided in **Table 35** presented below. A copy of an MSDS for Silver is attached in **Appendix A**.

Table 35 – Silver Hazard Data

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Silver	0.01 mg/m ³ TWA	0.01 mg/m ³ TWA	0.01 mg/m ³ TWA

4.1.34 Zinc



Zinc is present at the site as a metal. Zinc is slightly hazardous in case of skin contact, eye contact, ingestion, or inhalation. This substance is an irritant when in contact with skin or eyes.

Hazard communication data on Zinc is provided in **Table 36** presented below. A copy of an MSDS for Zinc is attached in **Appendix A**.

Table 36 – Zinc Hazard Data

Chemical Name ACGIH		NIOSH	OSHA-Final PELs
Zinc	nc Not available		Not available

4.2 Physical Hazards

Physical hazards associated with work tasks identified in **Table 2** may include uneven footing due to debris, unstable footing, noise, and weather (cold and hot) and airborne dust. In an attempt to reduce problems with physical hazards, the minimum level of safety attire for hazardous waste operations will be modified LEVEL D. The modified Level D for this project will include the following important elements:

- Hard hat,
- Nitrile gloves
- Safety goggles/glasses,
- Steel toe/shank boots.
- > Disposable rubber booties,
- > Disposable Tyvek suits (when needed), and
- > Ear protection.

This project will take place sometime in the winter; as a result, inclement weather may be encountered which could induce issues with the cold.

Other physical hazards associated with the hazardous waste operations at the site include construction equipment activity and excavation-related hazards including:

- Potential excavation collapse.
- Heavy equipment conflicts with personnel activities,
- > Equipment rollovers,
- Conflicts between site operations and MTA train corridor adjacent to site.
- Overhead hazards during soil loadout,
- Exposure to vehicle exhaust emissions, and
- Potential falling and unstable demolition debris.

4.2.1 Cold Stress and Exposure

In order to avoid cold stress, several preventative measures will be observed:

- Work will not take place when the temperature falls below -20° F; the wind chill factor will also be a significant consideration.
- Clothing should be worn in layers, so that personnel can adapt to changing conditions and various levels of physical stress.
- If possible, breaks should be taken in a heated vehicle or building, but care should be taken to remove outer clothing during each break.
- Have on hand extra inner clothing in case of perspiration build up which will necessitate a change.
- Keep insulated containers of warm liquids available for breaks.
- Be aware of signs of frostbite and take immediate remedial measures.
- Take extra care around areas subject to ice buildup (have sand on hand for areas of slippery footing).

4.2.2 Mechanical Hazards

In order to avoid hazards associated with operating equipment on the site the following should be observed by all HEES personnel and subcontractors:

- The hazards associated with each piece of moving equipment should be understood by reading the operations manual that come with each piece of equipment.
- Leave the area of operating equipment unless you are required to be near it to perform your job.
- Discuss contingencies for shutting down equipment in the event of an accident.

5.0 SITE ACCESS

The site is accessed from Buena Vista Avenue in Yonkers, New York.

6.0 ESTABLISHMENT OF WORK ZONES

The Safety Officer will establish and clearly mark the following areas with consultation and input from HEES Project Manager(s):

✓ Exclusion Zone (EZ)

Despite the previous remedial efforts at the site, this will be any area so

designated by the site Safety Officer where it has been determined that there is the potential for hazards for which added PPE and higher level OSHA training for worker safety are required. Access to the EZ will be limited to employees, contractors, subcontractors and visitors who have 40-Hour Health and Safety Training, protective equipment and responsibilities for work in this area. The entry of unauthorized personnel into the EZ will be prohibited.

✓ Contamination Reduction Zone (CRZ)

The area between the established EZ and the Support Zone, described below, will be established to facilitate employee and equipment decontamination, protective equipment storage and supply, and employee rest areas. The CRZ will correspondingly be a limited area established immediately adjacent to the EZ. It will exist to permit easy decontamination of equipment and PPE.

✓ Support Zone (SZ)

A clearly marked area free from any potential contamination will be identified where administrative and other support functions (i.e. those not requiring entrance to the EZ or CRZ) can be performed. The actual siting of the SZ will be established by the Safety Officer. It is anticipated that this area will consist of all areas outside the EZ or CRZ.

6.1 Exclusion Zone Entry

All personnel working in the EZ will enter their names on the site log, which will be maintained by the Safety Officer. Personnel will only enter an EZ after meeting with the Safety Officer to sign-in. Before engaging in *any* site work, all personnel involved in such work will be briefed on the following:

- The identity of the Safety Officer,
- The identity of project managers on-site,
- The boundary and exit point of the EZ,
- Decontamination procedure in the CRZ,
- Current state of chemical and physical hazards in the EZ.
- Levels of chemical contaminants (and oxygen) in air that will constitute a Warning Condition,
- Levels of chemical contaminants (and oxygen) in air that will constitute a Hazardous Condition,
- Location of first aid and emergency equipment,
- Procedures for site evaluation and contacting emergency response personnel,
- Location of emergency meeting point,
- Cold and/or Heat Stress symptoms, and
- PPE requirements.

A weekly site safety meeting will be held so that the Safety Officer can describe the expected hazards, the engineering controls in-place to reduce the hazards, and to go over the steps to take in the event of an emergency.

7.0 ACTION LEVELS

In order to protect site workers, particularly those workers in the EZ, the following established action levels shown below shall be adhered to:

TABLE 9 – ACTION LEVELS

Chemical/Hazard	Action Level for Warning Condition	Action to be Taken for Warning	Action Level for Hazardous Condition	Action to be Taken for Hazardous Condition
Fugitive Dust	Visible Dust Cloud	Alter pace of activities	Halt work	-Stop work -Apply water to problem areas -Record all pertinent information
Petroleum Vapors**	10 PPM	Mandate frequent breaks**	25 PPM	-Stop work, -Upgrade to Level C for all EZ personnel not already in Level C, or -Institute Engineering control to reduce levels.
Oxygen Content	-	Notify*	Less than 19.5% or greater than 23.5%	-Stop work -Notify appropriate personnel*, -Notify all personnel to evacuate EZ,

^{*}Air monitoring specialist is to notify the HEES Field Staff.

MSDS sheets for known chemical hazards that have been detected at the site are attached as **Appendix A**.

8.0 LEVEL OF TRAINING REQUIRED

The specific level of training necessary to complete work as described is outlined in OSHA 29 CFR 1910.120(e)(3–4). In this regard, the necessary training required for each class of site worker on this project is outlined in one of the three quoted OSHA training regulations below:

OSHA 29 CFR 1910.120(e)(3)(i)

"Workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or



^{**}Continuous breathing zone reading w/o respirators.

geophysical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor." Or,

OSHA 29 CFR 1910.120(e)(3)(ii)

"Workers regularly on site who work in areas which have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor." Or,

OSHA 29 CFR 1910.120(e)(3)(iii)

"General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor."

Based on this requirement, the minimum required safety training to participate in this project is 24 hours (and 1 day of field experience) for all field staff, unless they are to be in jobs that engage in hazardous substance removal or other activities that may potentially expose them to hazardous substances in which case the requirement is 40 hours (and 3 days of field experience) of initial training. Supervisors are required to have at least 8 hours of supplemental training on such topics as employer's safety and health program, the associated employee training program, PPE program, spill containment program, and health hazard monitoring procedures and techniques. In accordance with OSHA 29 CFR 1910.120(e)(4), the minimum required amount of safety training for supervisors (project managers and/or safety officers) for this project is 48 hours because they will be managing both 24 hour and 40 hour trained staff.

Training certificates demonstrating that each site worker listed in **Section 2.1, 2.2** and **2.3** has met the above referenced OSHA 29 CFR 1910.120(e)(3) are attached in **Appendix B**. Training certificates shall be provided to the Site Safety Officer on arrival at the site by any visitors and contractors.

8.1 Permit Required Confined Space Entry and Work Program

No portion of this project will involve work in permit-required confined spaces as defined in OSHA 1910.146. Thus, site specific confined space entry procedures have not been developed.

9.0 MEDICAL SURVEILLANCE PROGRAM

HEES has an in-place medical surveillance program for HEES employees in accordance with OSHA 29 CFR 1910.120(f)(1) which states the following:

"Employees engaged in operations specified in paragraphs(a)(1)(i) through (a)(1)(iv) of this section and not covered by (a)(2)(iii) exceptions and employers of employees specified in paragraph (q)(9) shall institute a medical surveillance program in accordance with this paragraph."

The HEES medical surveillance program provides for the following:

- ✓ All employees that are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year, or are required to wear respirators for more than 30 days a year have medical surveillance every 12 months or more frequently, as deemed medically necessary.
- ✓ Some employees that do not meet the exposure or respirator criteria above must undergo medical surveillance just prior to assignment where they may be exposed to substances or health hazards at or above the established permissible exposure limit (without regard to the use of respirators) or must wear a respirator for assignment (more than 30 days).
- ✓ All medical surveillance testing of employees that may wear respirators incorporates pulmonary testing as the first measure of approval to don a respirator.

HEES' medical surveillance program does not cover visitors, contractors, or subcontractors. Visitors, contractors, and subcontractors involved in this project are responsible for compliance with OSHA medical surveillance requirements as applicable.

10.0 PERSONAL PROTECTIVE EQUIPMENT

All on-site personnel shall be issued appropriate personal safety



equipment and protective clothing in accordance with this Health and Safety Plan. All safety equipment is to be used properly and protective clothing is to be kept clean and well maintained. If there is a need to address inhalation chemical hazards the Safety Officer shall do so using established "action levels". Upgraded action level may require upgraded PPE. The Safety Officer has the authority to require the use of additional equipment if he believes it is necessary for specific operations.

All personal protective equipment worn on-site shall be decontaminated before being reissued. Disposable equipment shall be properly disposed of as contaminated solid waste at the end of each work day or as needed. Disposed material shall be contained within a secured area daily, on-site, prior to disposal.

Standing orders for all HEES site workers, contractors, and subcontractors includes the use of the following important safety gear:

- All prescription eyeglasses used on-site shall be safety glass (the Safety Officer will ensure that all eye and face protection shall conform to OSHA 1910.133).
- A hard hat shall be worn by all personnel (the Safety Officer will ensure that all head protection shall conform to the requirements in OSHA 1910.135).
- Steel toe/shank safety boots (conforming to OSHA 1910.136).

There is no discussion of Level A, Level B or Level C PPE below because it is not anticipated as a part of this site specific work. If it is required, the practice will be added to this HASP in the form of an addendum.

10.1 Modified Level D

The PPE level required for the planned site activities is a modified level D for all job tasks outlined on **Table 2** and will be used when the atmosphere contains no hazard.

Modified Level D PPE consists of:

- Nitrile Gloves
- Hard hat.
- Steel toed/steel shank boots,
- Disposable rubber booties,
- Safety glasses,
- Disposable Tyvek suit,
- Ear protection.

11.0 EXPOSURE MONITORING

11.1 General Information

Air monitoring will be conducted under the supervision of the Safety Officer for the express purpose of safeguarding the health and welfare of site workers. The air monitoring program herein conforms to pertinent OSHA rules.

The company that will be providing the air monitoring is listed below:

Ms. Rachel Griffiths
HydroEnvironmental Engineering Services, P.C.
One Deans Bridge Road
Somers, New York, 10589
(914) 276-2560 (office)
(914) 774-3084 (24 hr. Emergency Number – William Canavan)
(914) 512-0779 (cell phone)

The HEES project manager responsible for this project is Mr. William Canavan, PG, CPG.

11.2 Air Monitoring Responsibilities

HEES will provide the following air monitoring services:

- Perform a site reconnaissance to become familiar with the area and surrounding areas and review general potentially hazardous conditions in the work area.
- Air monitoring to determine the level of oxygen and combustible gas (in percent) in the EZ, CRZ and SZ.
- The air monitoring representative will be on-site in advance of work startup in order to have ample time to set-up, calibrate the equipment, and screen all accessible areas. This time will also allow the proper reporting and/or notifications (see below) to be completed before work begins each day.
- Provide workers with verification that action levels are not exceeded in all work zones each day before work is scheduled to occur in those zones. This work will be done upon completion of daily instrument calibration.
- Provide continuous monitoring of the EZ, CRZ and SZ with logging of data hourly. An emphasis will be placed on those areas where a hazardous condition appears most likely to occur based on site activities and weather conditions. Verbal, and, if necessary, written verification, will be made



throughout each day as to the condition of each area (i.e. safe, Warning Condition, or Hazardous Condition).

- Evaluate adjustments necessary to render a given area safe to work and communicate to involved personnel.
- Notify personnel at the beginning of each day which work areas are in compliance with action levels and which areas are not.
- If HEES detects the presence of petroleum vapors at or exceeding the criteria listed below a WARNING condition shall be declared.

Constituents	Minimum levels for a WARNING Condition		
Petroleum Vapors	10% of the LEL		

If HEES detects the presence of petroleum vapors at or exceeding the criteria listed below, a HAZARDOUS Condition shall be declared and a portable air horn will be sounded to warn all of the condition. All field personnel will be notified and instructed to discontinue work in the zone until an expert in fire and explosions has assessed the condition and developed a plan to return the zone to below the trigger condition(s).

Constituents	Minimum levels for HAZARDOUS Condition		
Petroleum Vapors	20% of the LEL		
Oxygen	Less than 19.5% or greater than 23.5 %		

- HEES will provide gas detection equipment required for the project in sufficient quantities. The following will be provided:
 - One Gas Tech Model No. GX-82A (or equivalent) portable meter capable of measuring combustible gases, hydrogen sulfide, carbon monoxide, methane and percent of oxygen,
 - One MiniRae Model 3000 photoionization detector (PID),
 - Calibration kits for all meters, and all necessary sampling lines.
 - HEES will be responsible for providing or making available to Site personnel all pertinent safety gear for the project to meet the Modified Level D PPE.

Fugitive Dust

Description

According to the approved Remedial Design, fugitive dust could be generated during drilling activities. The site is adjacent to commercial and residential properties and a day care.

Fugitive Dust Control Plan

If fugitive dust is observed or monitored, the Site safety control personnel will halt activities until the problem area or areas can be properly suppressed by the application of clean water or calcium chloride. The frequency of application of dust control, if deemed necessary, will be determined based on the monitoring results. The height of the temporary clean material stockpiles will be limited as well as the amount of disturbance to the stockpiles.

Fugitive Dust Monitoring and Recording

During site activities, the site will be monitored visually for any signs of fugitive dust. The safety control personnel will record all dust control activities, if required. The date, time, control method and weather information will each be recorded to evaluate the success of the fugitive dust suppression methods.

11.3 Air Monitoring Reporting

As per the requirement of the NYSDEC, HEES will report findings of work in one of three ways:

- 1. <u>Daily Log Reports</u> This report will be prepared hourly and will be submitted to the NYSDEC and the Westchester County Department of Health (WCDOH) at the end of each week. The log will include the findings of the air monitoring, a summary of the conditions encountered each day, and will detail if any WARNING or HAZARDOUS Conditions were noted and where. Other site specific information (i.e. daily site figure showing location of monitoring stations; wind direction; work zone areas; 15 minute instrument averages) will be incorporated into the weekly report.
- 2. Notice of Unsafe Atmosphere The notice will be prepared immediately following all verbal notifications are completed. The notice will provide detail regarding the detection of the unsafe atmosphere (i.e. concentration(s) of gas(es) detected, the nature of the gas hazard, and the specifics of the detection). The NYSDEC and NYSDOH Project Managers will be notified of any CAMP exceedances and corrective actions in a timely manner. All exceedances and corrective actions will be documented in the

weekly report mentioned above.

3. Notice of Safe Atmosphere – When a previously determined HAZARDOUS Condition has been eliminated, and immediately after completing the notifications required above, HEES will prepare and deliver a Notice of Safe Atmosphere to Site personnel; The report will detail why the HAZARDOUS Condition was eliminated.

HEES will provide as many report copies as required by the NYSDEC and the WCDOH. Templates of the above referenced notices can be found in **Appendix C**

11.3.1 Community Air Monitoring Plan

In addition to the above outlined air monitoring program, HEES will implement the approved Community Air Monitoring Plan (CAMP) for the site. Air monitoring will be completed for potential air contaminants including VOCs and particulate levels at the perimeter of the work area in accordance with NYSDEC Requirements. VOC and particulate monitoring will be conducted at several locations, i.e. upwind, downwind and next to the daycare center on the south side of the site. It is anticipated that these CAMP locations will change throughout the investigation based on wind direction and work zone activities. The NYSDOH Generic Community Air Monitoring Plan is included in **Appendix D**. Based on Site history, the following CAMP was proposed and approved:

Continuous Monitoring will be completed during all ground intrusive activities at the subject Site. Ground intrusive activities include but are not limited to soil excavation and handling, test pitting or trenching, and the installation of soil borings or monitor wells.

Periodic Monitoring for VOCs will be required at the subject Site during non-intrusive activities such as collection of soil and sediment samples or groundwater samples from existing monitor wells. This monitoring will consist of taking a reading upon arrival to the sampling location, monitoring during sampling, and collecting a reading upon departure from the specific sampling location. Continuous monitoring may be required depending on the location of the sample point (i.e.: urban sidewalk) and the duration of exposure at the sampling point.

VOC Monitoring, Response Levels and Actions

VOCs will be monitored at the downwind perimeter of the EZ and next to the daycare center on a continuous basis. Upwind air concentrations will be monitored at the start of each work day and periodically thereafter to establish site specific background air concentrations. The monitoring will be completed using a calibrated PID. The PID will be calibrated on a daily basis. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.



- 1. If the ambient air concentration of total organic vapors at the downwind perimeter of the EZ exceeds 5 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 below 5 ppm over background, work activities can resume.
- 2. If total organic vapor levels at the downwind perimeter of the work area or EZ persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of the vapors identified, corrective actions taken to abate the vapors, and monitoring continued. After these steps are implemented, work activities can resume provided total organic vapor level 200 feet downwind of the EZ 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.
- 3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.
- 4. All 15-minute readings must be recorded and be available for NYSDEC and WCDOH personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the EZ at temporary particulate monitoring stations. The particulate monitoring will 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 15-minute period for comparison to airborne particulate action level. The equipment will have an audible alarm to indicate exceedance of the action level. Additionally, fugitive dust will be visually assessed during all work activities.

- 1. If the downwind PM-10 particulate 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 the downwind PM-10 particulate concentration is within 150 mcg/m³ above the upwind level and provided that no visible dust is migrating from the work area.
- 2. 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.

3. All readings will be recorded and available for NYSDEC and WCDOH personnel to review.

12.0 SPILL CONTAINMENT PROGRAM

The procedures defined in this section comprise the spill containment program in place for activities at the site.

All containers used during this work shall meet the appropriate Department of Transportation (DOT), OSHA, and EPA regulations for the waste that they will contain. Containers shall be inspected and their integrity assured prior to being moved. Containers that cannot be inspected before being moved because of storage condition, shall be positioned in an accessible location and inspected prior to further handling.

Operations on-site will be organized so as to minimize the amount of drum, tank or container movement.

Employees involved in drum, tank or container operations shall be warned of the hazards associated with the containers.

In areas where spills, leaks or ruptures may occur, adequate quantities of spill containment equipment (absorbent pillows, etc.) will be stationed. The spill containment program must be sufficient to contain and isolate the entire volume of hazardous substances being transferred.

Fire extinguishing equipment meeting OSHA 29 CFR part 1910 shall be on hand and ready for use to control fires. Equipment shall be located in the construction storage box as well as at the Contamination Reduction Corridor.

13.0 DECONTAMINATION PROCEDURES

To minimize contact with contaminated substances and reduce the potential for contamination, the following will be adhered to during all phases of site entry and evacuation:

- Personnel shall make every effort not to walk through any areas of obvious contamination.
- Personnel shall not kneel or sit on the ground in the Exclusion



- Zone and/or in the Contamination Reduction Zone.
- Personnel must wear all necessary PPE in the Exclusion Zone.
 These must be removed when evacuating the Exclusion Zone.

13.1 Personnel Decontamination

A decontamination area shall be constructed in accordance with OSHA 29CFR 1926.58(J). At this site, the decontamination area will be located in the CRZ, which will be established between the EZ, where work is being performed, and the SZ. A soap (detergent) and water wash/rinse shall be used for all protective equipment, unless it is placed directly into a trash bag. A waterless hand cleaner and paper towels may be used for hands, arms and any other skin surfaces potentially in contact with contaminated material. Any contaminated protective equipment and decontamination supplies shall be disposed of in designated receptacles. All personnel <u>must</u> decontaminate upon exiting the EZ or CRZ.

All personnel protective equipment worn on-site shall be decontaminated before being reissued. Disposable equipment shall be properly disposed of as contaminated solid waste at the end of each work day or as needed. Disposed material shall be contained within a secure area daily, on-site, prior to disposal.

13.2 Emergency Decontamination

Decontamination will be delayed if immediate medical treatment is required to save a life. Decontamination will be initiated after the victim is stabilized when it can be performed without interfering with medical treatment. If a worker has been contaminated with an extremely toxic or corrosive material which could cause additional injury or loss of life, decontamination will be performed immediately.

When decontamination cannot be done, the victim will be wrapped in a chemical protective barrier (clothing or sheeting) to reduce contamination of other personnel. Emergency and off-site medical personnel shall be informed of potential contamination and shall be instructed about specific decontamination procedures. When the victim is transported off the site personnel knowledgeable of the incident, the site, and decontamination procedure shall accompany the victim; a MSDS shall also accompany the victim.

13.3 Equipment Decontamination

The decontamination area for all equipment used in the EZ will be set up in close proximity to the EZ. A wash and rinse or adsorbent pad wipe down will be done on all equipment surfaces that come in contact with contaminants. Contaminated equipment will be kept out of clean areas until they have been

decontaminated.

14.0 <u>EMERGENCY/CONTI</u>NGENCY PLAN

This section deals with emergency planning and procedures in the event of an emergency. See **Appendix E** for the list of Emergency Contact Numbers.

14.1 Emergencies within the EZ

The Safety Officer will monitor all operations and assist any emergency personnel responding to an emergency within the various work zones.

In the event of an emergency requiring off-site emergency response agencies, the appropriate emergency service will be notified with the following information:

- A. Location of emergency 41-53 Buena Vista Avenue in Yonkers, New York
- B. Nature of emergency:
 - 1. Fire. if so of what kind and what equipment is involved **CALL 911**;
 - 2. In the event of an emergency medical incident **CALL 911**;
 - a) Communication shall include:
 - Number of injured people.
 - Nature of injuries.
 - If Project Field Team Members cannot handle injuries with its resources, what emergency medical services are needed.
 - b) If off-site emergency personnel must enter the site, hazards will be communicated to those people, and they shall be supervised by the Safety Officer or designee.
 - c) In the event that a team member wearing protective equipment in the Exclusion Zone becomes injured, the Safety Officer shall do whatever decontamination is necessary in accordance with Section 13.1.
 - d) Any emergency treatment information dealing with the injury shall accompany the injured party so that those treating personnel will have any

and all information.

- 3. Request for Police CALL 911. If any person(s) entering the site who does not belong there becomes a problem, the police shall be notified. In addition, HEES shall also be notified by radio or plant telephone that if a person(s) endangers the Field Team Members or himself, the Safety Officer shall suspend all work until that person(s) can be removed.
- C. If workers must evacuate the site due to any other emergency **CALL 911**.

14.1.1 Safety Officer Responsibilities

In all emergency situations, it shall be the responsibility of the Safety Officer, or her designee, to ensure that proper procedures are carried out and that all Project Field Team Members are accounted for.

14.2 Exposures

14.2.1 Personnel Exposures

The emergency procedures to be used in the event of acute exposure (eyes, skin contact, inhalation, or physical injury) are:

Eye Exposure - Treat by immediate flushing with distilled water (portable eyewash). Transport for examination and treatment.

Skin Exposure - Remove contaminated clothing and treat by washing with waterless hand cleaner and paper towels followed by soap and water.

<u>Inhalation</u> - If a person inhales a large amount of organic vapor, the person will be removed from the work area to fresh air and artificial respiration will be administered if breathing has ceased. The affected person will be transported to the hospital if overexposure to lungs has occurred. A map depicting the route to the hospitals is included in **Appendix E**

<u>Physical Injuries</u> - In case of physical injury, the victim may receive emergency first aid at the site, as appropriate, and, if necessary, will be transported by ambulance or emergency vehicle to the Hospital. An accident form must be completed for any accident or occupation exposure. Precautions shall be taken to eliminate any direct contact by the first aider to the injured person's blood, sputum, or other body fluids. PPE must be used by the responder.

14.3 Site Evacuation

If conditions warrant evacuation, project field team members shall assemble near the entrance of the site. Fire/Police Departments shall be notified in the event of fire, explosion or their potential. Depending on the cause and magnitude of the conditions requiring evacuation, three stages have been designated.

<u>Withdrawal to a Safe On-site Location</u> - withdraw to an <u>on-site</u> safe upwind (if possible) location if:

 Air quality concentration contains excessive concentrations of volatile organics or oxygen percentage above or below safe levels for the level of protection being worn.

- A minor accident occurs. The victim shall undergo decontamination procedures and be transported to a safe area outside the EZ. Field operations shall resume after first aid and/or decontamination procedures have been administered to the affected individual.
- Protective clothing malfunction.

The field team shall withdraw to an on-site safe upwind location. The Safety Officer shall determine the location and articulate it to the field personnel as conditions dictate.

Withdrawal from the Site – if:

- Explosive levels of combustible gas(es), dangerous levels of toxic gas(es), and/or volatile organics are measured,
- A major accident or injury occurs,
- Fire and/or explosion occurs, or
- Ordered by HEES.

The field team shall withdraw to a safe predetermined location. The Safety Officer shall determine the location and articulate the location at the initial site safety meeting.

Evacuation of Nearby Populations - a continuous release of toxic, flammable, or explosive vapors from the site could affect people off-site. If a significant release occurs, the Safety Officer shall be responsible for monitoring air quality downwind of the source of the release to assess the situation. The Safety Officer, or his on-site designee, is responsible for determining if circumstances exist for any level of off-site contamination warranting concern for people off-site. He should always assume worst case conditions until proven otherwise. If conditions are marginal, evacuation should be conducted until acceptable conditions resume. Key personnel identified in the HASP should be contacted when evacuation of nearby populations becomes necessary.

<u>Site Control</u> - during emergency conditions, the Safety Officer or designee shall prohibit any personnel or visitors from entering the affected area (Restricted Zone). The Safety Officer or designee shall assure that emergency equipment is available for use by authorized personnel and that all ignition sources are shutdown within his sphere of control. The Safety Officer or designee shall gain the assistance of personnel authorized to shut down other potential ignition sources.

14.4 Emergency Response Training

Training on the emergency response plan shall be initiated prior to start up of actual operations.

14.5 Directions to the Hospital

Saint Joseph's Medical Center is located within 0.5 miles of the site.

IF EMERGENCY CALL 911 otherwise contact information for these hospitals can be found in **Appendix E**. Directions to the hospital can also be found in **Appendix E**.

14.6 Additional Safety Related Items

The following additional safety items are considered essential equipment for the project. They include:

- 1. First Aid Kit (for minor injuries).
- 2. Disposable Eye Wash (1 liter or more) with a minimum of two additional bottles of eye wash solution.

14.7 Accident Reports

In the event of an injury or illness, work will cease until the Safety Officer and Project Manager have examined the cause of the incident and have taken the appropriate action. Any injury or illness, regardless of extent, is to be reported on the Accident Report Form.

14.8 Emergency Signals

In most cases, field personnel will carry cell phones for communication with the other field staff. Should an emergency occur, the information should be transmitted immediately. For workers not within the vicinity of personnel equipped with cell phones, air horn signals will be used. In some cases emergency hand signals will be utilized.

