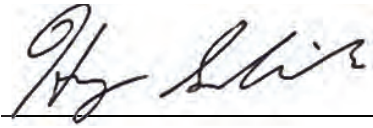


**American Two Cleaners
43-45 Lafayette Avenue
Suffern, Rockland County, New York 10901**

**REMEDIAL ACTION WORK PLAN
NYSDEC BCP SITE C344085**

**PREPARED FOR
REDScriB, LLC**

PREPARED BY:



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an affiliate of Terraphase Engineering Inc.

April 24, 2024

CERTIFICATIONS

I, Nicholas Krasnecky, certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and Green Remediation (DER-31).

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

Nicholas Krasnecky, P.E.

NYS Professional Engineer #10006

Date

Signature

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

Remedial Action Work Plan

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LIST OF ACRONYMS

A	Definition
AMSL	Above mean sea level
AGV	Air Guidance Value
AOC	Area of Concern
ARIR	Addendum Remedial Investigation Report
ASP	Analytical Services Protocol
AWQS	Ambient Water Quality Standards
B	
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BGS	Below Ground surface
BTEX	Benzene, toluene, ethylbenzene, xylenes
C	
CAMP	Community Air Monitoring Plan
CHASP	Construction Health & Safety Plan
C-1,2-DCE	cis-1,2-Dichloroethylene
COC	Contaminant of Concern
COC	Certificate of Completion
CP-51	Commissioners Policy-51 (<i>specifically “October 2010 NYSDEC Commissioners Policy 51”</i>)
CPP	Citizen Participation Plan
CQAP	Construction Quality Assurance Plan
CSM	Conceptual Site Model
CUSCO	Commercial Use Soil Cleanup Objectives
CVOC	Chlorinated Volatile Organic Compound
D	
4,4'-DDD	1,1-Dichloro-2,2-bis(4-chlorophenyl) ethane
4,4'-DDE	1,1-Dichloro-2,2-bis(4-chlorophenyl) ethene
4,4'-DDT	Dichlorodiphenyltrichloroethane
DER	Division of Environmental Remediation
DER-10	Division of Environmental Remediation-10 (<i>specifically “May 2010 NYSDEC Technical Guidance for Site Investigation and Remediation”</i>)
DTW	Depth to Water
DUSR	Data Usability Summary Report
E	

EC	Engineering Control(s)
ECMS	Environmental Consulting and Management Services, Inc.
EE	Environmental Easement
ELAP	Environmental Laboratory Approval Program
ES	EnviroSure
ESI	Environmental Site Investigation
F	
FER	Final Engineering Report
FBGS	feet below ground surface
G	
GWQS	Groundwater Quality Standard
H	
ECMS	ECMS of New York
HASP	Health and Safety
Plan	
HAZWOPER	Hazardous Waste Operations and Emergency Response
I	
IC	Institutional Control
ISCR	<i>In situ</i> Chemical Reductant
M	
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µg/m ³	micrograms per cubic meter
ml/min	milliliter per minute
N	
ng/L	nanograms per liter
NTU	Nephelometric Turbidity Unit
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental
Conservation NYSDOH	New York State Department of Health
O	
OSHA	Occupational Health and Safety Administration
P	
PAH	Polycyclic Aromatic Hydrocarbon
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyl
PCE	Perchloroethylene/Tetrachloroethene

PDI	Pre-Design Investigation
PE	Professional Engineer
Ph II/RI	Phase II Remedial Investigation Report
PHFxA	Perfluorohexanoic Acid
PFOA/PFAS	Per- and polyfluoroalkyl substances
PID	Photoionization Detector
PPB	Parts per billion
PPE	Personal Protective Equipment
PPM	Parts per million
Q	
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QHHEA	Qualitative Human Health Exposure Assessment
R	
RA	Remedial Action
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCRA	Resource Conservation and Recovery Act
RE	Resident Engineer
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
RRSCO	Restricted Residential Soil Cleanup Objective
S	
SCG	Standards, Criteria, and Guidelines
SCO	Soil Cleanup Objective
SDS	Safety Data Sheet
Site	93 Gerry Street, Brooklyn, New York
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SOE	Support-of-Excavation
SVI	Soil Vapor Intrusion
SVOC	Semi-Volatile Organic Compound
SWPPP	Stormwater Pollution Prevention Plan
T	
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List

TCLP	Toxicity Characteristic Leaching Procedure
TOGS 1.1.1	Technical and Operational Guidance Series 1.1.1 (<i>Specifically “June 1998 NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values, Class GA for the protection of a source of drinking water modified per the April 2000 addendum”</i>)
TPE	Terraphase Engineering Inc.
TPH	Total Petroleum Hydrocarbons
U	
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UUSCO	Unrestricted Use Soil Cleanup Objective
V	
VC	Vinyl Chloride
VOC	Volatile Organic Compound
W	
WQCA	Wastewater Quality Control Application

Executive Summary

This Remedial Action Work Plan (RAWP) was prepared by Environmental Consulting & Management Services, Inc. (ECMS) and Carson Voci Engineering and Geology, D.P.C (Carson Voci) *an affiliate of Terraphase Engineering, Inc.* on behalf of Redscrib, LLC (the Volunteer) for the property located at 43-45 Lafayette Avenue in Suffern Village, New York 10901 (the Site).

Redscrib, LLC has enrolled in the New York State Brownfield Cleanup Program (BCP) to investigate and remediate a property located at 43-45 Lafayette Ave, Suffern, New York 10901 in the Village of Suffern, Town of Ramapo in Rockland County, New York. A Remedial Investigation (RI) was performed by EnviroSure Inc. (ES) of Marlton, NJ. The Remedial Investigation Report (RIR) was initially submitted in September 2022 with approval after the revision on May 2, 2023.

The Addendum Remedial Investigation Report (ARIR) provides additional information establishing a source of the impacts and delineated the source impacts onsite. The results from that investigation help us establish the remedial action objectives, evaluation of interim remedial actions and remedial action alternatives, and selection of a remedy pursuant to DER-10.

SITE DESCRIPTION/PHYSICAL SETTING/SITE HISTORY

The Site is located at 43 Lafayette Ave, Suffern, New York 10901 and is identified as Section 54.35 Block 2 and Lot 25 on the Tax Map. **Figure 1** shows the Site location. The Site is a 0.09-acre site and is bounded by the intersection of Chestnut Street and Lafayette Avenue to East and North respectively. Mexican Restaurant to the west, and a hair stylist to the south. A map of the site boundary is shown in **Figure 2**. Currently, the Site consists of a first-floor fitness program tenant and a vacant tenant space and basement storage space that was previously used as part of the vacant tenant space formally American Two Cleaners (ATC) a dry-cleaners.

According to available town records the site has been a dry cleaner since the 1950's. The original building was replaced by a one-story commercial building in the mid-1960s. The site has remained substantially unchanged through 2023. The Target contaminants identified from the ES RIR Investigations include:

- Tetrachloroethene (PCE) and its breakdown compounds (trichloroethene (TCE) and cis-1,2-dichloroethene (C-1,2-DCE)) with impacts to soil vapor and indoor air. A source was not located based on the ES RIR after groundwater, soil, and vapor/ air sampling.
- Limited concentrations of SVOCs, metals, and PFAS were detected in soil and groundwater, and their origin is unknown based on the historical Site operations. The source is likely historical fill material, and/or an off-site or naturally occurring source. These non-target contaminants may represent an area-wide or regional condition.

Migration of these non-target contaminants across the Site may be minimal due to the nature of the contaminants and extensive low-permeable ground cover.

- An identified vapor encroachment condition is present at the site based on the original ECMS testing and confirmed by ES in their confirmation sampling

SUMMARY OF THE REMEDIAL INVESTIGATION

The EnviroSure (ES) RI was completed in accordance with Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR) Part 375, DER-10, and the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006 and subsequent updates). The objective of the RI was to determine the nature and extent of contamination in soil, groundwater, and soil vapor. The ES RI was performed from January 6, 2022, through July 8, 2022. ECMS performed a supplemental remedial investigation from June 26, 2023, through July 31, 2023.

The ES RI consisted of the following:

- Advancement of three exterior soil borings to 30 feet below ground surface (fbgs), A total of nine samples were collected from the following horizons: SB-02 (8.0-8.5 fbgs, 15.0-15.5 fbgs, and 29.5-30.0 fbgs), SB-03 (12.0-12.5 fbgs, 17.0-17.5 fbgs, and 28.0-28.5 fbgs), SB-08 (7.0-7.5 fbgs, 14.5-15.0 fbgs, and 29.5-30.0 fbgs) A total of 18 soil samples were collected (plus quality assurance/quality control [QA/QC] samples) for laboratory analysis;
- Advancement of five interior soil borings to 13.5 to 16 fbgs, the borings were advanced to refusal which was the following depths: SB-01 (15.0 fbgs), SB-04 (16.0 fbgs), SB-05 (16.0 fbgs), SB-06 (13.5 fbgs), and SB-07 (14.0 fbgs). It should be noted that these depths are in relation to the street-level ground surface which was approximately 8.0 fbgs and not the basement floor surface. A total of fifteen (15) samples and a duplicate sample were collected from the following horizons based on field observations and to assess the Site lithology: SB-01 (12.0-12.5 fbgs, 13.5-14.0 fbgs, and 14.5-15.0 fbgs), SB-04 (9.5-10.0 fbgs, 12.0-12.5 fbgs, and 15.5-16.0 fbgs), SB-05 (9.0-9.5 fbgs, 11.5-12.0 fbgs, and 15.5-16.0 fbgs), SB-06 (9.5-10.0 fbgs, 10.5-11.0 fbgs, and 12.5-13.0 fbgs), and SB-07 (9.0-9.5 fbgs, 11.5-12.0 fbgs, and 13.5-14.0 fbgs). Refusal was reached at approximately 13 to 16 fbgs (5 to 8 ft below the basement slab) due to basement access limiting usable equipment.
- EnviroSure and EnviroProbe returned to the Site and two groundwater monitoring wells were installed to a depth of approximately 35 fbgs. Monitoring well MW-1 was installed at the location of soil boring SB-02 (north of the building along Lafayette Avenue) and MW-2 was installed at the location of soil boring SB-03 (southeast corner of the building along Chestnut Street).

- On August 24, 2022, Badey & Watson Surveying & Engineering, D.P.C. (B&W) conducted a monitoring well survey to obtain the elevation data for MW-1 and MW-2.
- On April 14, 2022, a vapor intrusion and indoor air investigation was conducted on the property by Premier. The investigation was conducted in an attempt to further investigate the elevated concentrations of VOCs previously detected in the sub-slab soil vapor and indoor air samples collected at the Site.
- On July 8, 2022, four concrete chip samples (C-01 through C-04) were collected from the basement slab near the locations of the basement sub-slab soil vapor and indoor air samples that were previously collected. Samples C-01, C-03, and C-04 were collected near the locations of sub-slab soil vapor samples SS-03, SS-05, and SS-04, respectively, and sample C-02 was collected near the location of indoor air sample IA-04.
- The target contaminants at the Site are PCE and its breakdown compounds (TCE and C-1,2-DCE) with impacts to soil vapor and indoor air.
- The origin of the PCE, TCE, and C-1,2-DCE contamination in the sub-slab vapors are likely attributed to the former dry-cleaning operations of more than 60 years; however, the lack of these contaminants in the soil, groundwater and concrete indicate there is no source continuing to contribute to the contamination.
- The target contaminants were not identified in soil or groundwater, therefore delineation in these media is complete and the potential for off-site migration is minimal.
- Limited concentrations of SVOCs, metals, and PFAS were detected in soil and groundwater, and their origin is unknown based on the historical Site operations. The source is likely historical fill material, and/or an off-site or naturally occurring source. These non-target contaminants may represent an area-wide or regional condition. Migration of these non-target contaminants across the Site may be minimal due to the nature of the contaminants and extensive low-permeable ground cover.
- The exposure risk to the non-target contaminants for on- and off-site potential receptors is minimal due to the low potential for direct contact and their non-volatile nature. Additionally, groundwater at the Site location is not used for potable purposes.
- Characterization of the surface and subsurface at the Site has been completed, including topography, depth to groundwater, and the quality of the shallow aquifer.
- The QHHEA has been completed for the Site and potential receptors and pathways were identified for all scenarios.
- The Fish and Wildlife Impact Analysis was completed for the Site and no unacceptable ecological risks are expected under the current and future use scenario.

The objective of the ECMS Supplemental RI was to determine the nature and extent of contamination in soil and groundwater. As ES could not find the source of contaminants. A summary of the environmental findings from the June 26, 2023, through July 31, 2023 ECMS Supplemental RI is provided below:

- On July 24, 2021, a water/oil interface level meter was used to determine the depth to groundwater, which was identified at approximately 26.78 feet bgs in MW-1, 25.55 feet bgs in MW-2, and 27.75 feet bgs in MW-3. The groundwater flow Direction was confirmed to be to the South-Southwest towards the Ramapo River.
- On July 24, 2023, ECMS collected four groundwater samples from the site from MW-1 through MW-3 plus groundwater that accumulated in the basement sump. Groundwater analytical results from the monitoring wells showed no exceedances above NYSDEC Groundwater Quality Standards (GQS). The groundwater in contact with the impacted soils showed elevated groundwater concentrations of PCE, C-1,2-DCE, TCE, and Vinyl chloride (VC) above GQS. Due to the perched nature of the water in the sump it has not reached the wells MW-2 or MW-3. They are both within 10 ft laterally of the sump.
- On July 24, 2023, and July 31, 2023, five samples exceeded Unrestricted Use Soil Cleanup Objectives (UUSCOs). SB-A SUMP W (1'), SB-A SUMP H (3.0'), SB-A SUMP B (4.0'), SB-A #1 (26''-32''), and SB-A #1 (42''-59''). All exceeded PCE UUSCO of 1,300 ug/Kg. Two samples SB-A SUMP W (1') and SB-A #1 (42''-59'') exceeded the C-1,2-DCE UUSCO of 250 ug/Kg. The remainder of SB-A had detections of C-1,2-DCE and TCE. However, due to the Source of PCE solvent in SB-A SUMP H (3.0') C-1,2-DCE and TCE were "not detected" above the method detection limits due to the laboratory dilutions to achieve a reportable result.
- As part of the Supplemental RI, ECMS was able to determine the lateral and horizontal extent of contamination from PCE solvents that were formerly used at the site. The areas that are affected are strictly in the basement surrounding the sump. The groundwater table beneath the site has not been affected due to the tight silt and clay stratigraphy at the site. Only the soil vapor and indoor air have been affected. Some limited perched water has been impacted but it has not escaped from the sump standing water is put in drum onsite.
- ECMS was able to determine the lateral and horizontal extent of contamination from PCE solvents that were formerly used at the site. The areas that are affected are strictly in the basement surrounding the sump. The groundwater table beneath the site has not been affected due to the tight silt and clay stratigraphy at the site. Only localized soil/perched groundwater, soil vapor and indoor air have been affected.

QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT FISH AND WILDLIFE IMPACT ANALYSIS

Based on the ES RIR the potential exposure pathways for the current and future use conditions are listed below.

Current Use Scenario: Site contamination includes limited chlorinated VOCs related to historic site operations, and although not part of the former Site observations, exposure scenarios for SVOCs and metals are related to direct contact and the risk of exposure is addressed in a similar way to the VOC. Under current conditions, the exposure to soil or groundwater is not likely, as the site is completely capped by a building and concrete sidewalks. Potable water for the Village of Suffern will continue to be sourced from the Municipal Utilities Authority. All intrusive work on the Site is done in accordance with a Site-Specific Health and Safety Plan and donning of PPE. Exposure to sub-slab soil vapor is the most likely via soil vapor intrusion. The exposures can be mitigated through the use of a combination of source removal and engineering controls if needed based on the ability to remove known sources. If source removal is not enough inactive mitigation would be utilized including sealing of the basement slab and former sump with a vapor/water barrier cover system. Based on testing if that does not eliminate soil vapor intrusion coupled with source removal a SSDS pilot test would be performed. It would evaluate installation of passive/active sub-slab depressurization systems or Soil vapor extraction systems. Which is proposed as part of this RAWP. Currently, the supplemental testing locations are open, and the sump liner has been removed to facilitate source removal.

Future Use Scenario: The Site is planned to remain as a commercial space with potential cafe or retail store operations. Exposure to sub-slab soil vapor is via indoor air as in the current/future use scenario. These exposures can be eliminated if a majority of the source is able to be excavated and subsequent testing reveals at least one of the five Qualitative Human Health Exposure Assessment (QHHEA) elements is eliminated by conducting source removal as mentioned above. Otherwise, the future use will involve mitigation through the use of passive/active engineering controls or institutional controls.

Overall exposure by off-site potential receptors is minimal. Sub-slab vapors are not likely to migrate a significant distance due to silt and clay soil types. Exposure by potential offsite receptors in the first-floor commercial operations are similar to the on-site exposure potential. As proposed as part of this RAWP source removal will remove the need for active/passive mitigation measures to control the potential for off-site vapor migration. Exposure to target and non-target contaminants via soil and groundwater is not expected due to depth to groundwater, low volatility, low-permeable surface coverage, and use of municipal water for potable water supply.

Fish and Wildlife Resource Impact Analysis: The Site provides no wildlife habitat or food value and/or access to the detected subsurface contamination. No natural waterways are present on or adjacent to the Site. The proposed future use of the Site is for commercial purposes. As such, no

unacceptable Fish and Wildlife Resource Impact Analysis and ecological risks are expected under the current and future use scenario.

SUMMARY OF THE REMEDY

The selected Track 1 remedy will include the following:

1. A remedial program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components considered for this remedy are as follows:
 - Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
 - Reducing direct and indirect greenhouse gases and other emissions;
 - Increasing energy efficiency and minimizing use of non-renewable energy;
 - Conserving and efficiently managing resources and materials;
 - Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
 - Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
 - Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and

As part of the remedial program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis will be completed. The environmental footprint analysis was completed using an accepted environmental footprint analysis calculator Spreadsheets for Environmental Footprint Analysis(SEFA, USEPA) Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use will be estimated, and goals for the project related to these green and sustainable remediation metrics, as well as for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, will be incorporated into the remedial program, as appropriate. The project will include detailed requirements to achieve the green and

sustainable remediation goals. Further, progress with respect to green and sustainable remediation metrics will be tracked during implementation of the remedial action and reported in the Final Engineering Report (FER), including a comparison to the goals established during the remedial program.

Additionally, the remedial program will include a climate change vulnerability assessment, to evaluate the impact of climate change on the project site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightning, heat stress and drought), flooding, and sea level rise will be identified, and the remedial program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities.

2. Development and implementation of a HASP and CAMP for the protection of on-site workers, community/residents, and the environment during remediation and construction activities.
3. Break up and remove concrete slab of basement.
4. Implementation of pollution and sediment control measures in compliance with applicable laws and regulations.
5. Removal of the existing loose concrete cover and miscellaneous debris/soils on the Site.
6. Excavation around the basement sump via Vactor® soil vacuum truck or similar equipment, stockpiling, off-Site transport, and disposal of approximately 20-40 cubic yards of contaminated historical fill material that exceeds UUSCOs as defined by 6 NYCRR Part 375-6.8. Excavation will be to 13-15 ft bgs (below sidewalk level).
7. Collection and analysis of post-excavation end-point confirmation soil samples from the excavation base and, to the extent possible, sidewalls of the excavation in accordance with DER-10, to document post-excavation conditions to confirm a Track 1 remedy was achieved.
8. Implementation of a preliminary waste characterization to facilitate off-site disposal of excavated soil/fill.
9. Screening for indications of contamination (by visual means, odor, and PID readings) of excavated material during intrusive site work.
10. Localized dewatering of perched groundwaters with containerization, classification, and disposal at an approved receiving facility.
11. Off-site disposal of material removed from the Site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal.

12. Installation of a demarcation layer indicating the top of residual soils/extent of excavation with plastic sheeting and or orange construction fencing.
13. Backfilling of excavated areas, as necessary for development, with certified-clean material (i.e., meeting UUSCOs), recycled concrete aggregate (RCA), or virgin, native crushed stone.
14. Installation of a 4-inch PVC riser pipe stub in the excavated area for future soil vapor mitigation, lining of the excavated area with a vapor barrier, and replacement of the concrete slab.
15. Installation of SS soil vapor points and completion of a SVI Evaluation in accordance with DER-10 and the SVI Guidance following remedial excavation activities and prior to occupancy.
16. Based on the SVI Evaluation, preparation of an IRM Work Plan for the design and installation of a SVI mitigation alternative, if necessary. Potential SVI mitigation alternatives include, but not are limited to, construction and activation of an SSDS from the capped riser pipe and application of an interior vapor intrusion coating (i.e. RetroCoat or equivalent) on the basement floor slab and walls.
17. Preparing and implementing a post-remediation groundwater monitoring program to evaluate the response of CVOCs in groundwater after source removal.

As part of the Track 1 Remedy, the soil vapor RAO must be met for a Track 1 remedy to be achieved. As will the soil/ groundwater RAO. Contingent remedial elements include the following: 1) establishment of an approved SMP to ensure long-term management of engineering (waterproofing/ vapor barrier, and cover system) and institutional controls (Environmental Easement, to prevent use of site for gardening, groundwater), including the performance of periodic inspections and certification that the controls are performing as they were intended; and 2) recording of an Environmental Easement (EE) to ensure future owners of the site maintain the required engineering/institutional controls.

Remedial Action Work Plan

1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) was prepared by Environmental Consulting & Management Services, Inc. (ECMS) and Carson Voci Engineering and Geology, D.P.C. (Carson Voci) *an affiliate of Terraphase Engineering, Inc.* on behalf of Redscrib, LLC (the Volunteer). Redscrib, LLC entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) on September 1, 2021, to investigate and remediate the property located at 43-45 Lafayette Avenue, Village of Suffern, Town of Ramapo in Rockland County, New York (the Site). Redscrib, LLC is a Volunteer in the Brownfield Cleanup Program (BCP). When the RAWP activities are completed the Site is planned to remain as a commercial space with potential cafe or retail store operations. Refer to the BCP application for additional details.

This RAWP summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed by EnviroSure Inc. (EnviroSure) between January 6, 2022, and August 24, 2022, and the Addendum RI performed by ECMS between June 28 and July 31, 2023. This RAWP provides an evaluation of a Track 1 cleanup and other applicable Remedial Action alternatives, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria and guidance. The remedy described in this document also complies with all applicable Federal, State, and local laws, regulations, and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have not yet made a Significant Threat determination for this Site. The RI for this Site did not identify fish and wildlife resources. ECMS agrees with EnviroSure's findings. A formal Remedial Design document will not be prepared.

1.1 Site Location and Description

The Site is located in the County of Rockland, Village of Suffern, Town of Ramapo, New York and is identified as Block 54.35 and Lot 2-25 on the Town of Ramapo Tax Map. A United States Geological Survey (USGS) topographical quadrangle map **Figure 1** shows the Site location. The Site is developed with a one-story building with basement situated on an approximately 0.09-acre area. The building is split into two suites and only one suite, the vacant suite, has direct access to the basement via a staircase. The Site is located approximately 0.2-miles south of Interstate 287 and approximately 400-feet east of Route 202. The Site is adjoined by a building to the west. No structure adjoins the Site building to the south, and Lafayette Avenue and Chestnut Street border the Site to the north and east. The buildings surrounding the Site are used for commercial purposes. Some nearby buildings are mixed use with commercial occupants on the ground floor and residential use on the second floor. The enclosed **Figure 2**

shows the current site layout. A boundary map is attached to the BCA as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419. The boundaries of the 0.09-acre property are depicted in Figure 2.

1.2 Contemplated Redevelopment Plan

The Remedial Action to be performed under the RAWP is intended to make the Site protective of human health and the environment consistent with the contemplated end use of commercial use in the first-floor suites and basement space. The proposed redevelopment plan is to ensure the indoor air is not affected by soil vapor intrusion. It is the intent of the Volunteer after conducting the RAWP that both suites and the basement space indoor air are protective of human health before additional occupancy. Exposed receptors may comprise employees and contractors who may be employed to perform work on the property. Site visitors (retail patrons) may also be considered receptors; however, their exposure would be similar to that of the indoor employees but at a lesser frequency and duration. The enclosed **Figure 2** shows the current site layout and intended future use.

1.3 Description of Surrounding Property

The adjoining properties and usage are described as follows:

North: Lafayette Avenue, then 50 Lafayette Avenue, Java Love Coffee Roasting Co.
East: Chestnut Street, then 47 Lafayette Avenue, Boost Mobile
South: 23 Chestnut Street, Robert's Hairstylists
West: 41 Lafayette Avenue, My Mexican House

There are no schools, daycares, hospitals/medical practices, rivers/streams wetlands or other sensitive receptors within 500-ft surrounding the site. The zoning immediately surrounding the site is all General Business/Community Commercial land use. Zoning uses listed as Multi-Family Residences, are located to the south and southeast of the site. The residentially zoned areas are more than 100 ft away from the site.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The following sections summarize the Site History, including environmental investigations and assessments conducted during and prior to Remedial Investigation activities as part of the enrollment in the BCP.

2.1 Site History

The relevant site history, including past uses, ownership and prior investigations are presented in the following sections.

2.1.1 PAST USES AND OWNERSHIP

According to available town records the site has been a dry cleaner since the 1950's. The original building was replaced by a one-story commercial building in the mid-1960s. The site has remained substantially unchanged through 2023. The property was purchased by the current property owner, Red Cribs, LLC in October 2019, and a dry-cleaner, American Two Cleaners (ATC), occupied the property for at least six years prior. According to NYSDEC Dry-cleaner machine decommissioning records, dry cleaning operations ceased on June 19, 2020.

The Site building contains two tenant spaces. The 43 Lafayette Avenue tenant space is vacant and was formerly occupied by ATC. Only this tenant space has access to the basement. The 45 Lafayette Avenue tenant space is occupied by a fitness program tenant.

2.1.2 PRIOR INVESTIGATIONS

A limited vapor intrusion (VI) investigation was conducted at the Site on August 11, 2020, by ECMS and September 15, 2020, by EnviroSure and the results of the investigation were presented in the *Limited Vapor Intrusion Assessment Report, January 11, 2021* prepared by EnviroSure. The results of the limited VI investigation indicated the vapor intrusion was a concern at the Site due to tetrachloroethene (PCE) and trichloroethene (TCE) concentrations in sub-slab soil vapors and indoor air greater than the applicable NYSDOH Indoor Air Concentrations Due to Health Exposures Screening Value (IACHE).

The NYSDEC Spill Hotline was notified on September 9, 2020, of the release from historical dry-cleaning operations at the Site. The NYSDEC issued Spill No. 2005272 for the case and the owner subsequently voluntarily applied for, and enrolled in, the NYSDEC BCP. As a result of the Site's enrollment into the NYSDEC BCP on April 8, 2021, the NYSDEC Spill No. 2005272 was closed on April 30, 2021.

2.2 Summary Remedial Investigations Performed

The Site was investigated between January 6, 2022, and August 24, 2022, in accordance with the scope of work presented in the NYSDEC-approved Remedial Investigation (RI) Work Plan dated November 17, 2021, by EnviroSure. ECMS prepared a supplemental RIWP dated May 5, 2023, proposing further RI activities, and was approved by NYSDEC on June 8, 2023. The supplemental RI was conducted between June 28, 2023, and July 31, 2023. The final EnviroSure RIR was submitted to NYSDEC on May 2, 2023, and the ECMS Addendum RIR was submitted concurrent with this RAWP.

2.2.1. SOIL INVESTIGATION

Soil Boring Samples

Eight soil borings, three exterior (SB-02, SB-03, and SB-08) and five interior in the basement (SB-01 and SB-04 through SB-07), were advanced by Enviroprobe Service, Inc. (Enviroprobe) in January 2022 with oversight by EnviroSure. The 3 exterior soil borings were advanced to a depth of 30 feet below ground surface (fbgs) and the 5 interior basement soil borings advanced to refusal of between 13 to 16 fbgs (from sidewalk grade 5 to 8 feet below basement slab).

Up to 3 grab samples were collected for laboratory analysis from each boring location to investigate and delineate the vertical and horizontal extent of potential impacts. The shallowest sample from each boring was analyzed for full Part 375 Target Compound List 9TCL)/Target Analyte List (TAL) compounds, including emerging contaminants 1,4-dioxane and Per-and Polyfluoroalkyl Substances (PFAS). The remaining samples were extracted and held for analysis, pending the initial results.

In June and July 2023, ECMS performed the Addendum RI field work to collect additional soil data to delineate the extent of potential soil impacts stemming from the basement sump. In June 2023 Coastal Environmental Solutions (Coastal) used a Geoprobe 6610 DT Track Rig with 5-foot macro-core soil samplers and acetate liners to advance one exterior soil boring (SB-C) and hand auger and hammer to advance 3 interior basement borings (SB-A, SB-B, and SB-D). In total 16 soil samples were collected for chemical analysis during June 2023. Data on soil sample collection for chemical analyses, including dates of collection and sample depths are in **Table 1**. **Figure 3** shows the location of samples collected in this investigation.

ECMS returned to the site in July 2023 to collect soil samples from the basement sump (SB-A) using a hand auger and groundwater from the permanent monitoring wells. ECMS found the PCE Vapor source beneath the sump by auguring deeper. ECMS and the owner used a hammer drill to core drill the basement concrete slab to enable soil characterization, sample, and delineate the sub slab soil impacts laterally surrounding the PCE source.

On July 31, 2023, ECMS conducted additional soil sampling at the basement at SB-B and SB-D using a hand auger, to determine the extent of the contamination from the sump (SB-A). Based on ECMS Supplemental investigation it was discovered that the Site is generally underlain by tight silts and clay roughly 7 to 10 fbgs (sidewalk level). This lithology has prevented the migration of CVOCs from migrating into the water table at the site. It is also the reason why soil vapors and indoor air are a mitigation concern.

Soil Investigation Results

Soil Investigation results for the ECMS ARIR soil samples collected by ECMS were compared to the NYSDEC 6NYCRR Part 375 Section 6.8 Unrestricted Use and Commercial Use Soil Cleanup Objectives (SCOs).

The VOCs in SB-A; cis-1,2-Dichloroethene (C-1,2-DCE), Methylene chloride, PCE, and TCE, were detected in soil above their applicable unrestricted SCOs. SB-B, SB-C and SB-D were all

below the unrestricted use SCOs. Only PCE exceeded the Commercial SCOs in the bottom of the former basement sump.

2.2.2 SAMPLES COLLECTED - SOIL

Soil Investigation began on January 6, 2022. ES oversaw the installation of three (3) exterior soil borings (SB-02, SB-03, and SB-08) were advanced onsite by Enviroprobe in an effort to assess soil quality. The borings were advanced to a depth of 30 fbgs.

Envirosure recorded field observations of soil composition, olfactory and visual observations, and PID responses to total VOC concentrations at approximately six-inch intervals and at horizons of suspected impacts. Groundwater was not encountered during the investigation. The observations were recorded in the field logbook entries and soil boring logs.

A total of nine samples were collected from the following horizons: SB-02 (8.0-8.5 fbgs, 15.0-15.5 fbgs, and 29.5-30.0 fbgs), SB-03 (12.0-12.5 fbgs, 17.0-17.5 fbgs, and 28.0-28.5 fbgs), SB-08 (7.0-7.5 fbgs, 14.5-15.0 fbgs, and 29.5-30.0 fbgs). Each sample was collected in laboratory supplied bottleware using new Terra Core® samplers and disposable nitrile gloves. EnviroSure labeled the samples in the field, chilled the samples in a cooler with ice to approximately four degrees centigrade, and transported the samples via courier under chain of custody protocol to Alpha Analytical, Inc. laboratories of Westborough, Massachusetts (NYSDOH ELAP Certification # 11148). Samples SB-02 (8.0-8.5 fbgs), SB-03 (12.0-12.5 fbgs), and SB-08 (7.0-7.5 fbgs) were analyzed for full Target Compound List (TCL) plus the 30 (10 VOCs and 20 SVOCs) including Tentatively Identified Compounds (TICs); full Target Analyte List (TAL), 1,4-dioxane and Per- and Polyfluoroalkyl Substances (PFAS) analysis. The remaining samples were extracted and held for analysis, pending the initial results.

On January 13, 2022, five interior soil borings (SB-01, SB-04 through SB-07) were advanced by Enviroprobe in the basement of the Site building. The borings were advanced to refusal which was the following depths: SB-01 (15.0 fbgs), SB-04 (16.0 fbgs), SB-05 (16.0 fbgs), SB-06 (13.5 fbgs), and SB-07 (14.0 fbgs). It should be noted that these depths are in relation to the street-level ground surface which was approximately 8.0 fbgs and not the basement floor surface.

EnviroSure recorded field observations of soil composition, olfactory and visual observations, and photoionization detector (PID) responses to total VOC concentrations at approximately six-inch intervals and at horizons of suspected impacts. Groundwater was not encountered during the investigation. The observations were recorded in the field logbook entries and soil boring logs. Faint odors were detected in all five borings and possible light staining was observed in SB-01 and SB-05 through SB-07. Low PID responses were detected in all five borings, with a high reading of 3.1 ppm detected in SB-07.

A total of fifteen (15) samples and a duplicate sample were collected from the following horizons based on field observations and to assess the Site lithology: SB-01 (12.0-12.5 fbgs,

13.5-14.0 fbgs, and 14.5-15.0 fbgs), SB-04 (9.5-10.0 fbgs, 12.0-12.5 fbgs, and 15.5-16.0 fbgs), SB-05 (9.0-9.5 fbgs, 11.5-12.0 fbgs, and 15.5-16.0 fbgs), SB-06 (9.5-10.0 fbgs, 10.5-11.0 fbgs, and 12.5-13.0 fbgs), and SB-07 (9.0-9.5 fbgs, 11.5-12.0 fbgs, and 13.5-14.0 fbgs). Refusal was reached at approximately 13 to 16 fbgs (5 to 8 ft below the basement slab) due to basement access limiting usable equipment. Each sample was collected in laboratory-supplied bottlenecks using new Terra Core® samplers and disposable nitrile gloves. EnviroSure labeled the samples in the field, chilled the samples in a cooler with ice to approximately four degrees centigrade, and transported the samples via courier under chain of custody protocol to Alpha Analytical, Inc.

Samples SB-01 (12.0-12.5 fbgs), SB-04 (9.5-10.0), SB-05 (9.0-9.5), SB-06 (9.0-9.5) and SB-07 (9.0-9.5) were analyzed for TCL VOCs plus the 30 including TICs; full TAL, 1,4-dioxane and PFAS analysis. The remaining samples were extracted and held for analysis, pending the initial results.

Appropriate Quality Assurance/Quality Control (QA/QC) samples collected were duplicate sample DUP-011322 (duplicate of sample SB-05 9.0-9.5) and Field Blank sample FB-01132022.

ECMS performed the Addendum Remedial investigation field work on four dates: June 26, June 27, July 24, and July 31, 2023. On June 26 and June 27, 2023, Coastal Environmental Solutions used a Geoprobe 6610 DT Track Rig with 5-foot macro-core soil samplers and acetate liners to advance a soil boring (SB-C) and install a permanent monitoring well (MW-3).

Geoprobe-style drilling equipment was utilized to advance macrocore soil samples from ground surface with a disposable acetate liner. The acetate liner was extracted from the sampler to classify soil stratigraphy. Continuous soil sampling was accomplished by collection of vertical runs of five-foot cylindrical sections of soil. Two samples were collected from SB-C via this method. Soil samples from SB-A, SB-B, SB-D were collected by advancing a hand auger 12-inches at a time in each respective sampling location. When the auger barrel was full it was extracted via hammer into a Ziploc® type bag. Each Ziploc bag was used to classify the soil stratigraphy in the sample location. The Hand auger was advanced to refusal in each boring or where observed impacts appeared to decrease. Following the advancement of the geoprobe rods/liners or hand auger were decontaminated between uses. A mixture of rising water and Alconox between soil boring locations and flights was used to decontaminate sampling equipment.

Each bottlenecks container contained all required preservatives which were measured by the analytical laboratory, in the appropriate glassware according to the USEPA method 8260. The field personnel measured an aliquot of approximately 5 grams of soil utilizing a disposable terra-core handle for each individual soil sample. The soil interval to be sampled is containerized in laboratory prepared glassware, which was placed in a cooler until refrigeration. Proper chain-of-custody documentation accompanied the soil samplers to Phoenix Analytical Laboratories, Inc.

In total Sixteen soil samples were collected for chemical analysis during this investigation. Data on soil sample collection for chemical analyses, including dates of collection and sample depths are in **Table 1**. The **Figure 3** shows the location of samples collected in this investigation.

On June 26, 2023, ECMS attempted to install a soil boring (SB-B) inside the building using a hammer drill and a hand auger. Due to the circumstances Costal and ECMS were only able to get 12-inches below grade before the boring was obstructed.

ECMS characterized the soil samples based on their lithology, color, odor, and contamination level. They used a photoionization detector (PID) to measure the organic vapor concentration in the soil, which can detect as low as 0.1 ppm. They decontaminated all the drilling equipment between borings to prevent cross-contamination. They recorded all the field observations and PID readings in the soil boring and well construction logs.

The sixteen total soil samples were containerized, placed in a cooler, and transmitted under chain of custody to for laboratory analysis with Phoenix Analytical Laboratories, Inc of Manchester CT (NYSDOH ELAP Certification Number 11301). The soil samples were analyzed for volatile organic compounds (VOCs) in accordance with USEPA Method 8260. All the sampling and monitoring well locations are displayed in **Figure 3**.

The only soil boring that showed signs of contamination was SB-A, which had discoloration, odor, and a PID reading higher than 5,000 ppm at 36-inches below ground surface (bgs) in the sump area. The other soil borings (SB-B, SB-C, and SB-D) did not have any discoloration, odor, or elevated PID readings. Groundwater was encountered during the investigation and its characteristics are discussed below.

On July 24, 2023, ECMS returned to the site to collect soil samples from the basement sump (SB-A) using a hand auger and groundwater from the permanent monitoring wells. ECMS found the PCE Vapor source beneath the sump. ECMS and the owner used a hammer drill to core drill the basement concrete slab to enable soil characterization, sample, and delineate the sub slab soil impacts surrounding the PCE source.

On July 31, 2023, ECMS conducted additional soil sampling at the basement at SB-B and SB-D using a hand auger, to determine the extent of the contamination from the sump (SB-A). Based on ECMS Supplemental investigation it was discovered that the Site is generally underlain by tight silts and clay roughly 7 to10 fbgs (sidewalk level). This lithology has prevented the migration of CVOCs from migrating into the water table at the site. It is also the reason why soil vapors and indoor air are a mitigation concern.

2.2.3 SAMPLES COLLECTED - GROUNDWATER

The ES groundwater investigation began on January 13, 2022, EnviroSure's contractor, EnviroProbe set a temporary well point at soil boring location SB-01 to a depth of 15.0 fbgs (7 ft below the basement slab) to attempt the collection of groundwater based on moist soil observed

in the borehole. The one-inch PVC temporary well point was left in place for approximately five hours. No groundwater was observed in the temporary well point. Due to refusal at 15.0 fbgs, a monitoring well could not be installed.

On February 2, 2022, ES attempted the installation of two exterior monitoring wells with EnviroProbe; however, refusal was met at 22 fbgs and the determination was made to return to the Site with different equipment.

On March 14, 2022, ES and EnviroProbe returned to the Site and two groundwater monitoring wells were installed to a depth of approximately 35 fbgs. Monitoring well MW-1 was installed at the location of soil boring SB-02 (north of the building along Lafayette Avenue) and MW-2 was installed at the location of soil boring SB-03 (southeast corner of the building along Chestnut Street). The monitoring well locations are depicted on the ECMS **Figures 2, 3 and 4**.

The wells were installed by Enviroprobe using an ODEX Air Rotary MGD137 Geoprobe unit. n initial field-measured depth to water (DTW) reading for MW-1 was not recorded due to a malfunction of the water/oil interface probe at the time of installation. The initial DTW reading of MW-2 was 18.5 fbgs. Both monitoring wells were developed utilizing a Proactive® Mini Typhoon submersible pump.

On April 14, 2022, the monitoring wells were purged and sampled by EnviroSure's contractor, Premier Field Services ("Premier") of Toms River, New Jersey. Pre-purge DTW and PID readings were recorded as follows:

- MW-1: DTW 29.96 fbgs, PID=0.0 ppm
- MW-2: DTW 25.70 fbgs, PID=1.2 ppm

Approximately six gallons of ground water were purged from MW-1 and seven gallons of groundwater from MW-2 prior to sampling. One groundwater sample was collected from each monitoring well in laboratory-supplied bottleware using low-flow sampling techniques, stainless steel pump, HDPE tubing for PFAS analysis, and disposable nitrile gloves.

Appropriate QA/QC samples including one trip blank and one field blank sample were also collected. Premier labeled the samples in the field, chilled the samples in a cooler with ice to approximately four degrees centigrade, and transported the samples via courier under chain of custody protocol to Alpha Analytical, Inc.

On August 24, 2022, Badey & Watson Surveying & Engineering, D.P.C. (B&W) conducted a monitoring well survey to obtain the elevation data for MW-1 and MW-2.

On June 26, and June 27, 2023, ECMS directed Coastal Environmental Solutions to install a monitoring well MW-3 at the location indicated in **Figure 2**. Monitoring well SB-C/MW-3 was installed in the southern portion of the Site inside the building starting about 2 feet above sidewalk grade. The monitoring well was installed utilizing a Geoprobe 6610DT Track Rig. Monitoring well MW-3 was intended to evaluate if bedrock has been affected by impacts

identified at the site since the original monitoring wells MW-1 and MW-2 did not show evidence of impacts. Due to the prevalence of large cobbles in the subsurface the augers could not advance with the relatively small Geoprobe 6610DT Track Rig. The limited ceiling height approximately 12 feet prevented a larger rig from being used which would have been able to advance augers past shallow cobble fill, to set a bedrock well with the hammer drill attachment. Two attempts were made to move the boring/well to pass the cobbles with limited success. Coastal even attempted to break the cobbles with the hammer drill with no success.

As such a 1-inch monitoring well was installed via direct push with available materials. The well MW-3 materials consisted of 1-inch PVC riser pipe and was installed from 38 fbgs (from grade of back room.) to approximately 0.25 feet below ground surface. Coastal used installed 15 feet of PVC screen from 23 to 38 feet bgs from grade in the well. The screen was 0.01 slot screen. The annulus around the direct push well was filled with # 2 Morie well sand. Bentonite chips were used to create a seal. The new monitoring well was developed using a peristaltic pump.

On July 24, 2023, a water/oil interface level meter was used to determine the depth to groundwater, which was identified as

- MW-1 DTW 26.78 fbgs,
- MW-2 DTW 25.55 fbgs, and
- MW-3 DTW 27.75 fbgs.

Approximately fifteen gallons of groundwater were purged from MW-1 via a submersible pump. and thirty gallons of groundwater from MW-2 prior to sampling. The newest monitoring well MW-3 is only a 1-inch well. Due to the depth of groundwater and the smaller well construction only 2.5 gallons were able to be purged via a peristaltic pump before sampling was conducted. Perched groundwater in the former sump was additionally grab sampled. One groundwater sample was collected from each monitoring well in laboratory-supplied bottleware using standard sampling techniques, and disposable nitrile gloves.

2.2.4 SAMPLES COLLECTED – SOIL VAPOR INTRUSION

On April 14, 2022, a vapor intrusion and indoor air investigation was conducted on the property by Premier Field Services of Toms River, New Jersey. The investigation was conducted in an attempt to further investigate the elevated concentrations of VOCs previously detected in the sub-slab soil vapor and indoor air samples collected at the Site. The furnace formerly located in the basement was removed at an unknown time. Therefore, no air is circulated from the basement to the tenant spaces on the first floor. The heating system is natural gas and circulates heated air from the first floor. The basement has an open sump which is dry. No chemicals were observed on the site at the time of sampling.

Three indoor air samples were collected, with two samples collected from the first floor of the building (IA-05 collected from the former dry cleaner unit and IA-06 collected from the

occupied unit) and one sample collected from the basement (IA-04). A background air sample was also collected outside of the building (OA-02). The indoor air and background samples were collected over an approximate eight-hour interval. Following the completion of the indoor air samples, three sub-slab soil vapor points (SS-03 through SS-05) were collected by installing 3/8-inch sample ports through the concrete slab floor of the basement.

Each sample was collected in laboratory-supplied SUMMA canisters with a dedicated flow controller specific to the media, labeled in the field, and transported via courier under chain of custody protocol to Alpha Analytical, Inc. laboratories of Westborough, Massachusetts (NYSDOH ELAP Certification #11148) and analyzed for EPA Method TO-15.