EMERGENCY AIR HORN SIGNALS

HELP = Three short horn blasts
Evacuation = Three long horn blasts

All Clear = Alternating long and short blasts

EMERGENCY HAND SIGNALS

Out of air = Hand(s) gripping throat
Leave area immediately = Grip partners wrist
Hands on top of head
Okay! I am alright = Thumb(s) up
No! Negative = Thumb(s) down

15.0 Standard Operating Procedures

Workers are expected to adhere to established safe work practices for their respective specialties (i.e. equipment operations, project management, field staff, etc.). The need to exercise caution in the performance of specific work tasks is made more acute due to:

- Physical, chemical, and toxicological properties of contaminated material possibly present;
- Other types of hazards present, such as heavy equipment, falling objects, loss of balance or tripping;
- Weather conditions:
- Restricted mobility and reduced peripheral vision caused by the protective equipment itself; and
- The need to maintain the integrity of the protective gear.

Work on-site shall be conducted according to established protocols and guidelines for the safety and health of all involved.

15.1 General Considerations

The exhaust of <u>all</u> combustion engine equipment used inside any small spaces will be properly vented to a safe outside location.

An appropriately sized fire extinguisher will be a required piece of equipment on this project.

In any unknown situation, the worst conditions must always be assumed and operations must be planned accordingly.

Because no personal protective equipment is 100 percent effective, all personnel must *minimize* contact with contaminated materials.

Work areas, decontamination areas, and procedures must be effectively planned.

Smoking, eating, chewing (gum or tobacco), or drinking in the CRZ and EZ shall be prohibited. Oral ingestion of contaminants is the second most common route introducing toxic substances into the body (inhalation is the first).

Heat and other work stresses related to wearing protective gear shall be avoided. Work breaks should be planned to prevent stress related accidents or fatigue.

Entry into the EZ will conform to the 'buddy" system at all times.

Work zones may require modification based upon air contaminants measured at the perimeter of the CRZ.

Medicine and alcohol can mask or increase the effects from exposure to toxic chemicals and heat stress. Personnel taking prescription drugs shall not be permitted to work in the CRZ or EZ, unless approval has been given by a physician. Alcoholic beverage consumption is prohibited on the site.

Personnel must be observant of not only one's own immediate surroundings, but also those of others. Everyone will be working under constraints, therefore, a team effort is needed to warn of impending dangerous situations.

Extra precaution is necessary when working near equipment while utilizing personal gear because vision, hearing and communication may be restricted.

Personnel must be aware that chemical contaminants may mimic or enhance symptoms of other illnesses or intoxication. Avoid use of alcohol or working while ill during the duration of task assignment.

The Safety Officer will maintain records pertaining to daily activities, meetings, incidents, results of heat/cold stress monitoring, weekly first aid kit inspections/inventory. The records will remain on-site for the duration of the project so that other safety and health personnel may add information, thereby maintaining continuity. These daily records will become part of the permanent project file.

15.2 Site Personnel

Daily Site and EZ entry/exit logs will be prepared and maintained. All personnel on-site shall sign in and sign out. The daily log sheets will be made part of the permanent site record.

No matches or lighters of any kind will be allowed in the CRZ or EZ unless specified by the Safety Officer.

All personnel will have their "buddy" with them when the "buddy" system is in effect

All personnel will notify the Safety Officer of any unusual occurrences which might effect the overall safe operation of the Site.

Any time a fire extinguisher is used, personnel shall notify the Safety Officer of what took place.

All injuries and accidents shall be immediately reported to the Safety Officer and the appropriate reports shall be filed.

All safety equipment shall be located with additional equipment, such as a fire extinguisher and an eyewash station, located at the Contamination Reduction Corridor.

15.3 Traffic Safety Rules

All personnel will park vehicles and meet outside the EZ at the beginning of each workday throughout the project.

Any vehicles that will not be involved in the site operations shall be secured and left in a designated parking area.

All local traffic and parking rules will be followed by HEES personnel and their subcontractors working on the site.

16.0 CONFINED SPACE ENTRY PROGRAM

Confined space entry is not required by the outlined work for this site. Thus, site specific confined space entry procedures have not been developed.

17.0 IMPORTANT ACRONYMS

HASP - Health and Safety Plan

OSHA - Occupational Safety and Health Administration

PPE - Personal Protective Equipment

MSDS - Material Safety Data Sheet

EZ - Exclusion Zone

CRZ - Contaminant Reduction Zone

SZ - Support Zone

TWA - Time Weighted Average STEL - Short Term Exposure Limit

EPA - Environmental Protection Agency



Table 1

41-53 Buena Vista Avenue Yonkers, New York Brownfield Cleanup Program #360085

Project Organizational Chart

William Canavan	Senior Project Manager
Jon Ashley	Project Engineer
Alyssa Epstein	Environmental Scientist
Rachel Griffiths	Geologist/Hydrogeologist

Environmental Scientist II

Tom Brant

Table 2

HASP 41-53 Buena Vista Avenue Yonkers, NY 10701

Identified Hazards Associated with Each Task

Task	Daily Hours Performing Task (hrs)	Confined Space Entry (Yes or No)	Identified Hazards
Field Staff	8	No	-Cold Stress/Heat Stress and Exposure -Slip/trip -Noise -Chemical Gas Inhalation
Air Monitoring	8	No	- Cold Stress/Heat Stress and Exposure -Slip/trip -Noise -Chemical Gas Inhalation
Project Management/ Oversight	8	No	- Cold Stress/Heat Stress and Exposure -Slip/trip -Noise -Chemical Gas Inhalation

^{*}See Section on Confined Space Entry in HASP

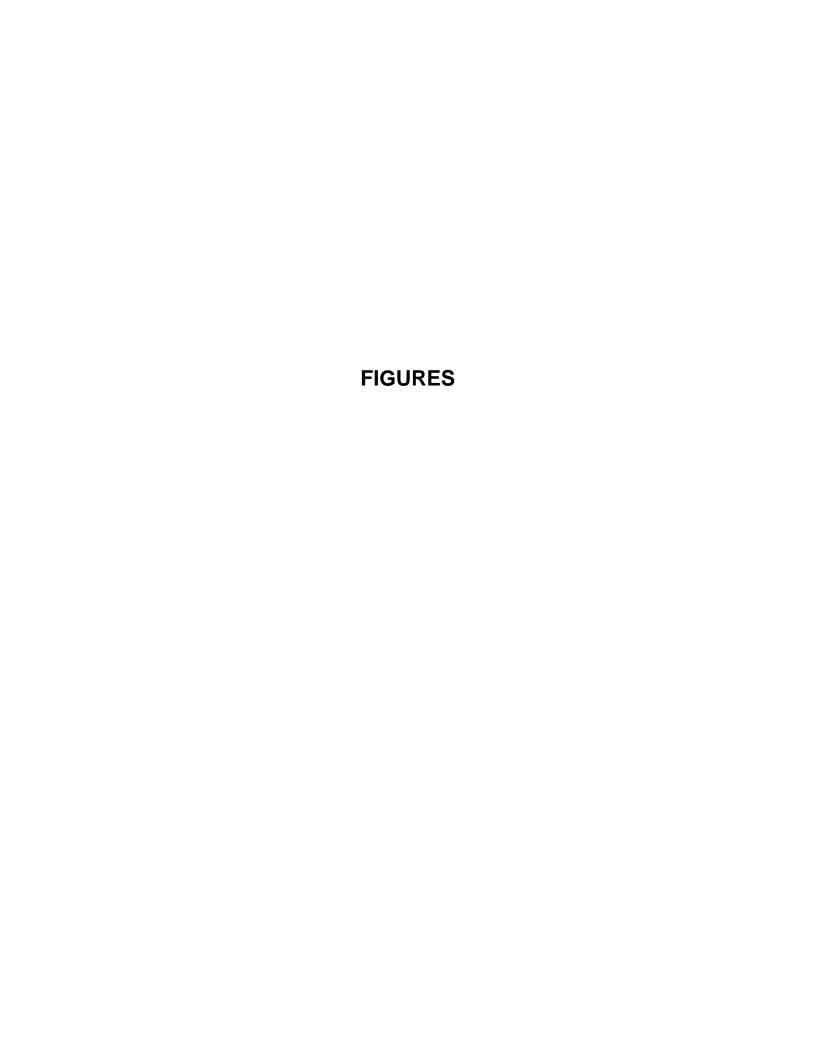
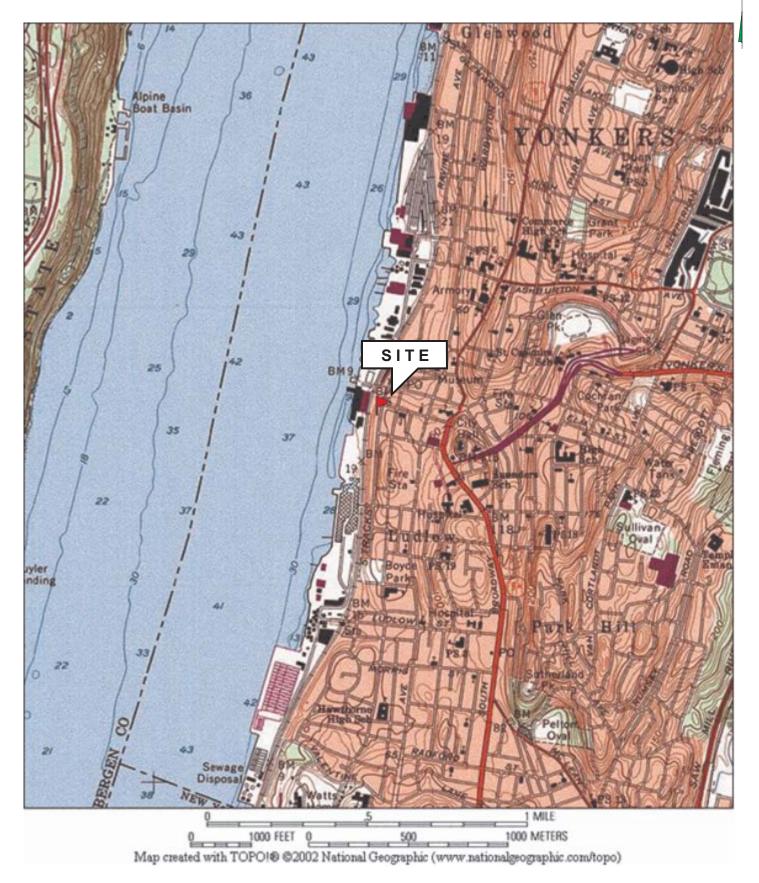


FIGURE 1 SITE LOCATION MAP

41-53 BUENA VISTA DRIVE YONKERS, NEW YORK







APPENDIX A:

Material Safety Data Sheets

SAFETY DATA SHEET

Version 5.5 Revision Date 06/13/2014 Print Date 01/02/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

CAS-No.

Product name : 4.4′-DDD

Product Number : 49009 Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

: 72-54-8

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.

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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

Formula : C₁₄H₁₀Cl₄

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.

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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 eves. 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.

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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

Form: solid a) **Appearance**

b) Odour no data available Odour Threshold no data available c) d) Нα no data available

Melting point/freezing

point

94.0 - 96.0 °C (201.2 - 204.8 °F)

Initial boiling point and

boiling range

193.0 °C (379.4 °F) at 1.3 hPa (1.0 mmHg)

no data available Flash point h) Evapouration rate no data available Flammability (solid, gas) no data available

Upper/lower

no data available

flammability or explosive limits

Vapour pressure < 0.00001 hPa (< 0.00001 mmHg) at 25.0 °C (77.0 °F)

Vapour density no data available

m) Relative density 1.38 g/cm3

n) Water solubility no data available Partition coefficient: n-

octanol/water

log Pow: 6.02

p) Auto-ignition temperature

no data available

Decomposition temperature

no data available

r) Viscosity no data available no data available s) Explosive properties

Oxidizing properties no data available

9.2 Other safety information

no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

no data available

Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

no data available

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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

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.

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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)

Marine pollutant: No

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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 72-54-8 1993-04-24

2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane

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
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

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Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 5.5 Revision Date: 06/13/2014 Print Date: 01/02/2015

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Safety Data Sheet Revision Date: 06/25/14

www.restek.com

1. IDENTIFICATION

Catalog Number / Product Name: 32202, 32202-5XX, & 32302 / 4,4'-DDE Standard

Company:

Address:

Restek Corporation
110 Benner Circle
Bellefonte, Pa. 16823

Phone#:

814-353-1300

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: 7

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 - 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	
4,4'-DDE	72-55-9		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 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 6000 ppm IDLH 250 ppm STEL 67-56-1 200 ppm TWA 200 ppm TWA; 260 mg/m3 TWA 4,4'-DDE 72-55-9 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: 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: Liquid

pH: No data available Vapor Density: 1.1 (air = 1) Melting Point: -98 $^{\circ}$ 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:
Odor Threshold:
Solubility:
Partition Coefficient: n-octanol in water:
No data available.
Moderate; 50-99%
No data available.

VOC % by weight: 99.90 Molecular Weight: 32.04

10. STABILITY AND REACTIVITY

Stability: Stable under normal conditions.

Conditions to Avoid:

Materials to Avoid / Chemical Incompatiability:

No data available.

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.

Toxic if swallowed. May cause target organ failure Ingestion:

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:

CAS No. **Chemical Name**

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 para,para"-DDE 72-55-9 Group 2B

12. ECOLOGICAL INFORMATION

Overview: Moderate ecological hazard. This product may be dangerous to plants and/or wildlife.

Mobility:No dataPersistence:No dataBioaccumulation: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:
UN Number:
Hazard Class:
Packing Group:

Methanol
UN1230
3
II

International:

IATA Proper Shipping Name:MethanolUN Number:UN1230Hazard 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

 4.4'-DDE
 72-55-9
 X

The following chemicals are listed on CA Prop 65:

Chemical Name CAS# Regulation Dichlorodiphenyldichloroethylene 72-55-9 Prop 65 Cancer Methanol 67-56-1 Prop 65 Devolop Tox 1,1-Dichloro-2,2-bis(p-Prop 65 Devolop Tox 72-55-9 chlorophenyl)ethylene DDE 72-55-9 Prop 65 Rep Male

State Right To Know Listing:

CAS# **Chemical Name New Jersey** Massachusetts Pennsylvania California methanol 67-56-1 Х Χ Х Χ Х Х Х 4,4'-DDE 72-55-9

16. OTHER INFORMATION

Prior Version Date: 03/15/12

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 products 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.

MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology **Standard Reference Materials Program** 100 Bureau Drive, Stop 2300

Gaithersburg, Maryland 20899-2300

RM Number: 8469 MSDS Number: 8469 RM Name: 4.4'-DDT

Date of Issue: 16 December 2011

Telephone: 301-975-2200 **Emergency Telephone ChemTrec:** FAX: 301-926-4751 1-800-424-9300 (North America) +1-703-527-3887 (International) E-mail: SRMMSDS@nist.gov

Description: This Reference Material (RM) is provided as a primary reference compound of measured purity for 4,4-DDT (dichlorodiphenyltrichloroethane). It is intended for use in the evaluation of procedures and daily working standards used in the measurement of 4,4-DDT in environmental samples. A unit of RM 8469 consists of one vial containing approximately 100 mg of 4,4-DDT.

Substance: dichlorodiphenyltrichloroethane

Other Designation: 4,4'-DDT; DDT; p'p'-DDT; 1,1'-(2,2,2-trichlroroethylidene)bis(4-chlorobenzene); 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane; alpha,alpha-bis(p-chlorophenyl)-beta,beta,beta-trichloroethane; dicophane; pentachlorin; RCRA U061; C₁₄H₉Cl₅.

2. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 2

Fire = 1

Reactivity = 0

Voc

No

Major Health Hazards: Harmful on contact with skin, harmful if swallowed, suspect cancer hazard (in animals).

Physical Hazards: Slight fire hazard.

Potential Health Effects

Ingestion: Acute: nausea, vomiting, diarrhea, stomach pain, headache, dizziness, visual disturbances, tingling sensation, lung congestion, blood disorders, paralysis, convulsions, and coma. Chronic: same as other routes of exposure. In addition, it may cross the placenta and may be excreted in breast milk.

Inhalation: Acute and chronic: same as short-term ingestion if prolonged and repeated exposure.

Skin Contact: Acute and chronic: same as short-term ingestion if prolonged and repeated exposure.

Eye Contact: Acute and chronic: no information available.

Listed as a Carcinogen/Potential Carcinogen

	1 65
In the National Toxicology Program Report on Carcinogens	$X^{(a)}$
In the International Agency for Research on Cancer Monographs	$X^{(b)}$
By The Occupational Safety and Health Administration (OSHA)	<u> </u>

⁽a) NTP – Reasonably anticipated to be a human carcinogen.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

		EC Number	Nominal Concentration
Component	CAS Number	(EINECS)	(%)
4,4'-DDT	50-29-3	200-024-3	100

EC Classification: T (Cancer Carc. 3), N EC Risk (R No.): 25, 40, 48/25, 50/53 EC Safety (S No.): 22, 36/37, 45, 60, 61

EC Risk/Safety Phrases: See Section 15, "Regulatory Information".

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⁽b) IARC – Group 2B (possibly carcinogenic).

4. FIRST AID MEASURES

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. Seek immediate medical attention.

Skin Contact: Rinse affected area with soap and water for at least 15 minutes. Seek medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: Contact local poison control immediately; if vomiting occurs, keep head lower than hips to prevent aspiration. If unconscious, turn head to side; get medical attention immediately.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Slight fire hazard.

Extinguishing Media: Regular dry chemical, carbon dioxide, fine water spray, regular foam.

Fire Fighting: Avoid inhalation of combustion by-products.

Flash Point (°C): Not available. Method Used: Not applicable.

Autoignition Temp. (°C): Not available.

Flammability Limits in Air

UPPER (Volume %): Not available. **LOWER (Volume %):** Not available.

Products of Combustion: Thermal decomposition may release hazardous or toxic gases (see Section 10, "Stability and Reactivity").

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Absorb with sand or other non-combustible material and collect in appropriate container for proper disposal.

Disposal: Refer to Section 13, "Disposal Considerations".

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards. Subject to storage regulations: US OSHA 29 CFR 1910.106. Keep separated from incompatible substances.

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

OSHA (TWA): 1 mg/m³ Prevent or reduce skin absorption.

NIOSH (TWA): 0.5 mg/m³ NIOSH (IDLH): 500 mg/m³ ACGIH (TWA): 1 mg/m³

Ventilation: Local exhaust ventilation system.

Respirator: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29 CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye Protection: Wear safety goggles. An eyewash station and drench shower should be readily available near the handling and use areas.

Personal Protection: Chemically resistant gloves and clothing are recommended.

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9. PHYSICAL AND CHEMICAL PROPERTIES
Appearance and Odor: White crystals; slight odor.
Molar Mass: 354.49 g/mol
Molecular Formula: $C_{14}H_9Cl_5$.
Specific Gravity (water = 1): 1.56 at 15 °C
Melting Point (°C): 107 to 109
Boiling Point (°C): 260
Water Solubility: Insoluble.
10. STABILITY AND REACTIVITY
Stability: X Stable Unstable
Stable at normal temperature and pressure.
Conditions to Avoid: Avoid heat, flames, sparks, and other ignition sources. Avoid generating dust. Keep out of water supplies and sewers.
Incompatible Materials: Bases, metals, and combustible materials.
Fire/Explosion Information: See Section 5, "Fire Fighting Measures".
Hazardous Decomposition: Halogenated compounds, and oxides of carbon.
Hazardous Polymerization: Will Occur X Will Not Occur
11. TOXICOLOGICAL INFORMATION
Route of Entry: X Inhalation X Skin X Ingestion
Toxicity Data
Rabbit, Dermal LD ₅₀ : 300 mg/kg
Rat, Oral LD ₅₀ : 87 mg/kg. Rat, Oral LD ₅₀ : 350 mg/kg.
Health Effects: See Section 2, "Hazards Identification" for potential health effects.
Target Organs: Central nervous system.
Mutagen/Teratogen
The following endpoints are listed in the Registry of Toxic Effects of Chemical Substances (RTECS).
Tumorigenic effects: Rat, Oral TD: 438 mg/kg (2 year).
Mutagenic effects: Human, 200 μg/L (72 h).
Reproductive effects: Rat, Oral, TDLo: 430 mg/kg (pregnant 1 d to 21 d and post 21 d).
Medical Conditions Generally Aggravated by Exposure: Blood system disorders, kidney disorders, and liver disorders.
12. ECOLOGICAL INFORMATION
Ecotoxicity Data (Aquatic Toxicity)
Fish: rainbow trout (<i>Oncorhynchus mykiss</i>), LC ₅₀ : 1.25 μg/L to 3.59 μg/L (96 h), static. Invertebrate: freshwater water flea (<i>daphnia magna</i>), LC ₅₀ : 0.000 46 mg/L to 0.001 mg/L (48 h), static
13. DISPOSAL CONSIDERATIONS
Waste Disposal: Dispose in accordance with federal, state, and local regulations.
14. Transportation Information
I MAINSPURTATION TINBURINATION

group II.

U.S. DOT and IATA: Organochlorine pesticide, solid, n.o.s. (4,4'-DDT); Hazard class 6.1, UN2761, packing

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15. REGULATORY INFORMATION

U.S. REGULATIONS

CERCLA Sections 102a/103 (40 CFR 302.4): 1 lb (0.454 kg) final RQ.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):

ACUTE HEALTH: Yes CHRONIC HEALTH: Yes FIRE: No REACTIVE: No PRESSURE: No

STATE REGULATIONS

California Proposition 65: Keep out of water supplies and sewers.

Warning this product contains a chemical known to the state of California to cause cancer.

Warning this product contains a chemical known to the state of California to cause reproductive/developmental effects.

CANADIAN REGULATIONS

WHMIS Information: Not provided for this information.

EUROPEAN REGULATIONS

EC Classification:

T – Toxic, Carc. Cat. 3

N – Dangerous to the Environment

EC Risk (R No.):

R25 – Toxic if swallowed.

R40 – Limited evidence of a carcinogenic effect.

R48/25 – Toxic: danger of serious damage to health by prolonged exposure if swallowed.

R50/53 – Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

EC Safety (S No.):

S22 – Do not breathe dust.

S36/37 – Wear suitable protective clothing and gloves.

S45 – In case of accident or if you feel unwell seek medical advice immediately (show the label where possible).

S60 – This material and its container must be disposed of as hazardous waste.

S61 – Avoid release to the environment. Refer to special instructions/safety data sheet.

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): 4,4'-DDT is listed.

TSCA 12(b), Export Notification: Section 5, 0.1 de minims concentration.

16. OTHER INFORMATION

Sources: ChemAdvisor, Inc., MSDS, Dichlorodiphenyltrichloroethane, 16 September 2011.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Report of Investigation.

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Material Safety Data Sheet Acetone MSDS

Section 1: Chemical Product and Company Identification

Product Name: Acetone

Catalog Codes: SLA3502, SLA1645, SLA3151, SLA3808

CAS#: 67-64-1

RTECS: AL3150000

TSCA: TSCA 8(b) inventory: Acetone

CI#: Not applicable.

Synonym: 2-propanone; Dimethyl Ketone; Dimethylformaldehyde; Pyroacetic Acid

Chemical Name: Acetone

Chemical Formula: C3-H6-O

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: 1-800-901-7247 International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
Acetone	67-64-1	100

Toxicological Data on Ingredients: Acetone: ORAL (LD50): Acute: 5800 mg/kg [Rat]. 3000 mg/kg [Mouse]. 5340 mg/kg [Rabbit]. VAPOR (LC50): Acute: 50100 mg/m 8 hours [Rat]. 44000 mg/m 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. The substance is toxic to central nervous system (CNS). The substance may be toxic to kidneys, the reproductive system, liver, skin. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 465°C (869°F)

Flash Points: CLOSED CUP: -20°C (-4°F). OPEN CUP: -9°C (15.8°F) (Cleveland).

Flammable Limits: LOWER: 2.6% UPPER: 12.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Vapor may travel considerable distance to source of ignition and flash back.

Special Remarks on Explosion Hazards:

Forms explosive mixtures with hydrogen peroxide, acetic acid, nitric acid, nitric acid + sulfuric acid, chromic anydride, chromyl chloride, nitrosyl chloride, hexachloromelamine, nitrosyl perchlorate, nitryl perchlorate, permonosulfuric acid, thiodiglycol + hydrogen peroxide, potassium ter-butoxide, sulfur dichloride, 1-methyl-1,3-butadiene, bromoform, carbon, air, chloroform, thitriazylperchlorate.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, acids, alkalis.

Storage:

Store in a segregated and approved area (flammables area). Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Keep away from direct sunlight and heat and avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 500 STEL: 750 (ppm) from ACGIH (TLV) [United States] TWA: 750 STEL: 1000 (ppm) from OSHA (PEL) [United States] TWA: 500 STEL: 1000 [Austalia] TWA: 1185 STEL: 2375 (mg/m3) [Australia] TWA: 750 STEL: 1500 (ppm) [United Kingdom (UK)] TWA: 1810 STEL: 3620 (mg/m3) [United Kingdom (UK)] TWA: 1800 STEL: 2400 from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Fruity. Mint-like. Fragrant. Ethereal

Taste: Pungent, Sweetish

Molecular Weight: 58.08 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 56.2°C (133.2°F)

Melting Point: -95.35 (-139.6°F)

Critical Temperature: 235°C (455°F)

Specific Gravity: 0.79 (Water = 1)

Vapor Pressure: 24 kPa (@ 20°C)

Vapor Density: 2 (Air = 1)
Volatility: Not available.
Odor Threshold: 62 ppm

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -0.2

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water. **Solubility:** Easily soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, ignition sources, exposure to moisture, air, or water, incompatible materials.

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3000 mg/kg [Mouse]. Acute toxicity of the vapor (LC50): 44000 mg/m3 4 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. Causes damage to the following organs: central nervous system (CNS). May cause damage to the following organs: kidneys, the reproductive system, liver, skin.

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material (mutagenicity) based on studies with yeast (S. cerevisiae), bacteria, and hamster fibroblast cells. May cause reproductive effects (fertility) based upon animal studies. May contain trace amounts of benzene and formaldehyde which may cancer and birth defects. Human: passes the placental barrier.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation. May be harmful if absorbed through the skin. Eyes: Causes eye irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. Inhalation: Inhalation at high concentrations affects the sense organs, brain and causes respiratory tract irritation. It also may affect the Central Nervous System (behavior) characterized by dizzness, drowsiness, confusion, headache, muscle weakeness, and possibly motor incoordination, speech abnormalities, narcotic effects and coma. Inhalation may also affect the gastrointestinal tract (nausea, vomiting). Ingestion: May cause irritation of the digestive (gastrointestinal) tract (nausea, vomiting). It may also

affect the Central Nevous System (behavior), characterized by depression, fatigue, excitement, stupor, coma, headache, altered sleep time, ataxia, tremors as well at the blood, liver, and urinary system (kidney, bladder, ureter) and endocrine system. May also have musculoskeletal effects. Chronic Potential Health Effects: Skin: May cause dermatitis. Eyes: Eye irritation.

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 5540 mg/l 96 hours [Trout]. 8300 mg/l 96 hours [Bluegill]. 7500 mg/l 96 hours [Fatthead Minnow]. 0.1 ppm any hours [Water flea].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Acetone UNNA: 1090 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene, Formaldehyde Connecticut hazardous material survey.: Acetone Illinois toxic substances disclosure to employee act: Acetone Illinois chemical safety act: Acetone New York release reporting list: Acetone Rhode Island RTK hazardous substances: Acetone Pennsylvania RTK: Acetone Florida: Acetone Minnesota: Acetone Massachusetts RTK: Acetone Massachusetts spill list: Acetone New Jersey: Acetone New Jersey spill list: Acetone Louisiana spill reporting: Acetone California List of Hazardous Substances (8 CCR 339): Acetone TSCA 8(b) inventory: Acetone TSCA 4(a) final test rules: Acetone TSCA 8(a) IUR: Acetone

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R11- Highly flammable. R36- Irritating to eyes. S9- Keep container in a well-ventilated place. S16- Keep away from sources of ignition - No smoking. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3
Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:

-Material safety data sheet issued by: la Commission de la Santé et de la Sécurité du Travail du Québec. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. LOLI, RTECS, HSDB databases. Other MSDSs

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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Safety Data Sheet Revision Date: 04/22/14

www.restek.com

1. IDENTIFICATION

Catalog Number / Product Name: 32207, 32207-5XX, & 32307 / alpha-Chlordane Standard

Company:

Address:

110 Benner Circle
Bellefonte, Pa. 16823

Phone#:

814-353-1300

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 - Dernal 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	
cis-chlordane	5103-71-9		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 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 5103-71-9 No TLV cis-chlordane 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: 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:

pH:

No data available.

No data available

Vapor Density:

1.1 (air = 1)

Melting Point:

-98 ℃

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 ℃

Evaporation Rate:

Odor Threshold:

Solubility:

Partition Coefficient: n-octanol in water:

No data available.

No data available.

Moderate; 50-99%

No data available.

VOC % by weight: 99.90 Molecular Weight: 32.04

10. STABILITY AND REACTIVITY

Stability: Stable under normal conditions.

Conditions to Avoid:

Materials to Avoid / Chemical Incompatiability:

No data available.

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: No data.

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:

No data.

Chemical Name CAS No. Group No.
No data. Group 1

Group 1 Group 2A Group 2B

cis-Chlordane 5103-71-9

12. ECOLOGICAL INFORMATION

Overview: Moderate ecological hazard. This product may be dangerous

to plants and/or wildlife.

Mobility:No dataPersistence:No dataBioaccumulation: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:
UN Number:
Hazard Class:
Packing Group:

Methanol
UN1230
3
II

International:

IATA Proper Shipping Name:MethanolUN Number:UN1230Hazard 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

 cis-chlordane
 5103-71-9
 X

The following chemicals are listed on CA Prop 65:

Chemical NameCAS #RegulationMethanol67-56-1Prop 65 Devolop Tox

State Right To Know Listing:

Chemical Name CAS# New Jersey Massachusetts Pennsylvania California

 methanol
 67-56-1
 X
 X
 X
 X
 X
 X

 cis-chlordane
 5103-71-9

16. OTHER INFORMATION

Prior Version Date: 01/25/11

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

Based upon Regulation (EC) No. 1907/2006, as amended by Regulation (EC) No. 453/2010

BCR-271: benzo[a]anthracene

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier:

Product name : BCR-271: benzo[a]anthracene
Product type REACH : Substance/mono-constituent

 CAS number
 : 56-55-3

 EC index number
 : 601-033-00-9

 EC number
 : 200-280-6

 RTECS number
 : CV9275000

 Molecular mass
 : 228.30 g/mol

 Formula
 : C18H12

1.2 Relevant identified uses of the substance or mixture and uses advised against:

Certified reference material for laboratory use only

1.3 Details of the supplier of the safety data sheet:

Supplier of the safety data sheet

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 number:

Poison Centre: +32 70 245 245

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture:

2.1.1 Classification according to Regulation EC No 1272/2008

Classified as dangerous according to the criteria of Regulation (EC) No 1272/2008

Class	Category	azard statements	
Carc.	category 1B	50: May cause cancer.	
Aquatic Acute	category 1	0: Very toxic to aquatic life.	
Aquatic Chronic	category 1	410: Very toxic to aquatic life with long lasting effects.	

2.1.2 Classification according to Directive 67/548/EEC-1999/45/EC

Carc. Cat. 2; R45 - May cause cancer.

N; R50-53 - Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

2.2 Label elements:

Labelling according to Regulation EC No 1272/2008 (CLP)





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.

Created by: Brandweerinformatiecentrum voor gevaarlijke stoffen vzw (BIG)

Technische Schoolstraat 43 A, B-2440 Geel http://www.big.be

© BIG vzw

Reason for revision: 453/2010

Revision number: 0300

Publication date: 2002-03-28 Date of revision: 2012-11-26 Reference number: BCR-271

134-15765-348

Product number: 49289 1

/ 11

P308 + P313 IF exposed or concerned: Get medical advice/attention.

P391 Collect spillage.
P405 Store locked up.

Supplemental information

Restricted to professional users.

2.3 Other hazards:

CLP

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

Not readily biodegradable in water

SECTION 3: Composition/information on ingredients

3.1 Substances:

Name (REACH Registration No)	CAS No EC No	Conc (C)	Classification according to DSD/DPD	Classification according to CLP	Note	Remark
	56-55-3 200-280-6		· · · · · · · · · · · · · · · · · · ·	Carc. 1B; H350 Aquatic Acute 1; H400	(1)(2)(10)(8)	Mono-constituent
	200-280-0	_	,	Aquatic Chronic 1; H410		

- (1) For R-phrases and H-statements in full: see heading 16
- (2) Substance with a Community workplace exposure limit
- (8) Specific concentration limits, see heading 16
- (10) Subject to restrictions of Annex XVII of Regulation (EC) No. 1907/2006

3.2 Mixtures:

Not applicable

SECTION 4: First aid measures

4.1 Description of first aid measures:

General:

If you feel unwell, seek medical advice.

After inhalation:

Remove the victim into fresh air. Respiratory problems: consult a doctor/medical service.

After skin contact:

Rinse with water. Take victim to a doctor if irritation persists.

After eye contact:

Rinse with water. Take victim to an ophthalmologist if irritation persists.

After ingestion:

Rinse mouth with water. Immediately after ingestion: give lots of water to drink. Consult a doctor/medical service if you feel unwell.

4.2 Most important symptoms and effects, both acute and delayed:

4.2.1 Acute symptoms

After inhalation:

No data available.

After skin contact:

Slight irritation.

After eye contact:

Slight irritation.

After ingestion:

No data available.

4.2.2 Delayed symptoms

If applicable and available it will be listed below.

4.3 Indication of any immediate medical attention and special treatment needed:

If applicable and available it will be listed below.

Reason for revision: 453/2010 Publication date: 2002-03-28
Date of revision: 2012-11-26

Date of revision: 2012-11-26 Reference number: BCR-271

Revision number: 0300 Product number: 49289 2 / 11

SECTION 5: Firefighting measures

5.1 Extinguishing media:

5.1.1 Suitable extinguishing media:

Water spray. Alcohol-resistant foam. ABC powder. Carbon dioxide.

5.1.2 Unsuitable extinguishing media:

Solid water jet ineffective as extinguishing medium.

5.2 Special hazards arising from the substance or mixture:

Upon combustion: CO and CO2 are formed.

5.3 Advice for firefighters:

5.3.1 Instructions:

Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it.

5.3.2 Special protective equipment for fire-fighters:

Gloves. Protective clothing. Heat/fire exposure: compressed air/oxygen apparatus.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

Prevent dust cloud formation.

6.1.1 Protective equipment for non-emergency personnel

See heading 8.2

6.1.2 Protective equipment for emergency responders

Gloves. Protective clothing.

Suitable protective clothing

See heading 8.2

6.2 Environmental precautions:

Contain leaking substance. Dam up the solid spill. Prevent soil and water pollution. Prevent spreading in sewers.

6.3 Methods and material for containment and 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.

6.4 Reference to other sections:

See heading 13.

SECTION 7: Handling and storage

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

7.1 Precautions for safe handling:

Avoid raising dust. Keep away from naked flames/heat. Warning! Avoid exposure. Obtain special instructions before use. Observe strict hygiene. Keep container tightly closed. Remove contaminated clothing immediately. Do not discharge the waste into the drain.

7.2 Conditions for safe storage, including any incompatibilities:

7.2.1 Safe storage requirements:

Store in a cool area. Store in a dry area. Store in a dark area. Keep container in a well-ventilated place. Keep locked up. Unauthorized persons are not admitted. Meet the legal requirements.

7.2.2 Keep away from:

Heat sources, ignition sources, oxidizing agents, (strong) acids.

7.2.3 Suitable packaging material:

No data available

7.2.4 Non suitable packaging material:

No data available

7.3 Specific end use(s):

If applicable and available, exposure scenarios are attached in annex. See information supplied by the manufacturer.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters:

8.1.1 Occupational exposure

a) Occupational exposure limit values

If limit values are applicable and available these will be listed below.

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USA (TLV-ACGIH)

Benz(a)anthracene	Time-weighted average exposure limit 8 h	TLV - Adopted Value; (L): Exposure by all
		routes should be carefully controlled to
		levels as low as possible

b) National biological limit values

If limit values are applicable and available these will be listed below.

8.1.2 Sampling methods

Product name	Test	Number
Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH	5515
Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH	5506

8.1.3 Applicable limit values when using the substance or mixture as intended

If limit values are applicable and available these will be listed below.

8.1.4 DNEL/PNEC values

If applicable and available it will be listed below.

8.1.5 Control banding

If applicable and available it will be listed below.

8.2 Exposure controls:

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

8.2.1 Appropriate engineering controls

Avoid raising dust. Keep away from naked flames/heat. Measure the concentration in the air regularly. Carry operations in the open/under local exhaust/ventilation or with respiratory protection.

8.2.2 Individual protection measures, such as personal protective equipment

Warning! Avoid exposure. Obtain special instructions before use. Observe strict hygiene. Keep container tightly closed. Do not eat, drink or smoke during work.

a) Respiratory protection:

Dust production: dust mask with filter type P3. High dust production: self-contained breathing apparatus.

b) Hand protection:

Gloves

- materials for protective clothing (less resistance)

Neoprene, nitrile rubber.

- materials for protective clothing (poor resistance)

Natural rubber, polyethylene, PVC.

c) Eye protection:

Safety glasses. In case of dust production: protective goggles.

d) Skin protection:

Revision number: 0300

Protective clothing.

8.2.3 Environmental exposure controls:

See headings 6.2, 6.3 and 13

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties:

Physical form	Crystalline solid	
	Scales	
Odour	Odourless	
Odour threshold	Not applicable	
Colour	Fluorescent yellow-green to colourless	
Particle size	No data available	
Explosion limits	No data available	
Flammability	Not easily combustible	
Log Kow	5.61 - 5.79	
Dynamic viscosity	No data available	
Kinematic viscosity	No data available	
Melting point	160 °C	
Boiling point	Not applicable	
Flash point	No data available	
Evaporation rate	No data available	
Vapour pressure	0.00007 hPa ; 20 °C	

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Relative vapour density	Not applicable	
Solubility	water ; 0.00001 g/100 ml	
	ether ; soluble	
	acetone ; soluble	
	oils/fats ; soluble	
Relative density	1.3	
Decomposition temperature	No data available	
Auto-ignition temperature	No data available	
Explosive properties	No chemical group associated with explosive properties	
Oxidising properties	No chemical group associated with oxidising properties	
рН	No data available	

Physical hazards

No physical hazard class

9.2 Other information:

- 1		
	Absolute density	1270 kg/m³

SECTION 10: Stability and reactivity

10.1 Reactivity:

Heating increases the fire hazard.

10.2 Chemical stability:

Unstable on exposure to light. Unstable on exposure to air.

10.3 Possibility of hazardous reactions:

Reacts violently with (strong) oxidizers. Decomposes on exposure to (strong) acids.

10.4 Conditions to avoid:

Avoid raising dust. Keep away from naked flames/heat.

10.5 Incompatible materials:

Oxidizing agents, (strong) acids.

10.6 Hazardous decomposition products:

Upon combustion: CO and CO2 are formed.

SECTION 11: Toxicological information

11.1 Information on toxicological effects:

11.1.1 Test results

Acute toxicity

BCR-271: benzo[a]anthracene

No (test)data available

Corrosion/irritation

BCR-271: benzo[a]anthracene

No (test)data available

Respiratory or skin sensitisation

BCR-271: benzo[a]anthracene

No (test)data available

Specific target organ toxicity

BCR-271: benzo[a]anthracene

No (test)data available

Mutagenicity (in vitro)

BCR-271: benzo[a]anthracene

	Result	Method	Test substrate	Effect	Value determination
	Positive	Ames test			

Mutagenicity (in vivo)

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BCR-271: benzo[a]anthracene

No (test)data available

Carcinogenicity

BCR-271: benzo[a]anthracene

No (test)data available

Reproductive toxicity

BCR-271: benzo[a]anthracene

No (test)data available

Conclusion CMR

May cause cancer.

Toxicity other effects

BCR-271: benzo[a]anthracene

No (test)data available

Chronic effects from short and long-term exposure

BCR-271: benzo[a]anthracene

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.

11.1.2 Other information

BCR-271: benzo[a]anthracene

EC carc cat	2
CLP carc cat	category 1B
Listed in SZW - List of carcinogenic substances	yes
TLV - Carcinogen	A2
IARC - classification	2B
MAK - Krebserzeugend Kategorie	2
MAK - Keimzellmutagen Kategorie	3A

SECTION 12: Ecological information

12.1 Toxicity:

BCR-271: benzo[a]anthracene

	Parameter	Method	Value	Duration	Species	 Fresh/salt water	Value determination
Acute toxicity fishes	LC50		0.0018 mg/l		Pimephales promelas		
Acute toxicity invertebrates	EC50		0.01 mg/l	96 h	Daphnia pulex		
Toxicity algae and other aquatic plants	EC50		0.018 mg/l	336 h	Cyanophyta		

Conclusion

Highly toxic to fishes

Very toxic to invertebrates (Daphnia)

12.2 Persistence and degradability:

BCR-271: benzo[a]anthracene

Half-life soil (t1/2 soil)

Method		Primary degradation/mineralisation	Value determination
	> 100 day(s)		

May cause long-term adverse effects in the aquatic environment

Conclusion

Not readily biodegradable in water

Photolysis in water

Revision number: 0300

Ozonation in water

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12.3 Bioaccumulative potential:

BCR-271: benzo[a]anthracene

BCF fishes

Parameter	Method	Value	Duration	Species	Value determination
BCF		350	72 h	Leuciscus idus	

BCF other aquatic organisms

Parameter	Method	Value	Duration	Species	Value determination
BCF		1106	24 h	Daphnia pulex	
		18000	192 h	Crassostrea sp.	

Log Kow

Method	Remark	Value	Temperature	Value determination
		5.61 - 5.79		

Conclusion

High potential for bioaccumulation (Log Kow > 5)

12.4 Mobility in soil:

Adsorbs into the soil

12.5 Results of PBT and vPvB assessment:

Due to insufficient data no statement can be made whether the substance fulfils the criteria of PBT and vPvB according to Annex XIII of Regulation (EC) No 1907/2006.

12.6 Other adverse effects:

BCR-271: benzo[a]anthracene

Ozone-depleting potential (ODP)

Not classified as dangerous for the ozone layer (Regulation (EC) No. 1272/2008 and 1005/2009)

SECTION 13: Disposal considerations

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

13.1 Waste treatment methods:

13.1.1 Provisions relating to waste

Waste material code (Directive 2008/98/EC, decision 2000/0532/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.

13.1.2 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).

13.1.3 Packaging/Container

Waste material code packaging (Directive 2008/98/EC).

15 01 10* (packaging containing residues of or contaminated by dangerous substances).

SECTION 14: Transport information

14.6 Special precautions for user:

Road (ADR)

•	
14.1 UN number:	
UN number	3077
14.2 UN proper shipping name:	
Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ADR	benz[a]anthracene
14.3 Transport hazard class(es):	
Hazard identification number	90
Class	9
Classification code	M7
14.4 Packing group:	
Packing group	III
Labels	9
14.5 Environmental hazards:	
Environmentally hazardous substance mark	yes

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Reference number: BCR-271

Revision number: 0300 Product number: 49289 7 / 11

Special provisions	274
Special provisions	335
Special provisions	601
Limited quantities	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass)
(RID)	
4.1 UN number:	
UN number	3077
4.2 UN proper shipping name:	
Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name RID	benz[a]anthracene
4.3 Transport hazard class(es):	
Hazard identification number	90
Class	9
Classification code	M7
4.4 Packing group:	
Packing group	III
Labels	9
4.5 Environmental hazards:	
Environmentally hazardous substance mark	yes
4.6 Special precautions for user:	
Special provisions	274
Special provisions	335
Special provisions	601
Limited quantities	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass)
nd waterways (ADN)	(S. (B. 10.1)
4.1 UN number:	
UN number	3077
4.2 UN proper shipping name:	3077
Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ADN	benz[a]anthracene
4.3 Transport hazard class(es):	penz[a]antinacene
Class	9
Classification code	M7
4.4 Packing group:	in i
Packing group	
Labels	9
4.5 Environmental hazards:	
Environmentally hazardous substance mark	yes
4.6 Special precautions for user:	
Special provisions	274
Special provisions	335
Special provisions	
	601
Limited quantities	
·	
(IMDG)	Combination packagings: not more than 5 kg per inner packaging for
(IMDG) 4.1 UN number:	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass)
(IMDG) 4.1 UN number: UN number	Combination packagings: not more than 5 kg per inner packaging for
(IMDG) 4.1 UN number: UN number 4.2 UN proper shipping name:	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass) 3077
(IMDG) 4.1 UN number: UN number 4.2 UN proper shipping name: Proper shipping name	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass) 3077 Environmentally hazardous substance, solid, n.o.s.
(IMDG) 4.1 UN number: UN number 4.2 UN proper shipping name: Proper shipping name Techn./chem. name IMO	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass) 3077
(IMDG) 4.1 UN number: UN number 4.2 UN proper shipping name: Proper shipping name Techn./chem. name IMO 4.3 Transport hazard class(es):	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass) 3077 Environmentally hazardous substance, solid, n.o.s. benz[a]anthracene
(IMDG) 4.1 UN number: UN number 4.2 UN proper shipping name: Proper shipping name Techn./chem. name IMO 4.3 Transport hazard class(es): Class	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass) 3077 Environmentally hazardous substance, solid, n.o.s.
(IMDG) 4.1 UN number: UN number 4.2 UN proper shipping name: Proper shipping name Techn./chem. name IMO 4.3 Transport hazard class(es): Class 4.4 Packing group:	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass) 3077 Environmentally hazardous substance, solid, n.o.s. benz[a]anthracene
(IMDG) 4.1 UN number: UN number 4.2 UN proper shipping name: Proper shipping name Techn./chem. name IMO 4.3 Transport hazard class(es): Class 4.4 Packing group: Packing group	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass) 3077 Environmentally hazardous substance, solid, n.o.s. benz[a]anthracene
(IMDG) 4.1 UN number: UN number 4.2 UN proper shipping name: Proper shipping name Techn./chem. name IMO 4.3 Transport hazard class(es): Class 4.4 Packing group: Packing group Labels	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass) 3077 Environmentally hazardous substance, solid, n.o.s. benz[a]anthracene
(IMDG) 4.1 UN number: UN number 4.2 UN proper shipping name: Proper shipping name Techn./chem. name IMO 4.3 Transport hazard class(es): Class 4.4 Packing group: Packing group Labels 4.5 Environmental hazards:	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass) 3077 Environmentally hazardous substance, solid, n.o.s. benz[a]anthracene 9 III 9
(IMDG) 4.1 UN number: UN number 4.2 UN proper shipping name: Proper shipping name Techn./chem. name IMO 4.3 Transport hazard class(es): Class 4.4 Packing group: Packing group Labels	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass) 3077 Environmentally hazardous substance, solid, n.o.s. benz[a]anthracene

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14.6 Special precautions for user:

Special provisions	274
Special provisions	335
· ·	Combination packagings: not more than 5 kg per inner packaging for solids. A package shall not weigh more than 30 kg. (gross mass)

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:

Annex II of MARPOL 73/78	Not applicable, based on available data
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Air

(ICAO-TI/IATA-DGR)	
14.1 UN number:	
UN number	3077
14.2 UN proper shipping name:	
Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ICAO	benz[a]anthracene
14.3 Transport hazard class(es):	
Class	9
14.4 Packing group:	
Packing group	III
Labels	9
14.5 Environmental hazards:	
Environmentally hazardous substance mark	yes
14.6 Special precautions for user:	
Special provisions	A97
Special provisions	A158
Special provisions	A179
Passenger and cargo transport: limited quantities; maximum net quantity	30 kg G

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

European legislation:

Volatile organic compounds (VOC)

0 %

REACH Annex XVII - Restriction

Subject to restrictions of 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.

	Designation of the substance, of the group of substances or of the mixture	Conditions of restriction
· benz[a]anthracene	Substances which appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 classified as carcinogen category 1A or 1B (Table 3.1) or carcinogen category 1 or 2 (Table 3.2) and listed as follows: - Carcinogen category 1A (Table 3.1)/carcinogen category 1 (Table 3.2) listed in Appendix 1 - Carcinogen category 1B (Table 3.1)/carcinogen category 2 (Table 3.2) listed in Appendix 2	Without prejudice to the other parts of this Annex the following shall apply to entries 28 to 30:1. Shall not be placed on the market, or used, — as substances, — as constituents of other substances, or, — in mixtures, for supply to the general public when the individual concentration in the substance or mixture is equal to or greater than: — either the relevant specific concentration limit specified in Part 3 of Annex VI to Regulation (EC) No 1272/2008, or, — the relevant concentration specified in Directive 1999/45/EC. Without prejudice to the implementation of other Community provisions relating to the classification, packaging and labelling of substances and mixtures, suppliers shall ensure before the placing on the market that the packaging of such substances and mixtures is marked visibly, legibly and indelibly as follows: "Restricted to professional users".2. By way of derogation, paragraph 1 shall not apply to: (a) medicinal or veterinary products as defined by Directive 2001/82/EC and Directive 2001/83/EC; (b) cosmetic products as defined by Directive 76/768/EEC; (c) the following fuels and oil products: — motor fuels which are covered by Directive 98/70/EC, — mineral oil products intended for use as fuel in mobile or fixed combustion plants, — fuels sold in closed systems (e.g. liquid gas bottles); (d) artists' paints covered by Directive 1999/45/EC; (e) the substances listed in Appendix 11, column 1, for the applications or uses listed in Appendix 11, column 2. Where a date is specified in column 2 of Appendix 11, the derogation shall apply until the said date.
· benz[a]anthracene		1. From 1 January 2010, extender oils shall not be placed on the market, or used for the production of tyres or parts of tyres if they contain: — more than 1 mg/kg (0,0001 % by weight) BaP, or, — more than 10 mg/kg (0,001 % by weight) of the sum of all listed PAHs. These limits shall be regarded as kept, if the polycyclic aromatics (PCA) extract is less than 3 % by weight as measured by the Institute of Petroleum standard IP346: 1998 (Determination of PCA in unused lubricating base oils and asphaltene free petroleum fractions — Dimethyl sulphoxide extraction refractive index method), provided that compliance with the limit values of BaP and of the listed PAHs, as well as the correlation of the measured values with the PCA extract, is controlled by the manufacturer or importer every six months or after each major operational change, whichever is earlier.2. Furthermore, tyres and treads for retreading manufactured after 1 January 2010 shall not be placed on the market if they contain extender oils exceeding the limits indicated in paragraph 1. These limits shall be regarded as kept, if the vulcanised rubber compounds do not exceed the limit of 0,35 % Bay protons as measured and calculated by ISO 21461 (Rubber vulcanised — Determination of

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aromaticity of oil in vulcanised rubber compounds).3. By way of derogation, paragraph 2
shall not apply to retreaded tyres if their tread does not contain extender oils exceeding the
limits referred to in paragraph 1.4. For the purpose of this entry "tyres" shall mean tyres for
vehicles covered by: — Directive 2007/46/EC of the European Parliament and of the Council
of 5 September 2007 establishing a framework for the approval of motor vehicles and their
trailers, — Directive 2003/37/EC of the European Parliament and of the Council of 26 May
2003 on type-approval of agricultural or forestry tractors, their trailers and interchangeable
towed machinery, together with their systems, components and separate technical units,
and — Directive 2002/24/EC of the European Parliament and of the Council of 18 March
2002 relating to the type-approval of two or three-wheel motor vehicles and repealing
Council Directive 92/61/EEC.

15.2 Chemical safety assessment:

No chemical safety assessment has been conducted.

SECTION 16: Other information

Labelling according to Directive 67/548/EEC-1999/45/EC (DSD/DPD)

Labelling according to Directive 2008/58/EC (30th adaptation of Directive 67/548/EEC)

Labels





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)

This material and its container must be disposed of as hazardous waste

Avoid release to the environment. Refer to special instructions/safety data sheets.

Additional recommendations

Restricted to professional users.

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

R50 Very toxic to aquatic organisms

R53 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.

(*) = INTERNAL CLASSIFICATION BY BIG

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)

M-factor

BCR-271: benzo[a]anthracene	100	
benz[a]anthracene	100	

Specific concentration limits DSD

benz[a]anthracene	C >= 0,25 %	T, N; R 45-50/53
	0,1 % <= C < 0,25 %	T, N; R 45-51/53
	0,025 % <= C < 0,1 %	N; R 51/53
	0,0025 % <= C < 0,025 %	R 52/53

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

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Benzo[a]pyrene

sc-257130

Material Safety Data Sheet



The Power to Question

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW
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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Benzo[a]pyrene

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

HEALTH AZARD INST BLITY

SUPPLIER

Company: Santa Cruz Biotechnology, Inc.

Address:

2145 Delaware Ave Santa Cruz, CA 95060

Telephone: 800.457.3801 or 831.457.3800

Emergency Tel: CHEMWATCH: From within the US and Canada:

877-715-9305

Emergency Tel: From outside the US and Canada: +800 2436 2255

(1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE

Available as a laboratory reference standard material only. Widely distributed in both work and domestic environments at trace levels. The substance is a major polycyclic hydrocarbon carcinogen formed by the pyrolysis of hydrocarbons and thus occurs in industrial smoke, cigarette smoke and tar and in fried, broiled or smoked food. Benz[a]pyrene in its native state is harmless, but it is metabolized in mammalian systems (including humans) through a number of complicated biochemical routes into active epoxide carcinogens. Thus 7,8-dihydrodiol-9,10-trans-epoxide is the carcinogenic form of benz[a]pyrene. {Principles of Environmental Toxicology - Zakrzewski} Intermediate

SYNONYMS

C20-H12, "benz-alpha-pyrene (sic)", benzo[a]pyrene, "benzo[d, e, f]chrysene", "6, 7-benzo[a]pyrene", "3, 4-benz[a]pyrene", BP, B[a]P, "3, 4-BP", "polycyclic aromatic hydrocarbon", PAH

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	2		
Body Contact:	2		Min/Nil=0 Low=1
Reactivity:	1		Moderate=2
Chronic:	3		High=3 Extreme=4





CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

May cause CANCER.

May cause SENSITIZATION by skin contact.

May cause heritable genetic damage.

May impair fertility.

May cause harm to the unborn child.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Accidental ingestion of the material may be damaging to the health of the individual.

FVF

■ Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.

SKIN

- The material is not thought to be a skin irritant (as classified using animal models). Abrasive damage however, may result from prolonged exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
- Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- 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.

INHALED

- The material is not thought to produce respiratory irritation (as classified using animal models). Nevertheless inhalation of dusts, or fume, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
- Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.
- Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

■ Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.

There is ample evidence that this material can be regarded as being able to cause cancer in humans based on experiments and other information.

Based on experiments and other information, there is ample evidence to presume that exposure to this material can cause genetic defects that can be inherited.

Ample evidence exists from experimentation that reduced human fertility is directly caused by exposure to the material.

Ample evidence exists, from results in experimentation, that developmental disorders are directly caused by human exposure to the material. Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

Polycyclic aromatic hydrocarbons are found in a number of materials such as coal tar, tobacco smoke, petroleum and air pollution. Some substituted derivatives have been identified as extremely liable to cause cancer, especially that of the lung and genito-urinary tract. Some jurisdictions required that health surveillance be conducted on workers occupationally exposed to PHAs.

Cited in many publications and by a number of regulatory authorities as a suspected human carcinogen.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

 NAME
 CAS RN
 %

 benz[a]pyrene
 50-32-8
 >98

Section 4 - FIRST AID MEASURES

SWALLOWED

- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

EYE

- If this product comes in contact with the eyes:
- Wash out immediately with fresh running water.
- 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.
- If pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

- If skin contact occurs:
- Immediately remove all contaminated clothing, including footwear
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED

_

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained.
 Perform CPR if necessary.
- Transport to hospital, or doctor.

NOTES TO PHYSICIAN

■ Treat symptomatically.

for poisons (where specific treatment regime is absent):

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for pulmonary edema .
- Monitor and treat, where necessary, for shock.
- Anticipate seizures .
- DO NOT use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.

patient to able to entailen, has a earling gag

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolemia are present use lactated Ringers solution. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary edema.
- Hypotension with signs of hypovolemia requires the cautious administration of fluids. Fluid overload might create complications.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994.