ECMS did not collect any Soil Vapor Intrusion samples as part of the Addendum RI due to soil delineation in the basement.

2.2.5 CONCRETE SLAB INVESTIGATION

In coordination with the NYSDEC case manager, EnviroSure collected concrete chip samples to rule out any impacts in the concrete slab onsite. On July 8, 2022, four concrete chip samples (C-01 through C-04) were collected from the basement slab near the locations of the basement sub-slab soil vapor and indoor air samples that were previously collected. Samples C-01, C-03, and C-04 were collected near the locations of sub-slab soil vapor samples SS-03, SS-05, and SS-04, respectively, and sample C-02 was collected near the location of indoor air sample IA-04.

2.3 Significant Threat

The NYSDEC and NYSDOH have not made a determination as to whether a significant threat to human health and the environment is present at the site. The NYSDEC is evaluating potential offsite impacts.

2.4 Physical Site Setting

The Site is located in the County of Rockland, New York at an elevation of approximately 297.5 feet above mean sea level. The topography of the site is generally level with a gentle slope to the south towards the Ramapo River. The ground surface in the vicinity of the Site consists of asphalt and concrete pavement and residential, commercial, and mixed-use buildings.

2.4.1 GEOLOGY

The general soil profile at the site consisted of the following layers:

- From Ground Surface:
 - 0 to 10 feet below ground surface (bgs): light to dark brown, compacted, fine-grained sands mixed with gravel and cobbles.

- 10 to 38 feet bgs: fine-coarse grained sands mixed with fine-coarse gravels with substantially thick lenses of tight silt and clay 1-2 feet thick (between 7-10 below grade).
- 35 to 38 feet bgs: weathered bedrock
- From bottom of Basement Concrete Slab:
 - 0 to 24 inches below slab: fine to coarse-grained sands with some silt, gravel, and urban fill
 - 24 to 59 inches below slab: moist, tightly compacted, sorted silts and clay.

2.4.2 HYDROGEOLOGY

The Site is located approximately 0.3 miles East of the Ramapo River. The vicinity of the Site is approximately 298 feet above mean sea level. The depth to groundwater at the Site was approximately 27 feet below ground surface during this investigation. Groundwater beneath the Site is expected to flow south-southwest towards the Ramapo River.

A table of water level data for all monitor wells is included in **Table 3**. A map of the inferred direction of groundwater flow is shown in **Figure 4**.

2.5 Contamination Conditions

The following sections detail the contamination conditions that exist at the Site in soil, groundwater, and soil vapor and indoor air based on the remedial investigation findings.

2.5.1 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) was developed based on the findings of the RI and ARI to understand the distribution of impacts to soil, groundwater, and soil vapor and the potential migration pathways and exposure pathways.

2.5.2 DESCRIPTION OF AREAS OF CONCERN

American Two Cleaners originally operated with a PCE dry-cleaning machine. The former Equipment model was a Crown F-354. ECMS spoke with the engineering department for the manufacturer they confirmed the former design to use PCE. Also, the final manifest identified PCE solvent. The manifested disposal documentation supplied by the NYSDEC was incomplete. The gap in manifests suggests that the former dry-cleaner operator may have dumped filters into the basement sump and as a result, the contamination is localized surrounding the sump. Perched groundwater enters the sump occasionally. Localized soil, soil vapor intrusion, and perched groundwater from the sump are the only areas of concern. There are no other drains in the basement.

- Contaminated Media
 - o Soil
 - o Soil vapor
 - o Perched Groundwater in soils surrounding the sump (contaminants not exceeding GQS in monitoring well network)

Contaminant Sources: The target contaminants at the Site are PCE and its breakdown compounds (TCE and C-1,2-DCE) with impacts to soil vapor and indoor air. The origin of these contaminants in the sub-slab vapors are likely attributed to the former dry-cleaning operations of more than 60 years. However, these contaminants were only identified in local soil and perched groundwater in and around the sump. Based upon ECMS' ARIR, delineation in all media is complete and the potential for off-site migration is minimal due to tight soil formation.

Distribution of all RI Impacts: Limited concentrations of SVOCs, metals, and PFAS were detected in soil and groundwater, and their origin is unknown based on the historical Site operations. The source is likely historical fill material, and/or an offsite or naturally occurring source. These non-target contaminants may represent an area-wide or local condition. Migration of these non-target contaminants across the Site is minimal due to the nature of the contaminants and extensive low-permeable ground cover.

Migration Pathways: The ES RI and ECMS ARIR involved the advancement of several exterior and interior soil borings, the installation of three groundwater monitoring wells, and the collection of numerous soil samples for laboratory analysis. Soil vapor and indoor air samples were also collected. These investigations helped to assess the Site lithology and determine the nature and extent of contamination onsite. Based on the results the areas affected are strictly in the basement surrounding the sump and are not migrating. The groundwater table beneath the site has not been affected due to the tight silt and clay stratigraphy at the site. Only localized soil/perched groundwater (in sump), soil vapor, and indoor air have been affected.

Exposure Pathways: Based on investigation activities SVOCs, metals, and PFAS have minimal or no exposure pathways due to site cover. Only the perched groundwater and vapor intrusion are currently complete exposure pathways.

- Perched Groundwater is intermittent. It only occurs after heavy rainfall events. The perched groundwater will enter basement through block walls. A person could only be exposed to dermal or ingestion exposure after periods of heavy rainfall. Water impacts have only been detected above Class GA standards in water directly in contact with soil in the earthen sump.
- Vapor intrusion is present based on the contaminants in the soils and perched groundwater of the sump. There is a complete inhalation exposure pathway. The PCE is volatilizing into the indoor air from water and soil with a potential preferential pathways from the earthen sidewall and bottom of the sump. The solvent is volatilizing into indoor air and permeating under the building in the sub slab fill of the basement slab.

- o Based on soil vapor intrusion assessments indoor air concentrations are below NYSDOH Indoor Air Guidance Values but due to sub-slab concentrations there is recommended mitigation.

Risk Assessment: Based on the above information, the planned remedial activities (i.e. source removal), and the installation of a vapor barrier there will no complete exposure pathways upon completion of remediation activities.

2.5.3 IDENTIFICATION OF STANDARDS, CRITERIA AND GUIDANCE

The following standards, criteria, and guidance (SCGs) are applicable to the development of this RAWP based on the CSM:

Analytical results generated during the RI activities addressed herein will be evaluated relative to NYSDEC standards, screening levels and other appropriate criteria applicable to each specific environmental medium, as indicated below.

Soil

- Soil analytical results will be evaluated relative to NYSDEC Standards, Criteria, and Guidance SCOs, published in 6 NYCCR 375-6.8

Groundwater

- Groundwater analytical results will be compared to Technical Operations and Guidance Memorandum 1.1.1 (TOGS 1.1.1) Ambient Water Quality Standards (AWQS) known as Groundwater Quality Standards (GQS)

Soil Vapor and Indoor Air

- Soil vapor and indoor air analytical results will be compared to the NYS Department of Health (NYSDOH) “Soil Vapor/Indoor Air (SV/IA) Decision Matrices” from the Guidance for Evaluating Soil Vapor Intrusion in the State of New York.

2.5.4 SOIL CONTAMINATION

As part of this work plan the volunteer will address the localized contamination in the former basement sump. The contamination is documented in the ECMS ARIR.

2.5.4.1 SUMMARY AND COMPARISON OF SOIL RESULTS WITH SCGS IN SOIL DATA

- Chlorinated Volatile Organic Compounds (CVOCs), PCE and its breakdown compounds (TCE and C-1,2-DCE) with impacts to soil vapor and indoor air were detected in a former sump.
- Ranges and maximum concentrations:

SB-A SUMP B (2.5`)

- PCE; 1,100 ug/Kg (UUSCO – 1,300 ug/Kg)
- C-1,2-DCE; 74 ug/Kg (UUSCO -250 ug/Kg)
- TCE; 9.3 ug/Kg (UUSCO - 470 ug/Kg).
- All other CVOCs were less than Laboratory Method detection limits (<5.3 ug/Kg – 11ug/Kg)

SB-A #2 (31``-36``)

- PCE; 300 ug/Kg (UUSCO – 1,300 ug/Kg)
- C-1,2-DCE; 15 ug/Kg (UUSCO -250 ug/Kg)
- TCE; 9.9 ug/Kg (UUSCO - 470 ug/Kg).
- All other CVOCs were less than Laboratory Method detection limits (<4.8 ug/Kg – 9.6 ug/Kg)

SB-A #2 (39``-43``)

- PCE; 300 ug/Kg (UUSCO – 1,300 ug/Kg)
- C-1,2-DCE; 15 ug/Kg (UUSCO -250 ug/Kg)
- TCE; 9.9 ug/Kg (UUSCO - 470 ug/Kg).
- All other CVOCs were less than Laboratory Method detection limits (<4.8 ug/Kg – 9.6 ug/Kg)

SB-A SUMP W (1`)

- PCE; 3,400 ug/Kg (UUSCO – 1,300 ug/Kg) EXCEEDS UUSCOs
- C-1,2-DCE; 550 ug/Kg (UUSCO -250 ug/Kg) EXCEEDS UUSCOs
- TCE; 6.4 ug/Kg (UUSCO - 470 ug/Kg).
- All other CVOCs were less than Laboratory Method detection limits (<5.3 ug/Kg – 11ug/Kg)

SB-A SUMP B (4.0`)

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- PCE; 12,000 ug/Kg (UUSCO – 1,300 ug/Kg) EXCEEDS UUSCOs
- C-1,2-DCE; 190 ug/Kg (UUSCO -250 ug/Kg)
- TCE; 12 ug/Kg (UUSCO - 470 ug/Kg).
- All other CVOCs were less than Laboratory Method detection limits (<4.4 ug/Kg – 8.8ug/Kg)

SB-A #1 (26``-32``)

- PCE; 3,600 ug/Kg (UUSCO – 1,300 ug/Kg) EXCEEDS UUSCOs
- C-1,2-DCE; 22 ug/Kg (UUSCO -250 ug/Kg)
- TCE; 5.9 ug/Kg (UUSCO - 470 ug/Kg).
- All other CVOCs were less than Laboratory Method detection limits (<5.1 ug/Kg – 10ug/Kg)

SB-A #1 (42``-59``)

- PCE; 5,900 ug/Kg (UUSCO – 1,300 ug/Kg) EXCEEDS UUSCOs
- C-1,2-DCE; 270 ug/Kg (UUSCO -250 ug/Kg) EXCEEDS UUSCOs
- TCE; 12 ug/Kg (UUSCO - 470 ug/Kg).
- All other CVOCs were less than Laboratory Method detection limits (<5.4 ug/Kg – 11ug/Kg)

SB-A H (3.0')

- PCE; 1,500,000 ug/Kg (UUSCO – 1,300 ug/Kg) EXCEEDS UUSCOs and Commercial Use Soil Cleanup Objectives (CUSCOs) – 150,000 ug/Kg) EXCEEDS CUSCOs
- All other CVOCs were less than Laboratory Method detection limits but due to elevated dilution they are in the following range. (<59,000 ug/Kg – <120,000 ug/Kg)

Five samples exceeded Unrestricted Use Soil Cleanup Objectives (UUSCOs). SB-A SUMP W (1`), SB-A SUMP H (3.0`), SB-A SUMP B (4.0`), SB-A #1 (26``-32``), and SB-A #1 (42``-59``). All exceeded PCE UUSCO of 1,300 ug/Kg. Two samples SB-A SUMP W (1`) and SB-A #1 (42``-59``) exceeded the C-1,2-DCE UUSCO of 250 ug/Kg. The remainder of SB-A had detections of C-1,2-DCE and TCE. However, due to the Source of PCE solvent in SB-A SUMP H (3.0`) C-1,2-DCE and TCE were “not detected” above the method detection limits due to the laboratory dilutions to achieve a reportable result.

The soil data referenced above are summarized in Table 1. The ECMS ARIR Table 1 “Soil Sample Results Summary- VOCs” table shows exceedances of Track 1 Unrestricted SCOs and Track 2 Commercial SCOs. The ECMS ARIR Figure 2 “Soil Analyte Detection” Map shows the

location and summarizes exceedances from Track 1 Unrestricted SCOs and Track 2 Commercial SCOs for the source area soil.

Due to the ample amount of sampling conducted in the basement and around the property the concentrations present in and around the sump it should be excavated to remove and source material. Due to the tight formation and soil types present under the site it has not migrated into the groundwater.

2.5.5 ON-SITE AND OFF-SITE GROUNDWATER CONTAMINATION

2.5.5.1 SUMMARY AND COMPARISON OF GROUNDWATER RESULTS WITH SCGS IN GROUNDWATER DATA

- Chlorinated Volatile Organic Compounds (CVOCs), PCE and its breakdown compounds (TCE, VC, and C-1,2-DCE) with impacts to perched contact water.
- Groundwater analytical results will be compared to Technical Operations and Guidance Memorandum 1.1.1 (TOGS 1.1.1) Ambient Water Quality Standards (AWQS) known as Groundwater Quality Standards (GQS)
- Ranges and maximum concentrations:
 - **Monitoring well MW-1** had no CVOC detections.
 - **Monitoring well MW-2** had detections of two CVOCs –
 - PCE at 1.1 ug/L (GQS 5 ug/L) and
 - C-1,2-DCE at 1.2 ug/L (GQS 5 ug/L)
 - **Monitoring well MW-3** had a detection of one CVOC –
 - PCE at 4.4 ug/L (GQS 5 ug/L)
 - **Sump Grab sample** had a detection of four CVOCs above the GQS and out of the forty compounds reported thirty-eight 38 had method detection limits above their respective GQS. Due to the dilution for C-1,2-DCE it elevated the method detection limits for the rest of the analytes in the run. The following detections were reported above TOGS GQS:
 - PCE at 110 ug/L (GQS 5 ug/L)
 - C-1,2-DCE at 4,800 ug/L (GQS 5 ug/L)
 - TCE at 86 ug/L (GQS 5ug/L)
 - Vinyl chloride (VC) at 560 ug/L (GQS 2 ug/L)

ECMS collected four groundwater samples from the site from MW-1 through MW-3 plus groundwater that accumulated in the basement sump. Groundwater analytical results from the monitoring wells showed no exceedances above NYSDEC Groundwater Quality Standards (GQS). The Sump Grab sample of groundwater in contact with the impacted soils showed elevated groundwater concentrations of PCE, C-1,2-DCE TCE, and VC above GQS. Due to the perched nature of the water in the sump it has not reached the wells MW-2 or MW-3. They are both within 10 ft laterally of the sump. The ECMS ARIR Table 2 “Groundwater Sample Results Summary – VOCs” compares ECMS’ samples to GQS. The EnviroSure Figure 4 Groundwater Location Sample Map compares results to GQS. Based on a review of EnviroSure Groundwater sampling results and the more recent ECMS ARIR well sampling and sump sampling results groundwater on the site is not affected by limited PCE impacts in soil surrounding the sump. The CVOC impacts in the monitoring wells which were detected from the water table at more than 20 feet below grade are not impacts by soils on the site. They may be related to offsite impacts or regional impacts unrelated to the source area which is roughly 9 ft below grade. Under the building. It is ECMS’ observed tight soils in the subsurface beneath the building and has shown in the ARIR that the CVOC impacts are limited in the extent and are strictly surrounding the sump.

The groundwater data referenced above are summarized in Table 2. ECMS ARIR Table 2 “Groundwater Sample Results Summary – VOCs” shows exceedances of GA groundwater standards. Figure 3 Groundwater Analyte Detection Map shows the location and summarizes exceedances of GA groundwater standards.

2.5.6 ON-SITE SOIL VAPOR INTRUSION SUMMARY AND COMPARISON WITH NYSDOH MATRIX CRITERIA

- Summary of soil vapor data
 - o CVOCs, were detected. In outdoor ambient air PCE was detected. In Indoor air, PCE and carbon tetrachloride were detected. And lastly in sub-slab soil vapor; PCE and its breakdown compounds (TCE and C-1,2-DCE) were detected.
 - o Ranges and maximum concentrations shown for Sub-Slab soil vapor samples

Parameter	SS-03	SS-04	SS-05
cis-1,2-Dichloroethene	11.6	ND (0.793)	543
Tetrachloroethene	3,160	490	2,500
Trichloroethene	41.5	4.96	394

Results reported in ug/m³

ND (0.793): Not Detected (Laboratory Reporting Limit)

Bold: Exceeds Criteria

- o Ranges and maximum concentrations shown for Indoor and Ambient Air Samples;

Parameter	IA-04	IA-05	IA-06	OA-02
Carbon tetrachloride	0.478	0.503	0.510	0.547
Tetrachloroethene	18.3	12.4	4.72	ND (0.136)

- o The summary tables for these Soil Vapor Intrusion Results are in the EnviroSure RIR Tables 3A, Table 3B Table 4A and Table 4B
- o The respective figures with SVI Data are located on EnviroSure RIR Figures 5 and Figure 6.

2.5.6.1 COMPARISON OF SOIL VAPOR WITH SCGS

- NYSDOH Indoor air guidance values have only been established for a few compounds. At this site PCE (30 ug/m³) and TCE(2ug/m³) have been detected below their respective Indoor Air Guidance Values. Sub-slab Soil Vapor results are not compared to Indoor Air Guidance Values.
- Based on the NYSDOH Matrix Criteria the Sub-Slab Vapor samples and respective Indoor air samples were compared to the respective Matrices A and B and based on the comparison of the respective concentrations the following compounds require mitigation TCE and C-1,2-DCE (Matrix A) and PCE (Matrix B).
- Once the proposed remedial action is completed at the site sub-slab soil vapor intrusion will be reevaluated.
- Due to the small size of the Site soil vapor is affecting indoor air. If the original source is removed from the immediate area surrounding the basement sump the result will reduce the need for mitigation if not eliminate soil vapor intrusion by conducting remediation.
- Soil Vapor Intrusion is a concern related to the PCE and breakdown products impacts in soil surrounding the basement sump. The proposed actions will reduce or eliminate the impact of soil vapor intrusion at the site.

2.6 Environmental and Public Health Assessments

2.6.1 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

The QHHEA evaluated the five elements (DER-10 Appendix 3B) associated with exposure pathways, and described how each of these elements pertains to the Site. The exposure pathway elements are described below:

1. Receptor population;
2. Contaminant source;
3. Contaminant release and transport mechanism;
4. Point of exposure; and,
5. Route of exposure.

As called for in DER-10, an exposure pathway is complete when all five elements of an exposure pathway are documented; a potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway is not documented but could reasonably occur. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway does not exist in the present and will not exist in the future.

2.6.2 RECEPTOR POPULATION

The receptor population includes the people who are or may be exposed to contaminants at a point of exposure. The identification of potential human receptors is based on the characteristics of the Site, the surrounding land uses, and the probable future land uses. The Site building has two commercial retail tenant spaces: 43 Lafayette Avenue is vacant and was formerly occupied by American Two Cleaners (ATC); 45 Lafayette Avenue is currently occupied by a wellness program tenant. Therefore, receptors would include the owner and contractors for the maintenance of Unit 43 and employees and patrons of Unit 45 that may be employed to perform work on the property. Exposure routes would include inhalation of sub-slab soil vapors migrating to indoor air.

At this time, the plans for the Site remain as they are. Exposed receptors may compromise employees and contractors who may be employed to perform work on the property. Site visitors (retail patrons) may also be considered receptors; however, their exposure would be similar to that of the indoor employees but at a lesser frequency and duration.

The Site is adjoined by a building to the west, only. No structure adjoins the Site building to the south, and Lafayette Avenue and Chestnut Street border the Site to the north and east. The buildings surrounding the Site are used for commercial purposes. Some adjacent and nearby buildings are mixed use with commercial occupants on the ground floor and residential use on the second floor.

2.6.3 CONTAMINANT SOURCES

The source of contamination is defined as either the source of contaminant release to the environment (such as a waste disposal area or point of discharge) or the impacted environmental medium (soil, air, water) at the point of exposure. Sections 6.0 and 7.0 discuss the COCs present in the Site media at elevated concentrations. This investigation was conducted to identify the source of the chlorinated solvent impact observed at the Site associated with past dry-cleaning operations. A source for chlorinated solvent impact is assumed to be the former dry cleaner operation, however laboratory analysis did not identify impact in concrete, soil, or ground water.

The non-target contaminants PAH, PFOA, sodium and iron were identified in ground water samples. The non-target contaminants nickel and lead were identified in soil samples, and acetone was detected in concrete samples. The source for non-target contaminants is not known and may be attributed to historical fill and/or offsite or naturally occurring sources.

2.6.4 CONTAMINANT RELEASE AND TRANSPORT MECHANISM

Contaminant release and transport mechanisms carry contaminants from the source to points where people may be exposed and are specific to the type of contaminant and Site use. For the limited CVOCs present in soil vapor, the potential exists for exposure through pathways associated with soil vapor intrusion. This would include the indoor vapor intrusion pathway. Under the current and future use scenario, soil vapor intrusion is a relevant transport mechanism. Soil vapor intrusion would entail soil vapor migrating from under the building slab and impacting the indoor air above the slab.

Based on the soil, concrete and ground water analytical results, off-site migration of the target contaminants (CVOCs) appears to be minimal. The potential for soil vapor to migrate offsite, also appears minimal and escaping vapors related to the target contaminants were not detected in the outdoor air sample.

Transport of non-target contaminants may migrate with groundwater. Due to the low volatility of the contaminants, relative stability in soil, and low-permeable surface cover in the Site area, significant vapor phase transport and migration through soil appears to be unlikely.

2.6.5 EXPOSURE ROUTES AND MECHANISMS

The point of exposure is a location where actual or potential human contact with a contaminated medium may occur. Based on the exceedances of guidance values for limited CVOCs in soil vapor and indoor air, the point of exposure is defined as the entire Site.

The route of exposure is the way a contaminant enters or contacts the body (e.g., ingestion, inhalation, dermal absorption). Based on the types of receptors and points of exposure identified above, potential routes of exposure are listed below:

Current Use Scenario: The Site is occupied by a one-story building and basement with a four to six-inch thick concrete slab as well as concrete sidewalks along the Site boundaries. Exposure to contaminated surface soil and contaminated groundwater is not likely due to the low-permeability barriers and use of municipal water for potable purposes. Release and transport mechanisms include sub-slab soil vapors migrating to indoor air.

- Employee/Patron - inhalation
- Contractors - inhalation

Future Use Scenario: The Site is planned to remain as a commercial space with potential cafe or retail store operations. The release and transport mechanisms remain the same as the current use scenario.

Exposure to chlorinated solvents by off-site potential receptors is limited since no contaminants were identified in soil or ground water. A slight potential for vapor migration to buildings located west may exist for the first-floor commercial operations. Vapor migration to second floor residential use is less likely. Off-site potential receptors exposure to non-targeted contaminants is unlikely due to the depth of groundwater, low permeability barriers, and use of municipal water for potable purposes.

2.6.6 EXPOSURE ASSESSMENT

Based on the above assessment, the potential exposure pathways for the current and future use conditions are listed below.

Current Use Scenario: Site contamination includes limited CVOCs related to historic site operations, and although not part of the former Site observations, exposure scenarios for SVOCs and metals are related to direct contact and the risk of exposure is addressed in a similar way to the VOC. Under current conditions, the exposure to soil or groundwater is not likely, as the site is completely capped by a building and concrete sidewalks. Potable water for the Village of Suffern will continue to be sourced from the Municipal Utilities Authority. All intrusive work on the Site is done in accordance with a Site-Specific Health and Safety Plan and donning of PPE. Exposure to sub-slab soil vapor is likely via indoor air and mitigation is required. In most instances, these exposures can be mitigated through the use of engineering controls, including sealing of the basement slab and sump, soil vapor extraction, and/or installation of sub-slab depressurization systems. Currently, all cracks in the basement slab have been sealed, the sump has been covered and sealed to limit vapor intrusion to the basement indoor air.

Future Use Scenario: The Site is planned to remain as a commercial space with potential cafe or retail store operations. Exposure to sub-slab soil vapor is via indoor air as in the current use scenario. These exposures can be mitigated through the use of engineering controls as mentioned above.

Overall exposure by off-site potential receptors is minimal. Sub-slab vapors are not likely to migrate a significant distance. Exposure by potential receptors in the first-floor commercial operations may be similar to the on-site exposure potential. Use of a sub-slab depressurization system at the Site will control the potential for off-site vapor migration. Exposure to target and non-target contaminants via soil and groundwater is not expected due to low concentrations, depth to groundwater, low volatility, low-permeable surface coverage, and use of municipal water for potable water supply.

2.6.7 FISH & WILDLIFE REMEDIAL IMPACT ANALYSIS

NYSDEC DER-10 requires an onsite and offsite Fish and Wildlife Resource Impact Analysis if the stipulated criteria are met. The Site, which was occupied by dry-cleaning operations from the early 1950s, is located within a mixed-use commercial and residential area of the Village of Suffern, New York. The Site provides no wildlife habitat or food value and/or access to the detected subsurface contamination. No natural waterways are present on or adjacent to the Site. The proposed future use of the Site is for commercial purposes. As such, no unacceptable ecological risks are expected under the current and future use scenario.

2.7 Remedial Action Objectives

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) have been identified for this Site.

2.7.1 GROUNDWATER

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer, to the extent practicable, to pre-disposal/pre-release conditions.
- Remove the source of ground or surface water contamination.

2.7.2 SOIL

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

2.7.3 SOIL VAPOR

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

3.0 Description of Remedial Action Plan

This section presents the technical description and evaluation of two proposed remedial alternatives and the selection of the preferred remedial alternative.

3.1 Technical Descriptions of Alternatives

Two alternatives were developed and evaluated for implementation at the Site to meet the proposed RAOs and are described below:

Alternative 1 – Conditional Track 1; Part 375 Unrestricted Use SCOs Remedy

1. In a conditional Track 1 remedy institutional and engineering controls (ICs/ECs) are allowed for periods of five years or less if the volunteer/participant has conducted remedial activities resulting in bulk reduction in groundwater contamination to asymptotic levels.
2. Removal of a portion of the basement concrete slab and excavation and off-site disposal of soils above Unrestricted SCOs, to a depth of approximately 5-feet below the bottom of the concrete slab (approximately 12 feet bgs).
3. Periodic groundwater monitoring of CVOCs to evaluate if the removal of the source soil impacts reduces associated CVOC concentrations in the perched groundwater. If groundwater standards are not met within five years a Track 2 remedy may be required.
4. Installation of piping for an active sub-slab depressurization system (SSDS) in the event an active engineering control for the mitigation of soil vapors is required. The SSDS will consist of a 4-inch PVC riser installed below the concrete slab prior to

pouring of the concrete and capped. If SSDS activation is required, the PVC riser will be run to above the roofline and fitted with an inline FanTech Rn4EC fan (or equivalent).

5. Sub-slab vapor monitoring points will be installed within the concrete slab to allow for soil vapor intrusion (SVI) sample collection upon completion of the remedial actions to evaluate if the SSDS is required. The SVI evaluation will be conducted in accordance with the NYSDOH SVI Guidance and include the collection of soil sub-slab vapor and indoor air samples. The results will be compared to the SVI Indoor Air Decision Matrices and should “mitigation” be required an evaluation of SVI mitigation alternatives will be conducted.
6. If necessary, the evaluation of SVI mitigation alternatives will be conducted, including, but not limited to, construction and activation of an SSDS from the capped riser pipe and application of an interior vapor intrusion coating (i.e. RetroCoat or equivalent) on the basement floor slab and walls. The SVI mitigation evaluation is anticipated to be prepared as an Interim Remedial Measures (IRM) Work Plan for NYSDEC and NYSDOH review, prior to implementation.
- 7.
8. If an SVI mitigation component is implemented, sub-slab vapor and indoor air concentrations will be periodically monitored as described in the Site Management Plan (SMP). If the sub-slab soil vapor and indoor air concentrations reach a point where “no further action” is required per the SVI Indoor Air Matrices, then a request to discontinue the SVI mitigation component will be submitted to no longer consider the component an EC and the condition on the Track 1 remedy will be removed. Should sub-slab vapors exceed the SVI Matrix values after 5-years, then the SVI mitigation component will become a permanent EC and the remedy will be considered a Track 2 as described below.
9. Preparation of an NYSDEC approved SMP to provide a management and monitoring plan for the short-term (less than five years) ICs/ECs, including, but not limited to, groundwater monitoring and SVI mitigation component operation, and to certify the ICs/ECs are performing as intended.

Alternative 2 –Track 2; Part 375 Commercial Use SCOs Remedy

- The Alternative 2 remedy will be the same as Alternative 1. This alternative is provided in the event Track 1 Soil SCOs cannot be met, SVI mitigation component is required for longer than 5 years, and/or groundwater treatment is required.
- Establishing and updating the NYSDEC approved SMP to provide long-term (greater than five years) management, monitoring, and performance certification of the ICs/ECs. The IC/ECs could include, but not be limited to, groundwater monitoring, cover system, and SVI mitigation component operation.

- Establishment of an Environmental Easement (if needed) for the property based on the required long-term ICs/ECs.

3.2 Evaluation of remedial alternatives

This section presents the detailed evaluation of the two proposed remedial alternatives to determine the selection of the preferred remedial alternative. As required, a minimum of two remedial alternatives (including a Track 1 remedy) are evaluated.

3.2.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Alternative 1 - Protective of human health and the environment through the removal of contaminants in soil above the UUSCOs. The removal of impacted soil above the UUSCOs is expected to eliminate post-remediation exposures to the extent that an SSDS is not required. Groundwater is anticipated to be restricted at the Site until groundwater quality recovers after removal of the soil source. This remedy would be most protective of human health and the environment.

Alternative 2 - Protective of human health and the environment by removing impacted soil above Commercial Use SCOs, due to the anticipated current and future site use, yet removing soil to meet UUSCOs would still be the remedial target. Long-term IC/ECs will be utilized to protect human health and the environment from potential exposure pathways.

3.2.2 COMPLIANCE WITH STANDARDS, CRITERIA, AND GUIDELINES

Alternative 1 – Remediating the Site via a Track 1 remedy will comply with all applicable SCGs listed in Section 4.1.1, due to the removal of all impacted on-site soil and subsequent reductions in groundwater and soil vapor impacts.

Alternative 2 – Remediating the Site via a Track 2 remedy includes removal of soil exceeding the UUSCOs to the extent practicable and any remaining residual soil left in place is below the commercial use SCOs. Alternative 2 will comply with the restricted SCGs, however residual groundwater contamination may exist and/or long-term operation of an SSDS may be required.

3.2.3 SHORT-TERM EFFECTIVENESS AND IMPACTS

Alternatives 1 and 2 have similar short-term effectiveness and impact during their implementation, as each requires excavation of impacted soils below the basement slab. The proposed excavation provides removal of the most impacted material at the Site, leading to a reduction of potential exposure pathways from the impacts in the immediate short-term.

Each alternative would result in potential minimum short-term dust generation impacts associated with Vactor® excavation, loading-out of materials, and truck traffic. The alternatives

are not expected to increase truck traffic in the area due to the limited volume of material to be excavated.

The potential impact to the public, on-site workers, and environment during remediation under both alternatives would be minimized by implementing project specific plans including a Health and Safety Plan (HASP), Soil/Materials Management Plan (SMMP), and a Community Air Monitoring Plan (CAMP) during all soil disturbance activities. ECMS will evaluate if solar power CAMP air monitoring setups will be suitable for the project needs to establish energy-efficient usage to comply with DER-31. ECMS will enforce idling restrictions on all construction equipment on the site such as meeting idling regulations, or in the absence of such regulations, limiting engine idling time to less than three minutes in any sixty-minute period to comply with DER-31. ECMS will evaluate if shipping remedially excavated contaminated soils is possible by rail to reduce greenhouse gas emissions.

3.2.4 LONG-TERM EFFECTIVENESS AND PERMANENCE

Alternative 1 – All impacted soil above UUSCOs would be removed from the Site by excavation and off-site disposal, resulting in an effective and permanent long-term remedy for soils. Alternative 1 will meet the RAOs for soil, groundwater, and soil vapor in the future, with potential short-term (less than 5 years) ICs/ECs while groundwater and soil vapor quality recover. To Comply with DER-31 ECMS will consider Reused PVC pipe, reuse polysheeting/snow fence for demarcation barriers.

Alternative 2 – This alternative would provide long-term effectiveness by removing most, if not all, of the on-site soil contamination by excavation and off-site disposal and attaining Track 2 Commercial Use SCOs. Should residual soil remain that exceeds the UUSCOs, but is below the commercial use SCOs, and/or groundwater and/or soil vapor impacts remain for a period longer than five years an SMP and Environmental Easement will be implemented to ensure long-term use restrictions and management of ICs/ECs. The SMP ensures long-term effectiveness of the ICs/ECs by requiring periodic inspection and certification that the controls and restrictions continue to be in place and are functioning as intended.

3.2.5 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME OF CONTAMINATED MATERIAL

Alternative 1 – This alternative will permanently and significantly reduce the toxicity, mobility, and volume of contamination through excavation and off-site disposal of all soil exceeding UUSCOs and the application of an interior vapor intrusion coating in the basement to reduce the potential mobility of soil vapor impacts. This remedy provides the largest reduction of toxicity, mobility, and volume of contamination at the Site.

Alternative 2 – This alternative will also significantly reduce the toxicity, mobility, and volume of contamination through excavation and off-site disposal of soil exceeding the UUSCOs to the extent practicable and any remaining residual soil left in place being below the commercial use SCOs. The application of an interior vapor intrusion coating in the basement and installation, activation, and operation of a SSDS will reduce the potential mobility of soil vapor impacts. An EE, governed by an SMP, will be implemented to address soil that exceeds Restricted Use Residential SCOs and the continued operation of the SSDS.

3.2.6 IMPLEMENTABILITY

Both Alternative 1 and 2 can be readily implemented and the proposed approach has been proven effective in remediating the impacts and media present at the Site. While excavation for the remediation of the soils in a basement can pose technical challenges, multiple reliable means and methods have been developed to facilitate this type of excavation.

The application of a vapor intrusion coating and SSDS (if required) are both readily implementable.

3.2.7 COST EFFECTIVENESS

The capital costs for Alternative 1 and Alternative 2 are similar, as the extents of the excavation will extend to the practicable limits, and both will include the application of an interior vapor intrusion coating if post excavation sampling requires. Alternative 2 will have higher costs for long-term groundwater monitoring and SSDS maintenance associated with the EE and SMP. The total costs for Alternative 1 are estimated at \$187,920. Alternative 2 costs are estimated at \$213,920 with the additional 5 years of monitoring, reporting and SSDS maintenance. The breakdown of the cost estimates is provided in Appendix F.

3.2.8 COMMUNITY ACCEPTANCE

Both remedial alternatives are expected to be acceptable to the community. In both alternatives the potential exposure pathways and on-site contamination will be eliminated or significantly reduced by remedial actions that have been used elsewhere in New York State and at similar sites, with acceptance by local communities and regulatory authorities. This RAWP will be subject to a 45-day public comment period to determine if the community has comments on the presented remedial alternatives and selected preferred remedy. Any substantive public comments will be addressed prior to approval of the remedy.

3.2.9 GREEN AND SUSTAINABLE REMEDIATION

Green and sustainable remediation principles and techniques were evaluated for both alternatives to the extent feasible per DER-31. A climate change vulnerability assessment was conducted, to evaluate the impact of climate change on the project site and the environmental

footprint analysis was completed using SEFA are included in **Appendix I**. The evaluation of alternatives and remediation of the project site in general will focus on incorporating green and sustainable remediation principles, including climate resiliency, through best management practices and material selection.

Alternatives 1 and 2 would incorporate the following best management practices:

- The use of roll-off containers to reduce truck traffic/idling and reduce potential pollution from not stockpiling materials.
- If roll-off containers containing materials for disposal can be shipped by rail vs vehicle to reduce carbon emissions it will be given preference.
- The demarcation layer will be made of recycled plastic sheeting or recycled snow fence.
- Preference will be given to recycled concrete aggregate to reduce direct and indirect greenhouse gases and other emissions.
- Prioritizing recycled PVC riser where appropriate.

Alternative 1 will also incorporate the following best management practices:

- Removal of the entire source to limit long term electric use and VOC pollutant emissions associated with mitigation with a SSDS.
- Proactive PVC riser installation, reducing potential repairs to the vapor barrier and additional construction materials and vehicle traffic.

Due to the similar scopes for the two alternatives and limited interior remedial footprints, and the evaluation of alternatives hereto providing support for the most protective Track 1 alternative, an environmental footprint analysis was not conducted at this time. The green and sustainable remediation best management practices will be tracked during implementation of the remedial action and reported in the Final Engineering Report (FER), including a comparison to the best management practices established during this RAWP.

3.2.10 LAND USE

The current and reasonably anticipated future land use of the Site are compatible with both remedial alternatives. The Site is currently used as a commercial building and is anticipated to continue to be used as commercial upon completion of the remedial action. Should future land use change, Alternative 1 would allow for unrestricted use in the future.

3.3 Selection of the Preferred Remedy

The preferred remedial alternative is Alternative 1.

Alternative 1 was selected based on the evaluation conducted in Section 3.2 and this alternative providing unrestricted future site use and not requiring long-term ICs/ECs and the associated EE and SMP monitoring requirements. A Track 2 contingency will be available for the Site in the form of Alternative 2 should UUSCOs not be met.

The detailed remedial scope of the preferred remedy is provided in the following sections.

3.3.1 PROTECTION OF PUBLIC HEALTH, ON-SITE WORKERS, AND THE ENVIRONMENT

A site-specific HASP is provided as Appendix B to protect site workers from accidents and exposure related to the contaminated media during the implementation of the remedial alternative. The CAMP provided as Appendix C, combined with dust, odor, and organic vapor control procedures, will be implemented to provide protection of public health. Appropriate soil erosion controls will be implemented to ensure protection of the environment.

3.3.2 EXCAVATION AND OFF-SITE DISPOSAL OF IMPACTED SOIL

The proposed excavation area is shown on FIGURE 4. The area will be excavated to a depth of approximately 5 feet below the bottom of the basement concrete slab (12 feet bgs) as that is the currently delineated extent of impacts exceeding the UUSCOs. Prior to excavation the concrete slab will be cut, removed, and segregated as Construction and Debris (C&D) materials to be managed and disposed of separate from the impacted soils. Facilities, bill of ladings and or manifests will be documented for Final Engineering Report (FER).

The impacted soil is anticipated to be excavated utilizing a “vactor truck”. All excavated materials will be managed in accordance with the Soil/Materials Management Plan (SMMP) presented in Section 5.0 . The soils removed from the vactor truck will either be live loaded or staged in roll-offs for off-site disposal. The anticipated total quantity of soil to be excavated and disposed of off-site is between 5-30 cubic yards (7.5 to 45 tons, assuming 1.5 tons per cubic yard).

All transportation and off-site disposal of excavated soils will be conducted in accordance with applicable state and federal statutes and guidances. Sampling and analysis of the excavated materials will be conducted as required by the disposal facility(ies). For each disposal facility anticipated to receive and accept material for disposal, a letter from the QEP/RE to the disposal facility requesting approval for disposal and a return letter from the disposal facility providing approval for disposal will be submitted to NYSDEC for approval prior to any transport and disposal of material at the facility. The selected disposal facility(ies) will be reported to NYSDEC when identified and prior to the start of the remedial action.

3.3.3 POST-EXCAVATION END-POINT SAMPLING

Post-excavation end-point samples will be collected upon completion of the excavation to verify the remedial goals have been achieved, in accordance with DER-10. A total of 5 end-point samples, 1 base sample and 4 sidewall samples, will be collected and will be analyzed by a NYS ELAP certified lab for the following site-specific contaminants of concern:

- Part 375 VOC compounds - carbon tetrachloride, 1,1-dichloroethene, C-1,2-DCE, TCE, methylene chloride, PCE, 1,1,1-trichloroethane, and VC by EPA Method 8260.

The locations will be biased towards areas exhibiting field indication of impacts, if present, such as PID measurements or visual/olfactory indication of impacts. End-point sampling results will be compared to the UUSCOs and should results exceed the UUSCOs, the excavation will be extended to the extent practicable to meet the UUSCOs. Backfilling in accordance with Section 3.3.4 will not occur until receipt and verification of end-point sample results meet the applicable SCOs.

3.3.4 BACKFILLING AND CONCRETE SLAB REPLACEMENT

Upon receipt of end-point sampling results meeting the applicable SCOs, the excavation will be backfilled with suitable gravel/stone material, as identified by others, for the structural support of the building. Material proposed to be imported to the Site for use as backfilling will be approved by NYSDEC prior to import. Virgin quarry material (gravel and stone) will not be tested prior to placement in accordance with DER-10. Upon completion of backfilling a 4-inch PVC riser pipe stub will be installed approximately 3-inches into the sub-grade and capped, for installation of a future SSDS if required. A vapor barrier is anticipated to be installed across the open excavation and then the concrete slab replaced.

3.3.5 POST-REMEDATION SOIL VAPOR INTRUSION EVALUATION

Upon completion of the concrete slab replacement, the sub-surface soil vapors will be allowed to equilibrate for at least 30 days. Three sub-slab (SS) soil vapor sampling points will be installed in the basement at the EnviroSure RI SVI sub-slab locations, SS-03, SS-04, and SS-05. A SVI investigation will be conducted in accordance with the NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (SVI Guidance) dated October 2006, with updates through February 2024, consisting of the 3 SS soil vapor samples, 1 indoor air (IA) sample in the basement, 2 IA samples on the first floor (1 in each tenant space), and 1 ambient outdoor air sample. Each sample will be collected in laboratory-supplied, certified clean SUMMA canister with a dedicated 8-hour flow controller, labeled in the field, and transported via courier under chain of custody protocol to an ELAP certified analytical laboratory and analyzed for EPA Method TO-15.

The results will be compared to the SVI Guidance and a determination of “no further action”, “monitor”, or “mitigate” will be made based on the comparison of the SS soil vapor and IA analytical results to the SV/IA Decision Matrices included in the SVI Guidance. Should the results indicate a mitigate determination, an evaluation of SVI mitigation alternatives will be conducted, including, but not limited to, construction and activation of an SSDS from the capped riser pipe and application of an interior vapor intrusion coating (i.e. RetroCoat or equivalent) on the basement floor slab and walls. The SVI mitigation evaluation is anticipated to be prepared as

an Interim Remedial Measures (IRM) Work Plan for NYSDEC and NYSDOH review, prior to implementation.

3.3.6 POST-REMEDIATION GROUNDWATER MONITORING

Upon completion of the remedial excavation and concrete slab replacement, a groundwater monitoring program will be implemented to monitor cVOC concentrations in the perched groundwater after the removal of the source soil impacts. The groundwater monitoring program will consist of monitoring wells, MW-1, MW-2, and MW-3, which will be sampled and analyzed for Site-specific VOC COCs only, via EPA Method 8260 by an ELAP certified analytical laboratory. The first post-remediation groundwater monitoring event will be conducted no sooner than 30-days after completion of the remedial excavation. The detailed groundwater monitoring program will be presented as part of the Interim SMP, should the results of the post-remediation groundwater monitoring event indicate exceedances above the Class GA Groundwater AWQS.

3.3.7 QUALITY ASSURANCE/QUALITY CONTROL AND DATA USABILITY

Quality Assurance/Quality Control (QA/QC) samples and procedures will be conducted in accordance with the QAPP provided as Appendix D.

Data validation will be conducted by a third-party data validator and data usability summary reports (DUSRs) prepared in accordance with Appendix 2B of DER-10. DUSRs for documentation/performance samples collected during the implementation of the remedial action will be provided in the FER.

3.4 Land Use Factor Evaluation

This section evaluates the preferred remedy presented in Section 3.3 to examine whether it is acceptable based on the following criteria (below) as required by Article 27, Title 14 of the Environmental Conservation Law 27-1415. This evaluation addresses the current, proposed, and reasonably anticipated future uses of the Site.

3.4.1 ZONING

Upon completion of the remedial action, the property is proposed to continue to be used as a commercial building in compliance with the current zoning. The preferred remedy will comply with the current zoning.

3.4.2 APPLICABLE COMPREHENSIVE COMMUNITY MASTER PLANS OR LAND USE PLANS

There are currently no applicable comprehensive community master plans or land use plans. Redevelopment at the Site is not proposed as part of this remedial action.

3.4.3 SURROUNDING PROPERTY USES

The properties immediately adjacent to the Site consist of other commercial properties and roadways. The limited footprint associated with completion of the proposed remedy is not anticipated to impact the surrounding property uses in the short-term and will not interfere with surrounding property uses in the long-term.