Section 5 - FIRE FIGHTING MEASURES				
Vapour Pressure (mmHG):	Negligible			
Upper Explosive Limit (%):	Not available			
Specific Gravity (water=1):	Not available			
Lower Explosive Limit (%):	Not available			

EXTINGUISHING MEDIA

- .
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog Large fires only.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- · Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- •
- Combustible solid which burns but propagates flame with difficulty.
- Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and
 any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a
 particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
- Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
- Build-up of electrostatic charge may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO2), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

Respirator:

Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof
 machines designed to be grounded during storage and use).
- Dampen with water to prevent dusting before sweeping.
- Place in suitable containers for disposal.

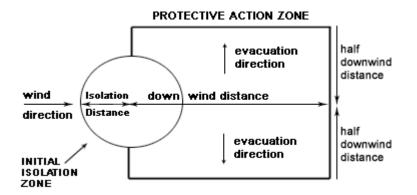
Environmental hazard - contain spillage.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by all means available, spillage from entering drains or water courses.
- Consider evacuation (or protect in place).
- · No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Water spray or fog may be used to disperse / absorb vapour.
- Contain or absorb spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

Environmental hazard - contain spillage.

PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)
Isolation Distance Downwind Protection Distance 10 meters

From US Emergency Response Guide 2000 Guide 171

FOOTNOTES

1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills". LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.

5 Guide 171 is taken from the US DOT emergency response guide book

6 IERG information is derived from CANUTEC - Transport Canada.

ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- .
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.

- Do NOT cut, drill, grind or weld such containers.
- In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

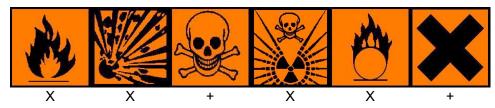
RECOMMENDED STORAGE METHODS

- Glass container.
- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

STORAGE REQUIREMENTS

■ Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



- X: Must not be stored together
- O: May be stored together with specific preventions
- +: May be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
Canada - British Columbia Occupational Exposure Limits	benz[a]pyrene (Benzo[a]pyrene Revised 2006)		(L)						A2, 1
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	benz[a]pyrene (Coal tar pitch volatiles (benzene soluble fraction), anthrancene, BaP, phenanthrene, acidine, chrysene, pyrene)		0.2						
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	benz[a]pyrene (Benzo(a)pyrene)		0.005						
US - Alaska Limits for Air Contaminants	benz[a]pyrene (Coal tar Pitch volatiles (benzene soluble fraction), BaP)		0.2						
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	benz[a]pyrene (K Benz(a)pyrene)		(See Table 14)						
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	benz[a]pyrene (Coal tar pitch volatiles (benzene soluble fraction), anthracene, BaP,phenanthrene,acridine, chrysene,pyrene)		0.2						
Canada - Alberta Occupational Exposure Limits	benz[a]pyrene (Kerosene/Jet fuels, as total hydrocarbon vapour)		200						
Canada - Alberta Occupational Exposure Limits	benz[a]pyrene (Diesel fuel, as total hydrocarbons)		100						
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	benz[a]pyrene (Diesel fuel as total hydrocarbons, (vapour))		100		150				Skin
Canada - Northwest Territories Occupational Exposure Limits (English)	benz[a]pyrene (Particulate polycyclic aromatic hydrocarbons (PPAH) as benzene solubles)		0.2		0.6				

MATERIAL DATA

BENZ[A]PYRENE:

■ It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of

health effects at airborne concentrations encountered in the workplace.

At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.

NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.

Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

CEL TWA: 0.005 mg/m3; STEL 0.03 mg/m3 (skin) [compare Swedish OEL]

NOTE: OEL-STEL (Russia): 0.00015 mg/m3

Epidemiological and animal studies indicate the need to establish rigorous control standards for B[a]P as increased exposures are harmful. As little as 0.05 mg can initiate tumours in experimental animals and 0.1uM (25 ug/l) is toxic to cultured human hepatocytes. It is estimated that millions of people living near coke ovens are exposed to 100 ug B[a]P daily. Because small repeated doses are more effective in initiating tumours than single administrations and because people are probably exposed to other synergistically acting pollutants they are exceeding safe levels of exposure. The Russian legislation concedes that the OEL-STEL is not considered safe but, rather, unavoidable.

PERSONAL PROTECTION



Consult your EHS staff for recommendations

EYE

- -
- Safety glasses with side shields.
- · Chemical goggles.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. DO NOT wear contact lenses.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.

Wear safety footwear or safety gumboots, eg. Rubber.

NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

RESPIRATOR

- -
- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory. These may
 be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a
 complete respiratory protection program.
- Use approved positive flow mask if significant quantities of dust becomes airborne.

• Try to avoid creating dust conditions.

RESPIRATOR

Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
10 x PEL	P1	-	PAPR-P1
	Air-line*	-	-
50 x PEL	Air-line**	P2	PAPR-P2
100 x PEL	-	P3	-
		Air-line*	-
100+ x PEL	-	Air-line**	PAPR-P3

^{* -} Negative pressure demand ** - Continuous flow

Explanation of Respirator Codes:

Class 1 low to medium absorption capacity filters.

Class 2 medium absorption capacity filters.

Class 3 high absorption capacity filters.

PAPR Powered Air Purifying Respirator (positive pressure) cartridge.

Type A for use against certain organic gases and vapors.

Type AX for use against low boiling point organic compounds (less than 65°C).

Type B for use against certain inorganic gases and other acid gases and vapors.

Type E for use against sulfur dioxide and other acid gases and vapors.

Type K for use against ammonia and organic ammonia derivatives

Class P1 intended for use against mechanically generated particulates of sizes most commonly encountered in industry, e.g. asbestos, silica.

Class P2 intended for use against both mechanically and thermally generated particulates, e.g. metal fume.

Class P3 intended for use against all particulates containing highly toxic materials, e.g. beryllium.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

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- Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area.
- Work should be undertaken in an isolated system such as a "glove-box". Employees should wash their hands and arms upon completion
 of the assigned task and before engaging in other activities not associated with the isolated system.
- Within regulated areas, the carcinogen should be stored in sealed containers, or enclosed in a closed system, including piping systems, with any sample ports or openings closed while the carcinogens are contained within.
- Open-vessel systems are prohibited.
- Each operation should be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation.
- Exhaust air should not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean
 make-up air should be introduced in sufficient volume to maintain correct operation of the local exhaust system.
- For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear
 clean, impervious garments, including gloves, boots and continuous-air supplied hood. Prior to removing protective garments the
 employee should undergo decontamination and be required to shower upon removal of the garments and hood.
- Except for outdoor systems, regulated areas should be maintained under negative pressure (with respect to non-regulated areas).
- Local exhaust ventilation requires make-up air be supplied in equal volumes to replaced air.
- Laboratory hoods must be designed and maintained so as to draw air inward at an average linear face velocity of 150 feet/ min. with a
 minimum of 125 feet/ min. Design and construction of the fume hood requires that insertion of any portion of the employees body, other
 than hands and arms, be disallowed.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

Does not mix with water.

State	Divided solid	Molecular Weight	252.32
Melting Range (°F)	350.6- 356	Viscosity	Not Applicable
Boiling Range (°F)	923	Solubility in water (g/L)	Immiscible
Flash Point (°F)	Not available	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	Not Applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not available

a]pyren

■ log Kow (Sangster 1997): 6.35

APPEARANCE

Yellowish plate-like solid crystals when precipitated from benzene/methanol solvent. No odour. Practically insoluble in water. Soluble in benzene, toluene, xylene; sparingly soluble in ethanol, methanol.

Material	Value
■ log Kow (Sangster 1997)	6.35

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerization will not occur.

STORAGE INCOMPATIBILITY

■ Avoid reaction with oxidizing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

a]pyren

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY IRRITATION
Subcutaneous (rat) LD50: 50 mg/kg Skin (mouse): 0.014 mg - Mild

Intraperitoneal (Mouse) LD: 500 mg/kg

Oral (Rat) TDLo: 100 mg/kg

Intraperitoneal (Mouse) TDLo: 100 mg/kg

Intraperitoneal (Rat) TDLo: 100 mg/kg

■ Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitization potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitizing substance which is widely distributed can be a more important allergen than one with stronger sensitizing potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).

WARNING: This substance has been classified by the IARC as Group 2A: Probably Carcinogenic to Humans.

Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen

[National Toxicology Program: U.S. Dep. of Health & Human Services 2002].

CARCINOGEN

Benzo[a]pyrene (NB: Overall evaluation upgraded from 2B to 1 based on mechanistic and other relevant data)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	1
Benzo[a]pyrene (BaP)	ND	Carcinogenicity	B2
Benzo[a]pyrene (BaP)	ND	Carcinogen Category	B2
Benzo[a]pyrene	ND	Carcinogen Category	A2
BENZO(A)PYRENE	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
BENZO(A)PYRENE	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
POLYCYCLIC ORGANIC MATTER (POM)	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	EPA-HEN, P65-MC

Benzo[a]pyrene (in	halation)	US Air Toxics Hot Spots TSD for Describi Available Cancer Potency Factors	ng IARC Class	2A	
Benzo[a]pyrene (or	al)	US Air Toxics Hot Spots TSD for Describi Available Cancer Potency Factors	ng IARC Class		
Benzo[a]pyrene SKIN		ND	Carcinogen	Ca	
benz[a]pyrene	ND		Notes		Skin
benz[a]pyrene	ND		Notation		Skin
benz[a]pyrene	Canada - Alberta Occupational E	Exposure Limits - Skin	Substance Interaction		1

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

BENZ[A]PYRENE:

beitzpy mene.	
Marine Pollutant:	Yes
■ log Kow (Sangster 1997):	6.35
■ Half- life Soil - High (hours):	12720
■ Half- life Soil - Low (hours):	1368
■ Half- life Air - High (hours):	1.1
■ Half- life Air - Low (hours):	0.37
■ Half- life Surface water - High (hours):	1.1
■ Half- life Surface water - Low (hours):	0.37
■ Half- life Ground water - High (hours):	25440
■ Half- life Ground water - Low (hours):	2736
■ Aqueous biodegradation - Aerobic - High (hours):	12720
■ Aqueous biodegradation - Aerobic - Low (hours):	1368
■ Aqueous biodegradation - Anaerobic - High (hours):	50880
■ Aqueous biodegradation - Anaerobic - Low (hours):	5472
■ Aqueous photolysis half- life - High (hours):	1.1
■ Aqueous photolysis half- life - Low (hours):	0.37
■ Aqueous photolysis half- life - High (hours):	1.1
■ Aqueous photolysis half- life - Low (hours):	0.37
■ Photooxidation half- life water - High (hours):	10349
■ Photooxidation half- life water - Low (hours):	207
■ Photooxidation half- life air - High (hours):	4.28
■ Photooxidation half- life air - Low (hours):	0.428

- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

■ PAHs travel through the atmosphere as a gas or attached to dust particles. They are carried by air currents and deposited by dry or wet (rain, dew, etc) deposition. When deposited in water they sink to the bottom of lakes and rivers. Some will move though the soil to contaminate groundwater.

Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous in the marine environment, occurring at their highest environmental concentrations

Two factors, lipid and organic carbon, control to a large extent the partitioning behaviour of PAHs in sediment, water and tissue; the more hydrophobic a compound, the greater the partitioning to non-aqueous phases. These two factors, along with the octanol-water partition coefficient, are the best predictors of this partitioning and can be used to determine PAH behaviour and its bioavailability in the environment. The lipid (fat) phase, of all organisms, contains the highest levels of PAHs: organic carbon associated with sediment or dissolved in water has a great influence on bioavailability resulting from its ability to adsorb.

Accumulation of PAHs occurs in all marine organisms, however there is a wide range in tissue concentrations resulting from variable environmental concentrations, level and time of exposure, and species ability to metabolize these compounds. PAHs generally partition in lipid-rich tissues and their metabolites are found in most tissues. In fish, bile and liver accumulate the highest levels of parent PAH and metabolites. In invertebrates, the highest concentrations can be found in the internal organs, such as the liver and pancreas; tissue concentrations appear to follow seasonal cycles which may be related to variations in lipid content or spawning cycles.

The primary mode of toxicity for PAHs in soil dwelling terrestrial invertebrates is non-specific non-polar narcosis. The uptake of PAHs by earthworms occurs primarily by direct contact with the soluble phase of soil solution (interstitial pore-water).

Microbial degradation of PAHs is a key process in soils. Biodegradation of PAHs may take place over a period of weeks to months. Mixed microbial populations in sediment/water systems may degrade some PAHs, with degradation progressively decreasing with increasing

molecular weight. The rate of degradation is dependent on nutrient content and the bacterial community in soil.

PAHs in soils undergo a weathering process such that the lighter chain fractions are removed (primarily by volatilisation). Heavier fractions bind to soil organic matter and remain behind in the top soil horizon. As the mixture of PAHs age, bioavailability changes as the fraction remaining bind more tightly.

In general the more soluble a PAH, the higher the uptake by plants while the reverse is true for uptake by earthworms and uptake in the gastrointestinal tract of animals.

■ DO NOT discharge into sewer or waterways.

log Koc: 4-8.3 Koc: 18000-52000 Half-life (hr) air: 0.37-1.1

Half-life (hr) H2O surface water: 0.37-300 Half-life (hr) H2O ground: 2736-25440 Half-life (hr) soil: 48-50400

Henry's Pa m³ /mol: 0.0079-0.81 BCF: 920-13000

Log BCF: 1.14-6.95 Toxicity Fish: LD50(96)<1ppm Bioacculmulation: sig Degradation Biological: sig

processes Abiotic: fast photol & oxid, no hydrol

Ecotoxicity

Ingredient Persistence: Water/Soil Persistence: Air Bioaccumulation Mobility benz[a]pyrene LOW LOW HIGH LOW

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

Name / **EHS** TRN A₁b A2 B1 B2 C1 C2 C3 D1 D2 D3 E1 E2 F3 Cas No / RTECS No (4) NI (1) (1) (2) F2~ / 4 4 4 NR (1) 574 224 CAS:50-6 32-8/

Legend: EHS=EHS Number (EHS=GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships) NRT=Net Register Tonnage, A1a=Bioaccumulation log Pow, A1b=Bioaccumulation BCF, A1=Bioaccumulation, A2=Biodegradation, B1=Acuteaquatic toxicity LC/ECIC50 (mg/l), B2=Chronic aquatic toxicity NOEC (mg/l), C1=Acute mammalian oral toxicity LD50 (mg/kg), C2=Acutemammalian dermal toxicity LD50 (mg/kg), C3=Acute mammalian inhalation toxicity LC50 (mg/kg), D1=Skin irritation & corrosion, D2=Eye irritation & corrosion, D3=Long-term health effects, E1=Tainting, E2=Physical effects on wildlife & benthic habitats, E3=Interference with coastal amenities, For column A2: R=Readily biodegradable, NR=Not readily biodegradable. For column D3: C=Carcinogen, M=Mutagenic, R=Reprotoxic, S=Sensitising, A=Aspiration hazard, T=Target organ systemic toxicity, L=Lunginjury, N=Neurotoxic, I=Immunotoxic. For column E1: NT=Not tainting (tested), T=Tainting test positive. For column E2: Fp=Persistent floater, F=Floater, S=Sinking substances. The numerical scales start from 0 (no hazard), while higher numbers reflect increasing hazard. (GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships)

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

B. Component Waste Numbers

When benz[a]pyrene is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U022 (waste code T).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: Burial in a licensed land-fill or Incineration in a licensed apparatus (after admixture with suitable combustible material)
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION



DOT:

Symbols: G Hazard class or Division: 9
Identification Numbers: UN3077 PG: III

Label Codes: 9 Special provisions: 8, 146, 335, B54, IB8, IP3, N20, T1, TP33

Packaging: Exceptions: 155 Packaging: Non-bulk: 213

Packaging: Exceptions: 155 Quantity limitations: Passenger aircraft/rail: No limit

Quantity Limitations: Cargo No limit Vessel stowage: Location: A

Vessel stowage: Other: None

Hazardous materials descriptions and proper shipping names:

Environmentally hazardous substance, solid, n.o.s

Air Transport IATA:

ICAO/IATA Class:9ICAO/IATA Subrisk:NoneUN/ID Number:3077Packing Group:III

Special provisions: A97

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. *(CONTAINS BENZ[A]PYRENE)

Maritime Transport IMDG:

IMDG Class:9IMDG Subrisk:NoneUN Number:3077Packing Group:IIIEMS Number:F-A, S-FSpecial provisions:179 274 335 909

Limited Quantities: 5 kg Marine Pollutant: Yes Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.(contains benz[a]pyrene)

Section 15 - REGULATORY INFORMATION





REGULATIONS

benz[a]pyrene (CAS: 50-32-8) is found on the following regulatory lists;

"Canada - British Columbia Occupational Exposure Limits", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Ontario Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada Saskatchewan Environmental Persistent or Chronic Hazardous Substances", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada ARET (Accelerated Reduction / Elimination of Toxics) Substance List", "Canada Domestic Substances List (DSL)","Canada Environmental Quality Guidelines (EQGs) Water: Aquatic life","Canada Environmental Quality Guidelines (EQGs) Water: Community", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada National Pollutant Release Inventory (NPRI)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (French)", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "International Chemical Secretariat (ChemSec) REACH SIN* List (*Substitute It Now!) 1.0", "OSPAR List of Substances of Possible Concern", "US - Alaska Limits for Air Contaminants", "US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California Proposition 65 - Carcinogens","US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens", "US - California Toxic Air Contaminant List Category II", "US - Connecticut Hazardous Air Pollutants", "US - Idaho - Limits for Air Contaminants","US - Maine Chemicals of High Concern List","US - Massachusetts Oil & Hazardous Material List","US - Minnesota Hazardous Substance List", "US - New Jersey Right to Know Hazardous Substances", "US - Oregon Permissible Exposure Limits (Z-1)", "US -Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits -Limits For Air Contaminants", "US - Texas Drinking Water Standards - Maximum Contaminant Levels (MCLs) for synthetic organic contaminants","US - Vermont Hazardous Constituents","US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Class A toxic air pollutants: Known and Probable Carcinogens", "US - Washington Dangerous waste constituents list", "US - Washington Discarded Chemical Products List - ""U"" Chemical Products","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US CERCLA Priority List of Hazardous Substances","US CERCLA Top 20 Priority List of Hazardous Substances", "US CWA (Clean Water Act) - Priority Pollutants", "US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides", "US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Carcinogens Listing","US EPA National Priorities List - Superfund Chemical Data Matrix (SCDM) - Hazard Ranking System - Hazardous Substance Benchmarks", "US List of Lists - Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act", "US National Toxicology Program (NTP) 11th Report Part B. Reasonably Anticipated to be a Human Carcinogen", "US RCRA (Resource Conservation & Recovery Act) - Appendix IX to Part 264 Ground-Water Monitoring List 1","US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Inorganic and Organic Constituents 1","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes", "US RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule -Universal Treatment Standards", "US Toxic Substances Control Act (TSCA) - Inventory", "WHO Guidelines for Drinking-water Quality -Guideline values for chemicals that are of health significance in drinking-water"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Inhalation, skin contact and/or ingestion may produce health damage*.
- * (limited evidence).

REPRODUCTIVE HEALTH GUIDELINES

■ Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

 Ingredient
 ORG
 UF
 Endpoint
 CR
 Adeq TLV

 benz[a]pyrene
 0.000175 mg/m3
 NA
 TC
 1

■ These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise. CR = Cancer Risk/10000; UF = Uncertainty factor: TLV believed to be adequate to protect reproductive health: LOD: Limit of detection Toxic endpoints have also been identified as: D = Developmental; R = Reproductive; TC = Transplacental carcinogen Jankovic J., Drake F.: A Screening Method for Occupational Reproductive Health Risk: American Industrial Hygiene Association Journal 57: 641-649 (1996).

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- Classification of the mixture and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

 A list of reference resources used to assist the committee may be found at: www.chemwatch.net/references.
- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Issue Date: Apr-25-2008 Print Date: Aug-3-2010

SAFETY DATA SHEET

Version 5.3 Revision Date 06/29/2014 Print Date 12/30/2014

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benzo[b]fluoranthene

Product Number : 275336 Brand : Aldrich Index-No. : 601-034-00-4

CAS-No. : 205-99-2

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)

Carcinogenicity (Category 1B), 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)

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.

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.

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2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms: 3,4-Benzofluoranthene

Benz[e]acephenanthrylene 2,3-Benzfluoranthene

3,4-Benz[e]acephenanthrylene

Benzo[b]fluoranthene Benzo[e]fluoranthene

NSC 89265

Formula : C₂₀H₁₂

Molecular Weight : 252.31 g/mol
CAS-No. : 205-99-2
EC-No. : 205-911-9
Index-No. : 601-034-00-4

Hazardous components

Component	Classification	Concentration
Benz[e]acephenanthrylene		
	Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H350,	-
	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. 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 fire fighting if necessary.

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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 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

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

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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 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

Oxidizing properties

9.1 Information on basic physical and chemical properties

Information on basic physical and chemical properties			
a)	Appearance	Form: solid	
b)	Odour	no data available	
c)	Odour Threshold	no data available	
d)	рН	no data available	
e)	Melting point/freezing point	Melting point/range: 163 - 165 °C (325 - 329 °F) - lit.	
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	
I)	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	
•	•		

no data available

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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

TDLo Oral - mouse - 7.57 mg/kg

Remarks: Liver:Changes in liver weight. Endocrine:Changes in thymus weight.

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 probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Benz[e]acephenanthrylene)

NTP: Reasonably anticipated to be a human carcinogen (Benz[e]acephenanthrylene)

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

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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.

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 daphnia and Immobilization EC50 - Daphnia magna (Water flea) - > 1.024 mg/l - 24 h other aquatic invertebrates

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)

Not dangerous goods

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.

(Benz[e]acephenanthrylene) Marine pollutant: Marine pollutant

IATA

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benz[e]acephenanthrylene)

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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

SARA 302: 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

Benz[e]acephenanthrylene 205-99-2 2007-03-01

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

Benz[e]acephenanthrylene CAS-No. Revision Date 205-99-2 2007-03-01

Pennsylvania Right To Know Components

CAS-No. Revision Date Benz[e]acephenanthrylene 205-99-2 2007-03-01

New Jersey Right To Know Components

Benz[e]acephenanthrylene CAS-No. Revision Date 205-99-2 2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

Benz[e]acephenanthrylene

CAS-No. Revision Date 205-99-2 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 Carc. Acute aquatic toxicity
Chronic aquatic toxicity
Carcinogenicity

H350 May cause cancer.
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: 2
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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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: 06/29/2014 Print Date: 12/30/2014

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Material Safety Data Sheet Benzo[k]fluoranthene, 99+% (tlc)

MSDS# 54641

Section 1 - Chemical Product and Company Identification

MSDS Name: Benzo[k]fluoranthene, 99+% (tlc) Catalog Numbers: AC279730000, AC279732500

8,9-Benzofluoranthane. Synonyms:

Acros Organics BVBA Company Identification:

Janssen Pharmaceuticalaan 3a

2440 Geel, Belgium

Acros Organics

Company Identification: (USA) One Reagent Lane

Fair Lawn, NJ 07410

For information in the US, call: 800-ACROS-01 For information in Europe, call: +32 14 57 52 11 Emergency Number, Europe: +32 14 57 52 99 **Emergency Number US:** 201-796-7100 CHEMTREC Phone Number, US: 800-424-9300 CHEMTREC Phone Number, Europe: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#: 207-08-9

Chemical Name: Benzo[k]fluoranthene, 99+% (TLC)

%:

EINECS#: 205-916-6

T Hazard Symbols:



Risk Phrases: 45

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Danger! May be fatal if swallowed. May be fatal if absorbed through the skin. Toxic. Carcinogen. May cause lung damage. Causes eye and skin irritation. Causes digestive and respiratory tract irritation. Cancer hazard. May be fatal if inhaled. Target Organs: Lungs, respiratory system.

Potential Health Effects

Eye: Causes eye irritation.

Skin: Causes skin irritation. May be fatal if absorbed through the skin.

May be fatal if swallowed. Causes gastrointestinal irritation with nausea, vomiting and diarrhea. Ingestion:

Inhalation: May be fatal if inhaled. Causes respiratory tract irritation.

Chronic: May cause cancer according to animal studies.

Section 4 - First Aid Measures

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower

Eyes:

eyelids. Get medical aid immediately.

Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing Skin:

contaminated clothing and shoes.

Call a poison control center. If swallowed, do not induce vomiting unless directed to do so by medical Ingestion:

personnel. Never give anything by mouth to an unconscious person. Get medical aid.

Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, Inhalation:

give artificial respiration. If breathing is difficult, give oxygen.

Notes to Physician:

Section 5 - Fire Fighting Measures

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH General

(approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be Information:

generated by thermal decomposition or combustion.

Extinguishing

Use water spray, dry chemical, carbon dioxide, or chemical foam. Media:

Autoignition Temperature: Not available

Flash Point: Not available

Explosion Limits: Not available Lower:

Explosion Limits: Upper: Not available

NFPA Rating: Not published

Section 6 - Accidental Release Measures

General Use proper personal protective equipment as indicated in Section 8. Information:

Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, Spills/Leaks:

observing precautions in the Protective Equipment section.

Section 7 - Handling and Storage

Wash thoroughly after handling. Wash thoroughly after handling. Remove contaminated clothing and wash before Handling: reuse. Use only in a well-ventilated area. Do not breathe dust, mist, or vapor. Do not get on skin or in eyes. Do not ingest or inhale.

Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	++ OSHA - Final PELs
Benzo[k]fluoranthen r e, 99+% (TLC)	none listed	none listed	none listed
++		<u> </u>	++

OSHA Vacated PELs: Benzo[k]fluoranthene, 99+% (TLC): None listed

Engineering Controls:

Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Exposure Limits

Personal Protective Equipment

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eve and face Eyes:

protection regulations in 29 CFR 1910.133 or European Standard EN166.

Wear appropriate protective gloves to prevent skin exposure. Skin:

Wear appropriate protective clothing to prevent skin exposure. Clothing:

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a

Respirators: NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if

irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Color: yellow

Odor: Not available pH: Not available

Vapor Pressure: Not available

Vapor Density: Not available

Evaporation Rate: Not available

Viscosity: Not available

Boiling Point: 480 deg C @ 760.00mm Hg (896.00°F)

Freezing/Melting Point: 216 - 218 deg C

Decomposition Temperature: Not available

Solubility in water: Not available

Specific Gravity/Density:

Molecular Formula: C20H12 Molecular Weight: 252.32

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, dust generation.

Incompatibilities with Other Materials Not available

Hazardous Decomposition Products Carbon monoxide, carbon dioxide.

Hazardous Polymerization Has not been reported.

Section 11 - Toxicological Information

RTECS#: CAS# 207-08-9: DF6350000

LD50/LC50: RTECS: Not available.

Carcinogenicity: Benzo[k]fluoranthene, 99+% (TLC) - California: carcinogen, initial date 7/1/87 NTP: Suspect carcinogen

IARC: Group 2B carcinogen

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Ecotoxicity: Not available

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT

Shipping Name: Not regulated as a hazardous material

Hazard Class: UN Number: Packing Group: Canada TDG

Shipping Name: Not available

Hazard Class: UN Number: Packing Group:

USA RQ: CAS# 207-08-9: 5000 lb final RQ; 2270 kg final RQ

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: T

Risk Phrases:

R 45 May cause cancer.

Safety Phrases:

S 53 Avoid exposure - obtain special instructions before use.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 207-08-9: Not available

Canada

Canadian WHMIS Classifications: Not available

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 207-08-9 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

CAS# 207-08-9 is not listed on the TSCA Inventory. It is for research and development use only.

Section 16 - Other Information

MSDS Creation Date: 9/02/1997 Revision #6 Date 7/20/2009

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility 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. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.



Material Safety Data Sheet

Chrysene, 98%

MSDS# 95251

Section 1 - Chemical Product and Company Identification

MSDS Name: Chrysene, 98%

Catalog Numbers: AC224140000, AC224140010, AC224140050, AC224145000

Synonyms: 1,2-Benzophenanthrene; Benzo(a)phenanthrene; 1,2,5,6-Dibenzonaphthalene.

Acros Organics BVBA

Company Identification: Janssen Pharmaceuticalaan 3a

2440 Geel, Belgium

Acros Organics

Company Identification: (USA)

One Reagent Lane

Fair Lawn, NJ 07410

For information in the US, call:

For information in Europe, call:

Emergency Number, Europe:

Emergency Number US:

201-796-7100

CHEMTREC Phone Number, US: 800-424-9300 CHEMTREC Phone Number, Europe: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#: 218-01-9 Chemical Name: Chrysene

%: 98

EINECS#: 205-923-4

Hazard Symbols: T



Risk Phrases: 45 50/53

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Caution! May cause respiratory tract irritation. May cause eye and skin irritation. May cause cancer in humans. Target Organs: Liver, skin.

Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause skin irritation.

Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.

Inhalation: May cause respiratory tract irritation.

Chronic: May cause cancer according to animal studies.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower

eyelids. Get medical aid.

Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing Skin:

contaminated clothing and shoes. Wash clothing before reuse.

Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give Ingestion:

anything by mouth to an unconscious person. Get medical aid immediately.

Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, Inhalation:

give artificial respiration. If breathing is difficult, give oxygen.

Notes to Physician:

General

Section 5 - Fire Fighting Measures

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved

or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is

capable of creating a dust explosion.

Extinguishing Media:

Information:

Use water spray, dry chemical, carbon dioxide, or chemical foam.

Autoignition Not available. Temperature:

Flash Point: Not applicable.

Explosion Not available Limits: Lower:

Explosion Not available Limits: Upper:

NFPA Rating: health: ; flammability: 1; instability: ;

Section 6 - Accidental Release Measures

General

Information:

Use proper personal protective equipment as indicated in Section 8.

Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately,

Spills/Leaks:

observing precautions in the Protective Equipment section. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash thoroughly after handling. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Avoid breathing dust.

Storage: Store in a tightly closed container. Store in a cool, dry area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	+	+ NIOSH	++ OSHA - Final PELs
Chrysene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	 	0.2 mg/m3 TWA (benzene soluble

OSHA Vacated PELs: Chrysene: 0.2 mg/m3 TWA (benzene soluble fraction) (listed under Coal tar pitches) **Engineering Controls:**

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.

Exposure Limits

Personal Protective Equipment

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face Eyes:

protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to prevent skin exposure.

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a

Respirators: NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if

irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Color: very light beige Odor: Not available pH: Not available

Vapor Pressure: Not available Vapor Density: Not available Evaporation Rate: Not available Viscosity: Not available

Boiling Point: 448 deg C @ 760 mm Hg (838.40°F)

Freezing/Melting Point: 250-255 deg C Decomposition Temperature: Not available

Solubility in water: insoluble

Specific Gravity/Density:

Molecular Formula: C18H12 Molecular Weight: 228.29

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Dust generation.

Incompatibilities with Other Materials Not available

Hazardous Decomposition Products Carbon monoxide, carbon dioxide.

Hazardous Polymerization Has not been reported.

Section 11 - Toxicological Information

RTECS#: CAS# 218-01-9: GC0700000

LD50/LC50: RTECS: Not available.

Carcinogenicity: Chrysene - ACGIH: A1 - Confirmed Human Carcinogen (Coal tar pitches). California: carcinogen, initial

date 1/1/90 NTP: Known carcinogen (Coal tar pitches). IARC: Group 1 carcinogen (Coal tar pitches).

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Ecotoxicity: Water flea LC50 = 1.9 mg/L; 2 Hr.; Unspecified

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT

Shipping Name: Please contact Fisher Scientific for shipping information

Hazard Class: UN Number: Packing Group: Canada TDG

Shipping Name: Not available

Hazard Class: UN Number: Packing Group:

USA RQ: CAS# 218-01-9: 100 lb final RQ; 45.4 kg final RQ

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: T

Risk Phrases:

R 45 May cause cancer.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

- S 53 Avoid exposure obtain special instructions before use.
- S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- S 60 This material and its container must be disposed of as hazardous waste.
- S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 218-01-9: Not available

Canada

CAS# 218-01-9 is listed on Canada's DSL List

Canadian WHMIS Classifications: D2A

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 218-01-9 is listed on Canada's Ingredient Disclosure List

US Federal

TSCA

CAS# 218-01-9 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 6/30/1999 Revision #6 Date 7/20/2009

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility 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. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.



Material Safety Data Sheet

Dibenz[a,h]anthracene, 99% (UV-Vis)

MSDS# 66416

Section 1 - Chemical Product and Company Identification

MSDS Name: Dibenz[a,h]anthracene, 99% (UV-Vis)

Catalog Numbers: AC406430000, AC406430010, AC406432500

1,2:5,6-Dibenz(a)anthracene. Synonyms:

Acros Organics BVBA Company Identification:

Janssen Pharmaceuticalaan 3a

2440 Geel, Belgium

Acros Organics One Reagent Lane Company Identification: (USA)

Fair Lawn, NJ 07410

For information in the US, call: 800-ACROS-01 For information in Europe, call: +32 14 57 52 11 Emergency Number, Europe: +32 14 57 52 99 **Emergency Number US:** 201-796-7100

CHEMTREC Phone Number, US: 800-424-9300 CHEMTREC Phone Number, Europe: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#: 53-70-3

Chemical Name: Dibenz[a,h]anthracene

%:

EINECS#: 200-181-8

Hazard Symbols: TN



Risk Phrases:



45 50/53

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Caution! May cause respiratory tract irritation. Cancer suspect agent. May cause eye and skin irritation. Target Organs: None known.

Potential Health Effects

Eye: May cause eye irritation. Skin: May cause skin irritation.

Ingestion: May cause irritation of the digestive tract. Inhalation: May cause respiratory tract irritation.

Chronic: May cause cancer in humans.

Section 4 - First Aid Measures

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get Eyes:

medical aid.

Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing Skin:

and shoes. Wash clothing before reuse. Remove contaminated clothing and shoes.

Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk Ingestion:

or water.

Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If Inhalation:

breathing is difficult, give oxygen. Get medical aid.

Notes to Physician:

Section 5 - Fire Fighting Measures

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH General

(approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be Information:

generated by thermal decomposition or combustion.

Use agent most appropriate to extinguish fire. Use water spray, dry chemical, carbon dioxide, or Extinguishing

Media: appropriate foam.

Autoignition Temperature: Not applicable.

Flash Point: Not applicable.

Explosion Limits: Not available Lower:

Explosion Limits: Not available Upper:

NFPA Rating: health: 1; flammability: 1; instability: 0;

Section 6 - Accidental Release Measures

General Use proper personal protective equipment as indicated in Section 8.

Information:

Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately,

observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide Spills/Leaks:

ventilation.

Section 7 - Handling and Storage

Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate Handling: ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	++ OSHA - Final PELs
Dibenz[a,h]anthrace	none listed	none listed	none listed
ne +	, +	 	; ++

OSHA Vacated PELs: Dibenz[a,h]anthracene: None listed

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Personal Protective Equipment

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face Eyes:

protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or Respirators:

European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Color: off-white

Odor: Not available

pH: Not available

Vapor Pressure: Not available

Vapor Density: Not available

Evaporation Rate: Not available

Viscosity: Not available

Boiling Point: Not available

Freezing/Melting Point: 265 deg C (509.00°F)

Decomposition Temperature: Not available

Solubility in water: Not available

Specific Gravity/Density:

Molecular Formula: C22H14 Molecular Weight: 278.34

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, dust generation, excess heat, strong oxidants.

Incompatibilities with Other Materials Not available

Hazardous Decomposition Products Carbon monoxide, carbon monoxide, carbon dioxide.

Hazardous Polymerization Has not been reported.

Section 11 - Toxicological Information

RTECS#: CAS# 53-70-3: HN2625000

LD50/LC50: RTECS: Not available.

Carcinogenicity: Dibenz[a,h]anthracene - California: carcinogen, initial date 1/1/88 NTP: Suspect carcinogen IARC: Group

y. 2A carcinogen

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Ecotoxicity: Not available

Other: For more information, see "HANDBOOK OF ENVIRONMENTAL FATE AND EXPOSURE DATA."

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT

Shipping Name: Please contact Fisher Scientific for shipping information

Hazard Class: UN Number: Packing Group: Canada TDG

Shipping Name: Not available

Hazard Class: UN Number: Packing Group:

USA RQ: CAS# 53-70-3: 1 lb final RQ; 0.454 kg final RQ

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: T N

Risk Phrases:

R 45 May cause cancer.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 53 Avoid exposure - obtain special instructions before use.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 53-70-3: Not available

Canada

CAS# 53-70-3 is listed on Canada's NDSL List

Canadian WHMIS Classifications: D2A

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 53-70-3 is listed on Canada's Ingredient Disclosure List

US Federal

TSCA

CAS# 53-70-3 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 6/24/1999 Revision #6 Date 7/20/2009

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility 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. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

SAFETY DATA SHEET

Version 5.2 Revision Date 06/27/2014 Print Date 01/02/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Endrin aldehyde

Product Number : 442578
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 4), H302 Chronic aquatic toxicity (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 Warning

Hazard statement(s)

H302 Harmful if swallowed.

H413 May cause long lasting harmful effects to aquatic life.

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 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you

feel unwell.

P330 Rinse mouth.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

Supelco - 442578 Page 1 of 7

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Molecular Weight : 380.89 g/mol

Hazardous components

Component	Classification	Concentration
Endrin aldehyde		
	Acute Tox. 4; Aquatic Chronic	-
	4; H302, H413	

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

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

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.

Supelco - 442578 Page 2 of 7

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

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

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eve/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

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

Form: solid a) Appearance

b) Odour no data available c) Odour Threshold no data available d) рН no data available Melting point/freezing e)

point

151.0 °C (303.8 °F)

Initial boiling point and boiling range

no data available

Supelco - 442578 Page 3 of 7 g) Flash point no data available
h) Evapouration rate no data available
i) Flammability (solid, gas) no data available
j) Upper/lower no data available flammability or explosive limits
k) Vapour pressure no data available

I) Vapour pressure no data available
 m) Relative density no data available

n) Water solubility insolubleo) Partition coefficient: n- log Pow: 5.60

octanol/water
p) Auto-ignition

q) Decomposition temperature

no data available

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 - 500.0 mg/kg

Inhalation: no data available

Dermal: no data available

no data available

Skin corrosion/irritation

no data available

Supelco - 442578 Page 4 of 7

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

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

no data available

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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

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

Endrin aldehyde CAS-No. Revision Date 2007-03-01

New Jersey Right To Know Components

Endrin aldehyde CAS-No. Revision Date 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

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

Aquatic Chronic Chronic aquatic toxicity H302 Harmful if swallowed.

H413 May cause long lasting harmful effects to aquatic life.

HMIS Rating

Health hazard: 2
Chronic Health Hazard: Flammability: 0
Physical Hazard 0

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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: 5.2 Revision Date: 06/27/2014 Print Date: 01/02/2015

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1. CHEMICAL PRODUCT and COMPANY INFORMATION

EMERGENCY TELEPHONE NUMBER (24 hrs): COMPANY CONTACT (business hours): 800-542-0778

CHEMTREC (800) 424-9300

Global Companies LLC Water Mill Center 800 South St. Waltham, MA 02454-9161



SYNONYMS: #2 Heating Oil; High Sulfur Diesel; Heating Oil Plus™

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (% BY WEIGHT)
No. 2 Fuel Oil	68476-30-2	OSHA PEL: 5 mg/m³ (TWA) as mineral oil mist ACGIH TLV: 100 mg/m³ (TWA), skin A3	95 – 100
Naphthalene	91-20-3	OSHA PEL: 10 ppm (TWA) ACGIH TLV: 10 ppm (TWA), 15 ppm (STEL), skin A4	Typically 0.1
Methyl Esters	67784-80-9	N/A	0 – 5

A complex combination of hydrocarbons with carbon numbers in the range C9 and higher produced from the distillation of petroleum crude oil.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW CAUTION!

OSHA/NFPA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED

Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation (rash). Long-term, repeated exposure may cause skin cancer. If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).

EYES

Contact with liquid or vapor may cause mild irritation.

SKIN

May cause skin irritation with prolonged or repeated contact. Single acute exposure not expected to cause allergic response. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed. Symptoms may include itching, irritation, pain and swelling.

INGESTION

Due to low viscosity, potential exists for 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. 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.

INHALATION

Excessive exposure may cause irritation to the nose, throat, lungs and respiratory tract. Central nervous system effects may include headache, dizziness, loss of balance and coordination and, at extreme exposures, unconsciousness, coma, respiratory failure, and death.

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WARNING: The burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products and inadequate oxygen levels, which may lead to suffocation, unconsciousness and death.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

See Section 11 for additional information regarding toxicity.

4. FIRST AID MEASURES

EYES

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 minutes. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water. If irritation or redness develops, seek medical attention.

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.

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.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: > 125°F (> 52 °C) minimum PMCC

AUTOIGNITION POINT: 494 °F (257 °C)
OSHA/NFPA FLAMMABILITY CLASS: 2 (COMBUSTIBLE)

LOWER EXPLOSIVE LIMIT (%): 0.6
UPPER EXPLOSIVE LIMIT (%): 7.5

FIRE AND EXPLOSION HAZARDS

OSHA and NFPA Class 2 Combustible Liquid. Vapors may ignite 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. Vapors may travel long distances to an ignition source and flashback. Vapors are heavier than air and may accumulate in low areas. Runoff to sewer may lead to fire or explosion hazard.

EXTINGUISHING MEDIA

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, carbon dioxide, fire fighting foam, or Halon. Use water spray to cool exposed materials.

LARGE FIRES: Fog or fire fighting foam recommended. Water spray may be ineffective for fighting fires, but may be used to cool fire-exposed materials and structures.

FIRE FIGHTING INSTRUCTIONS

Incipient stage fires may be extinguished using handheld portable fire extinguishers and other firefighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full face piece and full protective clothing. Isolate area surrounding fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water.

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For large 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.

HAZARDOUS COMBUSTION PRODUCTS

Combustion may yield a complex mixture of airborne solids, liquids and gases, including smoke, carbon monoxide, carbon dioxide, and other products of incomplete combustion.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY'S SPCC, SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Stay upwind and uphill when possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Do not touch or walk-through spilled material. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking or using absorbents/ absorbent booms. 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.

Take up with dry earth, sand or other non-combustible, inert oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container with clean, non-sparking tools for reclamation or disposal. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8). Local, state, and / or Federal notification may be required if this material is released to the environment (see Section 15 for additional information).

7. HANDLING AND STORAGE HANDLING PRECAUTIONS

Handle as a combustible liquid. Keep away from heat, sparks, and open flame. Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce potential for 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 higher flash point material (such as gasoline) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

GENERAL STORAGE PRECAUTIONS

Keep away from flame, sparks, and excessive temperatures. Use approved vented containers. Keep containers closed and clearly labeled. Label all secondary containers with the chemical name and associated hazard(s). Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat or weld containers. Do not expose containers to sources of ignition.

Store in a well ventilated area. Protect containers from damage and vehicular traffic. Post "No Smoking" signs in product storage areas. 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".

WORK/HYGIENIC PRACTICES

Wear protective gloves when handling. Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin.

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Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

ENGINEERING CONTROLS

Use adequate local or general ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits.

EYE/FACE PROTECTION

Safety glasses with side shields or goggles are recommended where there is a possibility of splashing or spraying.

SKIN/HAND PROTECTION

Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The breakthrough performance of materials may vary between products, based on degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges/ canisters should be used where airborne concentrations are, or may be expected to be, above exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the respirator manufacturer for additional guidance on respiratory protection selection.

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.

9. PHYSICAL and CHEMICAL PROPERTIES APPEARANCE

Red/orange dyed liquid.

ODOR

Mild, petroleum distillate odor

BASIC PHYSICAL PROPERTIES

BOILING RANGE: 320 to 690 °F (160 to 366 °C) VAPOR PRESSURE: 0.009 psia @ 70 °F (21 °C)

VAPOR DENSITY (air = 1): > 1.0

SPECIFIC GRAVITY (H2O = 1): 0.81 to 0.88 @ 60 °F (16 °C)

PERCENT VOLATILES: 100 %

EVAPORATION RATE: Slow: varies with conditions

SOLUBILITY (H2O): Negligible

10. STABILITY and REACTIVITY

STABILITY: Stable under normal ambient conditions. Hazardous polymerization will not occur.

CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong acids and oxidizers; Viton ®; Fluorel ®

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

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11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY

COMPONENT ORAL LD50 DERMAL LD50 INHALATION LC50

No. 2 Fuel Oil > 9 g/kg (rats) > 5g/kg (rabbits) 5 mg/L Methyl Esters > 14.4 g/kg (rats) No data No data

Primary dermal irritation: extremely irritating (rabbits) Draize eye irritation: non-irritating (rabbits)

Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY

Carcinogenic: OSHA: NO IARC: NO NTP: NO ACGIH: 1997 NOIC: A3

Petroleum middle distillates have been shown to produce skin tumors in laboratory animals following repeated and prolonged exposures. 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.

MUTAGENICITY (genetic effects)

No. 2 Fuel Oil has been found positive in mutagenicity studies in which mice and rats were subjected to oral exposures.

12. ECOLOGICAL INFORMATION

This product should be regarded as toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment. Keep out of sewers, drainage areas, and waterways. Spills and releases should be reported, as applicable, in accordance with appropriate Federal and state regulations. (See Section 15 for additional information).

13. DISPOSAL CONSIDERATIONS

Although this material does not specifically meet the definition of a RCRA hazardous waste, it may be considered hazardous for disposal, as it displays a characteristic of hazardous waste. Consult federal, state and local waste regulations to determine appropriate disposal options. See Section 15 for further information.

14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME: Fuel Oil, No. 2
HAZARD CLASS and PACKING GROUP: 3. PG III

DOT IDENTIFICATION NUMBER: UN1202 / NA 1993
DOT SHIPPING LABEL: Combustible Liquid

EMERGENCY RESPONSE GUIDEBOOK NUMBER: 128

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product contains constituents listed on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

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RCRA INFORMATION

This product may be recycled. If disposed, this product is considered an ignitable hazardous waste. Consult federal, state and local waste regulations to determine appropriate disposal options.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) or, if not practical, the U.S. Coast Guard with follow-up to the National Response Center, as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause that exempts crude oil, refined and unrefined petroleum products, and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES

This material does not contain chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

SARA SECTION 311/312 - HAZARD CATEGORIES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
Y	Y	Y		

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the *de minimis* levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. This material is subject to the reporting requirements of Section 311-312 of the Emergency Planning and Community Right to Know Act (EPCRA) if stored at quantities in excess of 10,000 pounds at any one time.

You may be required to report releases of chemicals listed in 40 CFR 372.28. However, Polycyclic Aromatic Compounds (PACs) are coincidentally manufactured from the combustion of various fuel oils and other petroleum products. Under SARA Section 313, the de minimis exemption has been eliminated for PACs and other listed persistent bio-accumulative and toxic chemicals (PBTs). Refer to EPA guidance for additional reporting information.

EPA NOTIFICATION (OIL SPILLS)

If the there is a discharge of more than 1,000-gallons of oil into or upon navigable waters of the United States, or if it is the second spill event of 42 gallons or more of oil into water within a twelve (12) month period, a written report must be submitted to the Regional Administrator of the EPA within sixty days of the event.

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 3 (Combustible Liquid) and Class D, Division 2, Subdivision B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING

HEALTH: 1 Slight
FIRE: 2 Moderate
REACTIVITY: 0 Negligible

HMIS® HAZARD RATING

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ABBREVIATIONS:

AP = Approximately <= Less than >= Greater than N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

7 10 1 10 11 11 11 11 11 11 11 11 11 11 1	<u>21</u>		
ACGIH	American Conference of Governmental Industrial Hygienists	OSHA	U.S. Occupational Safety & Health Administration
API	American Petroleum Institute	PEL	Permissible Exposure Limit (OSHA)
AIHA	American Industrial Hygiene Association	RCRA	Resource Conservation and Recovery Act
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act	REL	Recommended Exposure Limit (NIOSH)
ANSI	American National Standards Institute	SARA	Superfund Amendments and
DOT	U.S. Department of Transportation		Reauthorization Act of 1986 Title III
EPA	U.S. Environmental Protection Agency	SCBA	Self-Contained Breathing Apparatus
HMIS	Hazardous Materials Information	SPCC	Spill Prevention, Control, and
	System		Countermeasures
IARC	International Agency For Research On Cancer	STEL	Short-Term Exposure Limit (generally 15 minutes)
MSHA	Mine Safety and Health Administration	TLV	Threshold Limit Value (ACGIH)
NFPA	National Fire Protection Association	TSCA	Toxic Substances Control Act
NIOSH	National Institute of Occupational Safety and Health	TWA	Time Weighted Average (8 hr.)
NOIC	Notice of Intended Change	WEEL	Workplace Environmental Exposure Level (AIHA)
NTP	National Toxicology Program	WHMIS	Canadian Workplace Hazardous Materials Information System
OPA	Oil Pollution Act of 1990	PMCC	Pensky-martens Closed Cup Method

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

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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.

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Gasoline, All Grades

MSDS No. 9950

EMERGENCY OVERVIEW DANGER!

EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD



High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): CHEMTREC (800)424-9300 COMPANY CONTACT (business hours): Corporate Safety (732)750-6000

MSDS (Environment, Health, Safety) Internet Website www.hess.com

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline

(RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded

Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS *

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).

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Gasoline, All Grades

MSDS No. 9950

Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION

EYES

Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN

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 exposed repeatedly.

INGESTION

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.

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.

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.

CHRONIC EFFECTS and CARCINOGENICITY

Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES

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.

SKIN

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION

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Gasoline, All Grades

MSDS No. 9950

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. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION

Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT: -45 °F (-43°C)

AUTOIGNITION TEMPERATURE: highly variable; > 530 °F (>280 °C)

OSHA/NFPA FLAMMABILITY CLASS: 1A (flammable liquid)

LOWER EXPLOSIVE LIMIT (%): 1.4% UPPER EXPLOSIVE LIMIT (%): 7.6%

FIRE AND EXPLOSION HAZARDS

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. 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.

EXTINGUISHING MEDIA

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

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.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 "Low Expansion Foam - 1994 Edition."

FIRE FIGHTING 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.

See Section 16 for the NFPA 704 Hazard Rating.

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Gasoline, All Grades

MSDS No. 9950

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

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.

Carefully contain and stop the source of the spill, if safe to do so. 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.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL***** ******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. 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 higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. 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".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

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Gasoline, All Grades

MSDS No. 9950

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS				
Component (CAS No.)				Exposure Limits
, , ,	Source	TWA	STEL	Note
		(ppm)	(ppm)	
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	1000		Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000		
	ACGIH	1000		A4
Ethyl benzene (100-41-4)	OSHA	100		-
• , ,	ACGIH	100	125	A3
n-Hexane (110-54-3)	OSHA	500		
,	ACGIH	50		Skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)	,			None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
,	ACGIH	20		A4
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25		
Xylene, mixed isomers (1330-20-7)	OSHA	100		-
, ,	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is 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.

RESPIRATORY PROTECTION

A NIOSH-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. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

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.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

A translucent, straw-colored or light yellow liquid

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Gasoline, All Grades

MSDS No. 9950

ODOR

A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

Odor DetectionOdor RecognitionNon-oxygenated gasoline:0.5 - 0.6 ppm0.8 - 1.1 ppmGasoline with 15% MTBE:0.2 - 0.3 ppm0.4 - 0.7 ppmGasoline with 15% TAME:0.1 ppm0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE: 85 to 437 °F (39 to 200 °C)

VAPOR PRESSURE: 6.4 - 15 RVP @ 100 °F (38 °C) (275-475 mm Hg @ 68 °F (20 °C)

VAPOR DENSITY (air = 1): AP 3 to 4 SPECIFIC GRAVITY ($H_2O = 1$): 0.70 – 0.78

EVAPORATION RATE: 10-11 (n-butyl acetate = 1)

PERCENT VOLATILES: 100 %

SOLUBILITY (H₂O): Non-oxygenated gasoline - negligible (< 0.1% @ 77 °F). Gasoline with 15%

MTBE - slight (0.1 - 3% @ 77 °F); ethanol is readily soluble in water

10. STABILITY and REACTIVITY

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS

Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY

Acute Dermal LD50 (rabbits): > 5 ml/kg Acute Oral LD50 (rat): 18.75 ml/kg

Primary dermal irritation (rabbits): slightly irritating

Draize eye irritation (rabbits): non-irritating

Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY

Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

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Gasoline, All Grades

MSDS No. 9950

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME:

DOT HAZARD CLASS and PACKING GROUP:

DOT IDENTIFICATION NUMBER:

Gasoline
3, PG II
UN 1203

DOT SHIPPING LABEL: FLAMMABLE LIQUID

PLACARD:



15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH CHRONIC HEALTH FIRE SUDDEN RELEASE OF PRESSURE REACTIVE X X -- --

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER) CONCENTRATION WT. PERCENT

Benzene (71-43-2)
0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)

Ethyl benzene (100-41-4)
< 3

Ethyl benzene (100-41-4) < 3

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Gasoline, All Grades

MSDS No. 9950

0.5 to 4 n-Hexane (110-54-3) 0 to 15.0 Methyl-tertiary butyl ether (MTBE) (1634-04-4) 1 to 15 Toluene (108-88-3) 1,2,4- Trimethylbenzene (95-63-6) < 6 1 to 15 Xylene, mixed isomers (1330-20-7)

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER) CONCENTRATION - Parts per million (ppm) by weight

Polycyclic aromatic compounds (PACs) 17 Benzo (g,h,i) perylene (191-24-2) 2.55 Lead (7439-92-1) 0.079

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER) Date Listed Benzene 2/27/1987 Ethyl benzene 6/11/2004 Toluene 1/1/1991

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)

Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

OTHER INFORMATION

HEALTH: Slight **NFPA® HAZARD RATING** 1

FIRE: Serious 3 REACTIVITY: Minimal

1 * **HMIS® HAZARD RATING** Sliaht HEALTH:

> FIRE: Serious 3 PHYSICAL: Minimal 0 * CHRONIC

SUPERSEDES MSDS DATED: 07/01/06

(202)682-8000

ABBREVIATIONS:

AP = Approximately> = Greater than < = Less than N/A = Not ApplicableN/D = Not Determined ppm = parts per million

ACRONYMS:

F	ACGIH	American Conference of Governmental	CERCLA Comprehensive Emergency Response,	
		Industrial Hygienists		Compensation, and Liability Act
F	AHIA	American Industrial Hygiene Association	DOT	U.S. Department of Transportation
F	ANSI	American National Standards Institute		[General Info: (800)467-4922]
		(212)642-4900	EPA	U.S. Environmental Protection Agency
F	λPI	American Petroleum Institute	HMIS	Hazardous Materials Information System

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Gasoline, All Grades		MSDS No. 9950	
IARC	International Agency For Research On Cancer	REL SARA	Recommended Exposure Limit (NIOSH) Superfund Amendments and
MSHA	Mine Safety and Health Administration		Reauthorization Act of 1986 Title III

SCBA

SPCC Spill Prevention, Control, and (617)770-3000 National Institute of Occupational Safety Countermeasures

and Health STEL Short-Term Exposure Limit (generally 15 Notice of Intended Change (proposed NOIC

minutes)

change to ACGIH TLV) TLV Threshold Limit Value (ACGIH) NTP National Toxicology Program **TSCA** Toxic Substances Control Act Oil Pollution Act of 1990 Time Weighted Average (8 hr.) OPA TWA **OSHA** U.S. Occupational Safety & Health WEEL Workplace Environmental Exposure

Level (AIHA)

Self-Contained Breathing Apparatus

PEL Permissible Exposure Limit (OSHA) **WHMIS** Workplace Hazardous Materials Resource Conservation and Recovery Act Information System (Canada) **RCRA**

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Administration

National Fire Protection Association

NFPA

NIOSH

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.