3.4.4 CITIZEN PARTICIPATION

The Citizen Participation plan was developed as part of the EnviroSure RIR. It is included as part of Appendix E.

3.4.5 ENVIRONMENTAL JUSTICE CONCERNS

The Site is not located in an Environmental Justice Area.

3.4.6 LAND USE DESIGNATIONS

The proposed alternative is consistent with land use designations.

3.4.7 POPULATION GROWTH PATTERNS

The proposed plan continues using the building for commercial space. Therefore, there is expected to be no bearing on the population growth.

3.4.8 ACCESSIBILITY TO EXISTING INFRASTRUCTURE

The Site is accessible to existing infrastructure and the preferred remedy will not alter accessibility in the short or long term.

3.4.9 PROXIMITY TO CULTURAL RESOURCES

The proposed remedy will not negatively impact cultural resources.

3.4.10 PROXIMITY TO NATURAL RESOURCES

The Site is not located close to important federal, state, or local natural resources. The closest ecological receptor is the Ramapo River located approximately 1,500 feet southwest of the Site.

3.4.11 OFF-SITE GROUNDWATER IMPACTS

No off-site groundwater impacts have been identified during the RI. The proposed remedial plan will improve potential off-site groundwater impacts by removing contaminated soil at the Site that could act as a groundwater contamination source.

3.4.12 PROXIMITY TO FLOODPLAINS

According to the Federal Emergency Management Agency Flood Insurance Rate Map the Site is not located within a floodplain.

3.4.13 GEOGRAPHY AND GEOLOGY OF THE SITE

The geography and geology of the Site is consistent with the surrounding area and will not be impacted by the remedy.

3.4.14 CURRENT INSTITUTIONAL CONTROLS

There are currently no institutional controls at the Site.

3.5 Summary of selected Remedial Actions

The selected Track 1 remedy will include the following:

1. Development and implementation of a HASP and CAMP for the protection of on-site workers, community/residents, and the environment during remediation and construction activities.
2. Break up and remove concrete slab of basement.
3. Implementation of pollution and sediment control measures in compliance with applicable laws and regulations.
4. Removal of the existing loose concrete cover and miscellaneous debris/soils on the Site.
5. Excavation around the basement sump via Vactor® soil vacuum truck or similar equipment, stockpiling, off-Site transport, and disposal of approximately 20-40 cubic yards of contaminated historical fill material that exceeds UUSCOs as defined by 6 NYCRR Part 375-6.8. Excavation will be to 13-15 ft bgs (below sidewalk level).
6. Collection and analysis of post-excavation end-point confirmation soil samples from the excavation base and, to the extent possible, sidewalls of the excavation in accordance with DER-10, to document post-excavation conditions to confirm a Track 1 remedy was achieved.
7. Implementation of a preliminary waste characterization to facilitate off-site disposal of excavated soil/fill.

8. Screening for indications of contamination (by visual means, odor, and PID readings) of excavated material during intrusive site work.
9. Localized dewatering of perched groundwaters with containerization, classification, and disposal at an approved receiving facility.
10. Off-site disposal of material removed from the Site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal.
11. Installation of a demarcation layer indicating the top of residual soils/extent of excavation with plastic sheeting and or orange construction fencing.
12. Backfilling of excavated areas, as necessary for development, with certified-clean material (i.e., meeting UUSCOs), recycled concrete aggregate (RCA), or virgin, native crushed stone.
13. Installation of a 4-inch PVC riser pipe stub in the excavated area for future soil vapor mitigation, lining of the excavated area with a vapor barrier, and replacement of the concrete slab.
14. Installation of SS soil vapor points and completion of a SVI Evaluation in accordance with DER-10 and the SVI Guidance following remedial excavation activities and prior to occupancy.
15. Based on the SVI Evaluation, preparation of an IRM Work Plan for the design and installation of a SVI mitigation alternative, if necessary. Potential SVI mitigation alternatives include, but not are limited to, construction and activation of an SSDS from the capped riser pipe and application of an interior vapor intrusion coating (i.e. RetroCoat or equivalent) on the basement floor slab and walls.
16. Preparing and implementing a post-remediation groundwater monitoring program to evaluate the response of CVOCs in groundwater after source removal.

As part of the Track 1 Remedy, the soil vapor RAO must be met for a Track 1 remedy to be achieved. As will the soil/ groundwater RAO. Contingent remedial elements include the following: 1) establishment of an approved SMP to ensure long-term management of engineering (waterproofing/ vapor barrier, and cover system) and institutional controls (Environmental Easement, to prevent use of site for gardening, groundwater), including the performance of periodic inspections and certification that the controls are performing as they were intended; and 2) recording of an Environmental Easement (EE) to ensure future owners of the site maintain the required engineering/institutional controls

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP and the Department-issued Decision Document. All deviations from the RAWP and/or Decision Document will be promptly reported to NYSDEC for approval and fully detailed in the FER.

4.0 Remedial Action Program

4.1 Governing Documents

The primary documents governing the remedial action program are summarized in this section.

4.1.1 STANDARDS, CRITERIA AND GUIDANCE

The following standards, criteria, and guidance are typically applicable to Remedial Action projects in New York State, and will be consulted and adhered to as applicable:

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
- 6 NYCRR Subpart 373-4 - Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste
- 6 NYCRR Part 375 - Environmental Remediation Programs
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 6 NYCRR Part 750 - State Pollutant Discharge Elimination System (SPDES) Permits
- CP-43 – Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)
- CP – 51 – Soil Cleanup Guidance (2010)
- DER-2 - Making Changes to Selected Remedies (Revised April 2008)
- DER-10 – Technical Guidance for Site Investigation and Remediation (May 3, 2010)
- DER-23 – Citizen Participation Handbook for Remedial Programs (March 2010)
- **DER-31 – Green Remediation (2010)**
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)

- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- NYSDEC Sampling, Analysis, and Assessment of PFAS under NYSDEC's Part 375 Remedial Programs, dated April 2023

4.1.2 SITE SPECIFIC HEALTH & SAFETY PLAN (HASP)

Any person conducting investigation or remediation activities is required to prepare and implement a site-specific HASP which will be adhered to by all personnel involved in the investigation and/or remediation at the site. The HASP is a requirement of the federal Occupational Safety and Health Administration (OSHA) and all remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA.

The site-specific HASP and requirements defined in this Remedial Action Work Plan pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion. The HASP is provided in Appendix B and refers to and incorporates the CAMP which is enclosed as part of Appendix C.

The HASP provided as part of this RAWP does not include general or site-specific construction or general industry safety information. The General Contractor (GC) will prepare their own HASP and is responsible for the safety of their personnel when on-Site.

All work onsite will be conducted in accordance with the most recently adopted and applicable general industry (29 CFR 1910) and construction (29 CFR 1926) standards of OSHA, the U.S. Department of Labor, as well as any other federal, state or local applicable statutes or regulations.

The Site Safety Coordinator will be Harry Sudwischer. A resume will be provided to NYSDEC prior to the start of remedial construction.

Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gases. Confined space is not expected to be encountered as part of the proposed remedial action.

4.1.3 QUALITY ASSURANCE PROJECT PLAN (QAPP)

A QAPP has been prepared in accordance with the DER-10 and PFAS Sampling Guidance to describe the quality assurance and quality control components to ensure the proposed remedy accomplishes the RAOs. The QAPP is provided in Appendix D.

4.1.4 SOIL/MATERIALS MANAGEMENT PLAN (SMMP)

Soil/materials removal and management will be conducted in accordance with the SMMP plan presented in Section 5.0. The SMMP includes detailed plans for managing all soils/materials that are disturbed at the Site, including excavation, handling, storage, transport and disposal and includes the controls that will be applied to these efforts to assure effective, nuisance-free performance in compliance with all applicable Federal, State and local laws and regulations.

4.1.5 STORM-WATER POLLUTION PREVENTION PLAN (SWPPP)

Erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Erosion and sediment controls to be implemented are detailed in Section 4.3.3 A Stormwater Pollution Prevention Plan (SWPPP) is not required as the project will disturb less than one acre.

4.1.6 COMMUNITY AIR MONITORING PLAN (CAMP)

Community air monitoring will be conducted in accordance with the CAMP provided as Appendix C and the NYSDOH Generic CAMP included as Appendix 1A of DER-10.

4.1.7 CONTRACTORS SITE OPERATIONS PLAN (SOP);

The Remedial Engineer will review all plans and submittals for this remedial project (including those listed above and contractor and sub-contractor document submittals) prior to commencing remedial activities and will confirm that they are in compliance with this RAWP. The Remedial Engineer is responsible to ensure that all later document submittals for this remedial project, including contractor and sub-contractor document submittals, are in compliance with this RAWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

4.1.8 CITIZEN PARTICIPATION PLAN

Per the approved Citizen Participation Plan(Appendix E) fact sheets describing the remedial action proposed in this RAWP will be distributed through DEC Delivers, the NYSDEC's email listserv service.

No changes will be made to approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet.

Document repositories have been established at the following locations and contain/will contain all applicable project documents:

Suffern Free Library

210 Lafayette Avenue, Suffern, NY 10901

845-357-1237

Hours: Monday-Thursday: 10:00am-9:00pm Friday-Saturday: 10:00am-5:00pm

Sunday: 12:00pm-5:00pm

4.2 General Remedial construction information

4.2.1 PROJECT ORGANIZATION

Carson Voci and ECMS will act as the Environmental Consultant for this Site. The principal personnel for implementation of this remedial action are as follows, in a project organization chart format:

- Professional Engineer/Remedial Engineer: Nicholas Krasnecky, P.E., Carson Voci
- Qualified Environmental Professional: Harry Sudwischer, ECMS
- General Contractor: TBD
- Transport and Disposal Contractor: TBD

An organization chart is included in Figure 3.

Resumes of key personnel involved in the Remedial Action are included in Appendix J.

4.2.2 REMEDIAL ENGINEER

The Remedial Engineer for this project will be Nicholas Krasnecky. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the 43-45 Lafayette Ave Site (NYSDEC BCA Index No. C344085-07-21 Site No. C344085). The Remedial Engineer will certify in the Final Engineering Report that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other Remedial Engineer certification requirements are listed later in this RAWP.

The Remedial Engineer or the Qualified Environmental Professional will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of back fill material, and management of waste transport and disposal. The Remedial Engineer or the Qualified Environmental Professional will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this Remedial Action Work Plan and will certify compliance in the Final Engineering Report.

The Remedial Engineer will provide the certifications listed in Section 10.1 in the Final Engineering Report.

4.2.3 REMEDIAL ACTION CONSTRUCTION SCHEDULE

The proposed Remedial Action schedule is present below and is contingent on the approval of this RAWP by the date presented below:

Remedial Task	Estimated Date
Submittal of the RAWP	April 2024
NYSDEC Review of RAWP	May – June 2024
NYSDEC issues Decision Document	July 2024
Implementation of RAWP	July - August 2024
Prepare and Submit FER	August – October 2024

4.2.4 WORK HOURS

The hours for operation of remedial construction will conform to the municipal and county construction code requirements or according to specific variances issued by those departments. NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 SITE SECURITY

The site will be secured to prevent unauthorized access during the implementation of the remedial action. Site security is anticipated to consist of a construction fence surrounding any portion of the property where active remedial construction is conducted and/or utilized for equipment staging or soil stockpiling/loadout.

4.2.6 TRAFFIC CONTROL

The GC will be responsible for acquiring any traffic control related permits to facilitate the implementation of the remedial action. The estimated volume of soil to be removed from the Site would only require 2 to 3 trucks and therefore impact from transport and disposal of soil is not anticipated. Disposal trucks are anticipated to be staged and loaded on Chestnut Street and then will proceed directly to Route 202 and continuing to their final disposal facility destination.

4.2.7 WORKER TRAINING AND MONITORING

All Site workers are required, at minimum, to have completed 29 CFR 1910.120 Hazardous Waste Operations & Emergency Response (HAZWOPER), site safety training, and medical monitoring.

4.2.8 AGENCY APPROVALS

All applicable permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction. Approval of this RAWP by NYSDEC does not act as a substitute for obtaining any required permits.

A complete list of all local, regional, and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work will be included in the FER. This list includes a citation of the law, statute, or code to be complied with, the originating agency, and a contact name and phone number in that agency.

4.2.9 NYSDEC BCP SIGNAGE

A project sign is not anticipated to be posted for this Site.

4.2.10 PRE-CONSTRUCTION MEETING WITH NYSDEC

A pre-construction meeting will take place with NYSDEC prior to the start of major construction activities.

4.2.11 EMERGENCY CONTACT INFORMATION

An emergency contact sheet with names and phone numbers is included in the HASP in Appendix B. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.2.12 REMEDIAL ACTION COSTS

The total estimated cost of the Remedial Action is \$187,920. An itemized and detailed summary of estimated costs for all remedial activity is attached as Appendix F. This will be revised based on actual costs and submitted as an Appendix to the Final Engineering Report.

4.3 Site Preparation

4.3.1 MOBILIZATION

It is anticipated the remedial construction associated with the presented remedy can be completed in one mobilization. The GC will be in charge of mobilizing all necessary equipment

and conducting a kick-off orientation meeting in conjunction with the Environmental Consultant, to ensure all field personnel become familiar with the Site, health and safety requirements, and field procedures.

4.3.2 MONITORING WELL / VAPOR PROBE DECOMMISSIONING

Existing groundwater monitoring wells will either be protected during remediation and development for use in post-remedial monitoring or will be properly decommissioned in accordance with NYSDEC policy CP-43. The only exception to this is if the full length of the well is to be excavated during remediation and development.

Similarly, existing soil vapor probes will be properly decommissioned unless they are to be fully removed during remediation/development or used for post-remedial monitoring.

4.3.3 EROSION AND SEDIMENTATION CONTROLS

Erosion and sediment controls will be installed in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. The remedial excavation will be conducted from the interior of the basement; therefore erosion and sediment controls will not be required for the excavation. Should soil be stockpiled, straw/haybales, coir wattle, and/or silt fence will be placed by the GC at location surrounding the soil stockpile and load-out area. These controls measures, if required, will be installed prior to initiating the soil excavation activities.

4.3.4 STABILIZED CONSTRUCTION ENTRANCE(S)

Due to the proposed remedial excavation being conducted in the basement via vector truck and the entirety of the Site being hardscaped a stabilized construction entrance is not anticipated to be installed. Should trucks be loaded (as opposed to roll-offs) they are not anticipated to be exposed to loose, potentially impacted material.

4.3.5 UTILITY MARKER AND EASEMENTS LAYOUT

The presence of utilities and easements on the Site will be investigated prior to initiating any invasive work under this plan, by at minimum utilizing the One-Call System (811). A determination will be made on the use of a private utility detection company to confirm and/or verify the location of utilities and subsurface structures based on the One-Call mark-out.

The Volunteer and its contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Volunteer and its contractors must obtain any local,

State or Federal permits or approvals pertinent to such work that may be required to perform work under this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

The Remedial Engineer will review all results of the utility and easement investigation prior to initiating any invasive work under this plan and will determine that no risk or impediment to the planned work under this Remedial Action Work Plan is posed by utilities or easements on the Site.

4.3.6 SHEETING AND SHORING

Appropriate management of structural stability of on-Site or off-Site structures during on-Site activities include excavation is the sole responsibility of the Volunteer and its contractors. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The Volunteer and its contractors must obtain any local, State or Federal permits or approvals that may be required to perform work under this Plan. Further, the Volunteer and its contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

4.3.7 EQUIPMENT AND MATERIAL STAGING

Equipment and materials will be staged in compliance with applicable laws and regulations. The equipment and material staging area(s) are anticipated to be on-Site or in other pre-approved or permitted locations by the local and/or county agencies.

4.3.8 DEMOBILIZATION

Demobilization will include:

- As needed, restoration of areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management area[s], and access area);
- Removal of sediment and erosion control measures and disposal of materials in accordance with acceptable rules and regulations;
- Equipment decontamination;
- General refuse disposal.

Demobilization will be conducted at the completion of the proposed remedial activities outlined in this RAWP.

4.4 Reporting

All daily and monthly Reports will be included in the FER.

4.4.1 DAILY REPORTS

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of each day following the reporting period and will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to alpha-numeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP findings, including excursions;
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

Daily Reports will include a description of daily activities keyed to an alpha-numeric map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

The NYSDEC assigned project number will appear on all reports.

4.4.2 MONTHLY REPORTS

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers by the 10th of the following month of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,

- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

4.4.3 OTHER REPORTING

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area and Site structures before, during and after remediation. Photos will be included in the daily reports as needed, and a comprehensive collection of photos will be included in the Final Engineering Report.

Job-site record keeping for all remedial work will be appropriately documented. These records will be maintained on-Site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

4.4.4 DEVIATIONS FROM THE REMEDIAL ACTION WORK PLAN

Deviations or changes to the RAWP will be submitted to the NYSDEC Project Manager for review and approval prior to implementation. Any deviations will be documented in the associated daily or monthly report and reported in the FER. The following details will be provided in the request to NYSDEC for the approval of the deviation:

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy; and
- A determination the deviation does not impact the protection to public health or the environment.

5.0 SOIL/MATERIALS MANAGEMENT PLAN

The elements of the Soil/Materials Management Plan (SMMP) to be implemented during remedial excavation activities are presented in the following sections.

5.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by a qualified environmental professional or experienced field geologist under the direction of the Remedial Engineer during all remedial and development excavations into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during

development phase, such as excavations for foundations and utility work, prior to issuance of the COC.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the Final Engineering Report.

Screening will be performed by qualified environmental professionals. Resumes will be provided for all personnel responsible for field screening (i.e. those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work.

5.2 Stockpile Methods

Stockpiles are not anticipated due to the limited size of the site. In the event stockpiles are used they 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 NYSDEC.

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.

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

Water will be available on-site at suitable supply and pressure for use in dust control.

5.3 Materials Excavation and Load Out

The Remedial Engineer or a qualified environmental professional under his/her supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the Site has been investigated by the Remedial Engineer. It has been determined that no risk or impediment to the planned work under this Remedial Action Work Plan 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).

Vehicles leaving the Site will not be overloaded. The Remedial Engineer's representative will make reasonable efforts to ensure that vehicles are not loaded beyond their NYSDOT weight rating and that all material is secured beneath the truck bed cover.

Due to the excavations being conducted via vector truck a truck wash will not be required on-Site. Should the excavation methodology change the Remedial Engineer or a qualified environmental professional under his/her supervision will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the remedial construction is complete.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site sediment tracking.

The Remedial Engineer or a qualified environmental professional under his/her supervision will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site -derived materials.

The Volunteer and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The Remedial Engineer will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this Remedial Action Work Plan.

Each hotspot and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

Mechanical processing of historical fill and contaminated soil on-Site is prohibited.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the Final Engineering Report.

5.4 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.

Truck transport routes are as follows: Trucks are anticipated to be staged and loaded on Chestnut Street and then will proceed directly to Route 202 and continue to their final disposal facility destination. All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes.

Proposed in-bound and out-bound truck routes to the Site are shown in Figures 5 and 6. 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;

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.

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.

If a truck wash is required, all trucks will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of off-Site in an appropriate manner.

5.5 Materials Disposal Off-Site

Disposal location(s) are to be determined and will be reported to the NYSDEC Project Manager prior to the start of remedial activities.

The total quantity of impacted soils material expected to be disposed off-Site is less than 40 cubic yards that will be transported to a hazardous waste disposal facility. Less than 10 Cubic yards of Concrete will be disposed at a Construction and Demolition debris recycling facility.

All soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed of in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360.15 Registration Facility).

The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the Remedial Engineer or BCP Volunteer to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed of is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360.2.

Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360.15 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Materials Management (DMM) in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. This soil may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 3 DMM. This material is prohibited from being sent or redirected to a Part 360-15 Registration Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Final Engineering Report.

Hazardous wastes derived from on-Site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with all applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

5.6 Materials Reuse On-Site

The on-Site reuse of materials is not anticipated as part of this RAWP. Should on-Site reuse of materials be proposed during implementation of this RAWP, the following procedures will be met and documented.

Chemical criteria for on-Site reuse of material has been approved by NYSDEC. This criteria is listed in the UUSCO. The Remedial Engineer will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-Site.

A “Request to Import/Reuse Fill Material” form will be filed with the NYSDEC project manager for review and approval prior to material reuse on the site. A copy of the form is presented in Appendix G. Acceptable demolition material proposed for reuse on-Site, if any, will be sampled for asbestos.

Concrete crushing or processing on-Site is prohibited, unless NYSDEC has specifically approved on-site processing and reuse of acceptable demolition material.

Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-Site.

Contaminated on-Site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the final Site Management Plan.

5.7 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported, and disposed in accordance with applicable local, State, and Federal regulations. Liquids discharged into the municipal sewer system will be addressed through approval by NYSDEC and Municipal Sewer Authority.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site.

Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream, river and/or storm sewer) is prohibited without a SPDES permit.

5.8 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to backfilling, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils. A physical demarcation layer, consisting of orange snow fencing material or equivalent material will be placed on this surface to provide a visual reference. This demarcation layer will constitute the top of the ‘Residuals Management Zone’, the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in the Site Management Plan. The survey will measure the grade covered by the demarcation layer before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the ‘Residuals Management Zone’ in the Site Management Plan. A map showing the survey results will be included in the Final Engineering Report and the Site Management Plan.

5.9 Backfill from Off-Site Sources

All materials proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this RAWP prior to receipt at the Site.

Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site. Solid waste will not be imported onto the Site.

The Final Engineering Report will include the following certification by the Remedial Engineer: “I certify that all import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan”.

All imported soils will meet NYSDEC approved backfill or cover soil quality objectives for this Site. These NYSDEC approved backfill or cover soil quality objectives are the lower of the protection of groundwater or the protection of public health soil cleanup objectives for site specific use as set forth in Table 375-6.8(b) of 6 NYCRR Part 375 and listed as Unrestricted Use Soil Cleanup Objectives. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

Soils that meet ‘general fill’ requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in this Remedial Action Work Plan should be construed as an approval for this purpose.

A “Request to Import/Reuse Fill Material” form will be filed with the NYSDEC project manager for review and approval prior to import to the site. A copy of the form is presented in Appendix G.

5.10 Stormwater Pollution Prevention

A SWPPP is not required for this Site as the total area of disturbance is less than 1 acre. Erosion and sediment controls will be installed as detailed in Section 4.3.3 with additional considerations outlined below.

Barriers and hay bale checks (if installed) 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 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 RAWP 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.

5.11 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, sampling will be performed on product and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides, and PCBs). Analyses will not be otherwise limited without NYSDEC approval.

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. These findings will also be included in daily and periodic electronic media reports.

5.12 Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) is required per DER-10 (Appendix 1A, NYSDOH, Generic CAMP) during all intrusive activities. Real-time continuous air monitoring for VOCs and particulates will be performed during ground intrusive activities.

A figure showing the location of air sampling stations based on generally prevailing wind conditions is shown in **Appendix C**. These locations 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.

The monitoring shall be consistent with the NYSDOH *Generic Community Air Monitoring Plan*, dated May 2010 (contained in DER-10). If work is performed within 20 feet of potentially exposed individuals or structures, and for indoor work with co-located residences or facilities, the monitoring shall also be consistent with the *Special Requirements for Work Within 20-feet of Potentially Exposed Individuals or Structures*, dated June 2000.

CAMP data summary tables will be maintained during CAMP activities and provided to the NYSDEC and NYSDOH at a minimum on a weekly basis. Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

The CAMP documents are included in **Appendix C**.

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 part-per-million, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 micrograms per cubic meter or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

5.13 Odor and Dust Control Plan

The Final Engineering Report will include the following certification by the Remedial Engineer: “I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan.”

5.13.1 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-Site and on-Site, if there are residents or tenants on the property. Specific odor control methods to be used on a routine basis will include spraying biosolve surfactant or equivalent product on open or exposed soils to reduce odors. If nuisance odors are identified, 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 and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Volunteer’s Remedial Engineer, who is responsible for certifying the Final Engineering Report.

All necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (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.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

5.13.2 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 or hose connection for wetting. Water will be available on-site at suitable supply and pressure for use in dust control.
- 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 spraying.

6.0 Residual Contamination to Remain On-site

The remedial alternative selected for the Site is a contingent Track 1 remedy. If the Track 1 cleanup is achieved all soil remaining on-Site after completion of the remedial activities will meet UUSCOs. Therefore, residual contamination would not remain, and long-term ICs/ECs would not be required for the Site. A short-term SMP will be developed and included as part of the FER, if required.

If the Track 1 cleanup is not achieved, the Track 2 alternative will be implemented and residual contaminated soil, groundwater, and/or soil vapor may exist beneath the Site after the remedy is complete. requiring ECs and ICs to protect human health and the environment. The IC will be implemented in the form of an EE, which restricts the use of the property to a use consistent with residual soil contamination remaining on-site with respect to the Part 375 SCOs. Long-term management of EC/ICs and of residual contamination will be executed under a Site specific SMP that will be developed and included in the FER.

Should the Track 2 alternative be implemented, long term ECs to be implemented to protect public health and the environment by appropriately managing residual contamination may include:

1. A cover system if Restricted Commercial SCOs are not achieved;
2. Long term operation of a SSDS

The FER will report residual contamination on the Site in tabular and map form.

7.0 Engineering Controls

The selected remedy is intended to achieve Track 1 Cleanup criteria, which would not require ECs at the Site. As part of this RAWP, a Track 2 contingency is provided in the event Track 1 criteria are unable to be achieved, which would require the following primary ECs:

- 1) Interior Vapor Intrusion Coating System and/or Sub-slab Depressurization System
- 2) Composite Cover System

Details with respect to each of these ECs is provided in the following subsections.

7.1 Interior Vapor Intrusion Coating System and/or Sub-slab Depressurization System

Should the results of the post-remediation SVI evaluation indicate the need for mitigation, a design and evaluation of SVI mitigation alternatives will be conducted and presented in an IRM Work Plan. Based on the current evaluation, it is anticipated one of the following SVI mitigation alternatives would be implemented:

- 1) Interior vapor intrusion coating system, consisting of Land Science Retro-Coat® (Retro-Coat) or equivalent, applied to the basement slab and walls. Retro-Coat is designed specifically to mitigate vapor intrusion in existing structures. Retro Coat application typically consists of a 6-mil coating of Retro-Coat PRIMER followed by a 20-mil coating of Retro-Coat, commonly applied as two 10 mil coats. Product specification sheets for Retro-Coat are provided in Appendix H.
- 2) Installation of additional piping to bring the capped riser pipe stub to above the roofline and an inline fan/blower installed. The inline fan/blower will be hardwired and include a pressure gauge and alarm in an accessible area to confirm constant operation of the system. Sub-slab vacuum readings will be collected at the sub-slab vapor points to confirm vacuum below the slab meeting the design criteria.

The selected SVI mitigation alternative will be inspected by a field inspector under the direct supervision of a professional engineer will inspect and photograph the vapor intrusion coating system at critical stages before, during, and after installation to document compliance with the design specifications. The FER will include as-built drawings, manufacturer documentation, and photographs.,

The implemented SVI mitigation alternative will be inspected, and performance certified, at periodic intervals as required by this RAWP and the SMP. Operations and maintenance of this system will be described in the SMP. A SVI evaluation will be conducted after implementation and the results reviewed in comparison to the NYSDOH SVI guidance to confirm performance.

Should a SSDS be installed, the criteria for de-activation of the SSDS are provided in Section 8.2.

7.2 Composite Cover System

If a Track 1 cleanup or Track 2 Restricted Commercial Cleanup is not achieved, exposure to residual contaminated soils will be prevented by an engineered, composite cover system on the Site. This composite cover system will be comprised of concrete building slabs and concrete/brick covered sidewalks depending on the extent of the residual contaminated soils. Where possible a demarcation layer will be placed between the residual contamination and material imported to the Site for backfill. Any fill brought to the Site meet the requirements set forth in Section 5.0.

An Excavation Plan will be included in the Site Management Plan and will outline the procedures to be followed if the site cover system and underlying residual contamination are disturbed after the Remedial Action is complete. The components of the site cover system will be documented in the FER. Maintenance of this site cover system will be described in the SMP.

8.0 Criteria for Completion of Remediation/Termination of Remedial Systems

8.1 COMPOSITE COVER SYSTEM

The composite cover system is a permanent control, and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

8.2 SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS)

The active SSDS system will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the active SSDS system may be submitted by the property owner based on confirmatory data that justifies such request. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

8.3 GROUNDWATER MONITORING

Groundwater monitoring activities to assess the performance of the remedy, or natural attenuation following the removal of contaminant sources, will continue, as determined by NYSDOH and NYSDEC, until residual groundwater concentrations are found to be below NYSDEC standards or have become asymptotic over an extended period. Monitoring will continue until permission to discontinue is granted in writing by NYSDEC and NYSDOH. Monitoring activities will be outlined in the Monitoring Plan of the SMP. It is anticipated that, following remediation, a minimum of three quarterly monitoring events will be performed due to no documented exceedances of the contaminants of concern.

9.0 Institutional Controls

Long term institutional controls are not expected to be part of the final remedy at the Site, as the intent of the selected remedy is to achieve Track 1 cleanup criteria. If the Track 1 cleanup criteria is unable to be achieved, two IC elements, an environmental easement (EE) and a SMP, will be implemented to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement and a Site Management Plan.

The following section is not required if the project achieves Track 1. If a Track 1 remedy is pursued, it is strongly advised that a separate plan be developed for a Track 4 remedy to be implemented as a contingency in case Track 1 cannot be achieved. This section should be included as part of that contingency plan.

After the remedy is complete, the Site will have residual contamination remaining in place. Engineering Controls (ECs) for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement and a Site Management Plan.

All as-built drawings, diagrams, calculation, and manufacturer documentation for treatment systems will be presented in the FER. A Site -specific Environmental Easement will be recorded with Rockland County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all Engineering and Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

9.1 Environmental Easement

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-Site after the Remedial Action is complete. As part of this remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the Rockland County Office of the City Register. The Environmental Easement will be submitted as part of the Final Engineering Report.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the Rockland County Office of the City Register before the Certificate of Completion can be issued by NYSDEC. A series of Institutional Controls are required under this remedy to implement, maintain, and monitor these Engineering Control systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to Commercial/Retail use(s) only. These Institutional Controls are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. Institutional Controls can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on Site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the Site Management Plan, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support the potential Engineering Controls are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- A composite cover system consisting of concrete/brick covered sidewalks and concrete building slabs must be inspected, certified and maintained as required in the SMP;
- A soil vapor mitigation system consisting of a sub-slab depressurization system and/or vapor intrusion coating system must be inspected, certified, operated and maintained as required by the SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in the SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP;
- On-Site environmental monitoring devices, including but not limited to, groundwater monitor wells and soil vapor probes, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these Institutional Controls for the Site is mandated by the Environmental Easement and will be implemented under the Site Management Plan (discussed in the next section). The Controlled Property (Site) will also have a series of Institutional Controls in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the Site Management Plan;

- The Controlled Property may be used for Commercial/ Retail use only, provided the long-term Engineering and Institutional Controls included in the Site Management Plan are employed;
- The Controlled Property may not be used for a higher level of use, such as Industrial use without an amendment or extinguishment of this Environmental Easement;
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted triennially, or an alternate period of time that NYSDEC may allow. This triennially period will be certified by the volunteer the QEP and or the professional engineer that the NYSDEC finds acceptable. Annual QEP inspections will occur to ensure any IC/EC continues to be functioning as intended. Annual inspections will be documented in the PRR. If any inconsistencies or issues arise the respective DEC and DOH managers will be notified.

9.2 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the Final Engineering Report and issuance of the Certificate of Completion (COC) for the Remedial Action. The Site Management Plan is submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible for ensuring that all Site Management responsibilities defined in the Environmental Easement and the Site Management Plan are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the Remedial Action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP will include four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be triennially. The Site Management Plan will be based on the certifying period relative to the date of issuance of the COC. The first PRR submission will be due 16 months after the issuance of the COC, and triennially certification (or at another frequency as approved by NYSDEC) with annual inspections thereafter.

The Site Management Plan in the Final Engineering Report will include a monitoring plan for groundwater at the down-gradient Site perimeter to evaluate Site -wide performance of the remedy. Appropriately placed groundwater monitor wells will also be installed immediately down-gradient of all VOC remediation areas for the purpose of evaluation of the effectiveness of the remedy that is implemented.

No exclusions for handling of residual contaminated soils will be provided in the Site Management Plan (SMP). All handling of residual contaminated material will be subject to provisions contained in the SMP.

Note: See template for the SMP for details on required content.

10.0 Final Engineering Report

A Final Engineering Report (FER) will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides the documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The Final Engineering Report will include as-built drawings for all constructed elements, calculation and manufacturer documentation for treatment systems, certifications, manifests, bills of lading as well as the complete Site Management Plan (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the

Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

Where determined to be necessary by NYSDEC, a Financial Assurance Plan will be required to ensure the sufficiency of revenue to perform long-term operations, maintenance and monitoring tasks defined in the Site Management Plan and Environmental Easement. This determination will be made by NYSDEC in the context of the Final Engineering Report review.

The Final Engineering Report will include written and photographic documentation of all remedial work performed under this remedy.

The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 Unrestricted Use SCO in 6NYCRR Part 375-6. A table that shows exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that shows the location and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the Site in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of Site SCOs and a map that shows residual contamination in excess of Site SCOs will be included in the FER.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of a FER and issuance of a Certificate of Completion, all project reports must be submitted in digital form on electronic media (PDF).

10.1 Certifications

The following certification will appear in front of the Executive Summary of the Final Engineering Report. The certification will be signed by the Remedial Engineer Nicholas Krasnecky who is a Professional Engineer registered in New York State. This certification will be appropriately signed and stamped. The certification will include the following statements:

I, _____, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 43-45 Lafayette Ave Site (NYSDEC BCA Index No. C344085-07-21 Site No. C344085).

I certify that the Site description presented in this FER is identical to the Site descriptions presented in the Environmental Easement, the Site Management Plan, and the Brownfield Cleanup Agreement for 43-45 Lafayette Ave Site and related amendments.

I certify that the Remedial Action Work Plan dated [month day year] and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and all operation and maintenance requirements applicable to the Site are contained in an Environmental Easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded. A Site Management Plan has been submitted by the Volunteer for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the NYSDEC.

I certify that the export of all contaminated soil, fill, water or other material from the property was performed in accordance with the Remedial Action Work Plan and were taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

I certify that all import of soils from off-Site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology and soil screening methodology defined in the Remedial Action Work Plan.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York

State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

11.0 Schedule

The table below presents the schedule for the proposed RAWP and associated reporting. The schedule will be updated and submitted to NYSDEC as necessary, should remedial activities schedule change.

Task Description	Estimated Date
Submittal of the RAWP to NYSDEC	May 2024
NYSDEC Review and Approval of RAWP	May 2024 – June 2024
Submittal of the Revised RAWP to NYSDEC	June 2024
NYSDEC Issues Decision Document	July 2024
Implement RAWP	July 2024 – August 2024
Preparation and Submission of FER	August 2024 – October 2024
Post-Remediation Monitoring and Implementation of ECs (if required)	TBD
Certificate of Completion	Q1 2025

ATTACHMENTS



TABLES



ECMS ARIR TABLES



Table 1
Soil Sample Results Summary - VOCs
NYSDEC Site Number: C344085 American Two Cleaners
43-45 Lafayette Avenue, Suffern, Village of Suffern, Rockland County, New York 10901

Environmental Consulting & Mangement Services, Inc.			NYSDEC Part 375 Unrestricted Soil Cleanup Objectives	NYSDEC Part 375 Commercial Soil Cleanup Objectives	Sample Soil Boring Location							
10 Filmont Drive New City, New York 10956	Collection Date	PID Headspace Reading			SB-A	SB-A	SB-A	SB-A	SB-A	SB-A	SB-A	
New City, New York 10956	Sample Identification			7/24/2023	7/24/2023	7/24/2023	7/24/2023	7/31/2023	7/31/2023	7/31/2023	7/31/2023	
Project Id : 43 LAFAYETTE AVE	CAS No.	Units	SUMP W (1')	SUMP B (2.5')	SUMP H (3.0')	SUMP B (4.0')	#1 (26"-32")	#1 (42"-59")	#2 (31"-36")	#2 (39"-43")		
SUFFERN, NEW YORK			NR	NR	>5,000 ppm	65.0 ppm	17.2 ppm	169 ppm	5.1 ppm	9.8 ppm		
			Result	Result	Result	Result	Result	Result	Result	Result		
Halogenated Volatiles By SW8260C												
1,1,1,2-Tetrachloroethane	630-20-6	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,1,1-Trichloroethane	71-55-6	ug/Kg	680	500,000	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,1,2,2-Tetrachloroethane	79-34-5	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,1,2-Trichloroethane	79-00-5	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,1-Dichloroethane	75-34-3	ug/Kg	270	240,000	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,1-Dichloroethene	75-35-4	ug/Kg	330	500,000	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,1-Dichloropropene	563-58-6	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,2,3-Trichloropropane	96-18-4	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,2-Dibromo-3-chloropropane	96-12-8	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,2-Dibromoethane	106-93-4	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,2-Dichlorobenzene	95-50-1	ug/Kg	1,100	500,000	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,2-Dichloroethane	107-06-2	ug/Kg	20	30,000	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,2-Dichloropropane	78-87-5	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,3-Dichlorobenzene	541-73-1	ug/Kg	2,400	280,000	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,3-Dichloropropane	142-28-9	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
1,4-Dichlorobenzene	106-46-7	ug/Kg	1,800	130,000	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
2,2-Dichloropropane	594-20-7	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Bromobenzene	108-86-1	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Bromodichloromethane	75-27-4	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Bromoform	75-25-2	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Bromomethane	74-83-9	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Carbon tetrachloride	56-23-5	ug/Kg	760	2,200	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Chlorobenzene	108-90-7	ug/Kg	1,100	500,000	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Chloroethane	75-00-3	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Chloroform	67-66-3	ug/Kg	370	35,000	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Chloromethane	74-87-3	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
cis-1,2-Dichloroethene	156-59-2	ug/Kg	250	150,000	550	74	< 59000	190	22	270	15	18
cis-1,3-Dichloropropene	10061-01-5	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Dibromochloromethane	124-48-1	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Dibromomethane	74-95-3	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Dichlorodifluoromethane	75-71-8	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Methylene chloride	75-09-2	ug/Kg	50	500,000	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Tetrachloroethene	127-18-4	ug/Kg	1,300	150,000	3,400	1,100	1,500,000*	12,000	3,600	5,900	300	470
trans-1,2-Dichloroethene	156-60-5	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
trans-1,3-Dichloropropene	10061-02-6	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
trans-1,4-dichloro-2-butene	110-57-6	ug/Kg			< 11	< 11	< 120000	< 8.8	< 10	< 11	< 9.6	< 9.8
Trichloroethene	79-01-6	ug/Kg	470	200,000	6.4	9.3	< 59000	12	5.9	12	9.9	22
Trichlorofluoromethane	75-69-4	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Trichlorotrifluoroethane	76-13-1	ug/Kg			< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9
Vinyl chloride	75-01-4	ug/Kg	20	13,000	< 5.3	< 5.3	< 59000	< 4.4	< 5.1	< 5.4	< 4.8	< 4.9

Notes
Result Detected (Value)
Result Exceeds Unrestricted Criteria (Value)
Result Exceeds Commercial Criteria (value)*

Corresponds to Samples collected from
respective soil boring locations

SB-A NYSDOH Soil Vapor Matrices Compounds
SB-B Matrix A Compounds - carbon tetrachloride 1,1-dichloroethene cis-1,2-dichloroethene trichloroethene
SB-C Matrix B Compounds - methylene chloride tetrachloroethene 1,1,1-trichloroethane
SB-D Matrix C Compounds - vinyl chloride

Table 1
Soil Sample Results Summary - VOCs
NYSDEC Site Number: C344085 American Two Cleaners

43-45 Lafayette Avenue, Suffern, Village of Suffern, Rockland County, New York 10901

Environmental Consulting & Mangement Services, Inc.			NYSDEC Part 375 Unrestricted Soil Cleanup Objectives	NYSDEC Part 375 Commercial Soil Cleanup Objectives	Sample Soil Boring Location							
10 Filmont Drive	Collection Date				SB-B	SB-B	SB-B	SB-B	SB-C	SB-C	SB-D	SB-D
New City, New York 10956	Sample Identification				6/26/2023	7/31/2023	7/31/2023	7/31/2023	6/27/2023	6/27/2023	7/31/2023	7/31/2023
Project Id : 43 LAFAYETTE AVE	PID Headspace Reading				SB-B (0-1')	#5 (32"-38")	#6 (30"-35")	#7 (36"-41")	SB-C (14-16')	SB-C (35-38')	#3 (40"-45")	#4 (31"-36")
SUFFERN, NEW YORK	CAS No.	Units			10 ppm	2.8 ppm	1.7 ppm	2 ppm	NR	NR	4.1 ppm	26.8 ppm
					Result	Result	Result	Result	Result	Result	Result	Result
Halogenated Volatiles By SW8260C												
1,1,1,2-Tetrachloroethane	630-20-6	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,1,1-Trichloroethane	71-55-6	ug/Kg	680	500,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,1,2,2-Tetrachloroethane	79-34-5	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,1,2-Trichloroethane	79-00-5	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,1-Dichloroethane	75-34-3	ug/Kg	270	240,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,1-Dichloroethene	75-35-4	ug/Kg	330	500,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,1-Dichloropropene	563-58-6	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,2,3-Trichloropropane	96-18-4	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,2-Dibromo-3-chloropropane	96-12-8	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,2-Dibromoethane	106-93-4	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,2-Dichlorobenzene	95-50-1	ug/Kg	1,100	500,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,2-Dichloroethane	107-06-2	ug/Kg	20	30,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,2-Dichloropropane	78-87-5	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,3-Dichlorobenzene	541-73-1	ug/Kg	2,400	280,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,3-Dichloropropane	142-28-9	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
1,4-Dichlorobenzene	106-46-7	ug/Kg	1,800	130,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
2,2-Dichloropropane	594-20-7	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Bromobenzene	108-86-1	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Bromodichloromethane	75-27-4	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Bromoform	75-25-2	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Bromomethane	74-83-9	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Carbon tetrachloride	56-23-5	ug/Kg	760	2,200	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Chlorobenzene	108-90-7	ug/Kg	1,100	500,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Chloroethane	75-00-3	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Chloroform	67-66-3	ug/Kg	370	35,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Chloromethane	74-87-3	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
cis-1,2-Dichloroethene	156-59-2	ug/Kg	250	150,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
cis-1,3-Dichloropropene	10061-01-5	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Dibromochloromethane	124-48-1	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Dibromomethane	74-95-3	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Dichlorodifluoromethane	75-71-8	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Methylene chloride	75-09-2	ug/Kg	50	500,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Tetrachloroethene	127-18-4	ug/Kg	1,300	150,000	440	< 4.6	< 4.3	< 4.8	170	< 4.1	< 4.3	530
trans-1,2-Dichloroethene	156-60-5	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
trans-1,3-Dichloropropene	10061-02-6	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
trans-1,4-dichloro-2-butene	110-57-6	ug/Kg			< 9.1	< 9.1	< 8.6	< 9.5	< 8.6	< 8.1	< 8.6	< 9.3
Trichloroethene	79-01-6	ug/Kg	470	200,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Trichlorofluoromethane	75-69-4	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	5.7	< 4.6
Trichlorotrifluoroethane	76-13-1	ug/Kg			< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6
Vinyl chloride	75-01-4	ug/Kg	20	13,000	< 4.6	< 4.6	< 4.3	< 4.8	< 4.3	< 4.1	< 4.3	< 4.6

Notes
Result Detected (Value)
Result Exceeds Unrestricted Criteria (Value)
Result Exceeds Commercial Criteria (value)*

Corresponds to Samples collected from
respective soil boring locations

SB-A
SB-B
SB-C
SB-D

NYSDOH Soil Vapor Matrices Compounds

Matrix A Compounds - carbon tetrachloride 1,1-dichloroethene cis-1,2-dichloroethene trichloroethene
Matrix B Compounds - methylene chloride tetrachloroethene 1,1,1-trichloroethane
Matrix C Compounds - vinyl chloride

Table 2
Groundwater Sample Results Summary - VOCs
NYSDEC Site Number: C344085 American Two Cleaners

43-45 Lafayette Avenue, Suffern, Village of Suffern, Rockland County, New York 10901

Environmental Consulting & Mangement Services, Inc. 10 Filmont Drive, New City, New York 10956			NYSDEC TOGS (1.1.1): Ambient Water Quality Standards and Guidance Values	Monitoring Well Samples			Groundwater Grab Sample
Project Id : 43 LAFAYETTE AVE	Collection Date			7/24/2023	7/24/2023	7/24/2023	7/24/2023
SUFFERN, NEW YORK	Sample Identification			MW-1	MW-2	MW-3	SUMP
Halogenated Volatiles By SW8260C	CAS No.	Units		Result	Result	Result	Result
1,1,1,2-Tetrachloroethane	630-20-6	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
1,1,1-Trichloroethane	71-55-6	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
1,1,2,2-Tetrachloroethane	79-34-5	ug/L	5	< 0.50	< 0.50	< 0.50	< 10
1,1,2-Trichloroethane	79-00-5	ug/L	1	< 1.0	< 1.0	< 1.0	< 20
1,1-Dichloroethane	75-34-3	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
1,1-Dichloroethene	75-35-4	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
1,1-Dichloropropene	563-58-6	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
1,2,3-Trichloropropane	96-18-4	ug/L	0.04	< 1.0	< 1.0	< 1.0	< 20
1,2-Dibromo-3-chloropropane	96-12-8	ug/L	0.04	< 1.0	< 1.0	< 1.0	< 20
1,2-Dibromoethane	106-93-4	ug/L	0.0006	< 1.0	< 1.0	< 1.0	< 20
1,2-Dichlorobenzene	95-50-1	ug/L	4.7	< 1.0	< 1.0	< 1.0	< 20
1,2-Dichloroethane	107-06-2	ug/L	0.6	< 1.0	< 1.0	< 1.0	< 20
1,2-Dichloropropane	78-87-5	ug/L	1	< 1.0	< 1.0	< 1.0	< 20
1,3-Dichlorobenzene	541-73-1	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
1,3-Dichloropropane	142-28-9	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
1,4-Dichlorobenzene	106-46-7	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
2,2-Dichloropropane	594-20-7	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
Bromobenzene	108-86-1	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
Bromodichloromethane	75-27-4	ug/L	50	< 0.50	< 0.50	< 0.50	< 10
Bromoform	75-25-2	ug/L	50	< 1.0	< 1.0	< 1.0	< 20
Bromomethane	74-83-9	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
Carbon tetrachloride	56-23-5	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
Chlorobenzene	108-90-7	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
Chloroethane	75-00-3	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
Chloroform	67-66-3	ug/L	7	< 1.0	< 1.0	< 1.0	< 20
Chloromethane	74-87-3	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
cis-1,2-Dichloroethene	156-59-2	ug/L	5	< 1.0	1.2	< 1.0	4,800
cis-1,3-Dichloropropene	10061-01-5	ug/L	0.4	< 0.40	< 0.40	< 0.40	< 8.0
Dibromochloromethane	124-48-1	ug/L	5	< 0.50	< 0.50	< 0.50	< 10
Dibromomethane	74-95-3	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
Dichlorodifluoromethane	75-71-8	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
Methylene chloride	75-09-2	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
Tetrachloroethene	127-18-4	ug/L	5	< 1.0	1.1	4.4	110
trans-1,2-Dichloroethene	156-60-5	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
trans-1,3-Dichloropropene	10061-02-6	ug/L	0.4	< 0.40	< 0.40	< 0.40	< 8.0
trans-1,4-dichloro-2-butene	110-57-6	ug/L	5	< 2.5	< 2.5	< 2.5	< 50
Trichloroethene	79-01-6	ug/L	5	< 1.0	< 1.0	< 1.0	86
Trichlorofluoromethane	75-69-4	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
Trichlorotrifluoroethane	76-13-1	ug/L	5	< 1.0	< 1.0	< 1.0	< 20
Vinyl chloride	75-01-4	ug/L	2	< 1.0	< 1.0	< 1.0	560

Notes:

Result Detected

Result Exceeds Regulatory Criteria

Method Detection Limit Exceeds Regulatory Criteria

Table 3

Monitoring Well Information and Water Level Data Table

NYSDEC Site Number: C344085 American Two Cleaners

43-45 Lafayette Avenue, Suffern, Village of Suffern, Rockland County, New York 10901

Monitoring Well ID	Monitoring Well Installation Date	Diameter of Monitoring Well	Date Top of Casing (TOC) Established	Relative TOC Elevation (feet)	Date of DTW / DTB/ Relative GW Elevation Measurement	Depth to Water (DTW) (feet)	Depth to Bottom (DTB) (Decimal feet)	Relative Groundwater (GW) Elevation	PID Readings (ppm)
MW-1	3/14/2022	2-inch	8/24/2022	298.64	4/14/2022	29.96	34.50	268.68	0.0
MW-1	-	2-inch	7/29/2023	102.93	7/24/2023	26.78	34.36	77.15	10
MW-2	3/14/2022	2-inch	8/24/2022	297.33	4/14/2022	25.7	34.70	271.63	1.2
MW-2	-	2-inch	7/29/2023	101.57	7/24/2023	25.55	34.05	76.02	13.1
MW-3	6/27/2023	1-inch	7/29/2023	103.75	7/24/2023	27.75	33.23	76.00	6.30

ENVIROSURE RIR TABLES



SAMPLE ID:	SB-01-12.0-12.5	SB-02-8.0-8.5	SB-03-12.0-12.5	SB-04-9.5-10.0
SAMPLING DATE:	1/13/2022	1/6/2022	1/6/2022	1/13/2022
SAMPLE DEPTH (fbgs):	12.0-12.5	8.0-8.5	12.0-12.5	9.5-10.0
SAMPLE MATRIX:	SOIL	SOIL	SOIL	SOIL



EnviroSure Inc.