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Safety Data Sheet Revision Date: 05/15/14

www.restek.com

1. IDENTIFICATION

Catalog Number / Product Name: 31279, 31279-5XX, & 31379 / Indeno (1,2,3-cd) pyrene Standard

Company:

Address:

110 Benner Circle
Bellefonte, Pa. 16823

Phone#:

814-353-1300

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:

Intended use: For Laboratory use only

2. HAZARD(S)IDENTIFICATION

Emergency Overview:

GHS Hazard Symbols:



GHS Classification: Carcinogenicity Category 2

GHS Hazard: Suspected of causing cancer.

GHS Precautions:

Safety Precautions: Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Use personal protective equipment as required.

First Aid Measures: IF exposed or concerned: Get medical advice/attention.

Storage: 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	
Dichloromethane	75-09-2	200-838-9	99.900000	
indeno (1,2,3-c,d) pyrene	193-39-5	·	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: Immediately 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 and monitor the eye daily as advised by your physician. Serious harm

(damage) may result if treatment is delayed. Continue to flush eyes while awaiting medical

attention

Wash with soap and water. Remove contaminated clothing, launder immediately, and discard **Skin Contact:**

contaminated leather goods. Get medical attention immediately.

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. Never give anything by mouth

to an unconscious person

5. FIRE- FIGHTING MEASURES

Extinguishing Media: Use methods suitable to fight surrounding fire.

Fire Fighting Methods and Protection: Use methods for the surrounding fire. **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.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

United States:

ACGIH STEL ACGIH TLV-TWA **Chemical Name** CAS No. IDI H **OSHA Exposure Limit** Dichloromethane 75-09-2 2300 ppm IDLH 50 ppm TWA 25 ppm TWA; 125 ppm STEL (15 min. TWA) indeno (1,2,3-c,d) pyrene 193-39-5 ND No TLV No data available.

Personal Protection:

Engineering Measures: Local exhaust ventilation or other engineering controls are normally required

when handling or using this product to avoid overexposure.

Respiratory protection may be required to avoid overexposure when handling this **Respiratory Protection:**

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.

Eye Protection: Wear chemically resistant safety glasses with side shields when handling this

product. Wear additional eye protection such as chemical splash goggles and/or face shield when the possibility exists for eye contact with splashing or spraying liquid, or airborne material. Do not wear contact lenses. Have an eye wash

station available.

Skin Protection: Avoid skin contact by wearing chemically resistant gloves, an apron and other

protective equipment depending upon conditions of use. 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: Eye disease Skin disease including eczema and sensitization Respiratory

disease including asthma and bronchitis

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance, color: Colorless Strona Odor:

Physical State: No data available. pH:No data availableVapor Density:2.93 (air = 1)Melting Point: $-96.7 \text{ }^{\circ}\text{C}$

Flash Point:

Upper Flammable/Explosive Limit, % in air:

Lower Flammable/Explosive Limit, % in air:

No data available.

No data available.

No data available.

Soldeg C

Decomposition Temperature: No data available.

Specific Gravity: 1.3254 - 1.3258 g/cm3 at 20 ℃

Evaporation Rate: No data available.

Odor Threshold: ND

Solubility: Moderate; 50-99% Partition Coefficient: n-octanol in water: No data available.

VOC % by weight: 0.00

Molecular Weight: No data available.

10. STABILITY AND REACTIVITY

Stability: Stable under normal conditions.

Conditions to Avoid: No data available. Contamination High temperatures

Materials to Avoid / Chemical Incompatiability: Strong oxidizing agents Caustics (bases)
Hazardous Decomposition Products: Carbon dioxide Carbon monoxide

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation Absorption Ingestion Skin contact Eye

contact

Target Organs Potentially Affected By Exposure: Skin, Cardiovascular System, Eyes, Liver

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)Inhalation may

cause severe central nervous system depression (including unconsciousness).

Skin Contact: Contact causes severe skin irritation and possible burns.

Skin Absorption: Harmful if absorbed through the skin. May cause severe irritation and systemic

damage.

Eye Contact: Contact with the eyes may cause moderate to severe eye injury. Eye contact

may result in tearing and reddening, but not likely to permanently injure eye tissue. Temporary vision impairment (cloudy or blurred vision) is possible.

Ingestion Irritation: Irritating to mouth, throat, and stomach. Can cause abdominal discomfort,

nausea, vomiting and diarrhea.

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.

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 Absorption: Upon prolonged or repeated exposure, harmful if

absorbed through the skin. May cause severe irritation

and systemic damage

Component Toxicological Data:

NIOSH:

Chemical Name CAS No. LD50/LC50

Methane, dichloro- 75-09-2 Oral LD50 Rat >2000 mg/kg

Component Carcinogenic Data:

OSHA:

Chemical Name CAS No.

Methylene chloride 75-09-2

25 ppm TWA (8 hr.); 125 ppm STEL (15 min.); 12.5 ppm Action Level (see 29 CFR 1910.1051); effective date for respiratory

protection for certain employers to acheive the 8-hour TWA PEL is August 31, 1998; the start up date to install engineering controls is December 10, 1998; (OSHA - 29 CFR 1910

Specifically Regulate

Indeno[1,2,3-cd]pyrene 193-39-5 Present

ACGIH:

Chemical Name CAS No.

Dichloromethane 75-09-2 A3 - Confirmed Animal Carcinogen with

Unknown Relevance to Humans

NIOSH:

Chemical Name CAS No.

Methylene chloride 75-09-2 potential occupational carcinogen

NTP:

Chemical Name CAS No.

No data available.

Indeno(1,2,3-cd)pyrene

IARC:

Chemical Name CAS No. Group No.

 No data.
 Group 1

 No data.
 Group 2A

 Dichloromethane
 75-09-2
 Group 2B

193-39-5

12. ECOLOGICAL INFORMATION

Overview: Moderate ecological hazard. This product may be dangerous

to plants and/or wildlife. Keep out of waterways.

Group 2B

Mobility:No dataPersistence:No dataBioaccumulation:No dataDegradability: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: Incinerate spent or discarded material a permitted

hazardous waste facility.

Waste Disposal of Packaging: Comply with all Local, State, Federal, and Provincial

Environmental Regulations.

14. TRANSPORTATION INFORMATION

United States:

DOT Proper Shipping Name: Dichloromethane

UN Number: UN1593
Hazard Class: 6.1
Packing Group: III

International:

IATA Proper Shipping Name: Dichloromethane

UN Number: UN1593
Hazard Class: 6.1
Packing Group: III

Marine Pollutant: No

15. REGULATORY INFORMATION

 United States:

 Chemical Name
 CAS#
 CERCLA
 SARA 313
 SARA EHS 313
 TSCA

 Dichloromethane
 75-09-2
 X
 X
 X

 indeno (1,2,3-c,d) pyrene
 193-39-5
 X
 X
 X

The following chemicals are listed on CA Prop 65:

Chemical Name CAS # Regulation

Dichloromethane 75-09-2 Prop 65 Cancer

Dichloromethane (Methylene chloride)
Indeno [1,2,3-cd]pyrene 193-39-5 Prop 65 Cancer

State Right To Know Listing:

Chemical NameCAS#New JerseyMassachusettsPennsylvaniaCaliforniaDichloromethane75-09-2XXXindeno (1,2,3-c,d) pyrene193-39-5XXX
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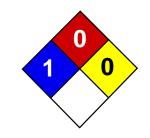
16. OTHER INFORMATION

Prior Version Date: 05/27/11

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 products 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.







Material Safety Data Sheet Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459,

SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead

Metal, sheet; Lead Metal, shot

Chemical Name: Lead
Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400
Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of

heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.05 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m3) from OSHA (PEL) [United States] TWA: 0.03 (mg/m3) from NIOSH [United States] TWA: 0.05 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole Color: Bluish-white. Silvery. Gray pH (1% soln/water): Not applicable. Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)
Critical Temperature: Not available.
Specific Gravity: 11.3 (Water = 1)
Vapor Pressure: Not applicable.
Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available. Ionicity (in Water): Not available.

Dispersion Properties: Not available. **Solubility:** Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungsby mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually abssorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, deliriuim, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead cholic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0 Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

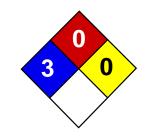
Other Special Considerations: Not available.

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Material Safety Data Sheet Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic

Mercury; Liquid Silver; Hydragyrum

Chemical Name: Mercury
Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400
Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients Composition: Name CAS # % by Weight Mercury 7439-97-6 100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:

A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 0.025 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available. Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available. Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonynickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsiliane, calcium,

Special Remarks on Corrosivity:

The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalga) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material Identification: : Mercury UNNA: 2809 PG: III Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0
Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0
Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Material Safety Data Sheet Selenium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Selenium
Catalog Codes: SLS2629

CAS#: 7782-49-2 **RTECS**: VS7700000

TSCA: TSCA 8(b) inventory: Selenium

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Se

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396 US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
Selenium	7782-49-2	100

Toxicological Data on Ingredients: Selenium: ORAL (LD50): Acute: 6700 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Material in powder form, capable of creating a dust explosion.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.2 (mg/m3) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 78.96 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 684.9°C (1264.8°F)

Melting Point: 217°C (422.6°F)

Critical Temperature: Not available.

Specific Gravity: 4.81 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.
Ionicity (in Water): Not available.
Dispersion Properties: Not available.
Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available. **Conditions of Instability:** Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 6700 mg/kg [Rat].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in animal. Excreted in maternal milk

in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material. **Identification:** : Selenium powder: UN2658 PG: III **Special Provisions for Transport:** Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Selenium Massachusetts RTK: Selenium TSCA 8(b) inventory: Selenium SARA 313 toxic chemical notification and release reporting: Selenium CERCLA: Hazardous substances.: Selenium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC): R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Material Safety Data Sheet 1,1,1-Trichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,1,1-Trichloroethane

Catalog Codes:

CAS#: 71-55-6

RTECS: KJ2975000

TSCA: TSCA 8(b) inventory: 1,1,1-Trichloroethane

CI#: Not available.

Synonym:

Chemical Formula: CH3CCI3

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
{1,1,1-}Trichloroethane	71-55-6	100

Toxicological Data on Ingredients: 1,1,1-Trichloroethane: ORAL (LD50): Acute: 9600 mg/kg [Rat]. 6000 mg/kg [Mouse]. DERMAL (LD50): Acute: 15800 mg/kg [Rabbit]. VAPOR (LC50): Acute: 18000 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of ingestion. Hazardous in case of skin contact (irritant, permeator), of inhalation. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 537°C (998.6°F)

Flash Points: Not available.

Flammable Limits: LOWER: 7.5% UPPER: 12.5%

Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds.

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of oxidizing materials, of

acids, of alkalis.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive to explosive in presence of oxidizing materials, of acids, of alkalis.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 350 STEL: 440 CEIL: 440 (ppm) from ACGIH (TLV) [1995] TWA: 1900 STEL: 2460 CEIL: 2380 (mg/m3) from ACGIH [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 133.41 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 74.1°C (165.4°F)

Melting Point: -32.5°C (-26.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.3376 (Water = 1)

Vapor Pressure: 100 mm of Hg (@ 20°C)

Vapor Density: 4.6 (Air = 1)

Volatility: Not available.

Odor Threshold: 400 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 6000 mg/kg [Mouse]. Acute dermal toxicity (LD50): 15800 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 18000 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant, permeator), of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material. **Identification:** : 1,1,1-Trichloroethane : UN2831 PG: III

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: 1,1,1-Trichloroethane Massachusetts RTK: 1,1,1-Trichloroethane TSCA 8(b) inventory: 1,1,1-Trichloroethane SARA 313 toxic chemical notification and release reporting: 1,1,1-Trichloroethane CERCLA: Hazardous substances.: 1,1,1-Trichloroethane

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC):

R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Material Safety Data Sheet Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eve Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

materiais.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 from ACGIH (TLV) [United States] [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available. Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available. **Conditions of Instability:** Not available.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. Causes damage to the following organs:

kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic Pennsylvania RTK: Arsenic Massachusetts RTK: Arsenic TSCA 8(b) inventory: Arsenic

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R22- Harmful if swallowed. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1
Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1
Reactivity: 2
Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

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Material Safety Data Sheet

Barium acetate

MSDS# 02280

Section 1 - Chemical Product and Company Identification

MSDS Name: Barium acetate

Catalog AC222800000, AC222800010, AC222805000, AC423430000, AC423431000, AC423435000

Numbers: AC423435000, B24-212, B24-250, B24-5, B24-500, B24-5LC

Synonyms: Acetic acid, barium salt; Barium diacetate.

Fisher Scientific

Company Identification: One Reagent Lane

Fair Lawn, NJ 07410

For information in the US, call: 201-796-7100
Emergency Number US: 201-796-7100
CHEMTREC Phone Number, US: 800-424-9300

Section 2 - Composition, Information on Ingredients

.....

CAS#: 543-80-6 Chemical Name: Barium acetate

%: >98

EINECS#: 208-849-0

Hazard Symbols: XN



Risk Phrases: 20/22

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! Harmful if inhaled or swallowed. May cause eye, skin, and respiratory tract irritation. Target Organs: Heart, lungs, gastrointestinal system, muscles, nerves.

Potential Health Effects

Eye: May cause eye irritation. Skin: May cause skin irritation.

Harmful if swallowed. May cause irritation of the digestive tract. The barium ion is a muscle poison causing

Ingestion: stimulation and then paralysis. Initial symptoms are gastrointestinal, including nausea, vomiting, colic, and

diarrhea, followed by myocardial and general muscular stimulation with tingling in the extremities.

Inhalation: May cause respiratory tract irritation. Harmful if inhaled.

Chronic: May cause lung damage.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower

eyelids. Get medical aid.

Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing

contaminated clothing and shoes.

Ingestion: Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk

or water.

Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If

breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear. Do NOT use mouth-Inhalation:

to-mouth resuscitation.

Notes to Signs and symptoms of hypokalemia are relieved by intravenous infusion of K+. Institute cardiac monitoring

for all significant ingestions of soluble barium salts. Physician:

Section 5 - Fire Fighting Measures

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH General

(approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be Information:

generated by thermal decomposition or combustion.

Extinguishing

Use extinguishing media most appropriate for the surrounding fire. Media:

Autoignition Temperature: Not available.

Flash Point: Not available

Explosion Limits: Not available Lower:

Explosion Limits: Upper: Not available

NFPA Rating: health: 2; flammability: 0; instability: 0;

Section 6 - Accidental Release Measures

General

Use proper personal protective equipment as indicated in Section 8.

Information:

Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately,

Spills/Leaks:

observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide

ventilation.

Section 7 - Handling and Storage

Handling: Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid breathing dust.

Storage: Store in a cool, dry place. Store in a tightly closed container. Keep from contact with oxidizing materials.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	++ OSHA - Final PELs
Barium acetate 	Ba) (listed	0.5 mg/m3 TWA (as Ba, except barium sulfate) (listed under Barium, soluble compounds).	(as Ba)

OSHA Vacated PELs: Barium acetate: 0.5 mg/m3 TWA (as Ba) (listed under Barium, soluble compounds)

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Personal Protective Equipment

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face Eyes:

protection regulations in 29 CFR 1910.133 or European Standard EN166.

Wear appropriate gloves to prevent skin exposure. Skin:

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a

Respirators: NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if

irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Crystals
Color: white

Odor: Odorless. pH: Not available

Vapor Pressure: Negligible.

Vapor Density: Not available

Evaporation Rate: Negligible.

Viscosity: Not available

Boiling Point: Not available

Freezing/Melting Point: Not available Decomposition Temperature: Not available

Solubility in water: soluble

Specific Gravity/Density: 2.46 g/cm3 Molecular Formula: C4H6O4Ba Molecular Weight: 255.43

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, dust generation.

Incompatibilities with Other Materials No significant incompatibilities identified with common materials and contaminants...

Hazardous Decomposition Products Carbon monoxide, carbon dioxide, barium oxide.

Hazardous Polymerization Has not been reported.

Section 11 - Toxicological Information

RTECS#: CAS# 543-80-6: AF4550000

RTECS:

LD50/LC50: CAS# **543-80-6**: Oral, rat: LD50 = 921 mg/kg;

JILC30.

Other: Rabbit oral LDLo: 236 mg/kg.

Carcinogenicity: Barium acetate - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Other: See actual entry in RTECS for complete information. The hazards associated with barium may be seen in

this product.

Section 12 - Ecological Information

Other: Do not empty into drains.

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT

Shipping Name: BARIUM COMPOUNDS, N.O.S.

Hazard Class: 6.1 UN Number: UN1564 Packing Group: III Canada TDG

Shipping Name: BARIUM COMPOUND, N.O.S.

Hazard Class: 6.1 UN Number: UN1564 Packing Group: III

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN

Risk Phrases:

R 20/22 Harmful by inhalation and if swallowed.

Safety Phrases:

S 28A After contact with skin, wash immediately with plenty of water.

WGK (Water Danger/Protection)

CAS# 543-80-6: 1

Canada

CAS# 543-80-6 is listed on Canada's DSL List

Canadian WHMIS Classifications: D1B

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 543-80-6 is listed on Canada's Ingredient Disclosure List

US Federal

TSCA

CAS# 543-80-6 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 12/12/1997 Revision #9 Date 7/20/2009

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility 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. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

SAFETY DATA SHEET

Version 4.2 Revision Date 07/03/2014 Print Date 01/07/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : cis-Dichloroethylene

Product Number : 48597
Brand : Supelco
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, 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 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.

Supelco - 48597 Page 1 of 8

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

Formula : C2H2Cl2

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	

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.

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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 fire fighting 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

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.

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Personal protective equipment

Eve/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).

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 multipurpose 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

Form: liquid **Appearance**

Colour: light yellow

Odour no data available b)

Odour Threshold no data available

d) рН no data available

Melting point/freezing

point

-80.0 °C (-112.0 °F)

Initial boiling point and

boiling range

60.0 - 61.0 °C (140.0 - 141.8 °F)

6.0 °C (42.8 °F) - closed cup Flash point

h) Evapouration rate no data available

Flammability (solid, gas) no data available

Upper/lower

no data available

flammability or explosive limits

no data available Vapour pressure

Vapour density no data available

m) Relative density 1.28 a/cm3

n) Water solubility no data available

Partition coefficient: noctanol/water

no data available

Auto-ignition no data available temperature

Decomposition no data available q) temperature

Supelco - 48597 Page 4 of 8 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.

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

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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

Marine pollutant: No

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

Marine pollutant: No

IATA

UN number: 1150 Class: 3 Packing group: II

Proper shipping name: 1,2-Dichloroethylene

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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

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: 4.2 Revision Date: 07/03/2014 Print Date: 01/07/2015

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Material Safety Data Sheet Copper MSDS

Section 1: Chemical Product and Company Identification

Product Name: Copper

Catalog Codes: SLC4939, SLC2152, SLC3943, SLC1150, SLC2941, SLC4729, SLC1936, SLC3727, SLC5515

CAS#: 7440-50-8

RTECS: GL5325000

TSCA: TSCA 8(b) inventory: Copper

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Cu

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400
Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
Copper	7440-50-8	100

Toxicological Data on Ingredients: Copper LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. Avoid contact with eyes Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If you feel unwell, seek medical attention and show the label when possible.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 1 (mg/m3) from ACGIH [1990] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 63.54 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 2595°C (4703°F)

Melting Point: 1083°C (1981.4°F)

Critical Temperature: Not available.

Specific Gravity: 8.94 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion. Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Human: passes through the placenta, excreted in maternal milk.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available. **Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Copper Massachusetts RTK: Copper TSCA 8(b) inventory: Copper CERCLA: Hazardous substances.:

Copper

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1
Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 04:58 PM

Last Updated: 05/21/2013 12:00 PM

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Material Safety Data Sheet Manganese MSDS

Section 1: Chemical Product and Company Identification

Product Name: Manganese

Catalog Codes: SLM2245

CAS#: 7439-96-5

RTECS: OO9275000

TSCA: TSCA 8(b) inventory: Manganese

CI#: Not available.

Synonym:

Chemical Name: Manganese

Chemical Formula: Mn

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
Manganese	7439-96-5	100

Toxicological Data on Ingredients: Manganese: ORAL (LD50): Acute: 9000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, lungs, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

Moderate fire potential, in the form of dust or powder, when exposed to flame. When manganese if heated in the vapor of phosphorus at a very dull red heat, union occurs with incandescence. Concentrated nitric acid reacts with powdered manganese with incandescence and explosion. Powdered manganese ignites in chlorine.

Special Remarks on Explosion Hazards: Moderate explosion potential, in the form of dust or powder, when exposed to flame.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, reducing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.1 (mg/m3) from ACGIH (TLV) [United States] TWA: 5 (mg/m3) [Canada] TWA: 1 STEL: 3 (mg/m3) from NIOSH [United States] TWA: 5 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: 54.94 g/mole

Color: Grayish white.

pH (1% soln/water): Not applicable.

Boiling Point: 2095°C (3803°F)

Melting Point: 1244°C (2271.2°F)

Critical Temperature: Not available.

Specific Gravity: 7.44 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Superficially oxidized on exposure to air. Reacts with aqueous solutions of sodium or potassium bicarbonate. Reacts with dilute mineral acids with evolution of hydrogen and formation of divalent manganous salts. Reacts with fluorine and chlorine to produce di or tri fluoride, and di and tri chloride, respectively. In the form of powder, it reduces most metallic oxides on heating. On heating, it reacts directly with carbon, phosphorus, antimony, or arsenic. Also incompatible with hydroxides, cyanides, carbonates.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 9000 mg/kg [Rat].

Chronic Effects on Humans: May cause damage to the following organs: blood, lungs, brain, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

Manganese can cross the placenta. May cause cancer (tumorigenic) based on animal data.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation Eyes: Dust may cause mechanical irritation. Inhalation: Dust may cause respiratory tract irritation. May cause "Metal Fume Fever" which may include flu-like symptoms (fever, chills, upset stomach, vomiting, weakness, headache, body aches, muscle pains, dry mouth and throat, coughing, tightness of the chest). May affect behavior/Central Nervous system (change in motor activity, torpor, nervousness, tremor, yawning, mood swings, irritability, restlessness, fatigue, headache, apathy, languor, insomnia than somnolence, hallucinations, delusions, uncontrollable laughter followed by crying, compulsions, aggressivness, weakness in legs, memory loss, decreased libido, impotence, salivation, hearing loss, slow gait,), and respiration (dyspnea, shallow respiration, cyanosis, alveolar inflammation). Ingestion: Repeated or prolonged exposure from ingestion may affect brain (degenerative changes), blood and metabolism. Ingestion: May cause digestive tract irritation. There is a low gastrointesitnal absorption of manganese. Chronic Potential Health Effects: Inhalation: Repeated or prolonged exposure from inhalation may affect brain (degeneratiave changes), behavior/Central Nervous system with symptoms to acute exposure. May also affect liver (chronic liver disease, jaundice) Ingestion: Repeated or prolonged exposure from ingestion may affect brain, blood and metabolism

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Illinois toxic substances disclosure to employee act: Manganese Rhode Island RTK hazardous substances: Manganese Pennsylvania RTK: Manganese Minnesota: Manganese Massachusetts RTK: Manganese New Jersey: Manganese New Jersey spill list: Manganese Louisiana spill reporting: Manganese California Director's List of Hazardous Substances: Manganese TSCA 8(b) inventory: Manganese SARA 313 toxic chemical notification and release reporting: Manganese

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC): Not applicable.

HMIS (U.S.A.):

Health Hazard: 1
Fire Hazard: 0
Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0
Reactivity: 0
Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	0
Reactivity	0
Personal Protection	Е

Material Safety Data Sheet Nickel metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Nickel metal

Catalog Codes: SLN2296, SLN1342, SLN1954

CAS#: 7440-02-0

RTECS: QR5950000

TSCA: TSCA 8(b) inventory: Nickel metal

CI#: Not applicable.

Synonym: Nickel Metal shot; Nickel metal foil.

Chemical Name: Nickel

Chemical Formula: Ni

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: 1-281-441-4400
Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

	Name	CAS#	% by Weight
	Nickel metal	7440-02-0	100

Toxicological Data on Ingredients: Nickel metal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (sensitizer), of ingestion, of inhalation (lung sensitizer). CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to skin. The substance may be toxic to kidneys, lungs, liver, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Material in powder form, capable of creating a dust explosion. This material is flammable in powder form only.

Special Remarks on Explosion Hazards:

Material in powder form, capable of creating a dust explosion. Mixtures containing Potassium Perchlorate with Nickel & Titanium powders & infusorial earth can explode. Adding 2 or 3 drops of approximately 90% peroxyformic acid to powdered nickel will result in explosion. Powdered nickel reacts explosively upon contact with fused ammonium nitrate at temperatures below 200 deg. C.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Keep away from incompatibles such as oxidizing agents, combustible materials, metals, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 1 (mg/m3) from ACGIH (TLV) [United States] Inhalation Respirable. TWA: 0.5 (mg/m3) [United Kingdom (UK)] TWA: 1 (mg/m3) from OSHA (PEL) [United States] InhalationConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid. Lustrous solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 58.71 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable. Boiling Point: 2730°C (4946°F) Melting Point: 1455°C (2651°F)

Critical Temperature: Not available.

Specific Gravity: Density: 8.908 (Water = 1)

Vapor Pressure: Not applicable. Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available. Ionicity (in Water): Not available. **Dispersion Properties:** Not available.

Solubility:

Insoluble in cold water, hot water. Insoluble in Ammonia. Soluble in dilute Nitric Acid. Slightly soluble in Hydrochloric Acid, Sulfuric Acid.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, combustible materials, metals, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with strong acids, selenium, sulfur, wood and other combustibles, nickel nitrate, aluminum, aluminum trichloride, ethylene, p-dioxan, hydrogen, methanol, non-metals, oxidants, sulfur compounds, aniline, hydrogen sulfide, flammable solvents, hydrazine, and metal powders (especially zinc, aluminum, and magnesium), ammonium nitrate, nitryl fluoride, bromine pentafluoride, potassium perchlorate + titanium powder + indusorial earth.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. Causes damage to the following organs: skin. May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of ingestion.

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose/Conc: LDL [Rat] - Route: Oral; Dose: 5000 mg/kg LDL [Guinea Pig] - Route: Oral; Dose: 5000 mg/kg

Special Remarks on Chronic Effects on Humans: May cause cancer based on animal test data

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Nickel dust and fume can irritate skin. Eyes: Nickel dust and fume can irritate eyes. Inhalation: Inhalation of dust or fume may cause respiratory tract irritation with non-productive cough, hoarseness, sore throat, headache, vertigo, weakness, chest pain, followed by delayed effects, including tachypnea, dyspnea, and ARDS. Death due to ARDS has been reported following inhalation of high concentrations of respirable metallic nickel dust. Later effects may include pulmonary edema and fibrosis. Ingestion: Metallic nickel is generally considered not to be acutely toxic if ingested. Ingestion may cause nausea, vomiting, abdominal, and diarrhea. Nickel may damage the kidneys(proteinuria), and may affect liver function. It may also affect behavior (somnolence), and cardiovascular system (increased cornary artery resistance, decreased myocardial contractility, myocardial damage, regional or general arteriolar or venus dilation). Chronic Potential Health Effects: Skin: May cause skin allergy. Nickel and nickel compounds are among the most common sensitizers inducing allergic contact dermatitis. Inhalation: Chronic inhalation nickel dust or fume can cause chronic hypertrophic rhinitis, sinusitis, nasal polyps, perforation of the nasal septum, chronic pulmonary irritation, fibrosis, pulmonary edema, pulmonary eosinophilia, Pneumoconiosis, allergies (asthma-like allergy), and cancer of the nasal sinus cavities, lungs, and possibly other organs. Future exposures can cause asthma attacks with shortness of breath, wheezing, cough, and/or chest tightness. Chronic inhalation of nickel dust or fume may also affect the liver (impaired liver function tests), and blood (changes in red blood cell count). Ingestion: Prolonged or repeated ingestion of nickel can be a source chronic urticaria and other signs of allergy.

Chronic ingestion of NIckel may also affect respiration and cause pneumoconiosis or fibrosis. Note: In the general population, sensitization occurs from exposure to nickel-containing coins, jewelry, watches,

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Nickel metal California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Nickel metal Connecticut hazardous material survey.: Nickel metal Illinois toxic substances disclosure to employee act: Nickel metal Illinois chemical safety act: Nickel metal New York release reporting list: Nickel metal Rhode Island RTK hazardous substances: Nickel metal Pennsylvania RTK: Nickel metal Michigan critical material: Nickel metal Massachusetts RTK: Nickel metal Massachusetts spill list: Nickel metal New Jersey: Nickel metal New Jersey spill list: Nickel metal Louisiana spill reporting: Nickel metal California Director's List of Hazardous Substances: Nickel metal TSCA 8(b) inventory: Nickel metal

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R40- Possible risks of irreversible effects. R43- May cause sensitization by skin contact. S22- Do not breathe dust. S36- Wear suitable protective clothing.

HMIS (U.S.A.):

Health Hazard: 2 Fire Hazard: 0 Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0
Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Material Safety Data Sheet Silver MSDS

Section 1: Chemical Product and Company Identification

Product Name: Silver

Catalog Codes: SLS4222, SLS2005, SLS3427, SLS1210,

SLS2632, SLS4054, SLS1837

CAS#: 7440-22-4

RTECS: VW3500000

TSCA: TSCA 8(b) inventory: Silver

CI#: Not applicable.

Synonym:

Chemical Formula: Ag

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400
Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

	Name	CAS#	% by Weight
	Silver	7440-22-4	100

Toxicological Data on Ingredients: Silver: ORAL (LD50): Acute: 100 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of ingestion, of inhalation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact: No known effect on skin contact, rinse with water for a few minutes.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Splash goggles. Lab coat.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 (mg/m3) from OSHA (PEL) TWA: 0.01 (mg/m3) from OSHA NIOSH Australia: TWA: 0.1 (mg/m3)Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 107.87 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.
Boiling Point: 2212°C (4013.6°F)
Melting Point: 961°C (1761.8°F)
Critical Temperature: Not available.
Specific Gravity: 10.4 (Water = 1)
Vapor Pressure: Not applicable.

Volatility: Not available.

Odor Threshold: Not available.

Vapor Density: Not available.

Water/Oil Dist. Coeff.: Not available.

lonicity (in Water): Not available.

Dispersion Properties: Is not dispersed in cold water, hot water.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available. **Conditions of Instability:** Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 100 mg/kg [Mouse].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Very hazardous in case of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Rhode Island RTK hazardous substances: Silver Pennsylvania RTK: Silver Minnesota: Silver Massachusetts RTK: Silver New Jersey: Silver TSCA 8(b) inventory: Silver TSCA 8(a) PAIR: Silver TSCA 8(d) H and S data reporting: Silver SARA 313 toxic chemical notification and release reporting: Silver: 1% CERCLA: Hazardous substances.: Silver: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC): R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1
Reactivity: 0

Specific hazard:

Protective Equipment:

Not applicable. Lab coat. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

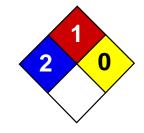
Other Special Considerations: Not available.

Created: 10/10/2005 08:26 PM

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Material Safety Data Sheet 1,1,2,2-Tetrachloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,1,2,2-Tetrachloroethane

Catalog Codes: SLT1927

CAS#: 79-34-5

RTECS: KI8575000

TSCA: TSCA 8(b) inventory: 1,1,2,2-Tetrachloroethane

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: C2H2Cl4

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
{1,1,2,2-}Tetrachloroethane	79-34-5	100

Toxicological Data on Ingredients: 1,1,2,2-Tetrachloroethane: ORAL (LD50): Acute: 250 mg/kg [Rat]. DERMAL (LD50):

Acute: 6400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 2250 ppm 4 hour(s) [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (irritant, permeator). Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2 (Reasonably anticipated.) by NTP. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, the nervous system, liver. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder, LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Carcinogenic, teratogenic or mutagenic materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 1 (ppm) from ACGIH (TLV) SKIN TWA: 6.9 (mg/m3) from ACGIH SKIN Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 167.86 g/mole

Color: Not available.

pH (1% soln/water): Not available. Boiling Point: 146.5°C (295.7°F) Melting Point: -44°C (-47.2°F)

Critical Temperature: Not available.

Specific Gravity: 1.5866 (Water = 1)

Vapor Pressure: 8 mm of Hg (@ 20°C)

Vapor Density: 5.77 (Air = 1)

Volatility: Not available.

Odor Threshold: 3 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available. **Conditions of Instability:** Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 250 mg/kg [Rat]. Acute dermal toxicity (LD50): 6400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 2250 ppm 4 hour(s) [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2 (Reasonably anticipated.) by NTP. The substance is toxic to blood, kidneys, the nervous system, liver.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion, of inhalation. Hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material. **Identification:** : Tetrachloroethane : UN1702 PG: II **Special Provisions for Transport:** Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: 1,1,2,2-Tetrachloroethane California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: 1,1,2,2-Tetrachloroethane Pennsylvania RTK: 1,1,2,2-Tetrachloroethane Massachusetts RTK: 1,1,2,2-Tetrachloroethane TSCA 8(b) inventory: 1,1,2,2-Tetrachloroethane SARA 313 toxic chemical notification and release reporting: 1,1,2,2-Tetrachloroethane CERCLA: Hazardous substances:: 1,1,2,2-Tetrachloroethane

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).

DSCL (EEC):

R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1
Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1
Reactivity: 0
Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-

Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolvel; Tetrachloroethene; Tetraleno;

Tetralex; Tetravec; Tetroguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C2-Cl4

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:

Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 25 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States] TWA: 170 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available. Boiling Point: 121.3°C (250.3°F) Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1) Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1) **Volatility:** Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.Dispersion Properties: Not available.

Solubility:

Miscible with alcohol, ether, chloroform, benzene, hexane. It dissolves in most of the fixed and volatile oils. Solubility in water: 0.015 g/100 ml @ 25 deg. C It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Oxidized by strong oxidizing agents. Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium, barium. Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2629 mg/kg [Rat]. Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:

Lowest Publishe Lethal Dose/Conc: LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg LDL [Dog] - Route: Oral; Dose: 4000 mg/kg LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects and birth defects(teratogenic). May affect genetic material (mutagenic). May cause cancer.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation with possible dermal blistering or burns. Symtoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts. Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain. Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorentiation, seizures, enotional instability, stupor, coma). It may cause pulmonary edema Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation. Ingestion/Inhalation: Chronic exposure can affect the liver(hepatitis,fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/central nervous system/peripheral nervous system (impaired memory, numbness of extremeties, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fatthead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material. **Identification:** : Tetrachloroethylene UNNA: 1897 PG: III **Special Provisions for Transport:** Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene Connecticut hazardous material survey.: Tetrachloroethylene Illinois toxic substances disclosure to employee act: Tetrachloroethylene Illinois chemical safety act: Tetrachloroethylene New York release reporting list: Tetrachloroethylene Rhode Island RTK hazardous substances: Tetrachloroethylene Pennsylvania RTK: Tetrachloroethylene Minnesota: Tetrachloroethylene Michigan critical material: Tetrachloroethylene Massachusetts RTK: Tetrachloroethylene Massachusetts spill list: Tetrachloroethylene New Jersey: Tetrachloroethylene New Jersey spill list: Tetrachloroethylene Louisiana spill reporting: Tetrachloroethylene California Director's List of Hazardous Substances: Tetrachloroethylene TSCA 8(b) inventory: Tetrachloroethylene TSCA 8(d) H and S data reporting: Tetrachloroethylene: Effective date: 6/1/87; Sunset date: 6/1/97 SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene CERCLA: Hazardous substances:: Tetrachloroethylene: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R40- Possible risks of irreversible effects. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S23- Do not breathe gas/fumes/vapour/spray S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37- Wear suitable gloves. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: g

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0
Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Material Safety Data Sheet

Creation Date 11-Jan-2010

Revision Date 11-Jan-2010

Revision Number 1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name 1,1,1-Trichloroethane, stabilized

Cat No. AC294930000; AC294930250; AC294932500

Synonyms Methylchloroform

Recommended Use Laboratory chemicals

CompanyEntity / Business NameFisher ScientificAcros Organics

One Reagent Lane

Fair Lawn, NJ 07410

One Reagent Lane

Fair Lawn, NJ 07410

Emergency Telephone Number

For information in the US, call: 800-ACROS-01 For information in Europe, call: +32 14 57 52 11

Emergency Number, Europe: +32 14 57 52 99 Emergency Number, US: 201-796-7100

CHEMTREC Phone Number, US: 800-424-

CHEMTREC Phone Number, Europe: 703-

527-3887

2. HAZARDS IDENTIFICATION

WARNING!

Tel: (201) 796-7100

Emergency Overview

Possible cancer hazard. May cause cancer based on animal data. Harmful if swallowed. Irritating to eyes and skin. Inhalation may cause central nervous system effects. May cause irritation of respiratory tract. Aspiration hazard if swallowed - can enter lungs and cause damage.

Appearance Colorless Physical State Liquid odor sweet

Target Organs Liver, Kidney, Central nervous system (CNS), Cardiovascular system, Lungs, Eyes, Skin

Potential Health Effects

Acute Effects

Principle Routes of Exposure

Irritating to eyes. **Eves**

Skin Irritating to skin. May be harmful in contact with skin.

Inhalation May cause irritation of respiratory tract. May be harmful if inhaled. Inhalation may cause central

nervous system effects.

Harmful if swallowed. Aspiration hazard. Ingestion may cause gastrointestinal irritation, Ingestion

nausea, vomiting and diarrhea.

Possible cancer hazard based on tests with laboratory animals. Tumorigenic effects have been **Chronic Effects**

reported in experimental animals.. Experiments have shown reproductive toxicity effects on laboratory animals. May cause adverse liver effects. May cause adverse kidney effects.

See Section 11 for additional Toxicological information.

Central nervous system disorders. Preexisting eye disorders. Kidney disorders. Liver disorders. **Aggravated Medical Conditions**

Skin disorders.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Haz/Non-haz

Component	CAS-No	Weight %
1,1,1-Trichloroethane	71-55-6	>90
1,4-Dioxane	123-91-1	5-6

4. FIRST AID MEASURES

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain **Eye Contact**

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.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash Point No information available. Method

No information available.

458°C / 856.4°F **Autoignition Temperature**

Explosion Limits

Upper 15.5 vol % Lower 8.0 vol %

Use water spray, alcohol-resistant foam, dry chemical or carbon Suitable Extinguishing Media

dioxide.

Unsuitable Extinguishing Media No information available.

Hazardous Combustion Products No information available.

Sensitivity to mechanical impact
Sensitivity to static discharge
No information available.
No information available.

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition

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 2 Flammability 1 Instability 0 Physical hazards N/A

6. ACCIDENTAL RELEASE MEASURES

Personal PrecautionsUse personal protective equipment. Ensure adequate ventilation.

Environmental Precautions Should not be released into the environment.

Methods for Containment and Clean Soak up with inert absorbent material. Keep in suitable and closed containers for disposal.

Uр

7. HANDLING AND STORAGE

Handling Use only under a chemical fume hood. Wear personal protective equipment. Do not breathe

vapors or spray mist. Do not ingest. Avoid contact with skin, eyes and clothing.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Measures

Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
1,1,1-Trichloroethane	TWA: 350 ppm	(Vacated) TWA: 350 ppm	IDLH: 700 ppm
	STEL: 450 ppm	(Vacated) TWA: 1900 mg/m ³	Ceiling: 350 ppm
		(Vacated) STEL: 450 ppm	Ceiling: 1900 mg/m ³
		(Vacated) STEL: 2450 mg/m ³	c c
		TWA: 1900 mg/m ³	
		TWA: 350 ppm	
1,4-Dioxane	TWA: 20 ppm	(Vacated) TWA: 25 ppm	IDLH: 500 ppm
	Skin	(Vacated) TWA: 90 mg/m ³	Ceiling: 3.6 mg/m ³
		Skin	Ceiling: 1 ppm
		TWA: 100 ppm	
		TWA: 360 mg/m ³	

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
1,1,1-Trichloroethane	TWA: 1910 mg/m ³	TWA: 1900 mg/m ³	TWA: 1910 mg/m ³
	TWA: 350 ppm	TWA: 350 ppm	TWA: 350 ppm
	STEL: 2460 mg/m ³	STEL: 2460 mg/m ³	STEL: 2455 mg/m ³
	STEL: 450 ppm	STEL: 450 ppm	STEL: 450 ppm
1,4-Dioxane	TWA: 20 ppm	TWA: 25 ppm	TWA: 20 ppm
	TWA: 72 mg/m ³	TWA: 90 mg/m ³	Skin
	Skin	STEL: 100 ppm	
		STEL: 360 mg/m ³	

NIOSH IDLH: Immediately Dangerous to Life or Health

Personal Protective Equipment

Eye/face Protection

Skin and body protection Respiratory 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 Wear appropriate protective gloves and clothing to prevent skin exposure.

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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State Liquid
Appearance Colorless
odor sweet

Odor Threshold No information available.

 pH
 Not applicable

 Vapor Pressure
 100 mmHg @ 20°C

 Vapor Density
 4.55 (Air = 1.0)

 Viscosity
 0.86 mPas @ 20 °C

Boiling Point/Range 74 - 76°C / 165.2 - 168.8°F **Melting Point/Range** -33°C / -27.4°F

Melting Point/Range -33°C / -27.4°

Decomposition temperature 95 °C

Flash Point
Evaporation Rate
Specific Gravity

No information available.
(Carbon Tetrachloride = 1.0)
1.33

9. PHYSICAL AND CHEMICAL PROPERTIES

Solubility Insoluble in water log Pow No data available Molecular Weight 133.4 Molecular Formula C2 H3 Cl3

10. STABILITY AND REACTIVITY

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO₂), Hydrogen chloride

gas

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
1,1,1-Trichloroethane	2000 mg/kg (Rat)	15800 mg/kg (Rabbit)	18000 ppm (Rat) 4 h
		2000 mg/kg (Rat)	
1,4-Dioxane	4200 mg/kg (Rat)	7600 mg/kg (Rabbit)	48.5 mg/L (Rat) 4 h

Irritation Irritating to eyes and skin

Toxicologically Synergistic

Products

No information available.

Chronic Toxicity

Carcinogenicity

The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	ACGIH	IARC	NTP	OSHA	Mexico
1,1,1-Trichloroethane	Not listed	Group 3	Not listed	Not listed	Not listed
1,4-Dioxane	A3	Group 2B	Reasonably Anticipated	X	Not listed

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)

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

Sensitization No information available.

Mutagenic Effects No information available.

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..

Other Adverse Effects Tumorigenic effects have been reported in experimental animals.. See actual entry in RTECS

for complete information.

Endocrine Disruptor Information No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
1,1,1-Trichloroethane	EC50 >669 mg/L/96h	Not listed	EC50 = 105 mg/L 5 min	EC50 >530 mg/L 48h
				EC50: 2384 mg/L 48h
1,4-Dioxane	Not listed	Not listed	EC50 = 610 mg/L 5 min	EC50 = 163 mg/L 48h
			EC50 = 668 mg/L 15 min	_
			EC50 = 733 mg/L 30 min	

Persistence and Degradability

No information available

Bioaccumulation/ Accumulation

No information available

Mobility .

Component	log Pow
1,1,1-Trichloroethane	2.46
1,4-Dioxane	-0.42

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
1,1,1-Trichloroethane - 71-55-6	U226	-
1,4-Dioxane - 123-91-1	U108	-

14. TRANSPORT INFORMATION

DOT

UN-No UN2831

Proper Shipping Name 1,1,1-Trichloroethane

Hazard Class 6.1 Packing Group

TDG

UN-No UN2831

Proper Shipping Name 1,1,1-TRICHLOROETHANE

Hazard Class 6.1 Packing Group III

IATA

UN-No UN2831

Proper Shipping Name 1,1,1-Trichloroethane (Mixture)

Hazard Class 6.1 Packing Group

IMDG/IMO

UN-No UN2831

Proper Shipping Name 1,1,1-Trichloroethane (Mixture)

Hazard Class 6.1
Packing Group

15. REGULATORY INFORMATION

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	CHINA	KECL
1,1,1-Trichloroethane	Х	Х	-	200-756-	-		Х	Χ	Х	Х	KE-
				3							34068
											Х
1,4-Dioxane	Х	Χ	-	204-661-	-		Χ	Χ	Χ	Χ	KE-
				8							10463
											Χ

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 %
1,1,1-Trichloroethane	71-55-6	>90	1.0
1.4-Dioxane	123-91-1	5-6	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
1,1,1-Trichloroethane	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
1,1,1-Trichloroethane	X	X	-
1,4-Dioxane	Х		-

OSHA

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
1,1,1-Trichloroethane	1000 lb	-
1,4-Dioxane	100 lb	-

California Proposition 65

This product contains the following Proposition 65 chemicals:

This product contains the following	g i reposition de chemicale.		
Component	CAS-No	California Prop. 65	Prop 65 NSRL
1.4-Dioxane	123-91-1	Carcinogen	30 ug/dav

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
1,1,1-Trichloroethane	Х	X	X	Χ	X
1,4-Dioxane	Χ	X	Х	Χ	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 D2B Toxic materials



16. OTHER INFORMATION

Prepared By Regulatory Affairs

Thermo Fisher Scientific Tel: (412) 490-8929

Creation Date 11-Jan-2010
Print Date 11-Jan-2010

Revision Summary "***", and red text indicates revision

Thermo Fisher Scientific - 1,1,1-Trichloroethane, stabilized

Revision Date 11-Jan-2010

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 MSDS

SAFETY DATA SHEET

Version 5.2 Revision Date 11/18/2014 Print Date 01/07/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Trichloroethylene

Product Number : 133124
Brand : 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.

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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. IF exposed or concerned: Get medical advice/ attention.

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 : C₂HCl₃

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 Subto Regulation (EC) No. 1907/2006 (REACH)	ostances of Very High Concern (S	SVHC) according
	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.

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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

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Component	CAS-No.	Value	Control parameters	Basis
Trichloroethylene	79-01-6	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nerv	ous System impai	rment
		cognitive de	crement	
		Renal toxicit	у	
				a Biological Exposure Index or Indices
		(see BEI® s		
			uman carcinogen	_
		STEL	25 ppm	USA. ACGIH Threshold Limit Values
				(TLV)
			ous System impai	rment
		cognitive de		
		Renal toxicit		
				a Biological Exposure Index or Indices
		(see BEI® s		
		Suspected human carcinogen		
		Potential Occupational Carcinogen		ogen
		See Appendix C		
		See Append		
		See Table Z		_
		TWA	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967	7	
		CEIL	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967	7	
		Peak	300 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		1 \ /
		TWA	50 ppm	USA. OSHA - TABLE Z-1 Limits for
			270 mg/m3	Air Contaminants - 1910.1000
		Skin notation		
		STEL	200 ppm	USA. OSHA - TABLE Z-1 Limits for
			1,080 mg/m3	Air Contaminants - 1910.1000
		Skin notation	า <u></u> _า	

Biological occupational exposure limits

Biological occupational exposure limits					
Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Trichloroethylene	79-01-6	Trichloroaceti c acid	15.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	narks End of shift at end of workweek		veek	
		Trichloroetha	0.5000	In blood	ACGIH - Biological
		nol	mg/l		Exposure Indices (BEI)
		End of shift at	end of worky	veek	
		Trichloroethyl ene		In blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift at	end of worky	veek	
		Trichloroethyl ene		In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

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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 multipurpose 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) Odourc) Odour Thresholdd) pHNo data availableNo 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

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h) Evaporation rate No data availablei) Flammability (solid, gas) No data available

j) Upper/lower Upper explosion limit: 10.5 %(V) flammability or Lower explosion limit: 8 %(V)

explosive limits

k) Vapour pressure 81.3 hPa (61.0 mmHg) at 20.0 °C (68.0 °F)

I) 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

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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: Not available

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

EC50 - Daphnia magna (Water flea) - 18.00 mg/l - 48 h

other aquatic invertebrates

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

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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 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

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. 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: 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

Massachusetts Right To Know Components

Trichloroethylene CAS-No. Revision Date 79-01-6 2007-07-01

Pennsylvania Right To Know Components

Trichloroethylene CAS-No. Revision Date 2007-07-01

New Jersey Right To Know Components

Trichloroethylene CAS-No. Revision Date 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 2011-09-01

Trichloroethylene

Aldrich - 133124 Page 8 of 9

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

Trichloroethylene

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 dizz

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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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 5.2 Revision Date: 11/18/2014 Print Date: 01/07/2015

Aldrich - 133124 Page 9 of 9







Material Safety Data Sheet Zinc Metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Zinc Metal

Catalog Codes: SLZ1054, SLZ1159, SLZ1267, SLZ1099,

SLZ1204

CAS#: 7440-66-6

RTECS: ZG8600000

TSCA: TSCA 8(b) inventory: Zinc Metal

CI#: Not applicable.

Synonym: Zinc Metal Sheets; Zinc Metal Shot; Zinc Metal

Strips

Chemical Name: Zinc Metal

Chemical Formula: Zn

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400
Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
Zinc Metal	7440-66-6	100

Toxicological Data on Ingredients: Zinc Metal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eve Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of open flames and sparks, of heat, of oxidizing materials, of acids, of alkalis, of moisture. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:

Zinc + NaOH causes ignition. Oxidation of zinc by potassium proceeds with incandescence. Residues from zinc dust /acetic acid reduction operations may ignite after long delay if discarded into waste bins with paper. Incandescent reaction when Zinc and Arsenic or Tellurium, or Selenium are combined. When hydrazine mononitrate is heated in contact with zinc, a flamming decomposition occurs at temperatures a little above its melting point. Contact with acids and alkali hydroxides (sodium hydroxide, postasium hydroxide, calcium hydroxide, etc.) results in evolution of hydrogen with sufficient heat of reaction to ignite the hydrogen gas. Zinc foil ignites if traces of moisture are present. It is water reactive and produces flammable gases on contact with water. It may ignite on contact with water or moist air.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Flammable solid that, in contact with water, emits flammable gases. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Cover with dry earth, sand or other non-combustible material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents, acids, alkalis, moisture.

Storage:

Keep container tightly closed. Keep container in a cool, well-ventilated area. Keep from any possible contact with water. Do not allow water to get into container because of violent reaction.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 65.39 g/mole

Color: Bluish-grey

pH (1% soln/water): Not applicable.

Boiling Point: 907°C (1664.6°F)

Melting Point: 419°C (786.2°F)

Critical Temperature: Not available.

Specific Gravity: Not available.

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials, moisture

Incompatibility with various substances:

Reactive with oxidizing agents, acids, alkalis. Slightly reactive to reactive with moisture. The product may react violently with water to emit flammable but non toxic gases.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with acids, halogenated hydrocarbons, NH4NO3, barium oxide, Ba(NO3)2, Cadmium, CS2, chlorates, Cl2, CrO3, F2, Hydroxylamine, Pb(N3)2, MnCl2, HNO3, performic acid, KClO3, KNO3, N2O2, Selenium, NaClO3, Na2O2, Sulfur, Te, water, (NH4)2S, As2O3, CS2, CaCl2, chlorinated rubber, catalytic metals, halocarbons, o-nitroanisole, nitrobenzene, nonmetals, oxidants, paint primer base, pentacarbonoyliron, transition metal halides, seleninyl bromide, HCl, H2SO4, (Mg +Ba(NO3)2 +BaO2), (ethyl acetoacetate +tribromoneopentyl alcohol. Contact with Alkali Hydroxides(Sodium Hydroxide, Potassium Hydroxide, Calcium Hydroxide, etc) results in evolution of hydrogen. Ammonium nitrate + zinc + water causes a violent reaction with evolution of steam and zinc oxide. May react with water.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation. Dermal exposure to zinc may produce leg pains, fatigue, anorexia and weight loss. Eyes: May cause eye irritation. Ingestion: May be harmul if swallowed. May cause digestive tract irritation with tightness in throat, nausea, vomiting, diarrhea, loss of appetite, malaise, abdominal pain. fever, and chills. May affect behavior/central nervous system and autonomic nervous system with ataxia, lethargy, staggering gait, mild derrangement in cerebellar function, lightheadness, dizzness, irritability, muscular stiffness, and pain. May also affect blood. Inhalation: Inhalation of zinc dust or fumes may cause respiratory tract and mucous membrane irritation with cough and chest pain. It can also cause "metal fume fever", a flu-like condition characterized appearance of chills, headached fever, maliase, fatigue, sweating, extreme thirst, aches in the legs and chest, and difficulty in breathing. A sweet taste may also be be present in metal fume fever, as well as a dry throat, aches, nausea, and vomiting, and pale grey cyanosis. The toxicological properties of this substance have not been fully investisgated.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: Not available.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

New York release reporting list: Zinc Metal Rhode Island RTK hazardous substances: Zinc Metal Pennsylvania RTK: Zinc Metal Florida: Zinc Metal Michigan critical material: Zinc Metal Massachusetts RTK: Zinc Metal New Jersey: Zinc Metal California Director's List of Hazardous Substances: Zinc Metal TSCA 8(b) inventory: Zinc Metal TSCA 12(b) one time export: Zinc Metal SARA 313 toxic chemical notification and release reporting: Zinc Metal CERCLA: Hazardous substances.: Zinc Metal: 1000 lbs. (453.6 kg)

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not Available

DSCL (EEC):

R15- Contact with water liberates extremely flammable gases. R17- Spontaneously flammable in air. S7/8- Keep container tightly closed and dry.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 1

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 1

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 12:18 AM

Last Updated: 05/21/2013 12:00 PM

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APPENDIX B:

Training Certificates



for the specific hazards of their job or federal, state, and local requirements. This training is intended to provide supervisor awareness for recognizing and preventing hazards on a construction site. Workers must receive additional training as required This is your pocket card which may be used for proof of completion of your training.

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This certifies that the person named below successfully completed a

William Canavan

HAZWOPER 8 hr Annual Refresher

10/24/2014

F. Marie Athey, OHST

This Card May Not Be Reproduced

1-800-442-1149

(CUT HERE)

sarety@osnacampus.com

Duestions? Visit

www.oshacampus.com

Trainer Name

Completed

This is to certify that

Thomas Brant

has completed

HAZWOPER 8 hr Annual Refresher

Completion Date 09/26/2014

Course Duration 8.0

360training.com ◆ 13801 Burnet Rd., Suite 100 ◆ Austin, TX 78727 ◆ 800-442-1149 ◆ www.360trainingsupport.com

moo,**eudmso**AHSO (**[[**]

This certifies that the person named below successfully completed a

Thomas Brant

HAZWOPER 8 hr Annual Refresher

09/26/2014

Trainer Name F. Marie Athey, OHST

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for the specific hazards of their job or federal, state, and local requirements.