Table 1A
Soil Sample Results Summary - VOCs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES	SAMPLE ID: SB-01-12.0-12.5				SB-02-8.0-8.5				SB-03-12.0-12.5				SB-04-9.5-10.0			
								SAMPLING DATE: 1/13/2022				1/6/2022				1/6/2022				1/13/2022			
								SAMPLE DEPTH (fbgs): 12.0-12.5				8.0-8.5				12.0-12.5				9.5-10.0			
								SAMPLE MATRIX: SOIL				SOIL				SOIL				SOIL			
								Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
Styrene	NS	NS	NS	NS	NS	NS	NS	<0.00018	U	0.00095	0.00018	<0.00018	U	0.00092	0.00018	<0.00020	U	0.0010	0.00020	<0.00022	U	0.0011	0.00022
tert-Butylbenzene	500	NS	5.9	1,000	100	100	5.9	<0.00011	U	0.0019	0.00011	<0.00011	U	0.0018	0.00011	<0.00012	U	0.0021	0.00012	<0.00013	U	0.0022	0.00013
Tetrachloroethene	150	2	1.3	300	5.5	19	1.3	0.0034		0.00047	0.00018	<0.00018	U	0.00046	0.00018	0.0060		0.00052	0.00020	0.0014		0.00056	0.00022
Toluene	500	36	0.7	1,000	100	100	0.7	<0.00051	U	0.00095	0.00051	<0.00050	U	0.00092	0.00050	<0.00056	U	0.0010	0.00056	<0.00060	U	0.0011	0.00060
trans-1,2-Dichloroethene	500	NS	0.19	1,000	100	100	0.19	<0.00013	U	0.0014	0.00013	<0.00013	U	0.0014	0.00013	<0.00014	U	0.0016	0.00014	<0.00015	U	0.0017	0.00015
trans-1,3-Dichloropropene	NS	NS	NS	NS	NS	NS	NS	<0.00026	U	0.00095	0.00026	<0.00025	U	0.00092	0.00025	<0.00028	U	0.0010	0.00028	<0.00030	U	0.0011	0.00030
trans-1,4-Dichloro-2-butene	NS	NS	NS	NS	NS	NS	NS	<0.0013	U	0.0047	0.0013	<0.0013	U	0.0046	0.0013	<0.0015	U	0.0052	0.0015	<0.0016	U	0.0056	0.0016
Trichloroethene	200	2	0.47	400	10	21	0.47	0.00038	J	0.00047	0.00013	<0.00013	U	0.00046	0.00013	0.00047	J	0.00052	0.00014	<0.00015	U	0.00056	0.00015
Trichlorofluoromethane	NS	NS	NS	NS	NS	NS	NS	<0.00066	U	0.0038	0.00066	<0.00064	U	0.0037	0.00064	<0.00072	U	0.0041	0.00072	<0.00077	U	0.0044	0.00077
Vinyl acetate	NS	NS	NS	NS	NS	NS	NS	<0.0020	U	0.0095	0.0020	<0.0020	U	0.0092	0.0020	<0.0022	U	0.010	0.0022	<0.0024	U	0.011	0.0024
Vinyl chloride	13	NS	0.02	27	0.21	0.9	0.02	0.00037	J	0.00095	0.00032	<0.00031	U	0.00092	0.00031	<0.00035	U	0.0010	0.00035	<0.00037	U	0.0011	0.00037
Xylenes, Total	500	0.26	1.6	1,000	100	100	0.26	<0.00028	U	0.00095	0.00028	<0.00027	U	0.00092	0.00027	<0.00030	U	0.0010	0.00030	<0.00032	U	0.0011	0.00032
Total VOCs	NS	NS	NS	NS	NS	NS	NS	0.00603	-	-	-	-	-	-	-	0.01006	-	-	-	0.0014	-	-	-
VOLATILE ORGANIC COMPOUNDS - TICS																							
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.0050	J	0	0	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.00835	J	0	0	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	0.00781	J	0	0	-	-	-	-	-	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.0057	J	0	0	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.00561	J	0	0	-	-	-	-
Unknown Aromatic	NS	NS	NS	NS	NS	NS	NS	0.00994	J	0	0	-	-	-	-	0.0049	J	0	0	0.0103	J	0	0
Unknown Aromatic	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.00582	J	0	0	-	-	-	-
Unknown Aromatic	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.00494	J	0	0	-	-	-	-
Unknown Benzene	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.00636	J	0	0	-	-	-	-
Unknown Benzene	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.00473	J	0	0	-	-	-	-
Unknown Naphthalene	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.00753	J	0	0	-	-	-	-
Total TIC Compounds	NS	NS	NS	NS	NS	NS	NS	0.00994	J	0	0	0.00781	J	0	0	0.0589	J	0	0	0.0103	J	0	0

Notes:

Units in milligrams per kilogram (mg/kg)

fbgs - feet below ground surface

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No regulatory standard

<0.00022 - analyte not detected at the indicated laboratory reporting limit

U - Not detected at the indicated laboratory reporting limit

J - Estimated value (MDL<Conc<RL)

"-" - not analyzed

Bold results indicate an exceedance of a NYSDEC regulatory standard

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESER: New York NYCRR Part 375 Ecological Resources Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Part 375 Environmental Remediation Programs, effective December 14, 2006.

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESI: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESR: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria per 6 NYCRR Part 375 Environmental

Remediation Programs, effective December 14, 2006.

* Samples SB-01, and SB-04 through SB-07 were collected from below the basement floor; sample depths

are from street level (Basement is 8.0' below street level)

Table 1A
Soil Sample Results Summary - VOCs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE									SB-05-9.0-9.5				SB-06-9.0-9.5				SB-07-9.0-9.5				SB-08-7.0-7.5							
									SAMPLE ID:				1/13/2022				1/13/2022				1/13/2022				1/6/2022			
									SAMPLE DEPTH (fbs):				9.0-9.5				9.0-9.5				9.0-9.5				7.0-7.5			
									SAMPLE MATRIX:				SOIL				SOIL				SOIL				SOIL			
	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL					
VOLATILE ORGANIC COMPOUNDS (VOCs)																												
1,1,1,2-Tetrachloroethane	NS	NS	NS	NS	NS	NS	NS	<0.00012 U	0.00048	0.00012	<0.00013 U	0.00050	0.00013	<0.00011 U	0.00042	0.00011	<0.00014 U	0.00042	0.00011	<0.00014 U	0.00042	0.00011	<0.00014 U	0.00052	0.00014			
1,1,1-Trichloroethane	500	NS	0.68	1000	100	100	0.68	<0.00016 U	0.00048	0.00016	<0.00017 U	0.00050	0.00017	<0.00014 U	0.00042	0.00014	<0.00017 U	0.00042	0.00014	<0.00017 U	0.00052	0.00014	<0.00017 U	0.00052	0.00017			
1,1,2,2-Tetrachloroethane	NS	NS	NS	NS	NS	NS	NS	<0.00016 U	0.00048	0.00016	<0.00017 U	0.00050	0.00017	<0.00014 U	0.00042	0.00014	<0.00017 U	0.00042	0.00014	<0.00017 U	0.00052	0.00014	<0.00017 U	0.00052	0.00017			
1,1,2-Trichloroethane	NS	NS	NS	NS	NS	NS	NS	<0.00025 U	0.00095	0.00025	<0.00027 U	0.0010	0.00027	<0.00022 U	0.00084	0.00022	<0.00028 U	0.0010	0.00028	<0.00028 U	0.0010	0.00028	<0.00028 U	0.0010	0.00028			
1,1-Dichloroethane	240	NS	0.27	480	19	26	0.27	<0.00014 U	0.00095	0.00014	<0.00014 U	0.0010	0.00014	<0.00012 U	0.00084	0.00012	<0.00015 U	0.0010	0.00015	<0.00015 U	0.0010	0.00015	<0.00015 U	0.0010	0.00015			
1,1-Dichloroethene	500	NS	0.33	1000	100	100	0.33	<0.00023 U	0.00095	0.00023	<0.00024 U	0.0010	0.00024	<0.00020 U	0.00084	0.00020	<0.00025 U	0.0010	0.00025	<0.00025 U	0.0010	0.00025	<0.00025 U	0.0010	0.00025			
1,1-Dichloropropene	NS	NS	NS	NS	NS	NS	NS	<0.00015 U	0.00048	0.00015	<0.00016 U	0.00050	0.00016	<0.00013 U	0.00042	0.00013	<0.00017 U	0.00052	0.00013	<0.00017 U	0.00052	0.00013	<0.00017 U	0.00052	0.00017			
1,2,3-Trichlorobenzene	NS	NS	NS	NS	NS	NS	NS	<0.00031 U	0.0019	0.00031	<0.00032 U	0.0020	0.00032	<0.00027 U	0.0017	0.00027	<0.00034 U	0.0021	0.00034	<0.00034 U	0.0021	0.00034	<0.00034 U	0.0021	0.00034			
1,2,3-Trichloropropane	NS	NS	NS	NS	NS	NS	NS	<0.00012 U	0.0019	0.00012	<0.00013 U	0.0020	0.00013	<0.00011 U	0.0017	0.00011	<0.00013 U	0.0021	0.00013	<0.00013 U	0.0021	0.00013	<0.00013 U	0.0021	0.00013			
1,2,4,5-Tetramethylbenzene	NS	NS	NS	NS	NS	NS	NS	<0.00018 U	0.0019	0.00018	<0.00019 U	0.0020	0.00019	<0.00016 U	0.0017	0.00016	<0.00020 U	0.0021	0.00020	<0.00020 U	0.0021	0.00020	<0.00020 U	0.0021	0.00020			
1,2,4-Trichlorobenzene	NS	NS	NS	NS	NS	NS	NS	<0.00026 U	0.0019	0.00026	<0.00027 U	0.0020	0.00027	<0.00023 U	0.0017	0.00023	<0.00028 U	0.0021	0.00028	<0.00028 U	0.0021	0.00028	<0.00028 U	0.0021	0.00028			
1,2,4-Trimethylbenzene	190	NS	3.6	380	47	52	3.6	<0.00032 U	0.0019	0.00032	<0.00034 U	0.0020	0.00034	<0.00028 U	0.0017	0.00028	<0.00035 U	0.0021	0.00035	<0.00035 U	0.0021	0.00035	<0.00035 U	0.0021	0.00035			
1,2-Dibromo-3-chloropropane	NS	NS	NS	NS	NS	NS	NS	<0.00095 U	0.0028	0.00095	<0.0010 U	0.0030	0.0010	<0.00084 U	0.0025	0.00084	<0.0010 U	0.0031	0.0010	<0.0010 U	0.0031	0.0010	<0.0010 U	0.0031	0.0010			
1,2-Dibromochloroethane	NS	NS	NS	NS	NS	NS	NS	<0.00026 U	0.00095	0.00026	<0.00028 U	0.0010	0.00028	<0.00023 U	0.00084	0.00023	<0.00029 U	0.0010	0.00029	<0.00029 U	0.0010	0.00029	<0.00029 U	0.0010	0.00029			
1,2-Dichlorobenzene	500	NS	1.1	1,000	100	100	1.1	<0.00014 U	0.0019	0.00014	<0.00014 U	0.0020	0.00014	<0.00012 U	0.0017	0.00012	<0.00015 U	0.0021	0.00015	<0.00015 U	0.0021	0.00015	<0.00015 U	0.0021	0.00015			
1,2-Dichloroethene	30	10	0.02	60	2.3	3.1	0.02	<0.00024 U	0.00095	0.00024	<0.00026 U	0.0010	0.00026	<0.00022 U	0.00084	0.00022	<0.00027 U	0.0010	0.00027	<0.00027 U	0.0010	0.00027	<0.00027 U	0.0010	0.00027			
1,2-Dichloroethene, Total	NS	NS	NS	NS	NS	NS	NS	0.00027 J	0.00095	0.00013	0.011	0.0010	0.00014	<0.00012 U	0.00084	0.00012	<0.00014 U	0.0010	0.00014	<0.00014 U	0.0010	0.00014	<0.00014 U	0.0010	0.00014			
1,2-Dichloropropane	NS	NS	NS	NS	NS	NS	NS	<0.00012 U	0.00095	0.00012	<0.00012 U	0.0010	0.00012	<0.00010 U	0.00084	0.00010	<0.00013 U	0.0010	0.00013	<0.00013 U	0.0010	0.00013	<0.00013 U	0.0010	0.00013			
1,3,5-Trimethylbenzene	190	NS	8.4	380	47	52	8.4	<0.00018 U	0.0019	0.00018	<0.00019 U	0.0020	0.00019	<0.00016 U	0.0017	0.00016	<0.00020 U	0.0021	0.00020	<0.00020 U	0.0021	0.00020	<0.00020 U	0.0021	0.00020			
1,3-Dichlorobenzene	280	NS	2.4	560	17	49	2.4	<0.00014 U	0.0019	0.00014	<0.00015 U	0.0020	0.00015	<0.00012 U	0.0017	0.00012	<0.00015 U	0.0021	0.00015	<0.00015 U	0.0021	0.00015	<0.00015 U	0.0021	0.00015			
1,3-Dichloropropane	NS	NS	NS	NS	NS	NS	NS	<0.00016 U	0.0019	0.00016	<0.00017 U	0.0020	0.00017	<0.00014 U	0.0017	0.00014	<0.00017 U	0.0021	0.00017	<0.00017 U	0.0021	0.00017	<0.00017 U	0.0021	0.00017			
1,3-Dichloropropane, Total	NS	NS	NS	NS	NS	NS	NS	<0.00015 U	0.00048	0.00015	<0.00016 U	0.0005	0.00016	<0.00013 U	0.00042	0.00013	<0.00016 U	0.00052	0.00013	<0.00016 U	0.00052	0.00013	<0.00016 U	0.00052	0.00016			
1,4-Dichlorobenzene	130	20	1.8	250	9.8	13	1.8	<0.00016 U	0.0019	0.00016	<0.00017 U	0.0020	0.00017	<0.00014 U	0.0017	0.00014	<0.00018 U	0.0021	0.00018	<0.00018 U	0.0021	0.00018	<0.00018 U	0.0021	0.00018			
1,4-Dioxane	130	0.1	0.1	250	9.8	13	0.1	<0.033 U	0.076	0.033	<0.035 U	0.080	0.035	<0.030 U	0.067	0.030	<0.037 U	0.084	0.037	<0.037 U	0.084	0.037	<0.037 U	0.084	0.037			
2,2-Dichloropropane	NS	NS	NS	NS	NS	NS	NS	<0.00019 U	0.0019	0.00019	<0.00020 U	0.0020	0.00020	<0.00017 U	0.0017	0.00017	<0.00021 U	0.0021	0.00021	<0.00021 U	0.0021	0.00021	<0.00021 U	0.0021	0.00021			
2-Butanone	500	100	0.12	1,000	100	100	0.12	<0.00021 U	0.0095	0.00021	<0.00022 U	0.010	0.00022	<0.00019 U	0.0084	0.00019	<0.00023 U	0.010	0.00023	<0.00023 U	0.010	0.00023	<0.00023 U	0.010	0.00023			
2-Hexanone	NS	NS	NS	NS	NS	NS	NS	<0.00011 U	0.0095	0.00011	<0.00012 U	0.010	0.00012	<0.000099 U	0.0084	0.000099	<0.00012 U	0.010	0.00012	<0.00012 U	0.010	0.00012	<0.00012 U	0.010	0.00012			
4-Methyl-2-pentanone	NS	NS	NS	NS	NS	NS	NS	<0.00012 U	0.0095	0.00012	<0.00013 U	0.010	0.00013	<0.00011 U	0.0084	0.00011	<0.00013 U	0.010	0.00013	<0.00013 U	0.010	0.00013	<0.00013 U	0.010	0.00013			
Acetone	500	2.2	0.05	1,000	100	100	0.05	<0.00046 U	0.0095	0.00046	0.017	0.010	0.0048	<0.0040 U	0.0084	0.0040	<0.0050 U	0.010	0.0050	<0.0050 U	0.010	0.0050	<0.0050 U	0.010	0.0050			
Acrylonitrile	NS	NS	NS	NS	NS	NS	NS	<0.00011 U	0.0038	0.00011	<0.00012 U	0.0040	0.00012	<0.000097 U	0.0034	0.000097	<0.00012 U	0.0042	0.00012	<0.00012 U	0.0042	0.00012	<0.00012 U	0.0042	0.00012			
Benzene	44	70	0.06	89	2.9	4.8	0.06	<0.00016 U	0.00048	0.00016	<0.00017 U	0.00050	0.00017	<0.00014 U	0.00042	0.00014	<0.00017 U	0.00052	0.00017	<0.00017 U	0.00052	0.00017	<0.00017 U	0.00052	0.00017			
Bromobenzene	NS	NS	NS	NS	NS	NS	NS	<0.00014 U	0.0019	0.00014	<0.00014 U	0.0020	0.00014	<0.00012 U	0.0017	0.00012	<0.00015 U	0.0021	0.00015	<0.00015 U	0.0021	0.00015	<0.00015 U	0.0021	0.00015			
Bromochloromethane	NS	NS	NS	NS	NS	NS	NS	<0.00020 U	0.0019	0.00020	<0.00021 U	0.0020	0.00021	<0.00017 U	0.0017	0.00017	<0.00021 U	0.0021	0.00021	<0.00021 U	0.0021	0.00021	<0.00021 U	0.0021	0.00021			
Bromodichloromethane	NS	NS	NS	NS	NS	NS	NS	<0.00010 U	0.00048	0.00010	<0.00011 U	0.00050	0.00011	<0.000099 U	0.00042	0.000099	<0.00011 U	0.00052	0.00011	<0.00011 U	0.00052	0.00011	<0.00011 U	0.00052	0.00011			
Bromoform	NS	NS	NS	NS	NS	NS	NS	<0.00023 U	0.0038	0.00023	<0.00025 U	0.0040	0.00025	<0.00021 U	0.0034	0.00021	<0.00026 U	0.0042	0.00026	<0.00026 U	0.0042	0.00026	<0.00026 U	0.0042	0.00026			
Bromomethane	NS	NS	NS	NS	NS	NS	NS	<0.00055 U	0.0019	0.00055	<0.00058 U	0.0020	0.00058	<0.00049 U	0.0017	0.00049	<0.00061 U	0.0021	0.00061	<0.00061 U	0.0021	0.00061	<0.00061 U	0.0021	0.00061			
Carbon disulfide	NS	NS	NS	NS	NS	NS	NS	<0.0043 U	0.0095	0.0043	<0.0046 U	0.010	0.0046	<0.0038 U	0.0084	0.0038	<0.0048 U	0.010	0.0048	<0.0048 U	0.010	0.0048	<0.0048 U	0.010	0.0048			
Carbon tetrachloride	22	NS	0.76	44	1.4	2.4	0.76	<0.00022 U	0.00095	0.00022	<0.00023 U	0.0010	0.000.															

Table 1A
Soil Sample Results Summary - VOCs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

									SB-05-9.0-9.5				SB-06-9.0-9.5				SB-07-9.0-9.5				SB-08-7.0-7.5			
									1/13/2022				1/13/2022				1/13/2022				1/6/2022			
									9.0-9.5				9.0-9.5				9.0-9.5				7.0-7.5			
									SOIL				SOIL				SOIL				SOIL			
ANALYTE	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES		Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
Styrene	NS	NS	NS	NS	NS	NS	NS		<0.00019	U	0.00095	0.00019	<0.00020	U	0.0010	0.00020	<0.00016	U	0.00084	0.00016	<0.00020	U	0.0010	0.00020
tert-Butylbenzene	500	NS	5.9	1,000	100	100	5.9		<0.00011	U	0.00019	0.00011	0.00012	J	0.0020	0.00012	<0.00010	U	0.00017	0.00010	<0.00012	U	0.0021	0.00012
Tetrachloroethene	150	2	1.3	300	5.5	19	1.3		0.0033		0.00048	0.00019	0.11		0.00050	0.00020	0.0026		0.00042	0.00016	<0.00020	U	0.00052	0.00020
Toluene	500	36	0.7	1,000	100	100	0.7		<0.00052	U	0.00095	0.00052	<0.00055	U	0.0010	0.00055	<0.00046	U	0.00084	0.00046	<0.00057	U	0.0010	0.00057
trans-1,2-Dichloroethene	500	NS	0.19	1,000	100	100	0.19		<0.00013	U	0.0014	0.00013	<0.00014	U	0.0015	0.00014	<0.00012	U	0.0013	0.00012	<0.00014	U	0.0016	0.00014
trans-1,3-Dichloropropene	NS	NS	NS	NS	NS	NS	NS		<0.00026	U	0.00095	0.00026	<0.00027	U	0.0010	0.00027	<0.00023	U	0.00084	0.00023	<0.00028	U	0.0010	0.00028
trans-1,4-Dichloro-2-butene	NS	NS	NS	NS	NS	NS	NS		<0.00014	U	0.0048	0.0014	<0.00014	U	0.0050	0.0014	<0.00012	U	0.0042	0.0012	<0.00015	U	0.0052	0.0015
Trichloroethene	200	2	0.47	400	10	21	0.47		0.00033	J	0.00048	0.00013	0.0098		0.00050	0.00014	<0.00012	U	0.00042	0.00012	<0.00014	U	0.00052	0.00014
Trichlorofluoromethane	NS	NS	NS	NS	NS	NS	NS		<0.00066	U	0.0038	0.00066	<0.00070	U	0.0040	0.00070	<0.00058	U	0.0034	0.00058	<0.00072	U	0.0042	0.00072
Vinyl acetate	NS	NS	NS	NS	NS	NS	NS		<0.00020	U	0.0095	0.00020	<0.00022	U	0.010	0.00022	<0.00018	U	0.0084	0.00018	<0.00022	U	0.010	0.00022
Vinyl chloride	13	NS	0.02	27	0.21	0.9	0.02		<0.00032	U	0.00095	0.00032	<0.00034	U	0.0010	0.00034	<0.00028	U	0.00084	0.00028	<0.00035	U	0.0010	0.00035
Xylenes, Total	500	0.26	1.6	1,000	100	100	0.26		<0.00028	U	0.00095	0.00028	<0.00029	U	0.0010	0.00029	<0.00024	U	0.00084	0.00024	<0.00030	U	0.0010	0.00030
Total VOCs	NS	NS	NS	NS	NS	NS	NS		0.00417	-	-	-	0.18007	-	-	-	0.0026	-	-	-	-	-	-	-
VOLATILE ORGANIC COMPOUNDS - TICS																								
Unknown	NS	NS	NS	NS	NS	NS	NS		-	-	-	-	0.0931	NJ	0	0	-	-	-	-	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS		-	-	-	-	0.0705	NJ	0	0	-	-	-	-	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS		-	-	-	-	0.0655	J	0	0	-	-	-	-	0.00814	J	0	0
Unknown	NS	NS	NS	NS	NS	NS	NS		-	-	-	-	0.071	J	0	0	-	-	-	-	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS		-	-	-	-	0.0827	J	0	0	-	-	-	-	-	-	-	-
Unknown Aromatic	NS	NS	NS	NS	NS	NS	NS		0.0105	J	0	0	-	-	-	-	0.00891	J	0	0	-	-	-	-
Unknown Aromatic	NS	NS	NS	NS	NS	NS	NS		-	-	-	-	0.0819	J	0	0	-	-	-	-	-	-	-	-
Unknown Aromatic	NS	NS	NS	NS	NS	NS	NS		-	-	-	-	0.102	J	0	0	-	-	-	-	-	-	-	-
Unknown Benzene	NS	NS	NS	NS	NS	NS	NS		-	-	-	-	0.064	J	0	0	-	-	-	-	-	-	-	-
Unknown Benzene	NS	NS	NS	NS	NS	NS	NS		-	-	-	-	0.0673	J	0	0	-	-	-	-	-	-	-	-
Unknown Naphthalene	NS	NS	NS	NS	NS	NS	NS		-	-	-	-	0.0703	J	0	0	-	-	-	-	-	-	-	-
Total TIC Compounds	NS	NS	NS	NS	NS	NS	NS		0.0105	J	0	0	0.768	J	0	0	0.00891	J	0	0	0.00814	J	0	0

Notes:

Units in milligrams per kilogram (mg/kg)

fbgs - feet below ground surface

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No regulatory standard

<0.00022 - analyte not detected at the indicated laboratory reporting limit

U - Not detected at the indicated laboratory reporting limit

J - Estimated value (MDL<Conc<RL)

"-" - not analyzed

Bold results indicate an exceedance of a NYSDEC regulatory standard

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESER: New York NYCRR Part 375 Ecological Resources Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Part 375 Environmental Remediation Programs, effective December 14, 2006.

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESI: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESR: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria per 6 NYCRR Part 375 Environmental

Remediation Programs, effective December 14, 2006.

* **Samples SB-01, and SB-04 through SB-07 were collected from below the basement floor; sample depths**

are from street level (Basement is 8.0' below street level)

Approved by: DKO 5/13/2022

SAS 1/27/2023

Table 1B
Soil Sample Results Summary - SVOCs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:																SB-01-12.0-12.5			SB-02-8.0-8.5			SB-03-12.0-12.5			SB-04-9.5-10.0		
	SAMPLING DATE:																1/13/2022			1/6/2022			1/6/2022			1/13/2022		
	SAMPLE DEPTH (ftbgs):																12.0-12.5			8.0-8.5			12.0-12.5			9.5-10.0		
	SAMPLE MATRIX:																SOIL			SOIL			SOIL			SOIL		
	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL					
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)																												
1,2,4,5-Tetrachlorobenzene	NS	NS	NS	NS	NS	NS	NS	<0.022	U	0.21	0.022	<0.020	U	0.19	0.020	<0.021	U	0.20	0.021	<0.020	U	0.19	0.020					
1,2,4-Trichlorobenzene	NS	NS	NS	NS	NS	NS	NS	<0.024	U	0.21	0.024	<0.022	U	0.19	0.022	<0.023	U	0.20	0.023	<0.022	U	0.19	0.022					
1,2-Dichlorobenzene	500	NS	1.1	1,000	100	100	1.1	<0.037	U	0.21	0.037	<0.035	U	0.19	0.035	<0.036	U	0.20	0.036	<0.034	U	0.19	0.034					
1,3-Dichlorobenzene	280	NS	2.4	560	17	49	2.4	<0.035	U	0.21	0.035	<0.033	U	0.19	0.033	<0.034	U	0.20	0.034	<0.033	U	0.19	0.033					
1,4-Dichlorobenzene	130	20	1.8	250	9.8	13	1.8	<0.036	U	0.21	0.036	<0.034	U	0.19	0.034	<0.035	U	0.20	0.035	<0.033	U	0.19	0.033					
1,4-Dioxane	130	0.1	0.1	250	9.8	13	0.1	<0.0095	U	0.03	0.010	<0.0089	U	0.03	0.0089	<0.0092	U	0.03	0.0092	<0.0088	U	0.03	0.0088					
2,4,5-Trichlorophenol	NS	NS	NS	NS	NS	NS	NS	<0.040	U	0.21	0.040	<0.037	U	0.19	0.037	<0.038	U	0.20	0.038	<0.036	U	0.19	0.036					
2,4,6-Trichlorophenol	NS	NS	NS	NS	NS	NS	NS	<0.039	U	0.12	0.039	<0.036	U	0.12	0.036	<0.038	U	0.12	0.038	<0.036	U	0.11	0.036					
2,4-Dichlorophenol	NS	NS	NS	NS	NS	NS	NS	<0.033	U	0.18	0.033	<0.031	U	0.17	0.031	<0.032	U	0.18	0.032	<0.031	U	0.17	0.031					
2,4-Dimethylphenol	NS	NS	NS	NS	NS	NS	NS	<0.068	U	0.21	0.068	<0.064	U	0.19	0.064	<0.066	U	0.20	0.066	<0.063	U	0.19	0.063					
2,4-Dinitrophenol	NS	NS	NS	NS	NS	NS	NS	<0.096	U	0.99	0.096	<0.090	U	0.93	0.090	<0.093	U	0.96	0.093	<0.089	U	0.91	0.089					
2,4-Dinitrotoluene	NS	NS	NS	NS	NS	NS	NS	<0.041	U	0.21	0.041	<0.039	U	0.19	0.039	<0.040	U	0.20	0.040	<0.038	U	0.19	0.038					
2,6-Dinitrotoluene	NS	NS	NS	NS	NS	NS	NS	<0.035	U	0.21	0.035	<0.033	U	0.19	0.033	<0.034	U	0.20	0.034	<0.033	U	0.19	0.033					
2-Chloronaphthalene	NS	NS	NS	NS	NS	NS	NS	<0.020	U	0.21	0.020	<0.019	U	0.19	0.019	<0.020	U	0.20	0.020	<0.019	U	0.19	0.019					
2-Chlorophenol	NS	NS	NS	NS	NS	NS	NS	<0.024	U	0.21	0.024	<0.023	U	0.19	0.023	<0.024	U	0.20	0.024	<0.022	U	0.19	0.022					
2-Methylnaphthalene	NS	NS	NS	NS	NS	NS	NS	<0.025	U	0.25	0.025	<0.023	U	0.23	0.023	<0.024	U	0.24	0.024	<0.023	U	0.23	0.023					
2-Methylphenol	500	NS	0.33	1,000	100	100	0.33	<0.032	U	0.21	0.032	<0.030	U	0.19	0.030	<0.031	U	0.20	0.031	<0.030	U	0.19	0.030					
2-Nitroaniline	NS	NS	NS	NS	NS	NS	NS	<0.040	U	0.21	0.040	<0.037	U	0.19	0.037	<0.038	U	0.20	0.038	<0.037	U	0.19	0.037					
2-Nitrophenol	NS	NS	NS	NS	NS	NS	NS	<0.078	U	0.44	0.078	<0.072	U	0.42	0.072	<0.075	U	0.43	0.075	<0.072	U	0.41	0.072					
3,3'-Dichlorobenzidine	NS	NS	NS	NS	NS	NS	NS	<0.055	U	0.21	0.055	<0.051	U	0.19	0.051	<0.053	U	0.20	0.053	<0.051	U	0.19	0.051					
3-Methylphenol/4-Methylphenol	500	NS	0.33	1,000	34	100	0.33	<0.032	U	0.30	0.032	<0.030	U	0.28	0.030	<0.031	U	0.29	0.031	<0.030	U	0.27	0.030					
3-Nitroaniline	NS	NS	NS	NS	NS	NS	NS	<0.039	U	0.21	0.039	<0.036	U	0.19	0.036	<0.038	U	0.20	0.038	<0.036	U	0.19	0.036					
4,6-Dinitro-o-cresol	NS	NS	NS	NS	NS	NS	NS	<0.099	U	0.54	0.099	<0.093	U	0.50	0.093	<0.096	U	0.52	0.096	<0.091	U	0.50	0.091					
4-Bromophenyl phenyl ether	NS	NS	NS	NS	NS	NS	NS	<0.031	U	0.21	0.031	<0.029	U	0.19	0.029	<0.030	U	0.20	0.030	<0.029	U	0.19	0.029					
4-Chloroaniline	NS	NS	NS	NS	NS	NS	NS	<0.038	U	0.21	0.038	<0.035	U	0.19	0.035	<0.036	U	0.20	0.036	<0.035	U	0.19	0.035					
4-Chlorophenyl phenyl ether	NS	NS	NS	NS	NS	NS	NS	<0.022	U	0.21	0.022	<0.021	U	0.19	0.021	<0.021	U	0.20	0.021	<0.020	U	0.19	0.020					
4-Nitroaniline	NS	NS	NS	NS	NS	NS	NS	<0.085	U	0.21	0.085	<0.080	U	0.19	0.080	<0.083	U	0.20	0.083	<0.079	U	0.19	0.079					
4-Nitrophenol	NS	NS	NS	NS	NS	NS	NS	<0.084	U	0.29	0.084	<0.079	U	0.27	0.079	<0.082	U	0.28	0.082	<0.078	U	0.27	0.078					
Acenaphthene	500	20	98	1,000	100	100	20	<0.021	U	0.16	0.021	<0.020	U	0.15	0.020	<0.021	U	0.16	0.021	<0.020	U	0.15	0.020					
Acenaphthylene	500	NS	107	1,000	100	100	100	<0.032	U	0.16	0.032	<0.030	U	0.15	0.030	<0.031	U	0.16	0.031	<0.029	U	0.15	0.029					
Acetophenone	NS	NS	NS	NS	NS	NS	NS	<0.026	U	0.21	0.026	<0.024	U	0.19	0.024	<0.025	U	0.20	0.025	<0.024	U	0.19	0.024					
Anthracene	500	NS	1,000	1,000	100	100	100	<0.040	U	0.12	0.040	<0.038	U	0.12	0.038	<0.039	U	0.12	0.039	<0.037	U	0.11	0.037					
Benzo(a)anthracene	5.6	NS	1	11	1	1	1	<0.023	U	0.12	0.023	<0.022	U	0.12	0.022	<0.022	U	0.12	0.022	<0.021	U	0.11	0.021					
Benzo(a)pyrene	1	2.6	22	1.1	1	1	1	<0.050	U	0.16	0.050	<0.047	U	0.15	0.047	<0.049	U	0.16	0.049	<0.046	U	0.15	0.046					
Benzo(b)fluoranthene	5.6	NS	1.7	11	1	1	1	<0.035	U	0.12	0.035	<0.032	U	0.12	0.032	<0.034	U	0.12	0.034	<0.032	U	0.11	0.032					
Benzo(ghi)perylene	500	NS	1,000	1,000	100	100	100	<0.024	U	0.16	0.024	<0.023	U	0.15	0.023	<0.024	U	0.16	0.024	<0.022	U	0.15	0.022					
Benzo(k)fluoranthene	56	NS	1.7	110	1	3.9	0.8	<0.033	U	0.12	0.033	<0.031	U	0.12	0.031	<0.032	U	0.12	0.032	<0.030	U	0.11	0.030					
Benzoic Acid	NS	NS	NS	NS	NS	NS	NS	<0.21	U	0.67	0.21	<0.20	U	0.62	0.20	<0.20	U	0.65	0.20	<0.19	U	0.62	0.19					
Benzyl Alcohol	NS	NS	NS	NS	NS	NS	NS	<0.063	U	0.21	0.063	<0.059	U	0.19	0.059	<0.061	U	0.20	0.061	<0.058	U	0.19	0.058					
Biphenyl	NS	NS	NS	NS	NS	NS	NS	<0.027	U	0.47	0.027	<0.025	U	0.44	0.025	<0.026	U	0.46	0.026	<0.025	U	0.43	0.025					
Bis(2-chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS	<0.021	U	0.22	0.021	<0.019	U	0.21	0.019	<0.020	U	0.22	0.020	<0.019	U	0.20	0.019					
Bis(2-chloroethoxy)ether	NS	NS	NS	NS	NS	NS	NS	<0.028	U	0.18	0.028	<0.026	U	0.17	0.026	<0.027	U	0.18	0.027	<0.026	U	0.17	0.026					
Bis(2-chloroisopropoxy)ether	NS	NS	NS	NS	NS	NS	NS	<0.035	U	0.25	0.035	<0.033	U	0.23	0.033	<0.034	U	0.24	0.034	<0.032	U	0.23	0.032					
Bis(2-ethylhexyl)phthalate	NS	NS	NS	NS	NS	NS	NS	<0.071	U	0.21	0.071	<0.067	U	0.19	0.067	<0.069	U	0.20	0.069	<0.066	U	0.19	0.066					
Butyl benzyl phthalate	NS	NS	NS	NS	NS	NS	NS	<0.052	U	0.21	0.052	<0.049	U	0.19	0.049	<0.050	U	0.20	0.050	<0.048	U	0.19	0.048					
Carbazole	NS	NS	NS	NS	NS	NS	NS	<0.020	U	0.21	0.020	<0.019	U	0.19	0.019	<0.019	U	0.20	0.019	<0.018	U	0.19	0.018					
Chrysene	56	NS	1	110	1	3.9	1	<0.021	U	0.12	0.021	<0.020	U	0.12	0.020	<0.021	U	0.12	0.021	<0.020	U	0.11	0.020					
Di-n-butylphthalate	NS	NS	NS	NS	NS	NS	NS	<0.039	U	0.21	0.039	<0.036	U	0.19	0.036	<0.038	U	0.20	0.038	<0.036	U	0.19	0.036					
Di-n-octylphthalate	NS	NS	NS	NS	NS	NS	NS	<0.070	U	0.21	0.070	<0.066	U	0.19	0.066	<0.068	U	0.20	0.068	<0.065	U	0.19	0.065					
Dibenz(a,h)anthracene	0.56	NS	1,000	1.1	0.33	0.33	0.33	<0.024	U	0.12	0.024	<0.022	U	0.12	0.022	<0.023	U	0.12	0.023	<0.022	U	0.11	0.022					
Dibenzofuran	350	NS	210	1,000	14	59	7	<0.020	U	0.21	0.020	<0.018	U	0.19	0.018	<0.019	U	0.20	0.019	<0.018	U	0.19	0.018					
Diethyl phthalate	NS	NS	NS	NS	NS	NS	NS	<0.019	U	0.21	0.019	<0.018	U	0.19	0.018	<0.018	U	0.20	0.018	<0.018	U	0.19	0.018					
Dimethyl phthalate	NS	NS	NS	NS	NS	NS	NS	<0.043	U	0.21	0.043	<0.040	U	0.19	0.040	<0.042	U	0.20	0.042	<0.040	U	0.19	0.040					
Fluoranthene	500	NS	1,000	1,000	100	100	100	<0.024	U	0.12	0.024	<0.022	U	0.														

Table 1B
Soil Sample Results Summary - SVOCs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

								SAMPLE ID:				SB-01-12.0-12.5				SB-02-8.0-8.5				SB-03-12.0-12.5				SB-04-9.5-10.0			
								SAMPLING DATE:				1/13/2022				1/6/2022				1/6/2022				1/13/2022			
								SAMPLE DEPTH (ftgs):				12.0-12.5				8.0-8.5				12.0-12.5				9.5-10.0			
								SAMPLE MATRIX:				SOIL				SOIL				SOIL				SOIL			
ANALYTE	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL				
Indeno(1,2,3-cd)pyrene	5.6	NS	8.2	11	0.5	0.5	0.5	<0.029	U	0.16	0.029	<0.027	U	0.15	0.027	<0.028	U	0.16	0.028	<0.026	U	0.15	0.026				
Isophorone	NS	NS	NS	NS	NS	NS	NS	<0.027	U	0.18	0.027	<0.025	U	0.17	0.025	<0.026	U	0.18	0.026	<0.025	U	0.17	0.025				
n-Nitrosodi-n-propylamine	NS	NS	NS	NS	NS	NS	NS	<0.032	U	0.21	0.032	<0.030	U	0.19	0.030	<0.031	U	0.20	0.031	<0.029	U	0.19	0.029				
Naphthalene	500	NS	12	1,000	100	100	12	<0.025	U	0.21	0.025	<0.024	U	0.19	0.024	<0.024	U	0.20	0.024	<0.023	U	0.19	0.023				
NDPA/DPA	NS	NS	NS	NS	NS	NS	NS	<0.023	U	0.16	0.023	<0.022	U	0.15	0.022	<0.023	U	0.16	0.023	<0.022	U	0.15	0.022				
Nitrobenzene	NS	NS	NS	NS	NS	NS	NS	<0.030	U	0.18	0.030	<0.028	U	0.17	0.028	<0.030	U	0.18	0.030	<0.028	U	0.17	0.028				
p-Chloro-m-cresol	NS	NS	NS	NS	NS	NS	NS	<0.031	U	0.21	0.031	<0.029	U	0.19	0.029	<0.030	U	0.20	0.030	<0.028	U	0.19	0.028				
Pentachlorophenol	6.7	0.8	0.8	55	2.4	6.7	0.8	<0.045	U	0.16	0.045	<0.042	U	0.15	0.042	<0.044	U	0.16	0.044	<0.042	U	0.15	0.042				
Phenanthrene	500	NS	1,000	1,000	100	100	100	<0.025	U	0.12	0.025	<0.023	U	0.12	0.023	<0.024	U	0.12	0.024	<0.023	U	0.11	0.023				
Phenol	500	30	0.33	1,000	100	100	0.33	<0.031	U	0.21	0.031	<0.029	U	0.19	0.029	<0.030	U	0.20	0.030	<0.029	U	0.19	0.029				
Pyrene	500	NS	1,000	1,000	100	100	100	<0.020	U	0.12	0.020	<0.019	U	0.12	0.019	<0.020	U	0.12	0.020	<0.019	U	0.11	0.019				
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
SEMIVOLATILE ORGANIC COMPOUNDS - TICS																											
No Tentatively Identified Compounds	NS	NS	NS	NS	NS	NS	NS	<0	U	0	0	<0	U	0	0	-	-	-	-	<0	U	0	0				
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.341	J	0	0	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.198	J	0	0	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.174	J	0	0	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.293	J	0	0	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.215	J	0	0	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown Cycloalkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Unknown Naphthalene	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Total TIC Compounds	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	1.22	J	0	0	-	-	-					

Notes:

Units in milligrams per kilogram (mg/kg)

ftgs - feet below ground surface

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No regulatory standard

<0.00022 - analyte not detected at the indicated laboratory reporting limit

U - Not detected at the indicated laboratory reporting limit

J - Estimated value (MDL<Conc<RL)

"-" - not analyzed

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESER: New York NYCRR Part 375 Ecological Resources Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Part 375 Environmental Remediation Programs, effective December 14, 2006.

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESI: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESR: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria per 6 NYCRR Part 375 Environmental

Remediation Programs, effective December 14, 2006.

* Samples SB-01, and SB-04 through SB-07 were collected from below the basement floor; sample depths

are from street level (Basement is 8.0' below street level)

Table 1B
Soil Sample Results Summary - SVOCs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:								SB-05-9.0-9.5			SB-06-9.0-9.5			SB-07-9.0-9.5			SB-08-7.0-7.5		
	SAMPLING DATE:								1/13/2022			1/13/2022			1/13/2022			1/6/2022		
	SAMPLE DEPTH (fbgs):								9.0-9.5			9.0-9.5			9.0-9.5			7.0-7.5		
	SAMPLE MATRIX:								SOIL			SOIL			SOIL			SOIL		
	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES		Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)																				
1,2,4,5-Tetrachlorobenzene	NS	NS	NS	NS	NS	NS	NS		<0.021	U	0.20	0.021	<0.021	U	0.20	0.021	<0.020	U	0.20	0.020
1,2,4-Trichlorobenzene	NS	NS	NS	NS	NS	NS	NS		<0.023	U	0.20	0.023	<0.023	U	0.20	0.023	<0.022	U	0.20	0.022
1,2-Dichlorobenzene	500	NS	1.1	1,000	100	100	1.1		<0.036	U	0.20	0.036	<0.036	U	0.20	0.036	<0.035	U	0.20	0.035
1,3-Dichlorobenzene	280	NS	2.4	560	17	49	2.4		<0.034	U	0.20	0.034	<0.034	U	0.20	0.034	<0.034	U	0.20	0.034
1,4-Dichlorobenzene	130	20	1.8	250	9.8	13	1.8		<0.034	U	0.20	0.034	<0.035	U	0.20	0.035	<0.034	U	0.20	0.034
1,4-Dioxane	130	0.1	0.1	250	9.8	13	0.1		<0.0091	U	0.03	0.0091	<0.0092	U	0.03	0.0092	<0.009	U	0.03	0.009
2,4,5-Trichlorophenol	NS	NS	NS	NS	NS	NS	NS		<0.038	U	0.20	0.038	<0.038	U	0.20	0.038	<0.038	U	0.20	0.038
2,4,6-Trichlorophenol	NS	NS	NS	NS	NS	NS	NS		<0.037	U	0.12	0.037	<0.038	U	0.12	0.038	<0.037	U	0.12	0.037
2,4-Dichlorophenol	NS	NS	NS	NS	NS	NS	NS		<0.032	U	0.18	0.032	<0.032	U	0.18	0.032	<0.032	U	0.18	0.032
2,4-Dimethylphenol	NS	NS	NS	NS	NS	NS	NS		<0.065	U	0.20	0.065	<0.066	U	0.20	0.066	<0.065	U	0.20	0.065
2,4-Dinitrophenol	NS	NS	NS	NS	NS	NS	NS		<0.092	U	0.95	0.092	<0.094	U	0.96	0.094	<0.092	U	0.94	0.092
2,4-Dinitrotoluene	NS	NS	NS	NS	NS	NS	NS		<0.040	U	0.20	0.040	<0.040	U	0.20	0.040	<0.039	U	0.20	0.039
2,6-Dinitrotoluene	NS	NS	NS	NS	NS	NS	NS		<0.034	U	0.20	0.034	<0.034	U	0.20	0.034	<0.034	U	0.20	0.034
2-Chloronaphthalene	NS	NS	NS	NS	NS	NS	NS		<0.020	U	0.20	0.020	<0.020	U	0.20	0.020	<0.019	U	0.20	0.019
2-Chlorophenol	NS	NS	NS	NS	NS	NS	NS		<0.023	U	0.20	0.023	<0.024	U	0.20	0.024	<0.023	U	0.20	0.023
2-Methylnaphthalene	NS	NS	NS	NS	NS	NS	NS		<0.024	U	0.24	0.024	<0.024	U	0.24	0.024	<0.024	U	0.24	0.024
2-Methylphenol	500	NS	0.33	1,000	100	100	0.33		<0.031	U	0.20	0.031	<0.031	U	0.20	0.031	<0.030	U	0.20	0.030
2-Nitroaniline	NS	NS	NS	NS	NS	NS	NS		<0.038	U	0.20	0.038	<0.039	U	0.20	0.039	<0.038	U	0.20	0.038
2-Nitrophenol	NS	NS	NS	NS	NS	NS	NS		<0.074	U	0.43	0.074	<0.076	U	0.43	0.076	<0.074	U	0.42	0.074
3,3'-Dichlorobenzidine	NS	NS	NS	NS	NS	NS	NS		<0.052	U	0.20	0.052	<0.053	U	0.20	0.053	<0.052	U	0.20	0.052
3-Methylphenol/4-Methylphenol	500	NS	0.33	1,000	34	100	0.33		<0.031	U	0.28	0.031	<0.031	U	0.29	0.031	<0.031	U	0.28	0.031
3-Nitroaniline	NS	NS	NS	NS	NS	NS	NS		<0.037	U	0.20	0.037	<0.038	U	0.20	0.038	<0.037	U	0.20	0.037
4,6-Dinitro-o-cresol	NS	NS	NS	NS	NS	NS	NS		<0.095	U	0.51	0.095	<0.096	U	0.52	0.096	<0.094	U	0.51	0.094
4-Bromophenyl phenyl ether	NS	NS	NS	NS	NS	NS	NS		<0.030	U	0.20	0.030	<0.031	U	0.20	0.031	<0.030	U	0.20	0.030
4-Chloroaniline	NS	NS	NS	NS	NS	NS	NS		<0.036	U	0.20	0.036	<0.036	U	0.20	0.036	<0.036	U	0.20	0.036
4-Chlorophenyl phenyl ether	NS	NS	NS	NS	NS	NS	NS		<0.021	U	0.20	0.021	<0.021	U	0.20	0.021	<0.021	U	0.20	0.021
4-Nitroaniline	NS	NS	NS	NS	NS	NS	NS		<0.082	U	0.20	0.082	<0.083	U	0.20	0.083	<0.081	U	0.20	0.081
4-Nitrophenol	NS	NS	NS	NS	NS	NS	NS		<0.081	U	0.28	0.081	<0.082	U	0.28	0.082	<0.080	U	0.28	0.080
Acenaphthene	500	20	98	1,000	100	100	20		<0.020	U	0.16	0.020	<0.021	U	0.16	0.021	<0.020	U	0.16	0.020
Acenaphthylene	500	NS	107	1,000	100	100	100		<0.030	U	0.16	0.030	<0.031	U	0.16	0.031	<0.030	U	0.16	0.030
Acetophenone	NS	NS	NS	NS	NS	NS	NS		<0.024	U	0.20	0.024	<0.025	U	0.20	0.025	<0.024	U	0.20	0.024
Anthracene	500	NS	1,000	1,000	100	100	100		<0.038	U	0.12	0.038	<0.039	U	0.12	0.039	<0.038	U	0.12	0.038
Benzo(a)anthracene	5.6	NS	1	11	1	1	1		<0.022	U	0.12	0.022	<0.023	U	0.12	0.023	0.027	J	0.12	0.027
Benzo(a)pyrene	1	2.6	22	1.1	1	1	1		<0.048	U	0.16	0.048	<0.049	U	0.16	0.049	<0.048	U	0.16	0.048
Benzo(b)fluoranthene	5.6	NS	1.7	11	1	1	1		<0.033	U	0.12	0.033	<0.034	U	0.12	0.034	<0.033	U	0.12	0.033
Benzo(ghi)perylene	500	NS	1,000	1,000	100	100	100		<0.023	U	0.16	0.023	<0.024	U	0.16	0.024	<0.023	U	0.16	0.023
Benzo(k)fluoranthene	56	NS	1.7	110	1	3.9	0.8		<0.032	U	0.12	0.032	<0.032	U	0.12	0.032	<0.031	U	0.12	0.031
Benzoic Acid	NS	NS	NS	NS	NS	NS	NS		<0.20	U	0.64	0.20	<0.20	U	0.65	0.20	<0.20	U	0.64	0.20
Benzyl Alcohol	NS	NS	NS	NS	NS	NS	NS		<0.060	U	0.20	0.060	<0.061	U	0.20	0.061	<0.060	U	0.20	0.060
Biphenyl	NS	NS	NS	NS	NS	NS	NS		<0.026	U	0.45	0.026	<0.026	U	0.46	0.026	<0.026	U	0.45	0.026
Bis(2-chloroethoxy)methane	NS	NS	NS	NS	NS	NS	NS		<0.020	U	0.21	0.020	<0.020	U	0.22	0.020	<0.020	U	0.21	0.020
Bis(2-chloroethyl)ether	NS	NS	NS	NS	NS	NS	NS		<0.027	U	0.18	0.027	<0.027	U	0.18	0.027	<0.027	U	0.18	0.027
Bis(2-chloroisopropyl)ether	NS	NS	NS	NS	NS	NS	NS		<0.034	U	0.24	0.034	<0.034	U	0.24	0.034	<0.034	U	0.24	0.034
Bis(2-ethylhexyl)phthalate	NS	NS	NS	NS	NS	NS	NS		<0.068	U	0.20	0.068	<0.070	U	0.20	0.070	<0.068	U	0.20	0.068
Butyl benzyl phthalate	NS	NS	NS	NS	NS	NS	NS		<0.050	U	0.20	0.050	<0.051	U	0.20	0.051	<0.050	U	0.20	0.050
Carbazole	NS	NS	NS	NS	NS	NS	NS		<0.019	U	0.20	0.019	<0.020	U	0.20	0.020	<0.019	U	0.20	0.019
Chrysene	56	NS	1	110	1	3.9	1		<0.020	U	0.12	0.020	<0.021	U	0.12	0.021	0.021	J	0.12	0.021
Di-n-butylphthalate	NS	NS	NS	NS	NS	NS	NS		<0.037	U	0.20	0.037	<0.038	U	0.20	0.038	<0.037	U	0.20	0.037
Di-n-octylphthalate	NS	NS	NS	NS	NS	NS	NS		<0.067	U	0.20	0.067	<0.068	U	0.20	0.068	<0.067	U	0.20	0.067
Dibenz(a,h)anthracene	0.66	NS	1,000	1.1	0.33	0.33	0.33		<0.023	U	0.12	0.023	<0.023	U	0.12	0.023	<0.023	U	0.12	0.023
Dibenzofuran	350	NS	210	1,000	14	59	7		<0.019	U	0.20	0.019	<0.019	U	0.20	0.019	<0.018	U	0.20	0.018
Diethyl phthalate	NS	NS	NS	NS	NS	NS	NS		<0.018	U	0.20	0.018	<0.019	U	0.20	0.019	<0.018	U	0.20	0.018
Dimethyl phthalate	NS	NS	NS	NS	NS	NS	NS		<0.042	U	0.20	0.042	<0.042	U	0.20	0.042	<0.041	U	0.20	0.041
Fluoranthene	500	NS	1,000	1,000	100	100	100		<0.023	U	0.12	0.023	<0.023	U	0.12	0.023	0.044	J	0.12	0.022
Fluorene	500	30	386	1,000	100	100	30		<0.019	U	0.20	0.019	<0.020	U	0.20	0.020	<0.019	U	0.20	0.019
Hexachlorobenzene	6	NS	3.2	12	0.33	1.2	0.33		<0.022	U	0.12	0.022	<0.022	U	0.12	0.022	<0.022	U	0.12	0.022
Hexachlorobutadiene	NS	NS	NS	NS	NS	NS	NS		<0.029	U	0.20	0.029	<0.029	U	0.20	0.029	<0.029	U	0.20	0.029
Hexachlorocyclopentadiene	NS	NS	NS	NS	NS	NS	NS		<0.18	U	0.56	0.18	<0.18	U	0.57	0.18	<0.18	U	0.56	0.18
Hexachloroethane	NS	NS	NS	NS	NS	NS	NS		<0.032	U	0.16	0.032	<0.032	U	0.16	0.032	<0.032	U	0.16	0.032

Table 1B
Soil Sample Results Summary - SVOCs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES	SAMPLE ID: SB-05-9.0-9.5				SB-06-9.0-9.5				SB-07-9.0-9.5				SB-08-7.0-7.5			
								SAMPLING DATE: 1/13/2022				1/13/2022				1/13/2022				1/6/2022			
								SAMPLE DEPTH (fbgs): 9.0-9.5				9.0-9.5				9.0-9.5				7.0-7.5			
								SAMPLE MATRIX: SOIL				SOIL				SOIL				SOIL			
								Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
Indeno(1,2,3-cd)pyrene	5.6	NS	8.2	11	0.5	0.5	0.5	<0.028	U	0.16	0.028	<0.028	U	0.16	0.028	<0.027	U	0.16	0.027	<0.028	U	0.16	0.028
Isophorone	NS	NS	NS	NS	NS	NS	NS	<0.026	U	0.18	0.026	<0.026	U	0.18	0.026	<0.026	U	0.18	0.026	<0.026	U	0.18	0.026
n-Nitrosodi-n-propylamine	NS	NS	NS	NS	NS	NS	NS	<0.030	U	0.20	0.030	<0.031	U	0.20	0.031	<0.030	U	0.20	0.030	<0.031	U	0.20	0.031
Naphthalene	500	NS	12	1,000	100	100	12	<0.024	U	0.20	0.024	<0.024	U	0.20	0.024	<0.024	U	0.20	0.024	<0.024	U	0.20	0.024
NDPA/DPA	NS	NS	NS	NS	NS	NS	NS	<0.022	U	0.16	0.022	<0.023	U	0.16	0.023	<0.022	U	0.16	0.022	<0.023	U	0.16	0.023
Nitrobenzene	NS	NS	NS	NS	NS	NS	NS	<0.029	U	0.18	0.029	<0.030	U	0.18	0.030	<0.029	U	0.18	0.029	<0.030	U	0.18	0.030
p-Chloro-m-cresol	NS	NS	NS	NS	NS	NS	NS	<0.029	U	0.20	0.029	<0.030	U	0.20	0.030	<0.029	U	0.20	0.029	<0.030	U	0.20	0.030
Pentachlorophenol	6.7	0.8	0.8	55	2.4	6.7	0.8	<0.043	U	0.16	0.043	<0.044	U	0.16	0.044	<0.043	U	0.16	0.043	<0.044	U	0.16	0.044
Phenanthrene	500	NS	1,000	1,000	100	100	100	<0.024	U	0.12	0.024	<0.024	U	0.12	0.024	<0.024	U	0.12	0.024	<0.024	U	0.12	0.024
Phenol	500	30	0.33	1,000	100	100	0.33	<0.030	U	0.20	0.030	<0.030	U	0.20	0.030	<0.030	U	0.20	0.030	<0.030	U	0.20	0.030
Pyrene	500	NS	1,000	1,000	100	100	100	<0.020	U	0.12	0.020	<0.020	U	0.12	0.020	0.037	J	0.12	0.020	<0.020	U	0.12	0.020
Total SVOCs	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-	0.129	-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS - TICS																							
No Tentatively Identified Compounds	NS	NS	NS	NS	NS	NS	NS	<0	U	0	0	-	-	-	-	<0	U	0	0	<0	U	0	0
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.317	J	0	0	-	-	-	-	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.313	J	0	0	-	-	-	-	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.182	J	0	0	-	-	-	-	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.321	J	0	0	-	-	-	-	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.227	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.777	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.208	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.193	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.365	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.244	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.249	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.255	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.307	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.859	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.193	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	1.08	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.236	J	0	0	-	-	-	-	-	-	-	-
Unknown Alkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.233	J	0	0	-	-	-	-	-	-	-	-
Unknown Cycloalkane	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.450	J	0	0	-	-	-	-	-	-	-	-
Unknown Naphthalene	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.275	J	0	0	-	-	-	-	-	-	-	-
Total TIC Compounds	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	7.28	J	0	0	-	-	-	-	-	-	-	-

Notes:

Units in milligrams per kilogram (mg/kg)
fbgs - feet below ground surface
Conc - Concentration
Q - Qualifier
RL - Reporting Limit
MDL - Method Detection Limit
NS - No regulatory standard
<0.00022 - analyte not detected at the indicated laboratory reporting limit
U - Not detected at the indicated laboratory reporting limit
J - Estimated value (MDL<Conc<RL)
"- " - not analyzed

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-RESER: New York NYCRR Part 375 Ecological Resources Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-RESI: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-RESR: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

* Samples SB-01, and SB-04 through SB-07 were collected from below the basement floor; sample depths are from street level (Basement is 8.0' below street level)

Approved by: DKO 5/13/2022
SAS 1/27/2023

Table 1C
Soil Sample Results Summary - PFAS
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE							SAMPLE ID:		SB-01-12.0-12.5				SB-02-8.0-8.5				SB-03-12.0-12.5								
							SAMPLING DATE:		1/13/2022		1/6/2022		1/6/2022												
							SAMPLE DEPTH (ftgs):		12.0-12.5		8.0-8.5		12.0-12.5												
							SAMPLE MATRIX:		SOIL		SOIL		SOIL												
NY-RESC							NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	
PERFLUORINATED ALKYL ACIDS (PFAS)																									
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)							NS	NS	NS	NS	NS	NS	NS	<0.000343	U	0.000597	0.000343	<0.000302	U	0.000525	0.000302	<0.000304	U	0.000529	0.000304
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)							NS	NS	NS	NS	NS	NS	NS	0.000243	J	0.000597	0.000214	<0.000188	U	0.000525	0.000188	<0.000190	U	0.000529	0.000190
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)							NS	NS	NS	NS	NS	NS	NS	<0.000101	U	0.000597	0.000101	<0.000089	U	0.000525	0.000089	<0.0000900	U	0.000529	0.0000900
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)							NS	NS	NS	NS	NS	NS	NS	<0.000241	U	0.000597	0.000241	<0.000212	U	0.000525	0.000212	<0.000213	U	0.000529	0.000213
Perfluorobutanesulfonic Acid (PFBS)							NS	NS	NS	NS	NS	NS	NS	<0.0000470	U	0.000299	0.0000470	<0.0000410	U	0.000263	0.0000410	<0.0000410	U	0.000265	0.0000410
Perfluorobutanoic Acid (PFBA)							NS	NS	NS	NS	NS	NS	NS	<0.0000270	U	0.000597	0.0000270	<0.0000240	U	0.000525	0.0000240	<0.0000240	U	0.000529	0.0000240
Perfluorodecanesulfonic Acid (PFDS)							NS	NS	NS	NS	NS	NS	NS	<0.000183	U	0.000597	0.000183	<0.000161	U	0.000525	0.000161	<0.000162	U	0.000529	0.000162
Perfluorodecanoic Acid (PFDA)							NS	NS	NS	NS	NS	NS	NS	<0.0000800	U	0.000299	0.0000800	<0.0000700	U	0.000263	0.0000700	<0.0000710	U	0.000265	0.0000710
Perfluorododecanoic Acid (PFDoA)							NS	NS	NS	NS	NS	NS	NS	<0.0000840	U	0.000597	0.0000840	<0.0000740	U	0.000525	0.0000740	<0.0000740	U	0.000529	0.0000740
Perfluoroheptanesulfonic Acid (PFHpS)							NS	NS	NS	NS	NS	NS	NS	<0.000163	U	0.000597	0.000163	<0.000143	U	0.000525	0.000143	<0.000144	U	0.000529	0.000144
Perfluoroheptanoic Acid (PFHpA)							NS	NS	NS	NS	NS	NS	NS	<0.0000540	U	0.000299	0.0000540	<0.0000470	U	0.000263	0.0000470	<0.0000480	U	0.000265	0.0000480
Perfluorohexanesulfonic Acid (PFHxS)							NS	NS	NS	NS	NS	NS	NS	<0.0000720	U	0.000299	0.0000720	<0.0000640	U	0.000263	0.0000640	<0.0000640	U	0.000265	0.0000640
Perfluorohexanoic Acid (PFHxA)							NS	NS	NS	NS	NS	NS	NS	<0.0000630	U	0.000597	0.0000630	<0.0000550	U	0.000525	0.0000550	<0.0000560	U	0.000529	0.0000560
Perfluorononanoic Acid (PFNA)							NS	NS	NS	NS	NS	NS	NS	<0.0000900	U	0.000299	0.0000900	<0.0000790	U	0.000263	0.0000790	<0.0000790	U	0.000265	0.0000790
Perfluorooctanesulfonamide (FOSA)							NS	NS	NS	NS	NS	NS	NS	<0.000117	U	0.000597	0.000117	<0.000103	U	0.000525	0.000103	<0.000104	U	0.000529	0.000104
Perfluorooctanesulfonic Acid (PFOS)							NS	NS	NS	NS	NS	NS	NS	0.000211	J	0.000299	0.000155	<0.000136	U	0.000263	0.000136	<0.000138	U	0.000265	0.000138
Perfluorooctanoic Acid (PFOA)							NS	NS	NS	NS	NS	NS	NS	<0.0000500	U	0.000299	0.0000500	<0.0000440	U	0.000263	0.0000440	<0.0000440	U	0.000265	0.0000440
Perfluoropentanoic Acid (PFPeA)							NS	NS	NS	NS	NS	NS	NS	<0.0000550	U	0.000597	0.0000550	<0.0000480	U	0.000525	0.0000480	<0.0000490	U	0.000529	0.0000490
Perfluorotetradecanoic Acid (PFTA)							NS	NS	NS	NS	NS	NS	NS	<0.0000650	U	0.000597	0.0000650	0.0000990	J	0.000525	0.0000570	0.0000990	J	0.000529	0.0000570
Perfluorotridecanoic Acid (PFTtDA)							NS	NS	NS	NS	NS	NS	NS	<0.000244	U	0.000597	0.000244	<0.000215	U	0.000525	0.000215	<0.000216	U	0.000529	0.000216
Perfluoroundecanoic Acid (PFUnA)							NS	NS	NS	NS	NS	NS	NS	<0.000056	U	0.000597	0.000056	<0.0000490	U	0.000525	0.0000490	<0.0000500	U	0.000529	0.0000500
PFOA/PFOS, Total							NS	NS	NS	NS	NS	NS	NS	0.000211	J	0.000299	0.0000500	<0.0000440	U	0.000263	0.0000440	<0.0000440	U	0.000265	0.0000440

Notes:

Units in milligrams per kilogram (mg/kg)

fbgs - feet below ground surface

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No regulatory standard

<0.00022 - analyte not detected at the indicated laboratory reporting limit

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* Samples SB-01, and SB-04 through SB-07 were collected from below the basement floor; sample depths

are from street level (Basement is 8.0' below street level)

Table 1C
Soil Sample Results Summary - PFAS
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

								SAMPLE ID: SB-04-9.5-10.0				SB-05-9.0-9.5				SB-06-9.0-9.5			
								1/13/2022				1/13/2022				1/13/2022			
								9.5-10.0				9.0-9.5				9.0-9.5			
								SOIL				SOIL				SOIL			
ANALYTE	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
PERFLUORINATED ALKYL ACIDS (PFAS)																			
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	NS	NS	NS	NS	NS	NS	NS	<0.000308	U	0.000536	0.000308	<0.000328	U	0.000572	0.000328	<0.000337	U	0.000588	0.000337
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	NS	NS	NS	NS	NS	NS	NS	<0.000193	U	0.000536	0.000193	<0.000205	U	0.000572	0.000205	<0.000211	U	0.000588	0.000211
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	NS	NS	NS	NS	NS	NS	NS	<0.000091	U	0.000536	0.000091	<0.000097	U	0.000572	0.000097	<0.000099	U	0.000588	0.000099
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	NS	NS	NS	NS	NS	NS	NS	<0.000216	U	0.000536	0.000216	<0.000231	U	0.000572	0.000231	<0.000237	U	0.000588	0.000237
Perfluorobutanesulfonic Acid (PFBS)	NS	NS	NS	NS	NS	NS	NS	<0.000042	U	0.000268	0.000042	<0.000045	U	0.000286	0.000045	<0.000046	U	0.000294	0.000046
Perfluorobutanoic Acid (PFBA)	NS	NS	NS	NS	NS	NS	NS	<0.000024	U	0.000536	0.000024	<0.000026	U	0.000572	0.000026	<0.000027	U	0.000588	0.000027
Perfluorodecanesulfonic Acid (PFDS)	NS	NS	NS	NS	NS	NS	NS	<0.000164	U	0.000536	0.000164	<0.000175	U	0.000572	0.000175	<0.000180	U	0.000588	0.000180
Perfluorodecanoic Acid (PFDA)	NS	NS	NS	NS	NS	NS	NS	<0.000072	U	0.000268	0.000072	<0.000077	U	0.000286	0.000077	<0.000079	U	0.000294	0.000079
Perfluorododecanoic Acid (PFDoA)	NS	NS	NS	NS	NS	NS	NS	<0.000075	U	0.000536	0.000075	<0.000080	U	0.000572	0.000080	<0.000082	U	0.000588	0.000082
Perfluoroheptanesulfonic Acid (PFHpS)	NS	NS	NS	NS	NS	NS	NS	<0.000146	U	0.000536	0.000146	<0.000156	U	0.000572	0.000156	<0.000160	U	0.000588	0.000160
Perfluoroheptanoic Acid (PFHpA)	NS	NS	NS	NS	NS	NS	NS	<0.000048	U	0.000268	0.000048	<0.000052	U	0.000286	0.000052	<0.000053	U	0.000294	0.000053
Perfluorohexanesulfonic Acid (PFHxS)	NS	NS	NS	NS	NS	NS	NS	<0.000065	U	0.000268	0.000065	<0.000069	U	0.000286	0.000069	<0.000071	U	0.000294	0.000071
Perfluorohexanoic Acid (PFHxA)	NS	NS	NS	NS	NS	NS	NS	<0.000056	U	0.000536	0.000056	<0.000060	U	0.000572	0.000060	<0.000062	U	0.000588	0.000062
Perfluorononanoic Acid (PFNA)	NS	NS	NS	NS	NS	NS	NS	<0.000081	U	0.000268	0.000081	<0.000086	U	0.000286	0.000086	<0.000088	U	0.000294	0.000088
Perfluorooctanesulfonamide (FOSA)	NS	NS	NS	NS	NS	NS	NS	<0.000105	U	0.000536	0.000105	<0.000112	U	0.000572	0.000112	<0.000115	U	0.000588	0.000115
Perfluorooctanesulfonic Acid (PFOS)	NS	NS	NS	NS	NS	NS	NS	<0.000139	U	0.000268	0.000139	<0.000149	U	0.000286	0.000149	<0.000153	U	0.000294	0.000153
Perfluorooctanoic Acid (PFOA)	NS	NS	NS	NS	NS	NS	NS	0.0000550	JF	0.000268	0.0000450	<0.000048	U	0.000286	0.0000480	<0.000049	U	0.000294	0.0000490
Perfluoropentanoic Acid (PFPeA)	NS	NS	NS	NS	NS	NS	NS	<0.000049	U	0.000536	0.000049	<0.000053	U	0.000572	0.0000530	<0.000054	U	0.000588	0.0000540
Perfluorotetradecanoic Acid (PFTA)	NS	NS	NS	NS	NS	NS	NS	<0.000058	U	0.000536	0.000058	<0.000062	U	0.000572	0.0000620	<0.000064	U	0.000588	0.0000640
Perfluorotridecanoic Acid (PFTrDA)	NS	NS	NS	NS	NS	NS	NS	<0.000219	U	0.000536	0.000219	<0.000234	U	0.000572	0.0002340	<0.000240	U	0.000588	0.000240
Perfluoroundecanoic Acid (PFUnA)	NS	NS	NS	NS	NS	NS	NS	<0.000050	U	0.000536	0.000050	<0.000054	U	0.000572	0.0000540	<0.000055	U	0.000588	0.0000550
PFOA/PFOS, Total	NS	NS	NS	NS	NS	NS	NS	0.0000550	J	0.000268	0.0000450	<0.000048	U	0.000286	0.0000480	<0.000049	U	0.000294	0.0000490

Notes:

Units in milligrams per kilogram (mg/kg)

fbgs - feet below ground surface

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No regulatory standard

<0.00022 - analyte not detected at the indicated laboratory reporting limit

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are from street level (Basement is 8.0' below street level)

Table 1C
Soil Sample Results Summary - PFAS
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES	SAMPLE ID: SB-07-9.0-9.5				SB-08-7.0-7.5			
								SAMPLING DATE: 1/13/2022				1/6/2022			
								SAMPLE DEPTH (fbgs): 9.0-9.5				7.0-7.5			
								SAMPLE MATRIX: SOIL				SOIL			
								Conc	Q	RL	MDL	Conc	Q	RL	MDL
PERFLUORINATED ALKYL ACIDS (PFAS)															
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	NS	NS	NS	NS	NS	NS	NS	<0.000310	U	0.000540	0.000310	<0.000302	U	0.000527	0.000302
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	NS	NS	NS	NS	NS	NS	NS	<0.000194	U	0.000540	0.000194	<0.000189	U	0.000527	0.000189
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	NS	NS	NS	NS	NS	NS	NS	<0.0000910	U	0.000540	0.0000910	<0.000089	U	0.000527	0.000089
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	NS	NS	NS	NS	NS	NS	NS	<0.000218	U	0.000540	0.000218	<0.000212	U	0.000527	0.000212
Perfluorobutanesulfonic Acid (PFBS)	NS	NS	NS	NS	NS	NS	NS	<0.0000420	U	0.000270	0.0000420	<0.0000410	U	0.000263	0.0000410
Perfluorobutanoic Acid (PFBA)	NS	NS	NS	NS	NS	NS	NS	<0.0000250	U	0.000540	0.0000250	<0.0000240	U	0.000527	0.0000240
Perfluorodecanesulfonic Acid (PFDS)	NS	NS	NS	NS	NS	NS	NS	<0.000165	U	0.000540	0.000165	<0.000161	U	0.000527	0.000161
Perfluorodecanoic Acid (PFDA)	NS	NS	NS	NS	NS	NS	NS	<0.0000720	U	0.000270	0.0000720	<0.0000710	U	0.000263	0.0000710
Perfluorododecanoic Acid (PFDoA)	NS	NS	NS	NS	NS	NS	NS	<0.0000760	U	0.000540	0.000076	<0.0000740	U	0.000527	0.0000740
Perfluoroheptanesulfonic Acid (PFHpS)	NS	NS	NS	NS	NS	NS	NS	<0.000147	U	0.000540	0.000147	<0.000144	U	0.000527	0.000144
Perfluoroheptanoic Acid (PFHpA)	NS	NS	NS	NS	NS	NS	NS	<0.0000490	U	0.000270	0.0000490	<0.0000480	U	0.000263	0.0000480
Perfluorohexanesulfonic Acid (PFHxS)	NS	NS	NS	NS	NS	NS	NS	<0.0000650	U	0.000270	0.0000650	<0.0000640	U	0.000263	0.0000640
Perfluorohexanoic Acid (PFHxA)	NS	NS	NS	NS	NS	NS	NS	<0.0000570	U	0.000540	0.0000570	<0.0000550	U	0.000527	0.0000550
Perfluorononanoic Acid (PFNA)	NS	NS	NS	NS	NS	NS	NS	<0.0000810	U	0.000270	0.0000810	<0.0000790	U	0.000263	0.0000790
Perfluorooctanesulfonamide (FOSA)	NS	NS	NS	NS	NS	NS	NS	<0.000106	U	0.000540	0.000106	<0.000103	U	0.000527	0.000103
Perfluorooctanesulfonic Acid (PFOS)	NS	NS	NS	NS	NS	NS	NS	<0.000140	U	0.000270	0.000140	<0.000137	U	0.000263	0.000137
Perfluorooctanoic Acid (PFOA)	NS	NS	NS	NS	NS	NS	NS	0.000108	J	0.000270	0.0000450	0.0000490	JF	0.000263	0.0000440
Perfluoropentanoic Acid (PFPeA)	NS	NS	NS	NS	NS	NS	NS	<0.0000500	U	0.000540	0.0000500	<0.0000480	U	0.000527	0.0000480
Perfluorotetradecanoic Acid (PFTA)	NS	NS	NS	NS	NS	NS	NS	<0.0000580	U	0.000540	0.0000580	0.0000750	J	0.000527	0.0000570
Perfluorotridecanoic Acid (PFTrDA)	NS	NS	NS	NS	NS	NS	NS	<0.000221	U	0.000540	0.000221	<0.000215	U	0.000527	0.000215
Perfluoroundecanoic Acid (PFUnA)	NS	NS	NS	NS	NS	NS	NS	<0.000051	U	0.000540	0.000051	<0.0000490	U	0.000527	0.0000490
PFOA/PFOS, Total	NS	NS	NS	NS	NS	NS	NS	0.000108	J	0.000270	0.000045	0.0000490	J	0.000263	0.0000440

Notes:

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Approved by: DKO 5/13/2022

SAS 1/27/2023

Table 1D
Soil Sample Results Summary - Pesticides and PCBs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	SAMPLE ID: SB-01-12.0-12.5				SB-02-8.0-8.5				SB-03-12.0-12.5				SB-04-9.5-10.0				
							SAMPLING DATE: 1/13/2022				1/6/2022				1/6/2022				1/13/2022				
							SAMPLE DEPTH (ftgs): 12.0-12.5				8.0-8.5				12.0-12.5				9.5-10.0				
							SAMPLE MATRIX: SOIL				SOIL				SOIL				SOIL				
							NY-UNRES	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
ORGANOCHLORINE PESTICIDES																							
4,4'-DDD	92	0.0033	14	180	2.6	13	0.0033	<0.000681	U	0.00191	0.000681	<0.000647	U	0.00182	0.000647	<0.000648	U	0.00182	0.000648	<0.000632	U	0.00177	0.000632
4,4'-DDE	62	0.0033	17	120	1.8	8.9	0.0033	<0.000442	U	0.00191	0.000442	<0.000420	U	0.00182	0.000420	<0.000420	U	0.00182	0.000420	<0.000410	U	0.00177	0.000410
4,4'-DDT	47	0.0033	136	94	1.7	7.9	0.0033	<0.00154	U	0.00358	0.00154	<0.00146	U	0.0034	0.00146	<0.00146	U	0.0034	0.00146	<0.00143	U	0.00332	0.00143
Aldrin	0.68	0.14	0.19	1.4	0.019	0.097	0.005	<0.000672	U	0.00191	0.000672	<0.000639	U	0.00182	0.000639	<0.000640	U	0.00182	0.000640	<0.000624	U	0.00177	0.000624
Alpha-BHC	3.4	0.04	0.02	6.8	0.097	0.48	0.02	<0.000226	U	0.000796	0.000226	<0.000215	U	0.000756	0.000215	<0.000215	U	0.000757	0.000215	<0.000210	U	0.000739	0.000210
Beta-BHC	3	0.6	0.09	14	0.072	0.36	0.036	<0.000724	U	0.00191	0.000724	<0.000688	U	0.00182	0.000688	<0.000689	U	0.00182	0.000689	<0.000672	U	0.00177	0.000672
Chlordane	NS	NS	NS	NS	NS	NS	NS	<0.00632	U	0.0159	0.00632	<0.00601	U	0.0151	0.00601	<0.00602	U	0.0151	0.00602	<0.00588	U	0.0148	0.00588
cis-Chlordane	24	1.3	2.9	47	0.91	4.2	0.094	<0.000665	U	0.00239	0.000665	<0.000632	U	0.00227	0.000632	<0.000633	U	0.00227	0.000633	<0.000618	U	0.00222	0.000618
Delta-BHC	500	0.04	0.25	1,000	100	100	0.04	<0.000374	U	0.00191	0.000374	<0.000356	U	0.00182	0.000356	<0.000356	U	0.00182	0.000356	<0.000347	U	0.00177	0.000347
Dieldrin	1.4	0.006	0.1	2.8	0.039	0.2	0.005	<0.000597	U	0.00119	0.000597	<0.000567	U	0.00113	0.000567	<0.000568	U	0.00114	0.000568	<0.000554	U	0.00111	0.000554
Endosulfan I	200	NS	102	920	4.8	24	2.4	<0.000451	U	0.00191	0.000451	<0.000429	U	0.00182	0.000429	<0.000429	U	0.00182	0.000429	<0.000419	U	0.00177	0.000419
Endosulfan II	200	NS	102	920	4.8	24	2.4	<0.000638	U	0.00191	0.000638	<0.000607	U	0.00182	0.000607	<0.000607	U	0.00182	0.000607	<0.000593	U	0.00177	0.000593
Endosulfan sulfate	200	NS	1,000	920	4.8	24	2.4	<0.000379	U	0.000796	0.000379	<0.000360	U	0.000756	0.000360	<0.000360	U	0.000757	0.000360	<0.000352	U	0.000739	0.000352
Endrin	89	0.014	0.06	410	2.2	11	0.014	<0.000326	U	0.000796	0.000326	<0.000310	U	0.000756	0.000310	<0.000310	U	0.000757	0.000310	<0.000303	U	0.000739	0.000303
Endrin aldehyde	NS	NS	NS	NS	NS	NS	NS	<0.000835	U	0.00239	0.000835	<0.000794	U	0.00227	0.000794	<0.000795	U	0.00227	0.000795	<0.000776	U	0.00222	0.000776
Endrin ketone	NS	NS	NS	NS	NS	NS	NS	<0.000492	U	0.00191	0.000492	<0.000467	U	0.00182	0.000467	<0.000468	U	0.00182	0.000468	<0.000457	U	0.00177	0.000457
Heptachlor	15	0.14	0.38	29	0.42	2.1	0.042	<0.000428	U	0.000955	0.000428	<0.000407	U	0.000908	0.000407	<0.000407	U	0.000908	0.000407	<0.000398	U	0.000887	0.000398
Heptachlor epoxide	NS	NS	NS	NS	NS	NS	NS	<0.00107	U	0.00358	0.00107	<0.00102	U	0.00340	0.00102	<0.00102	U	0.00340	0.00102	<0.000998	U	0.00332	0.000998
Lindane	9.2	6	0.1	23	0.28	1.3	0.1	<0.000356	U	0.000796	0.000356	<0.000338	U	0.000756	0.000338	<0.000338	U	0.000757	0.000338	<0.000330	U	0.000739	0.000330
Methoxychlor	NS	NS	NS	NS	NS	NS	NS	<0.00111	U	0.00358	0.00111	<0.00106	U	0.00340	0.00106	<0.00106	U	0.00340	0.00106	<0.00103	U	0.00332	0.00103
Toxaphene	NS	NS	NS	NS	NS	NS	NS	<0.0100	U	0.0358	0.0100	<0.00953	U	0.0340	0.00953	<0.00954	U	0.0340	0.00954	<0.00931	U	0.0332	0.00931
trans-Chlordane	NS	NS	NS	NS	NS	NS	NS	<0.000630	U	0.00239	0.000630	<0.000599	U	0.00227	0.000599	<0.000599	U	0.00227	0.000599	<0.000585	U	0.00222	0.000585
POLYCHLORINATED BIPHENYLS (PCBs)																							
Aroclor 1016	1	1	3.2	25	1	1	0.1	<0.00352	U	0.0397	0.00352	<0.00330	U	0.0372	0.00330	<0.00345	U	0.0388	0.00345	<0.00332	U	0.0374	0.00332
Aroclor 1221	1	1	3.2	25	1	1	0.1	<0.00398	U	0.0397	0.00398	<0.00373	U	0.0372	0.00373	<0.00389	U	0.0388	0.00389	<0.00375	U	0.0374	0.00375
Aroclor 1232	1	1	3.2	25	1	1	0.1	<0.00842	U	0.0397	0.00842	<0.00789	U	0.0372	0.00789	<0.00823	U	0.0388	0.00823	<0.00794	U	0.0374	0.00794
Aroclor 1242	1	1	3.2	25	1	1	0.1	<0.00535	U	0.0397	0.00535	<0.00502	U	0.0372	0.00502	<0.00523	U	0.0388	0.00523	<0.00505	U	0.0374	0.00505
Aroclor 1248	1	1	3.2	25	1	1	0.1	<0.00596	U	0.0397	0.00596	<0.00558	U	0.0372	0.00558	<0.00582	U	0.0388	0.00582	<0.00562	U	0.0374	0.00562
Aroclor 1254	1	1	3.2	25	1	1	0.1	<0.00434	U	0.0397	0.00434	<0.00407	U	0.0372	0.00407	<0.00425	U	0.0388	0.00425	<0.00410	U	0.0374	0.00410
Aroclor 1260	1	1	3.2	25	1	1	0.1	<0.00734	U	0.0397	0.00734	<0.00688	U	0.0372	0.00688	<0.00717	U	0.0388	0.00717	<0.00692	U	0.0374	0.00692
Aroclor 1262	1	1	3.2	25	1	1	0.1	<0.00504	U	0.0397	0.00504	<0.00473	U	0.0372	0.00473	<0.00493	U	0.0388	0.00493	<0.00475	U	0.0374	0.00475
Aroclor 1268	1	1	3.2	25	1	1	0.1	<0.00411	U	0.0397	0.00411	<0.00386	U	0.0372	0.00386	<0.00402	U	0.0388	0.00402	<0.00388	U	0.0374	0.00388
PCBs, Total	1	1	3.2	25	1	1	0.1	<0.00352	U	0.0397	0.00352	<0.00330	U	0.0372	0.00330	<0.00345	U	0.0388	0.00345	<0.00332	U	0.0374	0.00332

Notes:

Units in milligrams per kilogram (mg/kg)

ftgs - feet below ground surface

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No regulatory standard

<0.00022 - analyte not detected at the indicated laboratory reporting limit

U - Not detected at the indicated laboratory reporting limit

J - Estimated value (MDL<Conc<RL)

"-" - not analyzed

Bold results indicate an exceedance of a NYSDEC regulatory standard

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESER: New York NYCRR Part 375 Ecological Resources Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Part 375 Environmental Remediation Programs, effective December 14, 2006.

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

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Environmental Remediation Programs, effective December 14, 2006.

NY-RESR: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria per 6 NYCRR Part 375 Environmental

Remediation Programs, effective December 14, 2006.