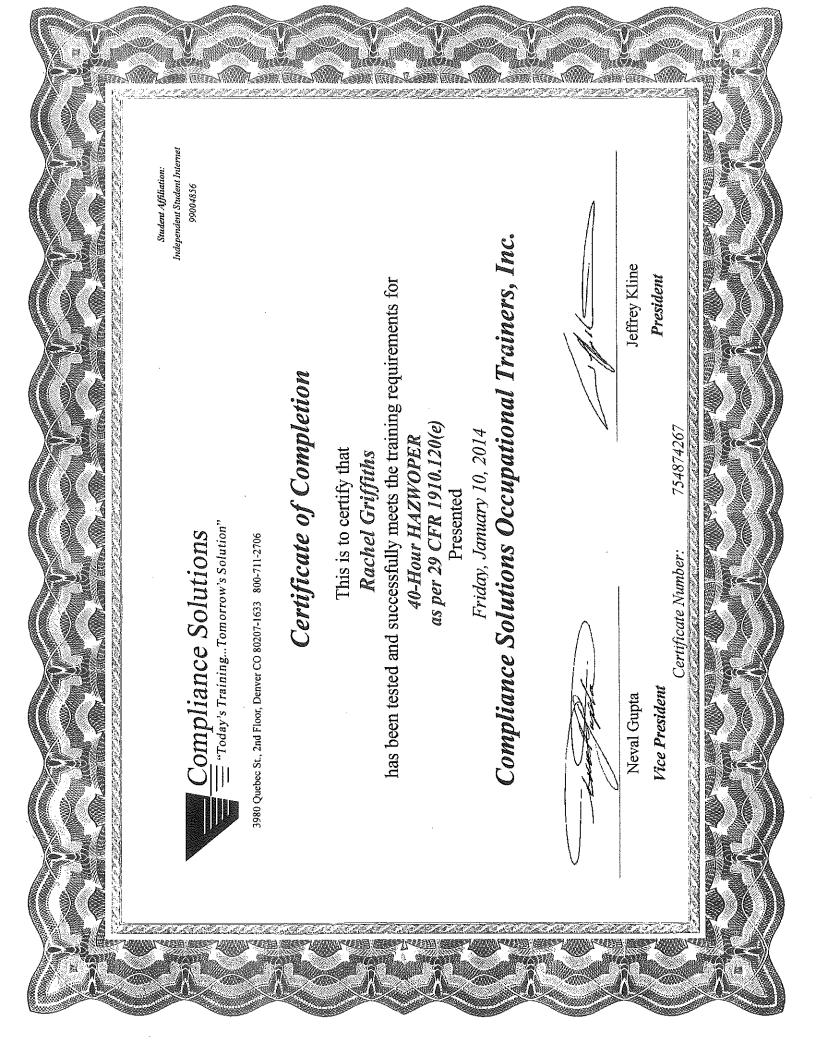
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Questions? Visit

- (FOLD)

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This Aertifies That

Alyssa Epstein

is atuarded this certificate for

HAZWOPER 8 HR Annual Refresher

Credit Hours: 8

Completion Date: 05/08/2014

CEU: 0.8

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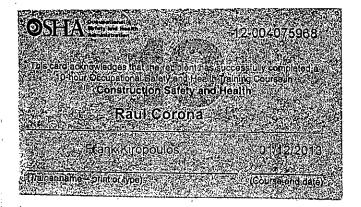
Marie Athey, OSHA Trainer

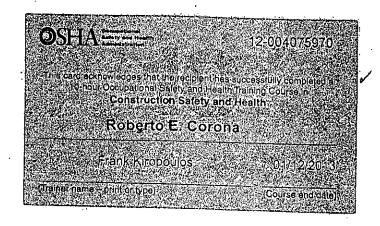
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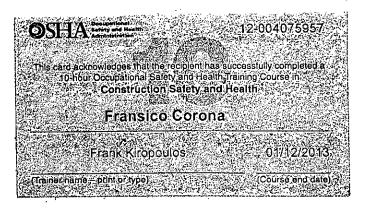
This course complies with OSHA 29 CFR 1910.120.

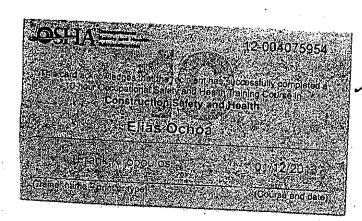
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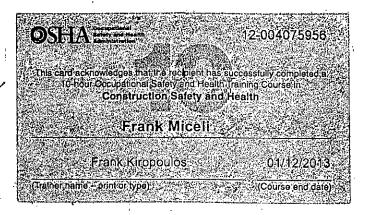












This is to certify that Brian K. Dreeland has completed 29 CFR 1910.120

40-Hr HAZWOPER Safety Training

Certified by: R. Kip Score Date: December 1, 2014

Saratoga Safety Wilton, NY

This is to certify that Anthony Petrie has completed 29 CFR 1910.120

40-Hr HAZWOPER Safety Training

Certified by: R. Kip Score

Saratoga Safety

Date: December 1, 2014

Wilton, NY

This is to certify that Nicole Supino has completed 29 CFR 1910.120

40-Hr HAZWOPER Safety Training

Certified by: R. Kip Score

Saratoga Safety

Date: December 1, 2014

Wilton, NY



This is to certify that **Brian K. Dreeland** has completed

29 CFR 1910.120 - 40-Hour HAZWOPER Safety Training



Instructor: **R. Kip Score** Date: December 1, 2014

Wilton, New York 12831 (518) 226-0300

THE NATIONAL ENVIRONMENTAL TRAINERS

Jonathan Ashley

has satisfactorily passed an exam and completed a 40-hour training course entitled Hazardous Waste Operations and Emergency Response

meeting the requirements identified in Title 29 CFR 1910.120 (OSHA HAZWOPER Regulations). This course has been awarded 6.68 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for 3.33 Continuance of Certification (COC) points from the Board of Certified Safety Professionals



Certificate Number: 984267

Signature of Instructor

Clay A. Bednarz, MS, RPIH



Metro-North Railroad

CONTRACT EMPLOYEE CARD

This certifies that Roberto F corona has attended the Roadway Worker Procedures for Contract Employees Working on Metro-North Property Program.

Date of Training 5/5/14 Sticker # 002716

Valid for one (1) year from date of training

This ID Card is to be used as follows:

Carried at all times while on Metro-North Property Non-Transferable to other contract employees Report lost/stolen card to Metro-North employee on site Police, Fire, Medical 1-888-682-9117 Railroad Operations 1-212-340-2050



Metro-North Railroad

CONTRACT EMPLOYEE CARD

This certifies that Assaula . has attended the Roadway Worker Procedures for Contract Employees Working on Metro-North Property Program.

Date of Training 3-5 #74 Sticker # 007715

alid for one (1) year from date of training

Metro-North Railroad

CONTRACT EMPLOYEE CARD

This certifies that has attended the Roadway Worker Procedures for Contract Employees Working on Metro-North Property Program.

Date of Training 5/5/11/ Sticker # (M)

Valid for one (1) year from date of training

This ID Card is to be used as follows

arried at all times while on Metro-North Property on-Transferable to other contract employees? Report lost/stolen/card to Metro North employee on site Police, Fire, Medical 1-888-682-9117 Railroad Operations 1-2-12-1340-2050

This ID Card is to be used as follows:

Carried at all times while on Metro-North Property Non-Transferable to other contract employees Report löst/stolen card to Metro-North employee on site Police, Fire, Medical 1-888-682-9117 Railroad Operations 1-212-340-2050

Signature, Contract Employee

This is to certify that **Anthony Petrie** has completed

29 CFR 1910.120 - 40-Hour HAZWOPER Safety Training



Instructor: **R. Kip Score** Date: December 1, 2014

Wilton, New York 12831 (518) 226-0300

This is to certify that **Nicole Supino** has completed

29 CFR 1910.120 - 40-Hour HAZWOPER Safety Training



Instructor: **R. Kip Score** Date: December 1, 2014

Wilton, New York 12831 (518) 226-0300

APPENDIX C:

Notice of Safe Atmosphere Air Monitoring Daily Report

NOTICE OF SAFE ATMOSPHERE

	Date:			
Т	ime of Repor	t:		
Р	repared By:_			
This notice is to be p		y requesting o onitoring servi	•	o track the on-site
During today's activit related to the followin		onitoring servi	ces noted an ur	nsafe atmosphere
After the notice of un return the noted airsp			ving actions we	re instituted to
The following monitor	ring data sho	ws the impacte	ed air is now sa	fe:
Monitored Constituent	EZ	CRZ	SZ	
Oxygen (ppm)		<u> </u>	"	1
% LEL				
VOCs (ppm)				
Dust				
William A. Canavan,	HES	_	 Date	
Alyssa N Epstein		_	 Date	_

AIR MONITORING DAILY REPORT

	Date:			
Т	ime of Report	·•		
	·			
	repared by			
This notice is to be p	•	y requesting ov onitoring servic	•	o track the on-site
During today's activit support zone (SZ), co (EZ).		_		•
During today's activit	ies, the follow	ing conditions	were noted:	
The data in the table that was performed: 0600 hrs:	below is the s	summary of the	finding of the	air monitoring
Monitored	E7	CD7	67	
Constituent	EZ	CRZ	SZ	1
Oxygen (ppm) % LEL				-
VOCs (ppm)				†
Dust				1
0700 hrs:				
Monitored				
Constituent	EZ	CRZ	SZ	
Oxygen (ppm)				
% LEL				
VOCs (ppm)				<u> </u> -
Dust				J
0800 hrs:				_
Monitored Constituent	F7	CR7	S7	

Oxygen (ppm) % LEL VOCs (ppm) Dust

0900 hrs:

Monitored Constituent	EZ	CRZ	SZ
Oxygen (ppm)			
% LEL			
VOCs (ppm)			
Dust			

1000 hrs:

Monitored Constituent	EZ	CRZ	SZ
Oxygen (ppm)			
% LEL			
VOCs (ppm)			
Dust			

1100 hrs:

Monitored Constituent	EZ	CRZ	SZ
Oxygen (ppm)			
% LEL			
VOCs (ppm)			
Dust			

1200 hrs:

Monitored Constituent	EZ	CRZ	SZ
Oxygen (ppm)			
% LEL			
VOCs (ppm)			
Dust			

1300 hrs:

Monitored Constituent	EZ	CRZ	SZ
Oxygen (ppm)			
% LEL			
VOCs (ppm)			
Dust			

1400 hrs:

Monitored Constituent	EZ	CRZ	SZ
Oxygen (ppm)			
% LEL			
VOCs (ppm)			
Dust			

1	5	n	n	h	rs	
•	Э	u	u	п	15	_

Monitored Constituent	EZ	CRZ	SZ
Oxygen (ppm)			
% LEL			
VOCs (ppm)			
Dust			

1600 hrs:

Monitored Constituent	EZ	CRZ	SZ
Oxygen (ppm)			
% LEL			
VOCs (ppm)			
Dust			

1700 hrs:

Monitored Constituent	EZ	CRZ	SZ
Oxygen (ppm)			
% LEL			
VOCs (ppm)			
Dust			

The following air monitoring equipment problems were noted today:		
William A. Canavan, HES	 Date	
Alyssa N. Epstein	 Date	

APPENDIX D:

NYSDOH and NYSDEC Approved Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN

PROPOSED MULTI-STORY RESIDENTIAL
APARTMENT COMPLEX
FORMER TEUTONIA HALL SITE
41-53 BUENA VISTA AVENUE
YONKERS, NEW YORK

PREPARED FOR:

TEUTONIA BUENA VISTA, LLC 225 NORTH ROUTE 202, SUITE 201 CONGERS, NEW YORK 10920

PREPARED BY:

HYDROENVIRONMENTAL SOLUTIONS, INC.
ENVIRONMENTAL CONSULTANTS
ONE DEANS BRIDGE ROAD
SOMERS, NEW YORK 10589
(914) 276-2560
wcanavan@hesny.com

August 11, 2014

Prepared by:

William A. Canavan, CPG, PG

President

Reviewed by:

Jonathan B.

Senior Project

HydroEnvironmental solutions, inc.

1.0 Introduction

This Community Air Monitoring Plan (CAMP) was prepared by HydroEnvironmental Solutions, Inc. (HES) as a subcontractor to Phelps Engineering, Inc., PC, for the proposed multi-story residential development located at 41-53 Buena Vista Avenue in Yonkers, New York (**Figure 1**). The site is bordered by Buena Vista Avenue to the East and the Metro North Railroad tracks and the Hudson River to the west. Residential properties border the subject site to the north and a daycare center to the south.

This CAMP will be implemented during all excavation activities (or other soil moving activities) scheduled at the site in connection with the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP #C360085) and construction of the proposed development. The CAMP outlines all air quality monitoring procedures to be followed to protect the surrounding downwind neighborhood (i.e.: off-site receptors) from potential airborne contaminants that may result from on-site excavation activities. The CAMP is consistent with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (Appendix 1).

Soil sampling conducted at the site in April and May 2014 indicates that some areas of the subject site contain elevated concentrations of volatile organic compounds (VOCs), semi-VOCs and concentrations of herbicides and pesticides which exceed the NYSDEC Regulatory Guidance Levels. The VOCs and semi-VOCs encountered were observed primarily in the historic fill located beneath the site. These compounds were detected at varying depths and locations across the site and are typical of historic fill in an urban environment. A site plan showing the pre-classification test boring and soil sampling locations along with observed elevated VOC and semi-VOC areas is included as **Figure 2**.

2.0 Soil Excavation Scope of Work

The project includes excavation in the areas of the site where basements are proposed to an average depth of 20 feet below grade (ftbg) and construction of the foundation for the proposed residential apartment complex. The project anticipates approximately 16,000 to 20,000 cubic yards of soil will be excavated for off-site disposal. The excavation is not anticipated to intersect the existing groundwater table as past test borings confirmed that the depth to groundwater beneath the site is greater than 25 ftbg and is located in the fractured bedrock beneath the site.



Once monitoring and sampling is completed prior to excavation, the excavated material will be placed directly into staged disposal trucks for appropriate off-site disposal.

3.0 Air Monitoring Procedures for Intrusive Activities

The following sections describe specific CAMP monitoring procedures for both particulates and on-site constituents of concern including VOCs.

3.1 Particulate Monitoring

The air on-site will be monitored in real-time during all excavation and earth moving activities in connection with the construction of the site. Air monitoring for dust will be performed continuously during project excavation activities using both visual observation and air monitoring equipment. Monitoring equipment capable of measuring particulate matter smaller than 10 micron (PM-10) and capable of integrating over periods of 15 minutes or less, at a minimum, will be setup; one upwind (background), one downwind, and one near the childcare center located on the southern boundary of the site, both at heights of approximately 5 feet above ground surface (i.e.: the breathing zone). The equipment will log the 15-minute average concentrations for subsequent downloading and reporting. A visible strobe light alarm will be placed on the downwind unit set at 90 micrograms per cubic meter (ug/m³) above the upwind background level. Upwind concentrations will also be monitored continuously during all on-site construction activities, as required.

The on-site CAMP coordinator will record wind direction and speed as outlined below. The wind direction readings will be used to locate the air monitoring equipment properly at the start of every work day. The particulate monitoring equipment will be calibrated at the start of each work day and as required thereafter.

The monitoring results will be compared to the following:

- If the downwind PM-10 particulate level is 100 ug/m³ greater than background for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques shall be employed. Work may continue with dust suppression techniques, provided that downwind PM-10 particulate levels do not exceed 150 ug/m³ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after dust suppression methods are employed, downwind PM-10 levels are greater than 150 ug/m³ above the upwind level, work shall be



reevaluated and changes initiated including work stoppage, if necessary, to reduce particulate levels to less than 150 ug/m³ above background conditions and to prevent visible dust migration.

Meteorological Data – Weather data consisting of wind speed, wind direction, temperature and barometric pressure will be recorded a minimum of three times per day. The results of weather monitoring will be used to position the recording devices in proper locations with respect to wind direction. A wireless weather station will be set up on-site to collect all required data.

<u>Potential Suppression Techniques:</u> If the integrated particulate level at the downwind location exceeds the upwind level by more than 100 ug/m³ at any time during intrusive activities, then dust suppression techniques will be employed as necessary.

Work may continue with dust suppression techniques, provided that the downwind PM-10 levels are not more than 150 ug/m³ greater than the upwind levels; all measures necessary to ensure PM-10 levels of less than 150 ug/m³ above background will be utilized. Additionally, if visible dust is observed leaving the site and is not detected by the instrumentation emplaced, then dust suppression techniques may be employed to control dust from migrating off-site.

If dust suppression techniques do not lower particulates to below 150 ug/m³ or visible dust persists, additional measures, including work suspension, if necessary, will be implemented to remedy the situation.

All air monitoring data, weather data and the locations of monitoring equipment will be recorded and filed and will be readily available for NYSDEC and NYSDOH review.

3.2 Volatile Organic Compound Monitoring

VOCs will be monitored at the upwind and downwind perimeter of the work area or site perimeter and along the property line common to the childcare center on a continual basis. The VOC monitoring component of the CAMP will be implemented during any ground intrusive activities on-site. VOC concentrations will be measured at the start of each work day at the three monitoring locations and periodically thereafter (at least three times per day) to establish background conditions. Additionally, a time weighted average will be recorded over the course of the workday. The monitoring work will be performed using a calibrated Mini Rae 3000 photoionization detector (PID) with an ionization potential of 10.6 eV. The equipment will be capable of calculating the



15-minute running average concentrations which will be compared to the levels specified below:

- If ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15minute average, work activities in the area of concern (AOC) will cease and monitoring will continue until appropriate measures are taken and the total organic vapor level decreases below 5 ppm. At that time, work may resume.
- If total organic vapor levels at the downwind perimeter of the work area or site perimeter persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities in the AOC must be halted, the source of the vapors identified, corrective actions taken to abate the emissions and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level at the downwind perimeter of the work area or site perimeter is below 5 ppm over background for the 15-minute average.
- If the total organic vapor level is more than 25 ppm above background at the downwind perimeter of the work area or site perimeter, activities must be halted in the AOC until corrective measures are identified and implemented to reduce emissions as described above.

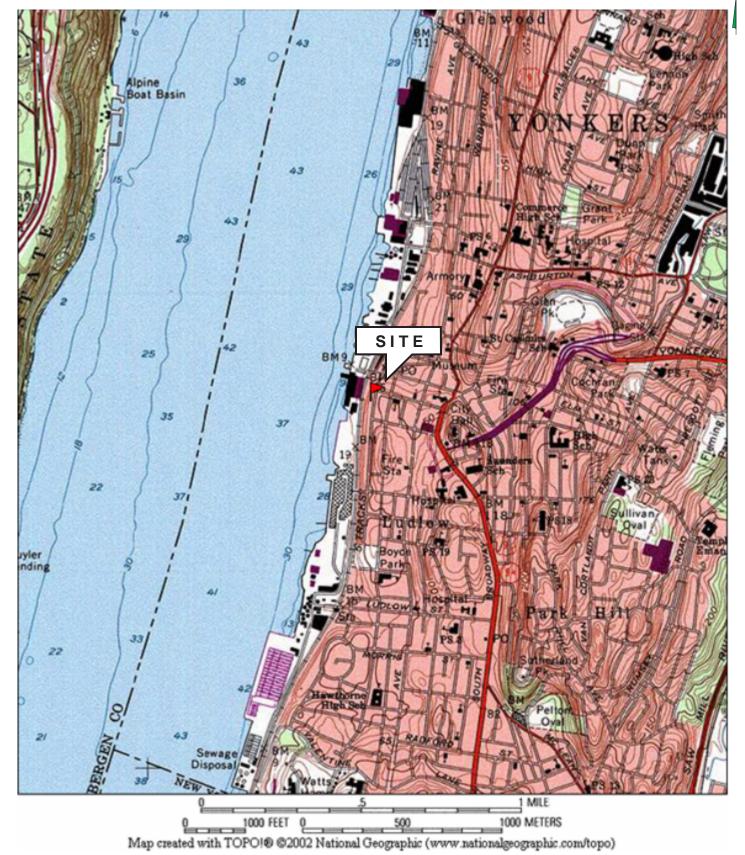
All air monitoring data and the locations of monitoring equipment will be recorded in on-site files and will be available for NYSDEC and NYSDOH review.

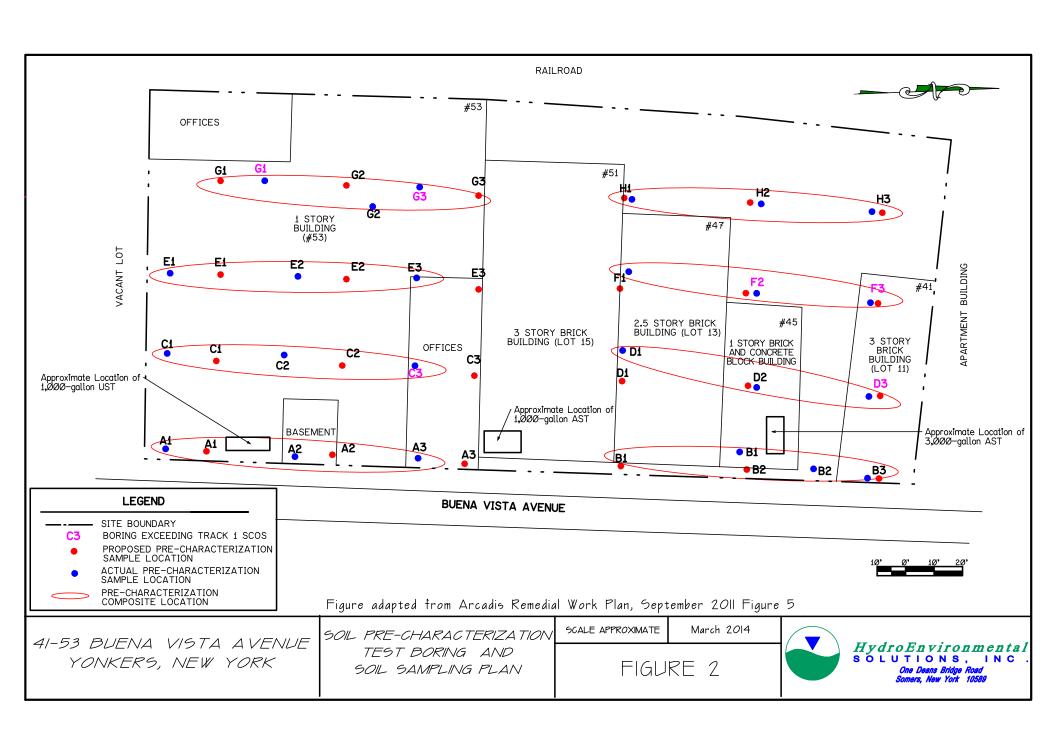


FIGURE 1 SITE LOCATION MAP

41-53 BUENA VISTA AVENUE YONKERS, NEW YORK







APPENDIX E:

Emergency Telephone Numbers Listing Routes to the Hospitals

EMERGENCY TELEPHONE NUMBERS

DIAL 911 FOR ANY POLICE, FIRE, OR MEDICAL EMERGENCY!!!

THE FOLLOWING TELEPHONE NUMBERS ARE TO BE USED AS A SECONDARY SOURCE

POLICE DEPARTMENTS:

Tuckahoe Police: (914) 377-7777

(104 South Broadway, Yonkers, NY)

State Police: (914) 769-2600

(200 Bradhurst Avenue, Hawthorne NY)

FIRE DEPARTMENTS & AMBULANCE CALLS:

Yonkers Fire Department: (914) 377-7500

(470 Nepperham Avenue, Yonkers, NY)

Empress Medical Service: (914) 965-5040

(722 Nepperhan Avenue, Yonkers, NY)

HOSPITAL (SEE DRIVING DIRECTIONS ATTACHED):

Saint Joseph's Medical Center (914) 378-7000 (Main Switchboard)

127 South Broadway Yonkers, NY 10701

FOR SPILLS OR HAZARDOUS MATERIALS INCIDENTS USE THESE NUMBERS

REGULATORY AGENCIES:

NYSDEC (800) 457-7362

(Spill Hotline)

Westchester County Health Department (914) 813-5000

(General #)

Driving Directions to Saint Joseph's Medical Center

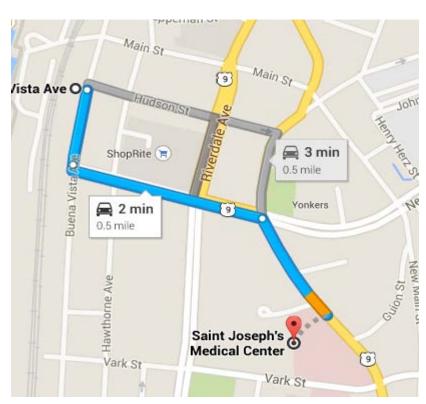
(914) 378-7000

Start: 41-53 Buena Vista Avenue Yonkers, New York 10701

End: 127 South Broadway Yonkers, New York 10701

	<u>Directions</u>	<u>Distance</u>
1.	Head south on Buena Vista Ave	0.1 miles
2	Turn left onto Prospect Street	0.2 miles
3.	Turn right onto South Broadway	0.1 miles

Total Estimated Time: 2 minutes Total Distance: 0.5 miles



APPENDIX H:

Responsibilities of Owner and Remedial Party

APPENDIX H - RESPONSIBILITIES of OWNER and REMEDIAL PARTY

Responsibilities

This page may be used when site management responsibilities are to be carried out by multiple parties. For example, it can be used when a Remedial Party does not own the site property, and, therefore, must share site management and/or reporting obligations with a site owner, or when the State is operating a remedial system or otherwise carrying out site management.

The responsibilities for implementing the Site Management Plan ("SMP") for the Former Tuetonia Hall site (the "site"), number C360085, are divided between the site owner(s) and a Remedial Party, as defined below. The owner(s) is/are currently listed as:

Teutonia, LLC
 Eric Wolf
 (914) 450-7794
 <u>ewolf@dwcap.com</u>
 (the "owner").

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is:

[Insert RP's name, contact and address].

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

Site Owner's Responsibilities:

- 1) The owner shall follow the provisions of the SMP as they relate to future construction and excavation at the site.
- 2) In accordance with a periodic time frame determined by the NYSDEC, the owner shall periodically certify, in writing, that all Institutional Controls set forth in an Environmental Easement remain in place and continue to be complied with. The owner shall provide a

- written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.
- 3) In the event the site is delisted, the owner remains bound by the Environmental Easement and shall submit, upon request by the NYSDEC, a written certification that the [Select one-Environmental Easement, Deed Restriction, Environmental] is still in place and has been complied with.
- 4) The owner shall grant access to the site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.
- 5) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. In the event that damage to the remedial components or vandalism is evident, the owner shall notify the site's RP and the NYSDEC in accordance with the timeframes indicated in **Section 1.3 Notifications**.
- 6) In the event some action or inaction by the owner adversely impacts the site, the owner must notify the site's RP and the NYSDEC in accordance with the time frame indicated in **Section** 1.3 - Notifications and (ii) coordinate the performance of necessary corrective actions with the RP.
- 7) The owner must notify the RP and the NYSDEC of any change in ownership of the site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site property/ies. 6 NYCRR Part contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 2.4 of the SMP. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

Remedial Party Responsibilities

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.

- 2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.
- 3) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.
- 4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).
- 5) The RP shall notify the NYSDEC and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.
- 6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under **Section 1.3 Notifications** of the SMP.
- 7) The RP is responsible for the proper maintenance of any installed vapor intrusion mitigation systems associated with the site, as required in **Section 3.3** of the SMP.
- 8) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.
- 9) Any change in use, change in ownership, change in site classification (e.g., delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the Department to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

APPENDIX I:

Quality Assurance Project Plan

APPENDIX I - QUALITY ASSURANCE PROJECT PLAN

All samples collected during redevelopment activities will be analyzed using EPA-approved analytical methods using the most recent edition of the EPA"s "Test Methods for Evaluating Solid Waste" (SW-846). Methods for Chemical Analysis of Water and Wastes "(EPA 600/4-79-020), Standard Methods for Examination of Waste and Wastewater" (prepared and published jointly by the American Public Health Association, American Waterworks Association and Water Pollution Control Federation).

The laboratory proposed to perform the analyses will be certified through the New York State Department of Health Environmental Laboratory Approval Program (ELAP) to perform Contract Laboratory Program (CLP) analysis and Solid Waste and Hazardous Waste Analytical testing on all media to be sampled during this investigation. The laboratory will maintain this certification for the duration of the project.

The laboratory will perform the analysis of samples in accordance with the most recent NYSDEC Analytical Services Protocol (ASP). Analytical data will be submitted in complete ASP Category B data packs including documentation of laboratory QA/QC procedures that will provide legally defensible data in a court of law. If requested, the Category B data packs will be submitted to the NYSDEC.

Procedures for chain of custody, laboratory instrumentation calibration, laboratory analyses, reporting of data, internal quality control, and corrective actions shall be followed as per SW-846 and as per the laboratory's Quality Assurance Plan. Where appropriate, trip blanks, field blanks, field duplicates, and matrix spike, matrix spike duplicate shall be performed at a rate of 10% and will be used to assess the quality of the data. The laboratory's in-house QA/QC limits will be utilized whenever they are more stringent than those suggested by the EPA methods.

After receipt of analytical results, the data package will be sent to a qualified, third party, data validation specialist for evaluation. A Data Usability Summary Report (DUSR) will be prepared. The DUSR will provide a determination of whether or not the data meets the project specific criteria for data quality and data use.