* **Samples SB-01, and SB-04 through SB-07 were collected from below the basement floor; sample depths**

are from street level (Basement is 8.0' below street level)

Table 1D
Soil Sample Results Summary - Pesticides and PCBs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

							SAMPLE ID:		SB-05-9.0-9.5				SB-06-9.0-9.5				SB-07-9.0-9.5				SB-08-7.0-7.5					
							SAMPLING DATE:				1/13/2022				1/13/2022				1/13/2022				1/6/2022			
							SAMPLE DEPTH (ftbgs):				9.0-9.5				9.0-9.5				9.0-9.5				7.0-7.5			
							SAMPLE MATRIX:				SOIL				SOIL				SOIL				SOIL			
ANALYTE	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL			
ORGANOCHLORINE PESTICIDES																										
4,4'-DDD	92	0.0033	14	180	2.6	13	0.0033	<0.000661	U	0.00185	0.000661	<0.000692	U	0.00194	0.000692	<0.000658	U	0.00184	0.000658	<0.000675	U	0.00189	0.000675			
4,4'-DDE	62	0.0033	17	120	1.8	8.9	0.0033	<0.000429	U	0.00185	0.000429	<0.000448	U	0.00194	0.000448	<0.000426	U	0.00184	0.000426	<0.000438	U	0.00189	0.000438			
4,4'-DDT	47	0.0033	136	94	1.7	7.9	0.0033	<0.00149	U	0.00348	0.00149	<0.00156	U	0.00364	0.00156	<0.00148	U	0.00346	0.00148	<0.00152	U	0.00355	0.00152			
Aldrin	0.68	0.14	0.19	1.4	0.019	0.097	0.005	<0.000653	U	0.00185	0.000653	<0.000683	U	0.00194	0.000683	<0.000649	U	0.00184	0.000649	<0.000667	U	0.00189	0.000667			
Alpha-BHC	3.4	0.04	0.02	6.8	0.097	0.48	0.02	<0.000219	U	0.000772	0.000219	<0.000230	U	0.000808	0.000230	<0.000218	U	0.000768	0.000218	<0.000224	U	0.000789	0.000224			
Beta-BHC	3	0.6	0.09	14	0.072	0.36	0.036	<0.000703	U	0.00185	0.000703	<0.000735	U	0.00194	0.000735	<0.000699	U	0.00184	0.000699	<0.000718	U	0.00189	0.000718			
Chlordane	NS	NS	NS	NS	NS	NS	NS	<0.00614	U	0.0154	0.00614	<0.00642	U	0.0162	0.00642	<0.00611	U	0.0154	0.00611	<0.00627	U	0.0158	0.00627			
cis-Chlordane	24	1.3	2.9	47	0.91	4.2	0.094	<0.000646	U	0.00232	0.000646	<0.000676	U	0.00242	0.000676	<0.000642	U	0.0023	0.000642	<0.000660	U	0.00237	0.000660			
Delta-BHC	500	0.04	0.25	1,000	100	100	0.04	<0.000363	U	0.00185	0.000363	<0.000380	U	0.00194	0.000380	<0.000361	U	0.00184	0.000361	<0.000371	U	0.00189	0.000371			
Dieldrin	1.4	0.006	0.1	2.8	0.039	0.2	0.005	<0.000579	U	0.00116	0.000579	<0.000606	U	0.00121	0.000606	<0.000576	U	0.00115	0.000576	<0.000592	U	0.00118	0.000592			
Endosulfan I	200	NS	NS	102	920	4.8	24	2.4	<0.000438	U	0.00185	0.000438	<0.000458	U	0.00194	0.000458	<0.000436	U	0.00184	0.000436	<0.000447	U	0.00189	0.000447		
Endosulfan II	200	NS	NS	102	920	4.8	24	2.4	<0.000620	U	0.00185	0.000620	<0.000648	U	0.00194	0.000648	<0.000616	U	0.00184	0.000616	<0.000633	U	0.00189	0.000633		
Endosulfan sulfate	200	NS	NS	1,000	920	4.8	24	2.4	<0.000368	U	0.000772	0.000368	<0.000385	U	0.000808	0.000385	<0.000366	U	0.000768	0.000366	<0.000376	U	0.000789	0.000376		
Endrin	89	0.014	0.06	410	2.2	11	0.014	<0.000317	U	0.000772	0.000317	<0.000331	U	0.000808	0.000331	<0.000315	U	0.000768	0.000315	<0.000324	U	0.000789	0.000324			
Endrin aldehyde	NS	NS	NS	NS	NS	NS	NS	<0.000811	U	0.00232	0.000811	<0.000848	U	0.00242	0.000848	<0.000807	U	0.0023	0.000807	<0.000828	U	0.00237	0.000828			
Endrin ketone	NS	NS	NS	NS	NS	NS	NS	<0.000477	U	0.00185	0.000477	<0.000499	U	0.00194	0.000499	<0.000475	U	0.00184	0.000475	<0.000488	U	0.00189	0.000488			
Heptachlor	15	0.14	0.38	29	0.42	2.1	0.042	<0.000416	U	0.000927	0.000416	<0.000435	U	0.000908	0.000435	<0.000413	U	0.000922	0.000413	<0.000424	U	0.000947	0.000424			
Heptachlor epoxide	NS	NS	NS	NS	NS	NS	NS	<0.00104	U	0.00348	0.00104	<0.00109	U	0.00364	0.00109	<0.00104	U	0.00346	0.00104	<0.00106	U	0.00355	0.00106			
Lindane	9.2	6	0.1	23	0.28	1.3	0.1	<0.000345	U	0.000772	0.000345	<0.000361	U	0.000808	0.000361	<0.000344	U	0.000768	0.000344	<0.000353	U	0.000789	0.000353			
Methoxychlor	NS	NS	NS	NS	NS	NS	NS	<0.00108	U	0.00348	0.00108	<0.00113	U	0.00364	0.00113	<0.00108	U	0.00346	0.00108	<0.00110	U	0.00355	0.00110			
Toxaphene	NS	NS	NS	NS	NS	NS	NS	<0.000973	U	0.00348	0.000973	<0.00102	U	0.00364	0.00102	<0.000968	U	0.00346	0.000968	<0.000994	U	0.00355	0.000994			
trans-Chlordane	NS	NS	NS	NS	NS	NS	NS	<0.000612	U	0.00232	0.000612	<0.000640	U	0.00242	0.000640	<0.000609	U	0.0023	0.000609	<0.000625	U	0.00237	0.000625			
POLYCHLORINATED BIPHENYLS (PCBs)																										
Aroclor 1016	1	1	3.2	25	1	1	0.1	<0.00353	U	0.0398	0.00353	<0.00352	U	0.0397	0.00352	<0.00349	U	0.0393	0.00349	<0.00338	U	0.0381	0.00338			
Aroclor 1221	1	1	3.2	25	1	1	0.1	<0.00399	U	0.0398	0.00399	<0.00398	U	0.0397	0.00398	<0.00394	U	0.0393	0.00394	<0.00382	U	0.0381	0.00382			
Aroclor 1232	1	1	3.2	25	1	1	0.1	<0.00843	U	0.0398	0.00843	<0.00842	U	0.0397	0.00842	<0.00834	U	0.0393	0.00834	<0.00808	U	0.0381	0.00808			
Aroclor 1242	1	1	3.2	25	1	1	0.1	<0.00536	U	0.0398	0.00536	<0.00535	U	0.0397	0.00535	<0.00530	U	0.0393	0.00530	<0.00514	U	0.0381	0.00514			
Aroclor 1248	1	1	3.2	25	1	1	0.1	<0.00597	U	0.0398	0.00597	<0.00595	U	0.0397	0.00595	<0.00590	U	0.0393	0.00590	<0.00572	U	0.0381	0.00572			
Aroclor 1254	1	1	3.2	25	1	1	0.1	<0.00435	U	0.0398	0.00435	<0.00434	U	0.0397	0.00434	<0.00430	U	0.0393	0.00430	<0.00417	U	0.0381	0.00417			
Aroclor 1260	1	1	3.2	25	1	1	0.1	0.0186	J	0.0398	0.00735	<0.00734	U	0.0397	0.00734	<0.00727	U	0.0393	0.00727	<0.00704	U	0.0381	0.00704			
Aroclor 1262	1	1	3.2	25	1	1	0.1	<0.00505	U	0.0398	0.00505	<0.00504	U	0.0397	0.00504	<0.00500	U	0.0393	0.00500	<0.00484	U	0.0381	0.00484			
Aroclor 1268	1	1	3.2	25	1	1	0.1	<0.00412	U	0.0398	0.00412	<0.00411	U	0.0397	0.00411	<0.00408	U	0.0393	0.00408	<0.00395	U	0.0381	0.00395			
PCBs, Total	1	1	3.2	25	1	1	0.1	0.0186	J	0.0398	0.00353	<0.00352	U	0.0397	0.00352	<0.00349	U	0.0393	0.00349	<0.00338	U	0.0381	0.00338			

Notes:

Units in milligrams per kilogram (mg/kg)
fbgs - feet below ground surface
Conc - Concentration
Q - Qualifier
RL - Reporting Limit
MDL - Method Detection Limit
NS - No regulatory standard
<0.00022 - analyte not detected at the indicated laboratory reporting limit
U - Not detected at the indicated laboratory reporting limit
J - Estimated value (MDL<Conc<RL)
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Bold results indicate an exceedance of a NYSDEC regulatory standard

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
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NY-RESI: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-RESR: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

* **Samples SB-01, and SB-04 through SB-07 were collected from below the basement floor; sample depths are from street level (Basement is 8.0' below street level)**

Approved by: DKO 5/13/2022
SAS 1/27/2023

Table 1E
Soil Sample Results Summary - Metals
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

								SAMPLE ID:				SB-01-12.0-12.5				SB-02-8.0-8.5				SB-03-12.0-12.5				SB-04-9.5-10.0			
								SAMPLING DATE:				1/13/2022				1/6/2022				1/6/2022				1/13/2022			
								SAMPLE DEPTH (fbgs):				12.0-12.5				8.0-8.5				12.0-12.5				9.5-10.0			
								SAMPLE MATRIX:				SOIL				SOIL				SOIL				SOIL			
ANALYTE	CasNum	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL			
TOTAL METALS																											
Aluminum, Total	7429-90-5	NS	NS	NS	NS	NS	NS	NS	11,200	9.52	2.57		8,840	9.02	2.43		8,380	9.26	2.50		15,400	43.4	11.7				
Antimony, Total	7440-36-0	NS	NS	NS	NS	NS	NS	NS	<0.362	U	4.76	0.362	0.965	J	4.51	0.342	0.732	J	4.63	0.352	<1.65	U	21.7	1.65			
Arsenic, Total	7440-38-2	16	13	16	16	16	16	13	5.51	0.952	0.198		4.48	0.902	0.188		2.74	0.926	0.193		4.42	4.34	0.902				
Barium, Total	7440-39-3	400	433	820	10,000	350	400	350	23.7	0.952	0.166		18.5	0.902	0.157		32.9	0.926	0.161		52.3	4.34	0.754				
Beryllium, Total	7440-41-7	590	10	47	2,700	14	72	7.2	0.495	0.476	0.031		0.604	0.451	0.0300		0.352	J	0.463	0.031	0.824	J	2.17	0.143			
Cadmium, Total	7440-43-9	9.3	4	7.5	60	2.5	4.3	2.5	0.495	J	0.952	0.093	0.884	J	0.902	0.088		0.63	J	0.926	0.091	0.607	J	4.34	0.425		
Calcium, Total	7440-70-2	NS	NS	NS	NS	NS	NS	NS	1,380	9.52	3.33		477	9.02	3.16		356	9.26	3.24		1,370	43.4	15.2				
Chromium, Total	7440-47-3	NS	NS	NS	NS	NS	NS	NS	15.3	0.952	0.091		11.2	0.902	0.087		11.5	0.926	0.0890		22.1	4.34	0.416				
Cobalt, Total	7440-48-4	NS	NS	NS	NS	NS	NS	NS	6.34	1.90	0.158		9.88	1.80	0.150		14.7	1.85	0.154		12.3	8.67	0.72				
Copper, Total	7440-50-8	270	50	1720	10,000	270	270	50	13.4	0.952	0.246		18.3	0.902	0.233		13.7	0.926	0.239		24.2	4.34	1.12				
Iron, Total	7439-89-6	NS	NS	NS	NS	NS	NS	NS	26,400	4.76	0.86		20,800	4.51	0.814		15,400	4.63	0.836		31,100	21.7	3.92				
Lead, Total	7439-92-1	1,000	63	450	3,900	400	400	63	8.59	4.76	0.255		10.2	4.51	0.242		11.9	4.63	0.248		15.9	J	21.7	1.16			
Magnesium, Total	7439-95-4	NS	NS	NS	NS	NS	NS	NS	3,100	9.52	1.47		2,780	9.02	1.39		3,360	9.26	1.43		5,420	43.4	6.68				
Manganese, Total	7439-96-5	10,000	1,600	2,000	10,000	2,000	2,000	1,600	453	0.952	0.151		374	0.902	0.143		229	0.926	0.147		961	4.34	0.689				
Mercury, Total	7439-97-6	2.8	0.18	0.73	5.7	0.81	0.81	0.18	<0.055	U	0.084	0.055	<0.0530	U	0.0810	0.0530		<0.0640	U	0.099	0.0640	<0.0480	U	0.0740	0.0480		
Nickel, Total	7440-02-0	310	30	130	10,000	140	310	30	14.1	2.38	0.23		18.1	2.25	0.218		18.3	2.31	0.224		33.4	10.8	1.05				
Potassium, Total	7440-09-7	NS	NS	NS	NS	NS	NS	NS	586	238	13.7		290	225	13.0		321	231	13.3		911	J	1080	62.4			
Selenium, Total	7782-49-2	1,500	3.9	4	6,800	36	180	3.9	<0.246	U	1.9	0.246	<0.233	U	1.80	0.233		<0.239	U	1.85	0.239	<1.12	U	8.67	1.12		
Silver, Total	7440-22-4	1,500	2	8.3	6,800	36	180	2	<0.269	U	0.952	0.269	<0.255	U	0.902	0.255		<0.262	U	0.926	0.262	<1.23	U	4.34	1.23		
Sodium, Total	7440-23-5	NS	NS	NS	NS	NS	NS	NS	275	190	3.00		396	180	2.84		250	185	2.92		348	J	867	13.6			
Thallium, Total	7440-28-0	NS	NS	NS	NS	NS	NS	NS	<0.300	U	1.9	0.300	<0.284	U	1.80	0.284		<0.292	U	1.85	0.292	<1.36	U	8.67	1.36		
Vanadium, Total	7440-62-2	NS	NS	NS	NS	NS	NS	NS	17.4	0.952	0.193		15.2	0.902	0.183		14.1	0.926	0.188		21.0	4.34	0.880				
Zinc, Total	7440-66-6	10,000	109	2,480	10,000	2,200	10,000	109	39.6	4.76	0.279		42.2	4.51	0.264		40.1	4.63	0.271		71.9	21.7	1.27				

Notes:

Units in milligrams per kilogram (mg/kg)

fbgs - feet below ground surface

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No regulatory standard

<0.00022 - analyte not detected at the indicated laboratory reporting limit

U - Not detected at the indicated laboratory reporting limit

J - Estimated value (MDL<Conc<RL)

"-" - not analyzed

Bold results indicate an exceedance of a NYSDEC regulatory standard

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESER: New York NYCRR Part 375 Ecological Resources Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Part 375 Environmental Remediation Programs, effective December 14, 2006.

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESI: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESR: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria per 6 NYCRR Part 375 Environmental

Remediation Programs, effective December 14, 2006.

*** Samples SB-01, and SB-04 through SB-07 were collected from below the basement floor; sample depths are from street level (Basement is 8.0' below street level)**

Table 1E
Soil Sample Results Summary - Metals
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	CasNum	NY-RESC	NY-RESER	NY-RESGW	NY-RESI	NY-RESR	NY-RESRR	NY-UNRES	SAMPLE ID:				SB-06-9.0-9.5				SB-07-9.0-9.5				SB-08-7.0-7.5			
									1/13/2022				1/13/2022				1/13/2022				1/6/2022			
									9.0-9.5				9.0-9.5				9.0-9.5				7.0-7.5			
									SOIL				SOIL				SOIL				SOIL			
									Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
TOTAL METALS																								
Aluminum, Total	7429-90-5	NS	NS	NS	NS	NS	NS	NS	9,660			6.13	10,000			2.52	8,960			2.40	7,960			2.54
Antimony, Total	7440-36-0	NS	NS	NS	NS	NS	NS	NS	<0.862	U	11.3	0.862	<0.354	U	4.66	0.354	<0.338	U	4.45	0.338	0.583	J	4.70	0.358
Arsenic, Total	7440-38-2	16	13	16	16	16	16	13	1.95	J	2.27	0.472	1.92		0.932	0.194	3.83		0.889	0.185	2.46		0.941	0.196
Barium, Total	7440-39-3	400	433	820	10,000	350	400	350	78.9		2.27	0.395	23.4		0.932	0.162	33.2		0.889	0.155	49.4		0.941	0.164
Beryllium, Total	7440-41-7	590	10	47	2,700	14	72	7.2	0.658	J	1.13	0.075	0.280	J	0.466	0.0310	0.462		0.445	0.029	0.527		0.47	0.0310
Cadmium, Total	7440-43-9	9.3	4	7.5	60	2.5	4.3	2.5	0.227	J	2.27	0.222	0.252	J	0.932	0.091	0.347	J	0.889	0.087	0.640	J	0.941	0.0920
Calcium, Total	7440-70-2	NS	NS	NS	NS	NS	NS	NS	2,000		22.7	7.94	806		9.32	3.26	1,080		8.89	3.11	4,520		9.41	3.29
Chromium, Total	7440-47-3	NS	NS	NS	NS	NS	NS	NS	13.6		2.27	0.218	13.2		0.932	0.09	11.3		0.889	0.085	7.82		0.941	0.0900
Cobalt, Total	7440-48-4	NS	NS	NS	NS	NS	NS	NS	6.56		4.54	0.377	3.54		1.86	0.155	6.66		1.78	0.148	6.24		1.88	0.156
Copper, Total	7440-50-8	270	50	1720	10,000	270	270	50	21.4		2.27	0.585	15.7		0.932	0.24	15.8		0.889	0.229	12.8		0.941	0.243
Iron, Total	7439-89-6	NS	NS	NS	NS	NS	NS	NS	14,700		11.3	2.05	14,200		4.66	0.842	17,300		4.45	0.803	11,900		4.70	0.850
Lead, Total	7439-92-1	1,000	63	450	3,900	400	400	63	7.03	J	11.3	0.608	11.9		4.66	0.25	8.84		4.45	0.238	118		4.70	0.252
Magnesium, Total	7439-95-4	NS	NS	NS	NS	NS	NS	NS	2,820		22.7	3.49	1,880		9.32	1.44	2,620		8.89	1.37	1,990		9.41	1.45
Manganese, Total	7439-96-5	10,000	1,600	2,000	10,000	2,000	2,000	1,600	91.3		2.27	0.361	74.1		0.932	0.148	316		0.889	0.141	450		0.941	0.15
Mercury, Total	7439-97-6	2.8	0.18	0.73	5.7	0.81	0.81	0.18	<0.0600	U	0.0920	0.0600	<0.0540	U	0.0820	0.0540	<0.0500	U	0.0760	0.0500	0.104		0.0890	0.0580
Nickel, Total	7440-02-0	310	30	130	10,000	140	310	30	14.2		5.67	0.549	8.26		2.33	0.226	13.7		2.22	0.215	11.3		2.35	0.228
Potassium, Total	7440-09-7	NS	NS	NS	NS	NS	NS	NS	512	J	567	32.7	449		233	13.4	478		222	12.8	392		235	13.5
Selenium, Total	7782-49-2	1,500	3.9	4	6,800	36	180	3.9	<0.585	U	4.54	0.585	<0.240	U	1.86	0.240	<0.229	U	1.78	0.229	<0.243	U	1.88	0.243
Silver, Total	7440-22-4	1,500	2	8.3	6,800	36	180	2	<0.642	U	2.27	0.642	<0.264	U	0.932	0.264	<0.252	U	0.889	0.252	<0.266	U	0.941	0.266
Sodium, Total	7440-23-5	NS	NS	NS	NS	NS	NS	NS	256	J	454	7.15	151	J	186	2.94	178		178	2.80	457		188	2.96
Thallium, Total	7440-28-0	NS	NS	NS	NS	NS	NS	NS	<0.715	U	4.54	0.715	<0.294	U	1.86	0.294	<0.280	U	1.78	0.280	<0.296	U	1.88	0.296
Vanadium, Total	7440-62-2	NS	NS	NS	NS	NS	NS	NS	14.7		2.27	0.461	20.4		0.932	0.189	16.7		0.889	0.180	13.8		0.941	0.191
Zinc, Total	7440-66-6	10,000	109	2,480	10,000	2,200	10,000	109	53.1		11.3	0.665	40.0		4.66	0.273	36.9		4.45	0.260	110		4.7	0.276

Notes:

Units in milligrams per kilogram (mg/kg)
fbgs - feet below ground surface
Conc - Concentration
Q - Qualifier
RL - Reporting Limit
MDL - Method Detection Limit
NS - No regulatory standard
<0.00022 - analyte not detected at the indicated laboratory reporting limit
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* Samples SB-01, and SB-04 through SB-07 were collected from below the basement floor; sample depths are from street level (Basement is 8.0' below street level)

Approved by: DKO 5/13/2022
SAS 1/27/2023

Table 2
Monitoring Well Summary
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

Monitoring Well ID	PID readings (ppm) 04/14/2022	Northing (Y)	Easting (X)	TD (ft bgs) 04/14/2022	DTW (ft bgs) 04/14/2022	TIC Elevation (ft amsl)	Groundwater Elevation (ft amsl) 04/14/2022
MW-1	0.0	831579.03	587815.83	34.50	29.96	298.64	268.68
MW-2	1.2	831510.43	587812.10	34.70	25.70	297.33	271.63

NOTES:

PID - Photoionization Detector

ppm - parts per million

TD - Total Well Depth

DTW - Depth to Water

TIC - Top of Inner Casing

ft bgs - feet below ground surface

ft amsl - feet above mean sea level

VOC - Volatile Organic Compounds

XY US Survey Feet

Table 2A
Groundwater Sample Results Summary - VOCs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:		MW-1				MW-2			
	SAMPLING DATE:		4/14/2022				4/14/2022			
	SAMPLE MATRIX:		WATER				WATER			
	NY-AWQS	Conc	Q	RL	MDL		Conc	Q	RL	MDL
VOLATILE ORGANIC COMPOUNDS (VOCs)										
Methylene chloride	5	ND		2.5	0.70		ND		2.5	0.70
1,1-Dichloroethane	5	ND		2.5	0.70		ND		2.5	0.70
Chloroform	7	ND		2.5	0.70		ND		2.5	0.70
Carbon tetrachloride	5	ND		0.50	0.13		ND		0.50	0.13
1,2-Dichloropropane	1	ND		1.0	0.14		ND		1.0	0.14
Dibromochloromethane	50	ND		0.50	0.15		ND		0.50	0.15
1,1,2-Trichloroethane	1	ND		1.5	0.50		ND		1.5	0.50
Tetrachloroethene	5	ND		0.50	0.18	0.18	J		0.50	0.18
Chlorobenzene	5	ND		2.5	0.70		ND		2.5	0.70
Trichlorofluoromethane	5	ND		2.5	0.70		ND		2.5	0.70
1,2-Dichloroethane	0.6	ND		0.50	0.13		ND		0.50	0.13
1,1,1-Trichloroethane	5	ND		2.5	0.70		ND		2.5	0.70
Bromodichloromethane	50	ND		0.50	0.19		ND		0.50	0.19
trans-1,3-Dichloropropene	0.4	ND		0.50	0.16		ND		0.50	0.16
cis-1,3-Dichloropropene	0.4	ND		0.50	0.14		ND		0.50	0.14
1,3-Dichloropropene, Total	NS	ND		0.50	0.14		ND		0.50	0.14
1,1-Dichloropropene	5	ND		2.5	0.70		ND		2.5	0.70
Bromoform	50	ND		2.0	0.65		ND		2.0	0.65
1,1,1,2-Tetrachloroethane	5	ND		0.50	0.17		ND		0.50	0.17
Benzene	1	ND		0.50	0.16		ND		0.50	0.16
Toluene	5	ND		2.5	0.70		ND		2.5	0.70
Ethylbenzene	5	ND		2.5	0.70		ND		2.5	0.70
Chloromethane	NS	ND		2.5	0.70		ND		2.5	0.70
Bromomethane	5	ND		2.5	0.70		ND		2.5	0.70
Vinyl chloride	2	ND		1.0	0.070		ND		1.0	0.070
Chloroethane	5	ND		2.5	0.70		ND		2.5	0.70
1,1-Dichloroethene	5	ND		0.50	0.17		ND		0.50	0.17
trans-1,2-Dichloroethene	5	ND		2.5	0.70		ND		2.5	0.70
Trichloroethene	5	ND		0.50	0.18		ND		0.5	0.18
1,2-Dichlorobenzene	3	ND		2.5	0.70		ND		2.5	0.70
1,3-Dichlorobenzene	3	ND		2.5	0.70		ND		2.5	0.70
1,4-Dichlorobenzene	3	ND		2.5	0.70		ND		2.5	0.70
Methyl tert butyl ether	10	ND		2.5	0.70		ND		2.5	0.70
p/m-Xylene	5	ND		2.5	0.70		ND		2.5	0.70
o-Xylene	5	ND		2.5	0.70		ND		2.5	0.70
Xylenes, Total	NS	ND		2.5	0.70		ND		2.5	0.70
cis-1,2-Dichloroethene	5	ND		2.5	0.70		ND		2.5	0.70
1,2-Dichloroethene, Total	NS	ND		2.5	0.70		ND		2.5	0.70
Dibromomethane	5	ND		5.0	1.0		ND		5.0	1.0
1,2,3-Trichloropropane	0.04	ND		2.5	0.70		ND		2.5	0.70
Acrylonitrile	5	ND		5.0	1.5		ND		5.0	1.5
Styrene	5	ND		2.5	0.70		ND		2.5	0.70
Dichlorodifluoromethane	5	ND		5.0	1.0		ND		5.0	1.0
Acetone	50	ND		5.0	1.5		ND		5.0	1.5
Carbon disulfide	60	ND		5.0	1.0		ND		5.0	1.0
2-Butanone	50	ND		5.0	1.9		ND		5.0	1.9
Vinyl acetate	NS	ND		5.0	1.0		ND		5.0	1.0
4-Methyl-2-pentanone	NS	ND		5.0	1.0		ND		5.0	1.0
2-Hexanone	50	ND		5.0	1.0		ND		5.0	1.0
Bromochloromethane	5	ND		2.5	0.70		ND		2.5	0.70
2,2-Dichloropropane	5	ND		2.5	0.70		ND		2.5	0.70
1,2-Dibromoethane	0.0006	ND		2.0	0.65		ND		2.0	0.65
1,3-Dichloropropane	5	ND		2.5	0.70		ND		2.5	0.70
1,1,1,2-Tetrachloroethane	5	ND		2.5	0.70		ND		2.5	0.70
Bromobenzene	5	ND		2.5	0.70		ND		2.5	0.70
n-Butylbenzene	5	ND		2.5	0.70		ND		2.5	0.70
sec-Butylbenzene	5	ND		2.5	0.70		ND		2.5	0.70
tert-Butylbenzene	5	ND		2.5	0.70		ND		2.5	0.70
o-Chlorotoluene	5	ND		2.5	0.70		ND		2.5	0.70
p-Chlorotoluene	5	ND		2.5	0.70		ND		2.5	0.70
1,2-Dibromo-3-chloropropane	0.04	ND		2.5	0.70		ND		2.5	0.70

Table 2A
Groundwater Sample Results Summary - VOCs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

	SAMPLE ID:	MW-1				MW-2			
	SAMPLING DATE:	4/14/2022				4/14/2022			
	SAMPLE MATRIX:	WATER				WATER			
ANALYTE	NY-AWQS	Conc	Q	RL	MDL	Conc	Q	RL	MDL
Hexachlorobutadiene	0.5	ND		2.5	0.70	ND		2.5	0.70
Isopropylbenzene	5	ND		2.5	0.70	ND		2.5	0.70
p-Isopropyltoluene	5	ND		2.5	0.70	ND		2.5	0.70
Naphthalene	10	ND		2.5	0.70	ND		2.5	0.70
n-Propylbenzene	5	ND		2.5	0.70	ND		2.5	0.70
1,2,3-Trichlorobenzene	5	ND		2.5	0.70	ND		2.5	0.70
1,2,4-Trichlorobenzene	5	ND		2.5	0.70	ND		2.5	0.70
1,3,5-Trimethylbenzene	5	ND		2.5	0.70	ND		2.5	0.70
1,2,4-Trimethylbenzene	5	ND		2.5	0.70	ND		2.5	0.70
1,4-Dioxane	NS	ND		250	61	ND		250	61
p-Diethylbenzene	NS	ND		2.0	0.70	ND		2.0	0.70
p-Ethyltoluene	NS	ND		2.0	0.70	ND		2.0	0.70
1,2,4,5-Tetramethylbenzene	5	ND		2.0	0.54	ND		2.0	0.54
Ethyl ether	NS	ND		2.5	0.70	ND		2.5	0.70
trans-1,4-Dichloro-2-butene	5	ND		2.5	0.70	ND		2.5	0.70
Total VOCs	NS	ND		-	-	0.18	-	-	-
VOLATILE ORGANIC COMPOUNDS (VOCs) - TICs									
Unknown	NS	ND		-	-	1.32	J	0	0
No Tentatively Identified Compounds	NS	ND		0	0	-		-	-
Total TIC Compounds	NS	ND		-	-	1.32	J	0	0
1,4 DIOXANE BY 8270D-SIM									
1,4-Dioxane	0.35	ND		0.144	0.0326	ND		0.139	0.0314

Notes:

Units in micrograms per liter (ug/L)

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No NY Regulatory Standard

ND - Analyte not detected at the indicated laboratory reporting limit

J - Estimated value (MDL<Conc<RL)

Italicized results indicate an analyte that was not detected, but had an elevated RL above an NY Regulatory Standard due to sample dilution due to the presence of target analytes that exceeded the calibration range

NY-AWQS: NY - New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria updated June 2021

Approved by: DKO 5/16/2022

SAS 1/27/2023

Table 2B
Groundwater Sample Results Summary - SVOCs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:	MW-1				MW-2			
	SAMPLING DATE:	4/14/2022				4/14/2022			
	SAMPLE MATRIX:	WATER				WATER			
	NY-AWQS	Conc	Q	RL	MDL	Conc	Q	RL	MDL
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)									
1,2,4-Trichlorobenzene	5	ND		5.0	0.50	ND		5.0	0.50
Bis(2-chloroethyl)ether	1	ND		2.0	0.50	ND		2.0	0.50
1,2-Dichlorobenzene	3	ND		2.0	0.45	ND		2.0	0.45
1,3-Dichlorobenzene	3	ND		2.0	0.40	ND		2.0	0.40
1,4-Dichlorobenzene	3	ND		2.0	0.43	ND		2.0	0.43
3,3'-Dichlorobenzidine	5	ND		5.0	1.6	ND		5.0	1.6
2,4-Dinitrotoluene	5	ND		5.0	1.2	ND		5.0	1.2
2,6-Dinitrotoluene	5	ND		5.0	0.93	ND		5.0	0.93
4-Chlorophenyl phenyl ether	NS	ND		2.0	0.49	ND		2.0	0.49
4-Bromophenyl phenyl ether	NS	ND		2.0	0.38	ND		2.0	0.38
Bis(2-chloroisopropyl)ether	5	ND		2.0	0.53	ND		2.0	0.53
Bis(2-chloroethoxy)methane	5	ND		5.0	0.50	ND		5.0	0.50
Hexachlorocyclopentadiene	5	ND		20	0.69	ND		20	0.69
Isophorone	50	ND		5.0	1.2	ND		5.0	1.2
Nitrobenzene	0.4	ND		2.0	0.77	ND		2.0	0.77
NDPA/DPA	50	ND		2.0	0.42	ND		2.0	0.42
n-Nitrosodi-n-propylamine	NS	ND		5.0	0.64	ND		5.0	0.64
Bis(2-ethylhexyl)phthalate	5	ND		3.0	1.5	2.2	J	3.0	1.5
Butyl benzyl phthalate	50	ND		5.0	1.2	ND		5.0	1.2
Di-n-butylphthalate	50	ND		5.0	0.39	ND		5.0	0.39
Di-n-octylphthalate	50	ND		5.0	1.3	ND		5.0	1.3
Diethyl phthalate	50	ND		5.0	0.38	ND		5.0	0.38
Dimethyl phthalate	50	ND		5.0	1.8	ND		5.0	1.8
Biphenyl	NS	ND		2.0	0.46	ND		2.0	0.46
4-Chloroaniline	5	ND		5.0	1.1	ND		5.0	1.1
2-Nitroaniline	5	ND		5.0	0.50	ND		5.0	0.50
3-Nitroaniline	5	ND		5.0	0.81	ND		5.0	0.81
4-Nitroaniline	5	ND		5.0	0.80	ND		5.0	0.80
Dibenzofuran	NS	ND		2.0	0.50	ND		2.0	0.50
1,2,4,5-Tetrachlorobenzene	5	ND		10	0.44	ND		10	0.44
Acetophenone	NS	1.7	J	5.0	0.53	0.66	J	5.0	0.53
2,4,6-Trichlorophenol	NS	ND		5.0	0.61	ND		5.0	0.61
p-Chloro-m-cresol	NS	ND		2.0	0.35	ND		2.0	0.35
2-Chlorophenol	NS	ND		2.0	0.48	ND		2.0	0.48
2,4-Dichlorophenol	1	ND		5.0	0.41	ND		5.0	0.41
2,4-Dimethylphenol	50	ND		5.0	1.8	ND		5.0	1.8
2-Nitrophenol	NS	ND		10	0.85	ND		10	0.85
4-Nitrophenol	NS	ND		10	0.67	ND		10	0.67
2,4-Dinitrophenol	10	ND		20	6.6	ND		20	6.6
4,6-Dinitro-o-cresol	NS	ND		10	1.8	ND		10	1.8
Phenol	1	ND		5.0	0.57	ND		5.0	0.57
2-Methylphenol	NS	ND		5.0	0.49	ND		5.0	0.49
3-Methylphenol/4-Methylphenol	NS	ND		5.0	0.48	ND		5.0	0.48
2,4,5-Trichlorophenol	NS	ND		5.0	0.77	ND		5.0	0.77
Benzoic Acid	NS	ND		50	2.6	ND		50	2.6
Benzyl Alcohol	NS	ND		2.0	0.59	ND		2.0	0.59
Carbazole	NS	ND		2.0	0.49	ND		2.0	0.49
Total SVOCs	NS	1.7	-	-	-	2.86	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs) - SIM									
Acenaphthene	20	ND		0.10	0.01	ND		0.10	0.01
2-Chloronaphthalene	10	ND		0.20	0.02	ND		0.20	0.02
Fluoranthene	50	ND		0.10	0.02	ND		0.10	0.02
Hexachlorobutadiene	0.5	ND		0.50	0.05	ND		0.50	0.05
Naphthalene	10	0.09	J	0.10	0.05	0.09	J	0.10	0.05
Benzo(a)anthracene	0.002	0.03	J	0.10	0.02	0.03	J	0.10	0.02
Benzo(a)pyrene	0	ND		0.10	0.02	ND		0.10	0.02
Benzo(b)fluoranthene	0.002	ND		0.10	0.01	0.02	J	0.10	0.01
Benzo(k)fluoranthene	0.002	ND		0.10	0.01	0.01	J	0.10	0.01
Chrysene	0.002	0.02	J	0.10	0.01	0.02	J	0.10	0.01
Acenaphthylene	NS	ND		0.10	0.01	ND		0.10	0.01
Anthracene	50	0.02	J	0.10	0.01	0.03	J	0.10	0.01

Table 2B
Groundwater Sample Results Summary - SVOCs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:	MW-1				MW-2			
	SAMPLING DATE:	4/14/2022				4/14/2022			
	SAMPLE MATRIX:	WATER				WATER			
	NY-AWQS	Conc	Q	RL	MDL	Conc	Q	RL	MDL
Benzo(ghi)perylene	NS	ND		0.10	0.01	ND		0.10	0.01
Fluorene	50	0.08	J	0.10	0.01	0.09	J	0.10	0.01
Phenanthrene	50	0.16		0.10	0.02	0.15		0.10	0.02
Dibenzo(a,h)anthracene	NS	ND		0.10	0.01	ND		0.10	0.01
Indeno(1,2,3-cd)pyrene	0.002	ND		0.10	0.01	ND		0.10	0.01
Pyrene	50	ND		0.10	0.02	0.03	J	0.10	0.02
2-Methylnaphthalene	NS	0.06	J	0.10	0.02	0.08	J	0.10	0.02
Pentachlorophenol	1	ND		0.80	0.01	ND		0.80	0.01
Hexachlorobenzene	0.04	ND		0.80	0.01	ND		0.80	0.01
Hexachloroethane	5	ND		0.80	0.06	ND		0.80	0.06
Total SVOCs	NS	0.46	-	-	-	0.55	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs) - TICs									
Unknown	NS	ND		-	-	1.53	J	0	0
Unknown	NS	2.94	JB	0	0	ND	-	-	-
Unknown	NS	ND		-	-	7.49	J	0	0
Unknown Organic Acid	NS	1.78	J	0	0	ND	-	-	-
Unknown	NS	ND		-	-	1.78	J	0	0
Unknown	NS	ND		-	-	5.6	J	0	0
Unknown	NS	ND		-	-	6.73	J	0	0
Unknown	NS	ND		-	-	2.87	J	0	0
Unknown	NS	ND		-	-	4.94	J	0	0
Unknown	NS	ND		-	-	1.53	J	0	0
Unknown	NS	ND		-	-	4.69	J	0	0
Unknown	NS	ND		-	-	21.5	JB	0	0
Unknown	NS	ND		-	-	2.69	J	0	0
Unknown	NS	ND		-	-	5.02	J	0	0
Unknown	NS	ND		-	-	3.53	J	0	0
Unknown	NS	ND		-	-	1.85	J	0	0
Unknown Alkane	NS	ND		-	-	ND		-	-
Unknown Alkane	NS	ND		-	-	ND		-	-
Unknown Organic Acid	NS	ND		-	-	14.1	J	0	0
Unknown Organic Acid	NS	ND		-	-	14.3	J	0	0
Unknown Organic Acid	NS	ND		-	-	8.62	J	0	0
Unknown Siloxane	NS	ND		-	-	1.49	J	0	0
Total TIC Compounds	NS	4.72	J	0	0	110	J	0	0

Notes:

Units in micrograms per liter (ug/L)

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No NY Regulatory Standard

ND - Analyte not detected at the indicated laboratory reporting limit

J - Estimated value (MDL<Conc<RL)

B - The analyte was detected above the reporting limit in the associated method blank

Italicized results indicate an analyte that was not detected, but had an elevated RL above an NY Regulatory Standard due to sample dilution due to the presence of target analytes that exceeded the calibration range

Bold results indicate an exceedance of an NY regulatory standard

NY-AWQS: NY - New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria updated June 2021

Approved by: DKO 5/16/2022
SAS 1/27/2023

Table 2C
Groundwater Sample Results Summary - PFAS
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:	MW-1				MW-2			
	SAMPLING DATE:	4/14/2022				4/14/2022			
	SAMPLE MATRIX:	WATER				WATER			
	NY-AWQS	Conc	Q	RL	MDL	Conc	Q	RL	MDL
PERFLUORINATED ALKYL ACIDS (PFAS)									
Perfluorobutanoic Acid (PFBA)	NS	4.71		1.84	3.75	4.76		1.77	3.61
Perfluoropentanoic Acid (PFPeA)	NS	6.68		1.84	0.364	5.88		1.77	3.50
Perfluorobutanesulfonic Acid (PFBS)	NS	7.80		1.84	0.219	6.69		1.77	2.10
Perfluorohexanoic Acid (PFHxA)	NS	6.16		1.84	0.302	5.29		1.77	2.90
Perfluorohexanoic Acid (PFHpA)	NS	4.73		1.84	0.207	3.73		1.77	1.99
Perfluorohexanesulfonic Acid (PFHxS)	NS	4.10		1.84	0.346	2.73		1.77	3.33
Perfluorooctanoic Acid (PFOA)	6.7	13.8		1.84	0.217	12.6		1.77	2.09
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	NS	1.62	J	1.84	1.22	1.50	J	1.77	1.18
Perfluoroheptanesulfonic Acid (PFHpS)	NS	ND		1.84	0.633	ND		1.77	0.609
Perfluorononanoic Acid (PFNA)	NS	2.42		1.84	0.287	2.07		1.77	0.276
Perfluorooctanesulfonic Acid (PFOS)	2.7	20.4	F	1.84	0.464	14.2	F	1.77	0.446
Perfluorodecanoic Acid (PFDA)	NS	0.500	J	1.84	0.280	0.513	J	1.77	0.269
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	NS	ND		1.84	1.12	ND		1.77	1.07
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	NS	ND		1.84	0.596	ND		1.77	0.573
Perfluoroundecanoic Acid (PFUnA)	NS	ND		1.84	0.239	0.432	J	1.77	0.230
Perfluorodecanesulfonic Acid (PFDS)	NS	ND		1.84	0.902	ND		1.77	0.867
Perfluorooctanesulfonamide (FOSA)	NS	ND		1.84	0.534	ND		1.77	0.513
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	NS	ND		1.84	0.740	ND		1.77	0.711
Perfluorododecanoic Acid (PFDoA)	NS	ND		1.84	0.342	ND		1.77	0.329
Perfluorotridecanoic Acid (PFTTrDA)	NS	ND		1.84	0.301	ND		1.77	0.290
Perfluorotetradecanoic Acid (PFTA)	NS	ND		1.84	0.228	ND		1.77	0.219
PFOA/PFOS, Total	NS	34.2		1.84	0.217	26.8		1.77	0.209

Notes:

Units in nanograms per liter (ng/L)

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No NY Regulatory Standard

ND - Analyte not detected at the indicated laboratory reporting limit

J - Estimated value (MDL<Conc<RL)

F - MS and/or MSD recovery exceeds control limits

dilution due to the presence of target analytes that exceeded the calibration range

Bold results indicate an exceedance of an NY regulatory standard

NY-AWQS: NY - New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria updated June 2021

Approved by: DKO 5/16/2022

SAS 4/13/2023

Table 2D
Groundwater Sample Results Summary - Pesticides and PCBs
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:		MW-1				MW-2			
	SAMPLING DATE:		4/14/2022				4/14/2022			
	SAMPLE MATRIX:		WATER				WATER			
	NY-AWQS	Conc	Q	RL	MDL		Conc	Q	RL	MDL
ORGANOCHLORINE PESTICIDES										
Delta-BHC	0.04	ND		0.014	0.003		ND		0.014	0.003
Lindane	0.05	ND		0.014	0.003		ND		0.014	0.003
Alpha-BHC	0.01	<i>ND</i>		<i>0.014</i>	<i>0.003</i>		<i>ND</i>		<i>0.014</i>	<i>0.003</i>
Beta-BHC	0.04	ND		0.014	0.004		ND		0.014	0.004
Heptachlor	0.04	ND		0.014	0.002		ND		0.014	0.002
Aldrin	NS	<i>ND</i>		<i>0.014</i>	<i>0.002</i>		<i>ND</i>		<i>0.014</i>	<i>0.002</i>
Heptachlor epoxide	0.03	ND		0.014	0.003		ND		0.014	0.003
Endrin	NS	<i>ND</i>		<i>0.029</i>	<i>0.003</i>		<i>ND</i>		<i>0.029</i>	<i>0.003</i>
Endrin aldehyde	5	ND		0.029	0.006		ND		0.029	0.006
Endrin ketone	5	ND		0.029	0.003		ND		0.029	0.003
Dieldrin	0.004	<i>ND</i>		<i>0.029</i>	<i>0.003</i>		<i>ND</i>		<i>0.029</i>	<i>0.003</i>
4,4'-DDE	0.2	ND		0.029	0.003		ND		0.029	0.003
4,4'-DDD	0.3	ND		0.029	0.003		ND		0.029	0.003
4,4'-DDT	0.2	ND		0.029	0.003		ND		0.029	0.003
Endosulfan I	NS	ND		0.014	0.002		ND		0.014	0.002
Endosulfan II	NS	ND		0.029	0.004		ND		0.029	0.004
Endosulfan sulfate	NS	ND		0.029	0.003		ND		0.029	0.003
Methoxychlor	35	ND		0.143	0.005		ND		0.143	0.005
Toxaphene	0.06	<i>ND</i>		<i>0.143</i>	<i>0.045</i>		<i>ND</i>		<i>0.143</i>	<i>0.045</i>
cis-Chlordane	NS	ND		0.014	0.005		ND		0.014	0.005
trans-Chlordane	NS	ND		0.014	0.004		ND		0.014	0.004
Chlordane	0.05	<i>ND</i>		<i>0.143</i>	<i>0.033</i>		<i>ND</i>		<i>0.143</i>	<i>0.033</i>
POLYCHLORINATED BIPHENYLS (PCBs)										
Aroclor 1016	0.09	ND		0.071	0.061		ND		0.071	0.061
Aroclor 1221	0.09	ND		0.071	0.061		ND		0.071	0.061
Aroclor 1232	0.09	ND		0.071	0.061		ND		0.071	0.061
Aroclor 1242	0.09	ND		0.071	0.061		ND		0.071	0.061
Aroclor 1248	0.09	ND		0.071	0.061		ND		0.071	0.061
Aroclor 1254	0.09	ND		0.071	0.061		ND		0.071	0.061
Aroclor 1260	0.09	ND		0.071	0.061		ND		0.071	0.061
Aroclor 1262	0.09	ND		0.071	0.061		ND		0.071	0.061
Aroclor 1268	0.09	ND		0.071	0.061		ND		0.071	0.061
PCBs, Total	NS	ND		0.071	0.061		ND		0.071	0.061

Notes:

Units in micrograms per liter (ug/L)

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No NY Regulatory Standard

ND - Analyte not detected at the indicated laboratory reporting limit

Italicized results indicate an analyte that was not detected, but had an elevated RL above an NY Regulatory Standard due to sample dilution due to the presence of target analytes that exceeded the calibration range

NY-AWQS: NY - New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria updated June 2021

Approved by: DKO 5/16/2022

SAS 1/27/2023

Table 2E
Groundwater Sample Results Summary - Metals
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:		MW-1				MW-2			
	SAMPLING DATE:		4/14/2022				4/14/2022			
	SAMPLE MATRIX:		WATER				WATER			
	NY-AWQS	Conc	Q	RL	MDL	Conc	Q	RL	MDL	
TOTAL METALS										
Aluminum, Total	NS	213		10.0	3.27	574		10.0	3.27	
Antimony, Total	3	ND		4.0	0.42	ND		4.0	0.42	
Arsenic, Total	25	0.23	J	0.50	0.16	0.35	J	0.50	0.16	
Barium, Total	1,000	48.23		0.50	0.17	50.76		0.50	0.17	
Beryllium, Total	3	ND		0.50	0.10	ND		0.50	0.10	
Cadmium, Total	5	ND		0.20	0.050	ND		0.20	0.050	
Calcium, Total	NS	53,100		100	39.4	50,700		100	39.4	
Chromium, Total	50	0.38	J	1.0	0.17	0.84	J	1.0	0.17	
Cobalt, Total	NS	0.37	J	0.50	0.16	0.81		0.50	0.16	
Copper, Total	200	1.55		1.0	0.38	3.35		1.0	0.38	
Iron, Total	300	391		50.0	19.1	1,120		50.0	19.1	
Lead, Total	25	ND		1.0	0.34	0.53	J	1.0	0.34	
Magnesium, Total	35,000	9,700		70.0	24.2	9,460		70.0	24.2	
Manganese, Total	300	22.3		1.0	0.44	56.02		1.0	0.44	
Mercury, Total	0.7	ND		0.20	0.090	ND		0.20	0.090	
Nickel, Total	100	0.76	J	2.0	0.55	1.57	J	2.0	0.55	
Potassium, Total	NS	3,440		100	30.9	3,040		100	30.9	
Selenium, Total	10	ND		5.0	1.73	ND		5.0	1.73	
Silver, Total	50	ND		0.40	0.16	ND		0.40	0.16	
Sodium, Total	20,000	296,000		100	29.3	270,000		100	29.3	
Thallium, Total	0.5	ND		1.0	0.14	ND		1.0	0.14	
Vanadium, Total	NS	ND		5.0	1.57	ND		5.0	1.57	
Zinc, Total	2,000	ND		10.0	3.41	3.63	J	10.0	3.41	

Notes:

Units in micrograms per liter (ug/L)

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No NY Regulatory Standard

ND - Analyte not detected at the indicated laboratory reporting limit

J - Estimated value (MDL<Conc<RL)

Italicized results indicate an analyte that was not detected, but had an elevated RL above an NY Regulatory Standard due to sample dilution due to the presence of target analytes that exceeded the calibration range

Bold results indicate an exceedance of an NY regulatory standard'

NY-AWQS: NY - New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria updated June 2021

Approved by: DKO 5/16/2022

SAS 1/27/2023

Table 3A
Subslab Soil Vapor Sample Results Summary
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:	SS-03				SS-04				SS-05			
	SAMPLING DATE:	4/14/2022				4/14/2022				4/14/2022			
	SAMPLE MATRIX:	SOIL VAPOR				SOIL VAPOR				SOIL VAPOR			
	NY DOH Matrix Criteria	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
VOLATILE ORGANIC COMPOUNDS (VOCs)													
1,1,1-Trichloroethane	100	ND	U	9.11	-	ND	U	1.09	-	ND	U	5.46	-
1,1,2,2-Tetrachloroethane	NS	ND	U	11.5	-	ND	U	1.37	-	ND	U	6.87	-
1,1,2-Trichloroethane	NS	ND	U	9.11	-	ND	U	1.09	-	ND	U	5.46	-
1,1-Dichloroethane	NS	ND	U	6.76	-	ND	U	0.809	-	ND	U	4.05	-
1,1-Dichloroethene	6	ND	U	6.62	-	ND	U	0.793	-	ND	U	3.96	-
1,2,4-Trichlorobenzene	NS	ND	U	12.4	-	ND	U	1.48	-	ND	U	7.42	-
1,2,4-Trimethylbenzene	NS	ND	U	8.21	-	2.98		0.983	-	ND	U	4.92	-
1,2-Dibromoethane	NS	ND	U	12.8	-	ND	U	1.54	-	ND	U	7.69	-
1,2-Dichlorobenzene	NS	ND	U	10.0	-	ND	U	1.20	-	ND	U	6.01	-
1,2-Dichloroethane	NS	ND	U	6.76	-	ND	U	0.809	-	ND	U	4.05	-
1,2-Dichloropropane	NS	ND	U	7.72	-	ND	U	0.924	-	ND	U	4.62	-
1,3,5-Trimethylbenzene	NS	ND	U	8.21	-	ND	U	0.983	-	ND	U	4.92	-
1,3-Butadiene	NS	ND	U	3.69	-	ND	U	0.442	-	ND	U	2.21	-
1,3-Dichlorobenzene	NS	ND	U	10.0	-	ND	U	1.20	-	ND	U	6.01	-
1,4-Dichlorobenzene	NS	ND	U	10.0	-	ND	U	1.20	-	ND	U	6.01	-
1,4-Dioxane	NS	ND	U	6.02	-	ND	U	0.721	-	ND	U	3.6	-
2,2,4-Trimethylpentane	NS	ND	U	7.80	-	ND	U	0.934	-	ND	U	4.67	-
2-Butanone	NS	ND	U	12.3	-	17.8		1.47	-	ND	U	7.37	-
2-Hexanone	NS	ND	U	6.84	-	1.87		0.820	-	ND	U	4.10	-
3-Chloropropene	NS	ND	U	5.23	-	ND	U	0.626	-	ND	U	3.13	-
4-Ethyltoluene	NS	ND	U	8.21	-	ND	U	0.983	-	ND	U	4.92	-
4-Methyl-2-pentanone	NS	ND	U	17.1	-	ND	U	2.05	-	ND	U	10.2	-
Acetone	NS	57.7		19.8	-	118		2.38	-	188		11.9	-
Benzene	NS	ND	U	5.34	-	1.03		0.639	-	ND	U	3.19	-
Benzyl chloride	NS	ND	U	8.65	-	ND	U	1.04	-	ND	U	5.18	-
Bromodichloromethane	NS	ND	U	11.2	-	ND	U	1.34	-	ND	U	6.70	-
Bromoform	NS	ND	U	17.3	-	ND	U	2.07	-	ND	U	10.3	-
Bromomethane	NS	ND	U	6.48	-	ND	U	0.777	-	ND	U	3.88	-
Carbon disulfide	NS	ND	U	5.20	-	1.77		0.623	-	ND	U	3.11	-
Carbon tetrachloride	6	ND	U	10.5	-	ND	U	1.26	-	ND	U	6.29	-
Chlorobenzene	NS	ND	U	7.69	-	ND	U	0.921	-	ND	U	4.61	-
Chloroethane	NS	ND	U	4.41	-	ND	U	0.528	-	ND	U	2.64	-
Chloroform	NS	ND	U	8.16	-	ND	U	0.977	-	28.5		4.88	-
Chloromethane	NS	ND	U	3.45	-	1.35		0.413	-	ND	U	2.07	-
cis-1,2-Dichloroethene	6	11.6		6.62	-	ND	U	0.793	-	543		3.96	-
cis-1,3-Dichloropropene	NS	ND	U	7.58	-	ND	U	0.908	-	ND	U	4.54	-
Cyclohexane	NS	ND	U	5.75	-	0.723		0.688	-	ND	U	3.44	-
Dibromochloromethane	NS	ND	U	14.2	-	ND	U	1.70	-	ND	U	8.52	-
Dichlorodifluoromethane	NS	ND	U	8.26	-	2.65		0.989	-	ND	U	4.94	-

EnviroSure, Inc.
750 Route 73, Suite 206
Marlton, NJ 08053

Table 3A
Subslab Soil Vapor Sample Results Summary
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:	SS-03	SS-04	SS-05
VOLATILE ORGANIC COMPOUNDS (VOCs)	SAMPLING DATE:	4/14/2022	4/14/2022	4/14/2022
NY DOH Matrix Criteria	SAMPLE MATRIX:	SOIL VAPOR	SOIL VAPOR	SOIL VAPOR
Conc	Q	RL	MDL	MDL
Ethanol	ND	U	78.6	-
Ethyl Acetate	ND	U	15.0	-
Ethylbenzene	ND	U	7.25	-
Freon-113	ND	U	12.8	-
Freon-114	ND	U	11.7	-
Heptane	ND	U	6.84	-
Hexachlorobutadiene	ND	U	17.8	-
Isopropanol	ND	U	10.3	-
Methyl tert butyl ether	ND	U	6.02	-
Methylene chloride	ND	U	14.5	-
n-Hexane	ND	U	5.89	-
o-Xylene	ND	U	7.25	-
p/m-Xylene	ND	U	14.5	-
Styrene	ND	U	7.11	-
Tertiary butyl Alcohol	ND	U	12.6	-
Tetrachloroethene	ND	U	11.3	-
Tetrahydrofuran	ND	U	12.3	-
Toluene	ND	U	6.29	-
trans-1,2-Dichloroethene	ND	U	6.62	-
trans-1,3-Dichloropropene	ND	U	7.58	-
Trichloroethene	ND	U	8.97	-
Trichlorofluoromethane	ND	U	9.38	-
Vinyl bromide	ND	U	7.30	-
Vinyl chloride	ND	U	4.27	-

Notes:
Units in micrograms per cubic meter (µg/m³)
Conc - Concentration
Q - Qualifier
RL - Reporting Limit
MDL - Method Detection Limit
NS - No Regulatory NY DOH Matrix Criteria Standard
ND - Analyte not detected at the indicated laboratory reporting limit
U - Analyte not detected at the indicated laboratory reporting limit
J - Estimated value (MDL<Conc<RL)
Italicized results indicate an analyte that was not detected, but had an elevated RL above a NY DOH Matrix Criteria due to need for Sample dilution due to the presence of target analytes that exceeded the calibration range
Bold results indicate an exceedance of an NYSDEC regulatory standard

Approved by: DKO 5/16/2022
SAS 1/27/2023

NY DOH Matrix Criteria: NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006), updated May 2017

EnviroSure, Inc.
750 Route 73, Suite 206
Marlton, NJ 08053



Table 3B

VOLATILE ORGANICS IN AIR

Approved by:

SAS 1/27/2023

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100%

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Table 4A
Indoor Air Sample Results Summary
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:		IA-04		IA-05		IA-06		OA-02	
	SAMPLING DATE:		4/14/2022		4/14/2022		4/14/2022		4/14/2022	
	SAMPLE MATRIX:		AIR		AIR		AIR		AIR	
VOLATILE ORGANICS IN AIR	NY DOH Matrix Criteria		Conc	Q	RL	MDL	Conc	Q	RL	MDL
			Conc	Q	RL	MDL	Conc	Q	RL	MDL
1,1,1-Trichloroethane	3		ND	U	0.109	-	ND	U	0.109	-
1,1,2,2-Tetrachloroethane	NS		ND	U	1.37	-	ND	U	1.37	-
1,1,2-Trichloroethane	NS		ND	U	1.09	-	ND	U	1.09	-
1,1-Dichloroethane	NS		ND	U	0.809	-	ND	U	0.809	-
1,1-Dichloroethene	0.2		ND	U	0.0790	-	ND	U	0.0790	-
1,2,4-Trichlorobenzene	NS		ND	U	1.48	-	ND	U	1.48	-
1,2,4-Trimethylbenzene	NS		1.35		0.983	-	ND	U	0.983	-
1,2-Dibromoethane	NS		ND	U	1.54	-	ND	U	1.54	-
1,2-Dichlorobenzene	NS		ND	U	1.20	-	ND	U	1.20	-
1,2-Dichloroethane	NS		ND	U	0.809	-	ND	U	0.809	-
1,2-Dichloropropane	NS		ND	U	0.924	-	ND	U	0.924	-
1,3,5-Trimethylbenzene	NS		ND	U	0.983	-	ND	U	0.983	-
1,3-Butadiene	NS		ND	U	0.442	-	ND	U	0.442	-
1,3-Dichlorobenzene	NS		ND	U	1.20	-	ND	U	1.20	-
1,4-Dichlorobenzene	NS		ND	U	1.20	-	ND	U	1.20	-
1,4-Dioxane	NS		ND	U	0.721	-	ND	U	0.721	-
2,2,4-Trimethylpentane	NS		ND	U	0.934	-	ND	U	0.934	-
2-Butanone	NS		18.1		1.47	-	16.0		1.47	-
2-Hexanone	NS		ND	U	0.820	-	ND	U	0.820	-
3-Chloropropene	NS		ND	U	0.626	-	ND	U	0.626	-
4-Ethyltoluene	NS		ND	U	0.983	-	ND	U	0.983	-
4-Methyl-2-pentanone	NS		ND	U	2.05	-	ND	U	2.05	-
Acetone	NS		82.0		2.38	-	82.7		2.38	-
Benzene	NS		0.805		0.639	-	0.776		0.639	-
Benzyl chloride	NS		ND	U	1.04	-	ND	U	1.04	-
Bromodichloromethane	NS		ND	U	1.34	-	ND	U	1.34	-
Bromoform	NS		ND	U	2.07	-	ND	U	2.07	-
Bromomethane	NS		ND	U	0.777	-	ND	U	0.777	-
Carbon disulfide	NS		ND	U	0.623	-	ND	U	0.623	-
Carbon tetrachloride	0.2		0.478		0.126	-	0.503		0.126	-
Chlorobenzene	NS		ND	U	0.921	-	ND	U	0.921	-
Chloroethane	NS		ND	U	0.528	-	ND	U	0.528	-
Chloroform	NS		ND	U	0.977	-	ND	U	0.977	-
Chloromethane	NS		1.21		0.413	-	1.24		0.413	-
cis-1,2-Dichloroethene	0.2		ND	U	0.0790	-	ND	U	0.0790	-
cis-1,3-Dichloropropene	NS		ND	U	0.908	-	ND	U	0.908	-
Cyclohexane	NS		ND	U	0.688	-	ND	U	0.688	-
Dibromochloromethane	NS		ND	U	1.70	-	ND	U	1.70	-
Dichlorodifluoromethane	NS		2.53		0.989	-	2.49		0.989	-

Table 4A
Indoor Air Sample Results Summary
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:	IA-04			IA-05			IA-06			OA-02		
	SAMPLING DATE:	4/14/2022			4/14/2022			4/14/2022			4/14/2022		
	SAMPLE MATRIX:	AIR			AIR			AIR			AIR		
NY DOH Matrix Criteria	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	
VOLATILE ORGANICS IN AIR													
Ethanol	NS	52.8		9.42	-	68.4		9.42	-	139		9.42	-
Ethyl Acetate	NS	ND	U	1.80	-	ND	U	1.80	-	2.18		1.80	-
Ethylbenzene	NS	13.1		0.869	-	7.25		0.869	-	2.3		0.869	-
Freon-113	NS	ND	U	1.53	-	ND	U	1.53	-	ND	U	1.53	-
Freon-114	NS	ND	U	1.40	-	ND	U	1.40	-	ND	U	1.40	-
Heptane	NS	ND	U	0.820	-	ND	U	0.820	-	ND	U	0.820	-
Hexachlorobutadiene	NS	ND	U	2.13	-	ND	U	2.13	-	ND	U	2.13	-
Isopropanol	NS	3.76		1.23	-	4.67		1.23	-	6.32		1.23	-
Methyl tert butyl ether	NS	ND	U	0.721	-	ND	U	0.721	-	ND	U	0.721	-
Methylene chloride	3	ND	U	1.74	-	ND	U	1.74	-	ND	U	1.74	-
n-Hexane	NS	0.705		0.705	-	0.712		0.705	-	ND	U	0.705	-
o-Xylene	NS	17.9		0.869	-	9.9		0.869	-	3.19		0.869	-
p/m-Xylene	NS	63.4		1.74	-	34.4		1.74	-	11.7		1.74	-
Styrene	NS	ND	U	0.852	-	ND	U	0.852	-	ND	U	0.852	-
Tertiary butyl Alcohol	NS	ND	U	1.52	-	ND	U	1.52	-	ND	U	1.52	-
Tetrachloroethene	3	18.3		0.136	-	12.4		0.136	-	4.72		0.136	-
Tetrahydrofuran	NS	21.6		1.47	-	16.8		1.47	-	2.42		1.47	-
Toluene	NS	5.88		0.754	-	3.84		0.754	-	2.09		0.754	-
trans-1,2-Dichloroethene	NS	ND	U	0.793	-	ND	U	0.793	-	ND	U	0.793	-
trans-1,3-Dichloropropene	NS	ND	U	0.908	-	ND	U	0.908	-	ND	U	0.908	-
Trichloroethene	0.2	0.118		0.107	-	ND	U	0.107	-	ND	U	0.107	-
Trichlorofluoromethane	NS	1.33		1.12	-	1.33		1.12	-	1.3		1.12	-
Vinyl bromide	NS	ND	U	0.874	-	ND	U	0.874	-	ND	U	0.874	-
Vinyl chloride	0.2	ND	U	0.0510	-	ND	U	0.0510	-	ND	U	0.0510	-

Notes:
Units in micrograms per cubic meter (µg/m³)
Conc - Concentration
Q - Qualifier
RL - Reporting Limit
MDL - Method Detection Limit
NS - No Regulatory NY DOH Matrix Criteria Standard
ND - Analyte not detected at the indicated laboratory reporting limit
U - Analyte not detected at the indicated laboratory reporting limit
J - Estimated value (MDL<Conc<RL)
Italicized results indicate an analyte that was not detected, but had an elevated RL above a NY DOH Matrix Criteria due to need for Sample dilution due to the presence of target analytes that exceeded the calibration range
Bold results indicate an exceedance of an NYSDOH regulatory standard
NY DOH Matrix Criteria: NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006), updated May 2017

Approved by: DKO 5/16/2022
SAS 1/27/2023

Table 4B
Indoor Air Sample Results Summary - Contaminants of Concern
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:		IA-04		IA-05		IA-06		OA-02		NYSDOH Requirements Established in the Soil Vapor/Indoor Air Matrices				
	SAMPLING DATE:		4/14/2022		4/14/2022		4/14/2022		4/14/2022						
	SAMPLE LOCATION:		Basement		Vacant Space		Tenant Space		Outside of Building						
	SAMPLE MATRIX:		AIR		AIR		AIR		AIR						
			Conc	Q	RL	MDL	Conc	Q	RL	MDL		Conc	Q	RL	MDL
NY DOH Matrix Criteria															
VOLATILE ORGANICS IN AIR															
1,1,1-Trichloroethane	3		ND	U	0.109	-	ND	U	0.109	-	ND	U	0.109	-	No Further Action
Methylene chloride	3		ND	U	1.74	-	ND	U	1.74	-	ND	U	1.74	-	No Further Action
Tetrachloroethene	3		18.3	U	0.136	-	12.4	U	0.136	-	4.72	U	0.136	-	Mitigate
1,1-Dichloroethene	0.2		ND	U	0.0790	-	ND	U	0.0790	-	ND	U	0.0790	-	No Further Action
Carbon tetrachloride	0.2		0.478	U	0.126	-	0.503	U	0.126	-	0.510	U	0.126	-	Mitigate
cis-1,2-Dichloroethene	0.2		ND	U	0.0790	-	ND	U	0.0790	-	ND	U	0.0790	-	No Further Action
Trichloroethene	0.2		0.118	U	0.107	-	ND	U	0.107	-	ND	U	0.107	-	No Further Action
Vinyl chloride	0.2		ND	U	0.0510	-	ND	U	0.0510	-	ND	U	0.0510	-	No Further Action

Notes:

Units in micrograms per cubic meter (µg/m³)

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

Blue highlighted compound - New York DOH Matrix B Sub-slab Vapor Concentrations Criteria Evaluating Soil Vapor Intrusion

Yellow highlighted compound - New York DOH Matrix A Sub-slab Vapor Concentrations Criteria for Evaluating Soil Vapor Intrusion

Green highlighted compound - New York DOH Matrix C Sub-slab Vapor Concentrations Criteria Evaluating Soil Vapor Intrusion

ND - Analyte not detected at the indicated laboratory reporting limit

U - Analyte not detected at the indicated laboratory reporting limit

J - Estimated value (MDL<Conc<RL)

Italicized results indicate an analyte that was not detected, but had an elevated RL above a NY DOH Matrix Criteria due to need for Sample dilution due to the presence of target analytes that exceeded the calibration range

Bold results indicate an exceedance of the indicated New York DOH Matrix Regulatory Criteria

Approved by:

AD 1/24/2023

SAS 1/27/2023

Table 5
Concrete Sample Results Summary
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C34085

ANALYTE	SAMPLE ID:				C-01				C-02			
	7/8/2022				7/8/2022				7/8/2022			
	SAMPLE MATRIX:				CONCRETE				CONCRETE			
VOLATILE ORGANIC COMPOUNDS (VOCs)	NY-UNRES				Conc				Conc			
	NY-RESR	NY-RESI	NY-RESGW	NY-RESR	NY-RESR	NY-RESI	NY-RESGW	NY-RESR	NY-RESR	NY-RESI	NY-RESGW	NY-RESR
1,1,1,2-Tetrachloroethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00013	U	0.00051
1,1,1-Trichloroethane	500	NS	0.68	1,000	100	NS	NS	NS	NS	<0.00017	U	0.00051
1,1,2,2-Tetrachloroethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00017	U	0.00051
1,1,2-Trichloroethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00027	U	0.00027
1,1-Dichloroethane	240	NS	0.27	480	19	NS	NS	NS	NS	<0.00015	U	0.00015
1,1-Dichloroethene	500	NS	0.33	1,000	100	NS	NS	NS	NS	<0.00024	U	0.00024
1,1-Dichloropropene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00016	U	0.00016
1,2,3-Trichlorobenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00033	U	0.00033
1,2,3-Trichloropropane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00013	U	0.00013
1,2,4,5-Tetramethylbenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00019	U	0.00019
1,2,4-Trichlorobenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00028	U	0.00028
1,2,4-Trimethylbenzene	190	NS	3.6	360	47	NS	NS	NS	NS	<0.00034	U	0.00034
1,2-Dibromo-3-chloropropane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00010	U	0.00010
1,2-Dibromoethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00028	U	0.00028
1,2-Dichlorobenzene	500	NS	1.1	1,000	100	NS	NS	NS	NS	<0.00015	U	0.00015
1,2-Dichloroethane	30	10	0.02	60	2.3	NS	NS	NS	NS	<0.00026	U	0.00026
1,2-Dichloroethene, Total	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00014	U	0.00014
1,2-Dichloropropane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00013	U	0.00013
1,3,5-Trimethylbenzene	190	NS	8.4	360	47	NS	NS	NS	NS	<0.00020	U	0.00020
1,3-Dichlorobenzene	280	NS	2.4	560	17	NS	NS	NS	NS	<0.00015	U	0.00015
1,3-Dichloropropane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00017	U	0.00017
1,3-Dichloropropene, Total	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00016	U	0.00016
1,4-Dichlorobenzene	130	20	1.8	250	9.8	NS	NS	NS	NS	<0.00017	U	0.00017
1,4-Dioxane	130	0.1	0.1	250	9.8	NS	NS	NS	NS	<0.036	U	0.082
2,2-Dichloropropane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00020	U	0.00020
2-Butanone	500	100	0.12	1,000	100	NS	NS	NS	NS	<0.00022	U	0.00022
2-Hexanone	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00012	U	0.00012
4-Methyl-2-pentanone	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00013	U	0.00013
Acetone	500	2.2	0.05	1,000	100	NS	NS	NS	NS	<0.00049	U	0.00049
Acrylonitrile	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00012	U	0.00012
Benzene	44	70	0.06	89	2.9	NS	NS	NS	NS	<0.00015	U	0.00015
Bromobenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00015	U	0.00015
Bromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00021	U	0.00021
Bromodichloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00011	U	0.00011
Bromoflorm	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00025	U	0.00025
Bromomethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00059	U	0.00059
Carbon disulfide	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00046	U	0.00046
Carbon tetrachloride	22	NS	0.76	44	1.4	NS	NS	NS	NS	<0.00023	U	0.00023
Chlorobenzene	500	40	1.1	1,000	100	NS	NS	NS	NS	<0.00013	U	0.00013
Chloroethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00046	U	0.00046
Chloroform	350	12	0.37	700	10	NS	NS	NS	NS	<0.00014	U	0.00014
Chloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00095	U	0.00095
dis-1,2-Dichloroethene	500	NS	0.25	1,000	59	NS	NS	NS	NS	<0.00018	U	0.00018
dis-1,3-Dichloropropene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00016	U	0.00016
Dibromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00014	U	0.00014
Dibromomethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00024	U	0.00024
Dichlorodifluoromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00093	U	0.00093
Ethyl ether	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00035	U	0.00035
Ethylbenzene	390	NS	1	780	30	NS	NS	NS	NS	<0.00014	U	0.00014
Hexachlorobutadiene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00017	U	0.00017
Isopropylbenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00011	U	0.00011
Methyl tert butyl ether	500	NS	0.93	1,000	62	NS	NS	NS	NS	<0.00020	U	0.00020
Methylene chloride	500	12	0.05	1,000	51	NS	NS	NS	NS	<0.00023	U	0.00023
n-Butylbenzene	500	NS	12	1,000	100	NS	NS	NS	NS	<0.00017	U	0.00017
n-Propylbenzene	500	NS	3.9	1,000	100	NS	NS	NS	NS	<0.00017	U	0.00017

Table 5
Concrete Sample Results Summary
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C344085

ANALYTE	SAMPLE ID:										C-01				C-02			
	SAMPLING DATE:										7/8/2022				7/8/2022			
	SAMPLE MATRIX:										CONCRETE				CONCRETE			
	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-UNRES	Conc	Q	RL	MDL	Conc	Q	RL	MDL
Naphthalene	500	NS	NS	12	1,000	NS	NS	100	100	12	<0.00066	U	0.0041	0.00066	<0.00067	U	0.0041	0.00067
o-Chlorotoluene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00019	U	0.0020	0.00019	<0.00020	U	0.0020	0.00020
o-Xylene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00030	U	0.0010	0.00030	<0.00030	U	0.0010	0.00030
p-Chlorotoluene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00011	U	0.0020	0.00011	<0.00011	U	0.0020	0.00011
p-Diethylbenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00018	U	0.0020	0.00018	<0.00018	U	0.0020	0.00018
p-Ethyltoluene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00039	U	0.0020	0.00039	<0.00039	U	0.0020	0.00039
p-Isopropyltoluene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00011	U	0.0010	0.00011	0.00012	J	0.0010	0.00011
p-m-Xylene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00057	U	0.0020	0.00057	0.00072	J	0.0020	0.00057
sec-Butylbenzene	500	NS	NS	11	1,000	NS	NS	100	100	11	<0.00015	U	0.0010	0.00015	<0.00015	U	0.0010	0.00015
Styrene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00020	U	0.0010	0.00020	0.00021	J	0.0010	0.00020
tert-Butylbenzene	500	NS	NS	5.9	1,000	NS	NS	100	100	5.9	<0.00012	U	0.0020	0.00012	<0.00012	U	0.0020	0.00012
Tetrachloroethene	150	2	1.3	300	5.5	19	NS	NS	NS	1.3	<0.00020	U	0.00051	0.00020	0.00036	J	0.00051	0.00020
Toluene	500	36	0.7	1,000	100	100	NS	100	100	0.7	<0.00065	U	0.0010	0.00065	0.00067	J	0.0010	0.00066
trans-1,2-Dichloroethene	500	NS	NS	0.19	1,000	NS	NS	100	100	0.19	<0.00014	U	0.0015	0.00014	<0.00014	U	0.0015	0.00014
trans-1,3-Dichloropropene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00028	U	0.0010	0.00028	<0.00028	U	0.0010	0.00028
trans-1,4-Dichloro-2-butene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00014	U	0.0051	0.00014	<0.00014	U	0.0051	0.00014
Trichloroethene	200	2	0.47	400	10	21	NS	NS	NS	0.47	0.00018	J	0.00051	0.00014	0.00024	J	0.00051	0.00014
Trichlorofluoromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00071	U	0.0041	0.00071	<0.00071	U	0.0041	0.00071
Vinyl acetate	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00022	U	0.0100	0.00022	<0.00022	U	0.010	0.00022
Vinyl chloride	13	NS	NS	0.02	27	0.9	NS	NS	NS	0.02	<0.00034	U	0.0010	0.00034	<0.00034	U	0.0010	0.00034
Xylenes, Total	500	0.26	1.6	1,000	100	100	NS	NS	NS	0.26	<0.0003	U	0.0010	0.00030	0.00072	J	0.0010	0.00030
Total VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00018	-	-	-	0.00989	-	-	-
VOLATILE ORGANIC COMPOUNDS (VOCs) - TICs																		
1-Butanol	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.00748	NJ	0	0
1-Hexanol, 2-ethyl-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-
7-Octen-2-ol, 2,6-dimethyl-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-
Butylated Hydroxytoluene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-
Unknown	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00612	J	0	0	0.0152	J	0	0
Unknown	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.031	J	0	0	0.00252	J	0	0
Unknown	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.0738	J	0	0
Unknown	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00224	J	0	0	0.0836	J	0	0
Unknown Organic Acid	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00399	J	0	0	-	-	-	-
Total TIC Compounds	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0434	J	0	0	0.183	J	0	0

Notes:

Units in milligrams per kilogram (mg/kg)

Conc - Concentration

Q - Qualifier

RL - Reporting Limit

MDL - Method Detection Limit

NS - No regulatory standard

<0.00022 - analyte not detected at the indicated laboratory reporting limit

U - Not detected at the indicated laboratory reporting limit

J - Estimated value (MDL<Conc<RL)

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

"," - not analyzed

Bold results indicate an exceedance of a NYSEDEC regulatory standard

NOTE: Regulatory standards above are pertaining to soil, as no NYSEDEC regulatory standards exist for concrete samples

NY-RESR: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESR: New York NYCRR Part 375 Ecological Resources Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Part 375 Environmental Remediation Programs, effective December 14, 2006.

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESI: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESR: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375

Environmental Remediation Programs, effective December 14, 2006.

NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

Remediation Programs, effective December 14, 2006.

Table 5
Concrete Sample Results Summary
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C34085

ANALYTE	SAMPLE ID:										C-03				C-04			
	VOLATILE ORGANIC COMPOUNDS (VOCs)										7/8/2022				7/8/2022			
	SAMPLE MATRIX:										CONCRETE				CONCRETE			
	NY-UNRES	NY-RESRR	NY-RESR	NY-RESI	NY-RESGW	NY-RESER	NY-RESER	NY-RESER	NY-RESER	NY-RESER	Conc	Q	RL	MDL	Conc	Q	RL	MDL
1,1,1,2-Tetrachloroethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00014	U	0.00054	0.00014	<0.00012	U	0.00048	0.00012	
1,1,1-Trichloroethane	500	NS	NS	1,000	100	NS	NS	NS	NS	<0.00018	U	0.00054	0.00018	<0.00016	U	0.00048	0.00016	
1,1,2,2-Tetrachloroethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00018	U	0.00054	0.00018	<0.00016	U	0.00048	0.00016	
1,1,2-Trichloroethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00029	U	0.0011	0.00029	<0.00025	U	0.00095	0.00025	
1,1-Dichloroethane	240	NS	NS	480	19	26	NS	NS	NS	<0.00016	U	0.0011	0.00016	<0.00014	U	0.00095	0.00014	
1,1-Dichloroethane	500	NS	NS	1,000	100	100	NS	NS	NS	<0.00026	U	0.0011	0.00026	<0.00023	U	0.00095	0.00023	
1,1-Dichloroethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00017	U	0.00054	0.00017	<0.00015	U	0.00048	0.00015	
1,2,3-Trichlorobenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00035	U	0.0022	0.00035	<0.00031	U	0.0019	0.00031	
1,2,3-Trichloropropane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00014	U	0.0022	0.00014	<0.00012	U	0.0019	0.00012	
1,2,4,5-Tetramethylbenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00020	U	0.0022	0.00020	<0.00018	U	0.0019	0.00018	
1,2,4-Trichlorobenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00029	U	0.0022	0.00029	<0.00026	U	0.0019	0.00026	
1,2,4-Trimethylbenzene	190	NS	NS	380	47	52	NS	NS	NS	<0.00036	U	0.0022	0.00036	<0.00032	U	0.0019	0.00032	
1,2-Dibromo-3-chloropropane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00011	U	0.0032	0.00011	<0.000095	U	0.0028	0.00095	
1,2-Dibromoethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00030	U	0.0011	0.00030	<0.00026	U	0.00095	0.00026	
1,2-Dichlorobenzene	500	NS	NS	1,000	100	100	NS	NS	NS	<0.00016	U	0.0022	0.00016	<0.00014	U	0.0019	0.00014	
1,2-Dichloroethane	30	10	0.02	60	2.3	3.1	0.02	NS	NS	<0.00028	U	0.0011	0.00028	<0.00024	U	0.00095	0.00024	
1,2-Dichloroethane, Total	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00015	U	0.0011	0.00015	<0.00013	U	0.00095	0.00013	
1,2-Dichloropropane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00013	U	0.0011	0.00013	<0.00012	U	0.00095	0.00012	
1,3,5-Trimethylbenzene	190	NS	NS	380	47	52	NS	NS	NS	<0.00021	U	0.0022	0.00021	<0.00018	U	0.0019	0.00018	
1,3-Dichlorobenzene	280	NS	NS	560	17	49	NS	NS	NS	<0.00016	U	0.0022	0.00016	<0.00014	U	0.0019	0.00014	
1,3-Dichloropropane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00018	U	0.0022	0.00018	<0.00016	U	0.0019	0.00016	
1,3-Dichloropropane, Total	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00017	U	0.00054	0.00017	<0.00015	U	0.00048	0.00015	
1,4-Dichlorobenzene	130	20	1.8	250	9.8	13	1.8	NS	NS	<0.00018	U	0.0022	0.00018	<0.00016	U	0.0019	0.00016	
1,4-Dioxane	130	0.1	0.1	250	9.8	13	0.1	NS	NS	<0.038	U	0.086	0.038	<0.033	U	0.076	0.033	
2,2-Dichloropropane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00022	U	0.0022	0.00022	<0.00019	U	0.0019	0.00019	
2-Butanone	500	100	0.12	1,000	100	100	0.12	NS	NS	<0.0024	U	0.011	0.0024	<0.0021	U	0.0095	0.0021	
2-Hexanone	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.0013	U	0.011	0.0013	<0.0011	U	0.0095	0.0011	
4-Methyl-2-pentanone	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.0014	U	0.011	0.0014	<0.0012	U	0.0095	0.0012	
Acetone	500	2.2	0.05	1,000	100	100	0.05	NS	NS	<0.0052	U	0.011	0.0052	0.22	U	0.0095	0.0046	
Acrylonitrile	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.0012	U	0.0043	0.0012	<0.0011	U	0.0038	0.0011	
Benzene	44	70	0.06	89	2.9	4.8	NS	NS	NS	<0.0018	U	0.00054	0.00018	<0.00016	U	0.00048	0.00016	
Bromobenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00016	U	0.0022	0.00016	<0.00014	U	0.0019	0.00014	
Bromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00022	U	0.0022	0.00022	<0.00019	U	0.0019	0.00019	
Bromodichloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00012	U	0.00054	0.00012	<0.00010	U	0.00048	0.00010	
Bromoforn	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00026	U	0.0043	0.00026	<0.00023	U	0.0038	0.00023	
Bromomethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00063	U	0.0022	0.00063	<0.00055	U	0.0019	0.00055	
Carbon disulfide	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.0049	U	0.011	0.0049	<0.0043	U	0.0095	0.0043	
Carbon tetrachloride	22	NS	NS	44	1.4	2.4	NS	NS	NS	<0.00025	U	0.0011	0.00025	<0.00022	U	0.00095	0.00022	
Chlorobenzene	500	40	1.1	1,000	100	100	NS	NS	NS	<0.00014	U	0.00054	0.00014	<0.00012	U	0.00048	0.00012	
Chloroethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00049	U	0.0022	0.00049	<0.00043	U	0.0019	0.00043	
Chloroform	350	12	0.37	700	10	49	NS	NS	NS	<0.00015	U	0.0016	0.00015	<0.00013	U	0.0014	0.00013	
Chloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.0010	U	0.0043	0.0010	<0.00088	U	0.0038	0.00088	
cis-1,2-Dichloroethene	500	NS	NS	1,000	59	100	NS	NS	NS	<0.00019	U	0.0011	0.00019	<0.00017	U	0.00095	0.00017	
cis-1,3-Dichloropropene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00017	U	0.00054	0.00017	<0.00015	U	0.00048	0.00015	
Dibromochloromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00015	U	0.0011	0.00015	<0.00013	U	0.00095	0.00013	
Dibromomethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00026	U	0.0022	0.00026	<0.00023	U	0.0019	0.00023	
Dichlorodifluoromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00099	U	0.011	0.00099	<0.00087	U	0.0095	0.00087	
Ethyl ether	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00037	U	0.0022	0.00037	<0.00032	U	0.0019	0.00032	
Ethylbenzene	390	NS	NS	1	780	30	41	NS	NS	<0.00015	U	0.0011	0.00015	<0.00013	U	0.00095	0.00013	
Hexachlorobutadiene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00018	U	0.0043	0.00018	<0.00016	U	0.0038	0.00016	
Isopropylbenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00012	U	0.0011	0.00012	<0.00010	U	0.00095	0.00010	
Methyl tert butyl ether	500	NS	NS	1,000	62	100	NS	NS	NS	<0.00022	U	0.0022	0.00022	<0.00019	U	0.0019	0.00019	
Methylene chloride	500	12	0.05	1,000	51	100	0.05	NS	NS	<0.00025	U	0.0054	0.00025	<0.00022	U	0.0048	0.00022	
n-Butylbenzene	500	NS	NS	1,000	100	100	NS	NS	NS	<0.00018	U	0.0011	0.00018	<0.00016	U	0.00095	0.00016	
n-Propylbenzene	500	NS	NS	1,000	100	100	NS	NS	NS	<0.00018	U	0.0011	0.00018	<0.00016	U	0.00095	0.00016	

Table 5
Concrete Sample Results Summary
43-45 Lafayette Avenue, Suffern Village, Rockland County, New York
Site No. C34085

ANALYTE	SAMPLE ID:										C-03				C-04			
	SAMPLING DATE:										7/8/2022				7/8/2022			
	SAMPLE MATRIX:										CONCRETE				CONCRETE			
	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-RESR	NY-RESR	Conc	Q	RL	MDL	Conc	Q	RL	MDL
Naphthalene	500	NS	NS	12	1,000	100	100	100	100	100	<0.00070	0.00070	0.00070	<0.00062	0.00062	0.00062	0.00062	0.00062
o-Chlorotoluene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00020	U	0.0022	0.00020	<0.00018	U	0.0019	0.00018
o-Xylene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00031	U	0.0011	0.00031	<0.00028	U	0.00095	0.00028
p-Chlorotoluene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00012	U	0.0022	0.00012	<0.00010	U	0.0019	0.00010
p-Diethylbenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00019	U	0.0022	0.00019	<0.00017	U	0.0019	0.00017
p-Ethyltoluene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00041	U	0.0022	0.00041	<0.00036	U	0.0019	0.00036
p-Isopropyltoluene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00012	U	0.0011	0.00012	<0.00010	U	0.00095	0.00010
p-m-Xylene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00060	U	0.0022	0.00060	<0.00053	U	0.0019	0.00053
sec-Butylbenzene	500	NS	NS	11	1,000	100	100	100	100	100	<0.00016	U	0.0011	0.00016	<0.00014	U	0.00095	0.00014
Styrene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00021	U	0.0011	0.00021	<0.00019	U	0.00095	0.00019
tert-Butylbenzene	500	NS	NS	5.9	1,000	100	100	100	100	100	<0.00013	U	0.0022	0.00013	<0.00011	U	0.0019	0.00011
Tetrachloroethene	150	2	1.3	300	5.5	19	100	100	100	100	<0.00021	U	0.0054	0.00021	<0.00019	U	0.00048	0.00019
Toluene	500	36	0.7	1,000	100	100	100	100	100	100	<0.00058	U	0.0011	0.00058	<0.00052	U	0.00095	0.00052
trans-1,2-Dichloroethene	500	NS	NS	0.19	1,000	100	100	100	100	100	<0.00015	U	0.0016	0.00015	<0.00013	U	0.0014	0.00013
trans-1,3-Dichloropropene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00029	U	0.0011	0.00029	<0.00026	U	0.00095	0.00026
trans-1,4-Dichloro-2-butene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00015	U	0.0054	0.00015	<0.00013	U	0.00048	0.00013
Trichloroethene	200	2	0.47	400	10	21	100	100	100	100	<0.00075	U	0.0043	0.00075	<0.00066	U	0.00038	0.00066
Trichlorofluoromethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00023	U	0.011	0.0023	<0.0020	U	0.0095	0.0020
Vinyl acetate	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<0.00036	U	0.0011	0.00036	<0.00032	U	0.00095	0.00032
Vinyl chloride	13	NS	NS	0.02	27	0.9	100	100	100	100	<0.00031	U	0.0011	0.00031	<0.00028	U	0.00095	0.00028
Xylenes, Total	500	0.26	1.6	1,000	100	100	100	100	100	100	-	-	-	-	0.22	-	-	-
Total VOCs	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-
VOLATILE ORGANIC COMPOUNDS (VOCs) - TICs																		
1-Butanol	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	-	-	-	-
1-Hexanol, 2-ethyl-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00676	NJ	0	0	-	-	-	-
7-Octen-2-ol, 2,6-dimethyl-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00298	NJ	0	0	-	-	-	-
Butylated Hydroxytoluene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0031	NJ	0	0	0.0178	NJ	0	0
Unknown	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0101	J	0	0	0.0195	J	0	0
Unknown	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0113	J	0	0	0.00773	J	0	0
Unknown	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-	-	-	0.203	J	0	0
Unknown	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0023	J	0	0	0.0272	J	0	0
Unknown Organic Acid	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0159	J	0	0	-	-	-	-
Total TIC Compounds	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0524	J	0	0	0.275	J	0	0

Notes:
Units in milligrams per kilogram (mg/kg)
Conc - Concentration
Q - Qualifier
RL - Reporting Limit
MDL - Method Detection Limit
NS - No regulatory standard
<0.00022 - analyte not detected at the indicated laboratory reporting limit
U - Not detected at the indicated laboratory reporting limit
J - Estimated value (MDL<Conc<RL)
NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identifier is based on a mass spectral library search.
"-", - not analyzed
Bold results indicate an exceedance of a NYSDC regulatory standard
NOTE: Regulatory standards above are pertaining to soil, as no NYSDC regulatory standards exist for concrete samples
NY-RESR: New York NYCRR Part 375 Ecological Resources Criteria, New York Restricted use Criteria per 6 NYCRR Part 375
Environmental Remediation Programs, effective December 14, 2006.
NY-RESR: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375
NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375
Environmental Remediation Programs, effective December 14, 2006.
NY-RESI: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375
Environmental Remediation Programs, effective December 14, 2006.
NY-RESR: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375
Environmental Remediation Programs, effective December 14, 2006.
NY-RESR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375
Environmental Remediation Programs, effective December 14, 2006.
NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

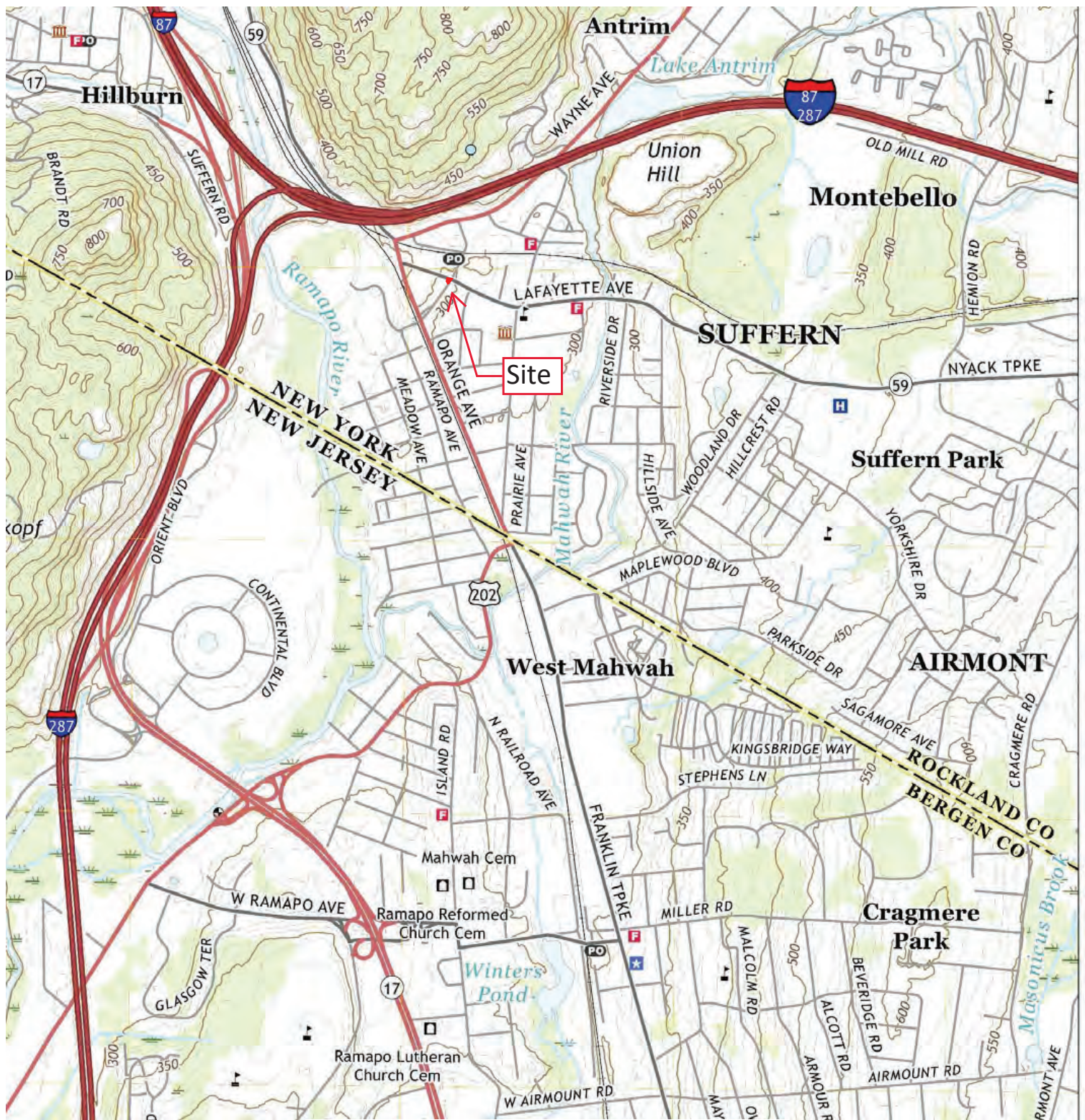
Approved by: AD 1/24/2023
SAS 1/27/2023

FIGURES

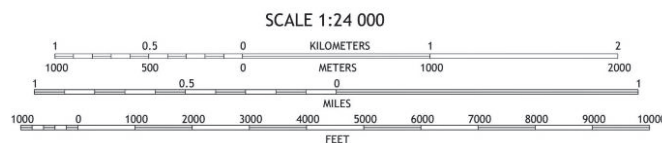


ECMS RAWP FIGURES





SOURCE: RAMSEY QUADRANGLE,
NEW JERSEY/NEW YORK
7.5 MINUTE SERIES, USGS 2019



**Environmental Consulting &
Management Services, Inc.**
10 Filmont Drive, New City, NY 10956



SOURCE: USGS
DATE: 2019

APPROVED BY H. Sudwischer

DRAWN BY H. Sudwischer

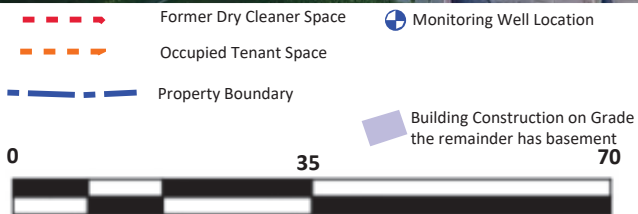
PROJECT DRAWING NO. 23.527

FIGURE 1
Site Location Map
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1:24,000

Contour Interval: 10 FT

DATE 10/14/23



Environmental Consulting & Management Services, Inc.
 10 Filmont Drive, New City, NY 10956



IMAGE SOURCE: H.Sudwischer
 DATE: 7/24/23

APPROVED BY H. Sudwischer

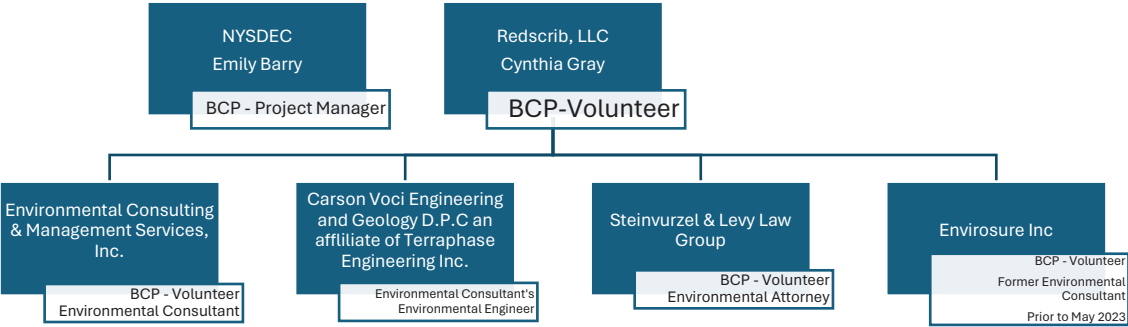
DRAWN BY H. Sudwischer

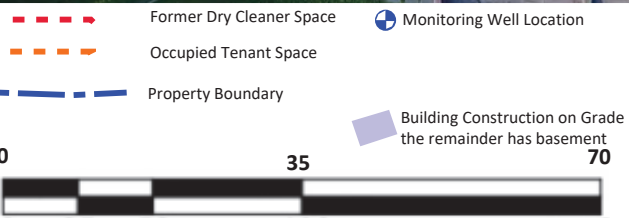
PROJECT DRAWING NO. 23.527

FIGURE 2
 Site Boundary Map
 43-45 LAFAYETTE AVENUE
 SUFFERN VILLAGE
 ROCKLAND COUNTY, NEW YORK

DATE 10/14/23

FIGURE 3
Project Organizational Chart





Proposed excavation extents and Endpoint sample locations.



Environmental Consulting & Management Services, Inc. 10 Filmont Drive, New City, NY 10956 	IMAGE SOURCE: H.Sudwischer DATE: 7/24/23	FIGURE 4 Proposed Excavation Area 43-45 LAFAYETTE AVENUE SUFFERN VILLAGE ROCKLAND COUNTY, NEW YORK		
	APPROVED BY H. Sudwischer			
	DRAWN BY H. Sudwischer			
	PROJECT DRAWING NO. 23.527			DATE 10/14/23

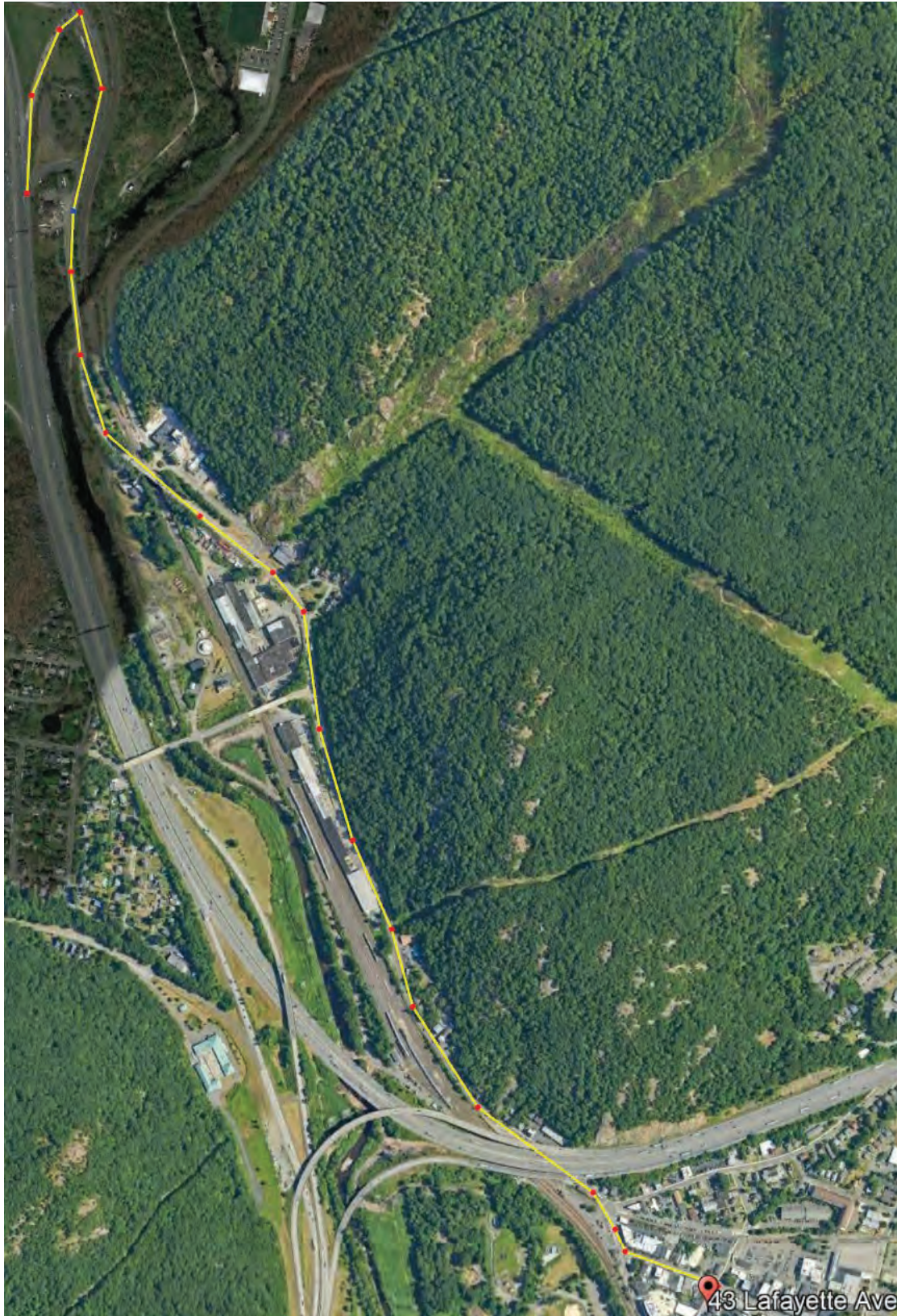


FIGURE 5

**RAWP Inbound Truck Route
43-45 Lafayette Ave
Suffern, New York 10901**





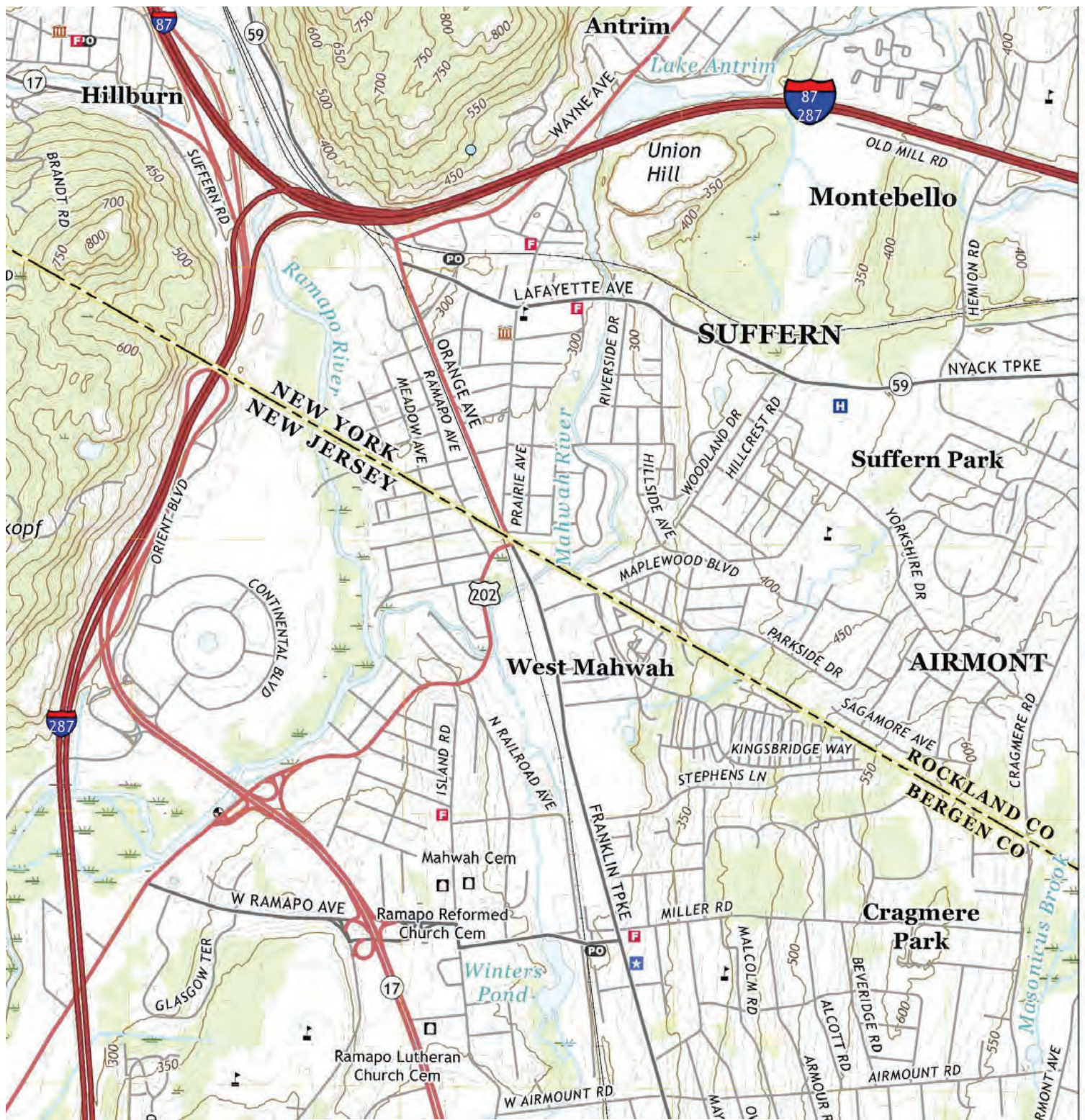
FIGURE 6

RAWP Outbound Truck Route
43-45 Lafayette Ave
Suffern, New York 10901

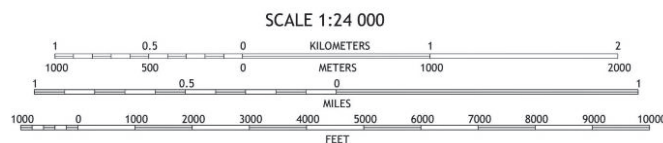


ECMS ARIR FIGURES





SOURCE: RAMSEY QUADRANGLE,
NEW JERSEY/NEW YORK
7.5 MINUTE SERIES, USGS 2019



**Environmental Consulting &
Management Services, Inc.**
10 Filmont Drive, New City, NY 10956



SOURCE: USGS
DATE: 2019

APPROVED BY H. Sudwischer

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PROJECT DRAWING NO. 23.527

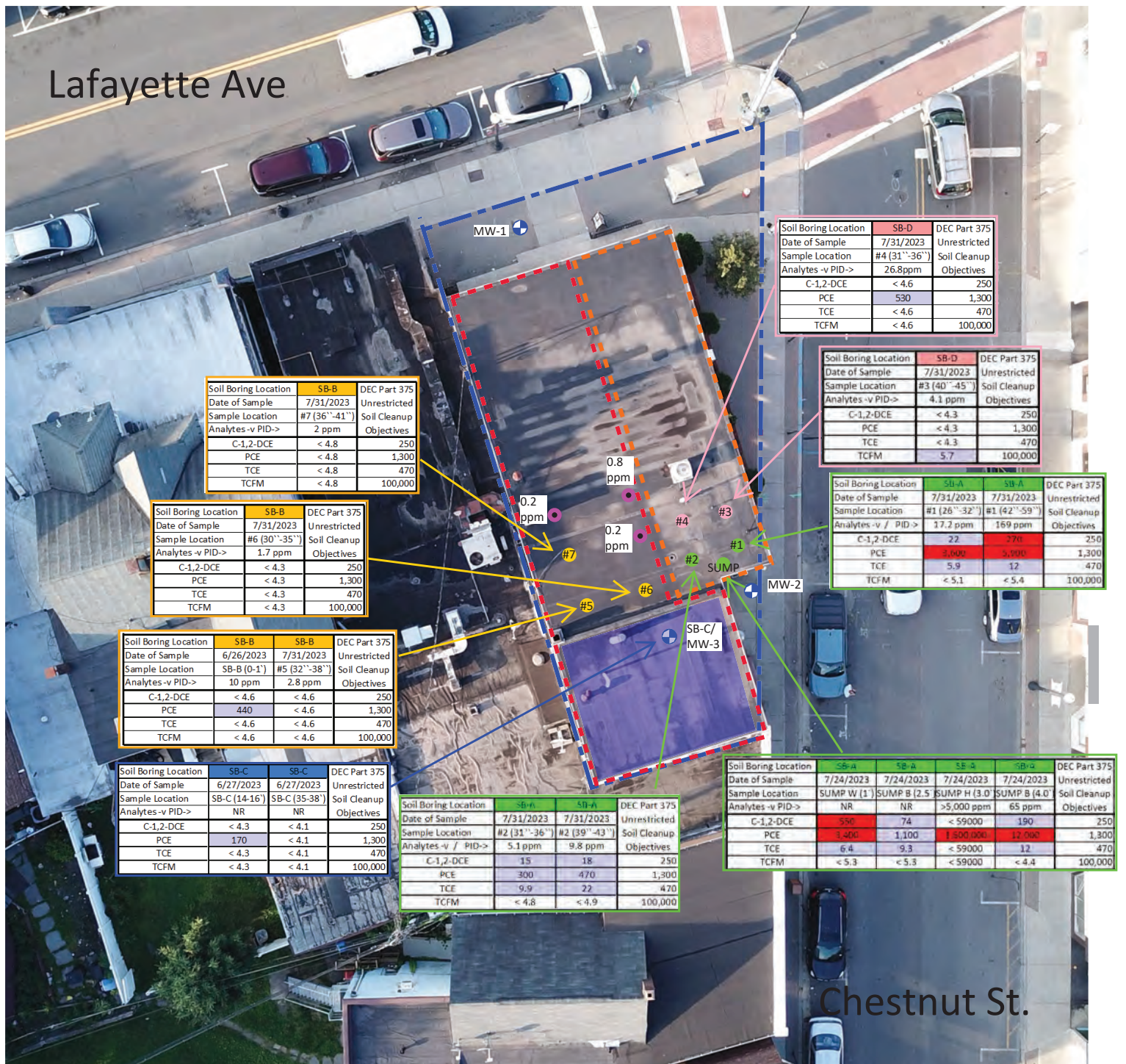
FIGURE 1
Site Location Map
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1:24,000

Contour Interval: 10 FT

DATE 10/14/23

Lafayette Ave



Chestnut St.

- Former Dry Cleaner Space
- Occupied Tenant Space
- Property Boundary
- Monitoring Well Location
- PID only location
- Sampled Hand boring location
- Building Construction on Grade the remainder has basement

Soil Analytical Results are reported in ug/Kg



Notes: SB-A had 8 different soil samples collected. Four were directly collected from the sump and 1 Water sample collected. The Highest PID from the sump was greater than 5000 ppm. SB-B Inside former boiler room closest to former dry-cleaning equipment laterally. SB-C Located directly adjacent the former dry cleaning machine. SB-D was adjacent SB-A #1 and #2 to determine if the impacts spread out laterally.

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IMAGE SOURCE: H.Sudwischer
DATE: 7/24/23

APPROVED BY H. Sudwischer
DRAWN BY H. Sudwischer

PROJECT DRAWING NO. 23.527

FIGURE 2
Soil Analyte Detection Map
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

DATE 10/14/23

Lafayette Ave

Date	7/24/2023	TOGS (1.1.1): Ambient Water Quality Standards and Guidance
Sample Location	MW-1	
PID Headspace	10 ppm	
Analytes	Result	Guidance
cis-1,2-DCE	< 1.0	5
PCE	< 1.0	5
TCE	< 1.0	5
VC	< 1.0	2

Date	7/24/2023	TOGS (1.1.1): Ambient Water Quality Standards and Guidance Values
Sample Location	SUMP	
PID Headspace	N/A	
Analytes	Result	Guidance
cis-1,2-DCE	4,800	5
PCE	110	5
TCE	86	5
VC	560	2

Date	7/24/2023	TOGS (1.1.1): Ambient Water Quality Standards and Guidance Values
Sample Location	MW-3	
PID Headspace	6.3 ppm	
Analytes	Result	Guidance
cis-1,2-DCE	< 1.0	5
PCE	4.4	5
TCE	< 1.0	5
VC	< 1.0	2

Date	7/24/2023	TOGS (1.1.1): Ambient Water Quality Standards and Guidance Values
Sample Location	MW-2	
PID Headspace	13.1 ppm	
Analytes	Result	Guidance
cis-1,2-DCE	1.2	5
PCE	1.1	5
TCE	< 1.0	5
VC	< 1.0	2

Chestnut St.

- Former Dry Cleaner Space
- Monitoring Well Location
- Occupied Tenant Space
- Grab Water Sample From Earthen Sump
- Property Boundary
- Building Construction on Grade the remainder has basement



cis-1,2-Dichloroethene	cis-1,2-DCE
Tetrachloroethene	PCE
Trichloroethene	TCE
Vinyl chloride	VC



Notes: Groundwater analytical concentrations are reported in ug/L

SB-C / MW-3 was converted to a 1- inch monitoring well MW-3 because cobble fill was not allowing the augers to advance to bedrock. SB-C/MW-3 Located directly adjacent the area of the former dry cleaning machine.

Environmental Consulting & Management Services, Inc.

10 Filmont Drive, New City, NY 10956



IMAGE SOURCE: H.Sudwischer
DATE: 7/24/23

APPROVED BY H. Sudwischer

DRAWN BY H. Sudwischer

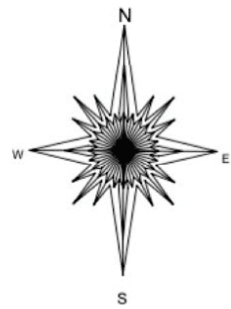
PROJECT DRAWING NO. 23.527

FIGURE 3
Groundwater Analyte Detection Map
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

DATE 10/14/23

FIGURE 4

Well Survey Elevations Shows
Groundwater Flow Contours



MW-1 (2-inch well)

DTW = 26.78'

Rel Elev = 77.15'

MW-3 (1-inch well)

DTW = 27.75'

Rel Elev = 76.00'

MW-2 (2-inch well)

DTW = 25.55'

Rel Elev = 76.02'

Groundwater
Flow Direction

LAFAYETTE AVENUE

CHESTNUT STREET

TAX MAP DESIGNATION: 54.35-2-25

LOCATION
OF TOP OF
WELLS

43-45 LAFAYETTE AVE.

TOWN OF RAMAPO, ROCKLAND COUNTY

SUFFERN, NEW YORK

JULY 29, 2023 SCALE: 1" = 10'



ANTHONY R. CELENTANO P.L.S.
31 ROSMAN ROAD
THIELLS, N.Y. 10984
845 429 5290 FAX 429 5974

Anthony R. Celentano

LIC#50633

Legend

Top of Pipe - Top of well casing (TOC)

DTW - Depth to water below TOC

Rel Elev - Relative Groundwater (GW)

Elevation compared to arbitrary benchmark

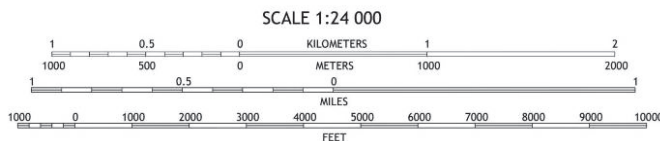
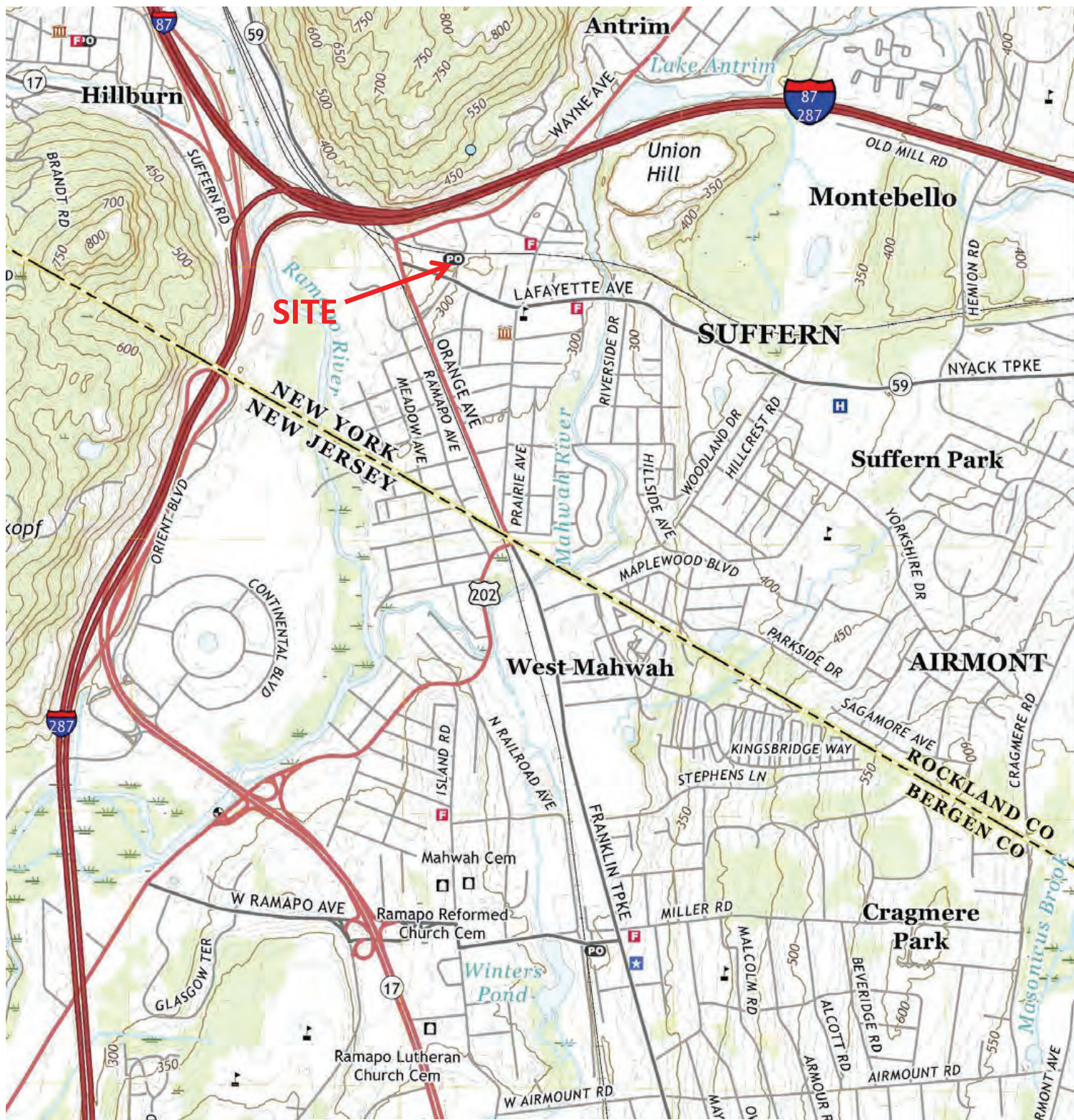
- GW Contours with Rel Elev



77.00'

ENVIROSURE RIR FIGURES





LEGEND

SOURCE: RAMSEY
QUADRANGLE, NEW
JERSEY/NEW YORK
7.5 MINUTE SERIES, USGS 2019



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621 SHREWSBURY AVENUE, SUITE 151, SHREWSBURY, NJ 07702

APPROVED BY D. Ogonowski

DRAWN BY D. Grothusen

PROJECT DRAWING NO. SO833-1

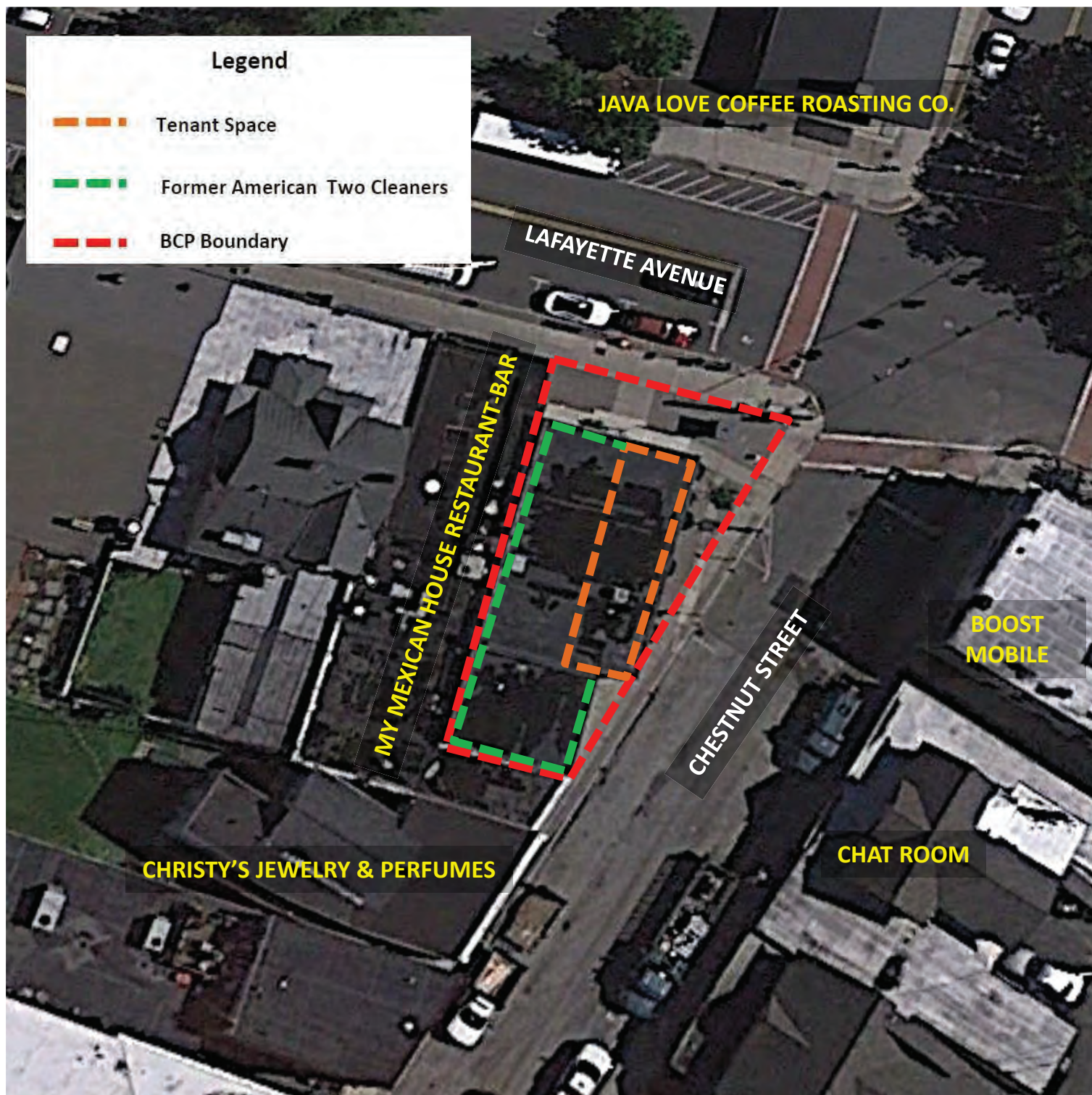
FIGURE 1

SITE LOCATION MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE
1:24,000

CONTOUR INTERVAL
10 feet

DATE
1/7/2021



LEGEND

SOURCE: GOOGLE EARTH PRO,
IMAGE DATE 6/25/2019



621 SHREWSBURY AVENUE, SUITE 151, SHREWSBURY, NJ 07702

APPROVED BY D. OGONOWSKI

DRAWN BY D. GROTHUSEN

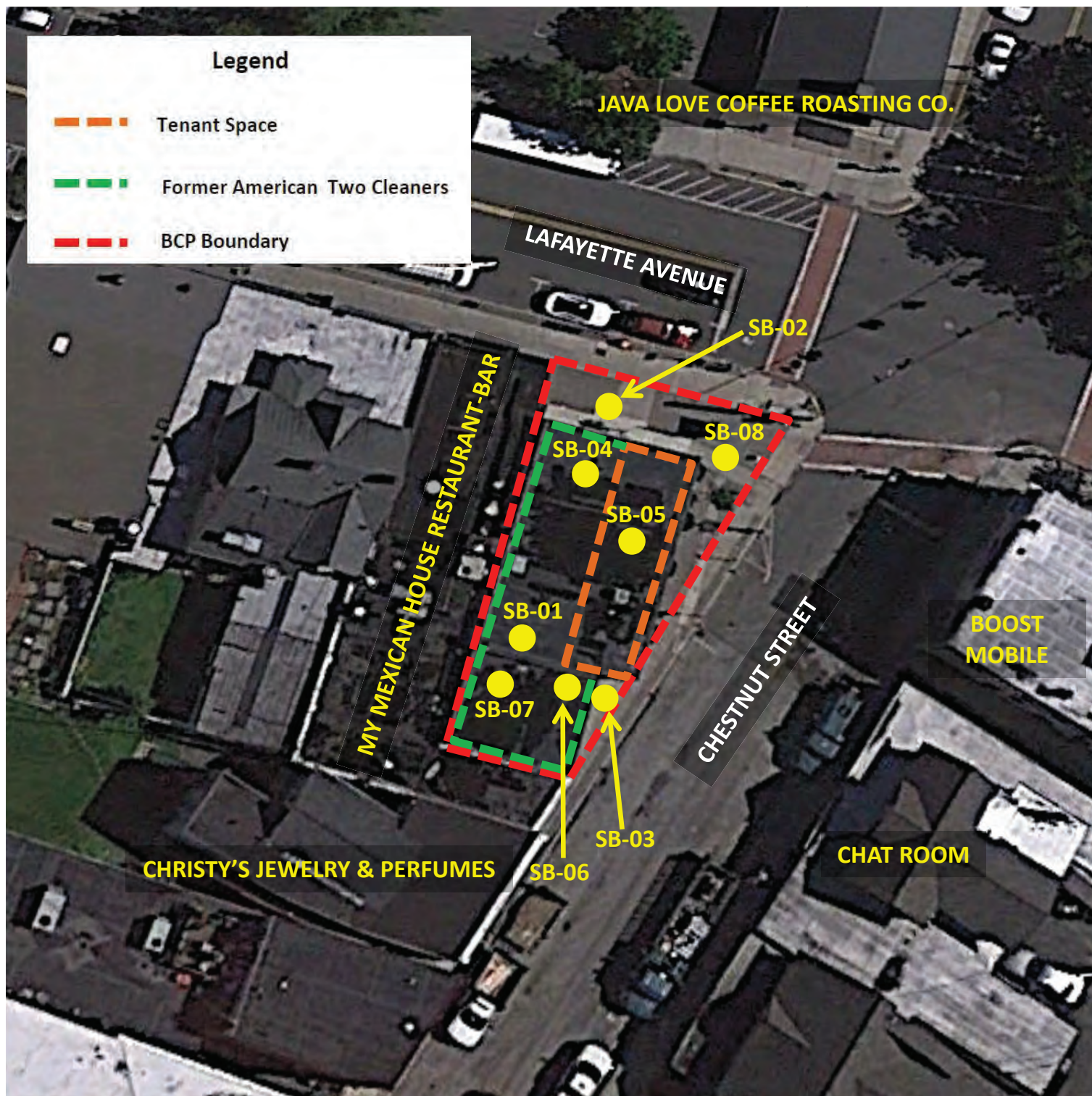
PROJECT DRAWING NO. SO833-2

FIGURE 2

SITE LAYOUT MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1":38 feet

DATE 1/7/2021



LEGEND

SOURCE: GOOGLE EARTH PRO,
IMAGE DATE 6/25/2019



Soil Boring Location



APPROVED BY D. OGONOWSKI

DRAWN BY D. GROTHUSEN

PROJECT DRAWING NO. S01241-2

FIGURE 3

SOIL BORING LOCATION MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1":38 feet SITE NO. C344085 DATE 5/13/2022

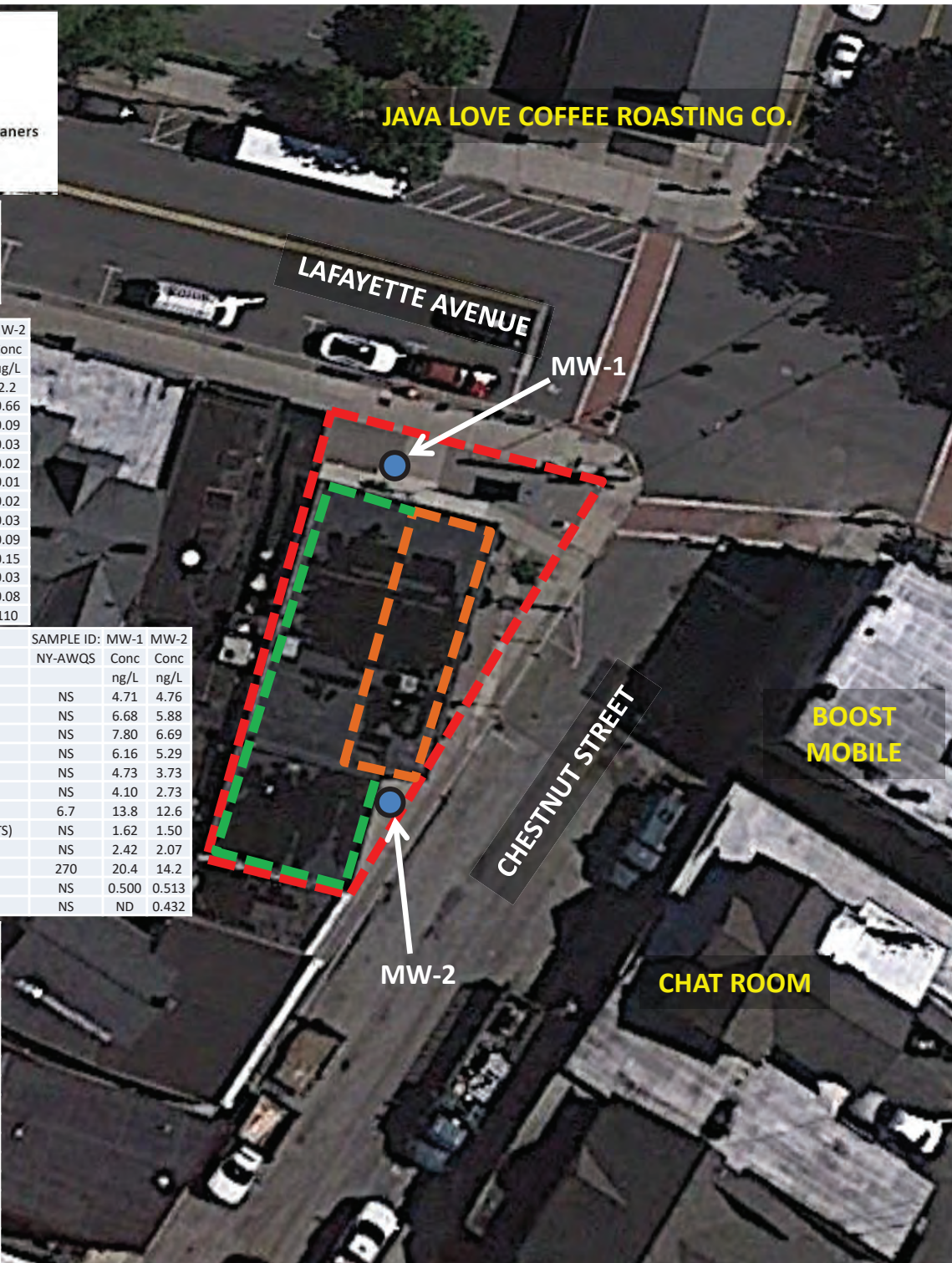


	SAMPLE ID: MW-1 MW-2	
ANALYTE	NY-AWQS	Conc
VOC		UG/I
Tetrachloroethene	5	ND
Total TIC Compounds	NS	ND

	SAMPLE ID: MW-1 MW-2	
ANALYTE	NY-AWQS	Conc
SVOC		ug/L
Bis(2-ethylhexyl)phthalate	5	ND
Acetophenone	NS	1.7
Naphthalene	10	0.09
Benzo(a)anthracene	0.002	0.03
Benzo(b)fluoranthene	0.002	ND
Benzo(k)fluoranthene	0.002	ND
Chrysene	0.002	0.02
Anthracene	50	0.02
Fluorene	50	0.08
Phenanthrene	50	0.16
Pyrene	50	ND
2-Methylnaphthalene	NS	0.06
Total TIC Compounds	NS	4.72

	SAMPLE ID: MW-1 MW-2	
ANALYTE	NY-AWQS	Conc
PERFLUORINATED ALKYL ACIDS (PFAS)		ng/L
Perfluorobutanoic Acid (PFBA)	NS	4.71
Perfluoropentanoic Acid (PFPeA)	NS	6.68
Perfluorobutanesulfonic Acid (PFBS)	NS	7.80
Perfluorohexanoic Acid (PFHxA)	NS	6.16
Perfluoroheptanoic Acid (PFHpA)	NS	4.73
Perfluorohexanesulfonic Acid (PFHxS)	NS	4.10
Perfluorooctanoic Acid (PFOA)	6.7	13.8
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	NS	1.62
Perfluorononanoic Acid (PFNA)	NS	2.42
Perfluorooctanesulfonic Acid (PFOS)	270	20.4
Perfluorodecanoic Acid (PFDA)	NS	0.500
Perfluoroundecanoic Acid (PFUnA)	NS	ND

	SAMPLE ID: MW-1 MW-2	
ANALYTE	NY-AWQS	Conc
TOTAL METALS		ug/L
Aluminum	NS	213
Arsenic	25	0.23
Barium	1,000	48.23
Calcium	NS	53,100
Chromium	50	0.38
Cobalt	NS	0.37
Copper	200	1.55
Iron	300	391
Lead	25	ND
Magnesium	35,000	9,700
Manganese	300	22.3
Nickel	100	0.76
Potassium	NS	3,440
Sodium	20,000	296,000
Zinc	2,000	ND



LEGEND

SOURCE: GOOGLE EARTH PRO,
IMAGE DATE 6/25/2019



Monitoring Well Location



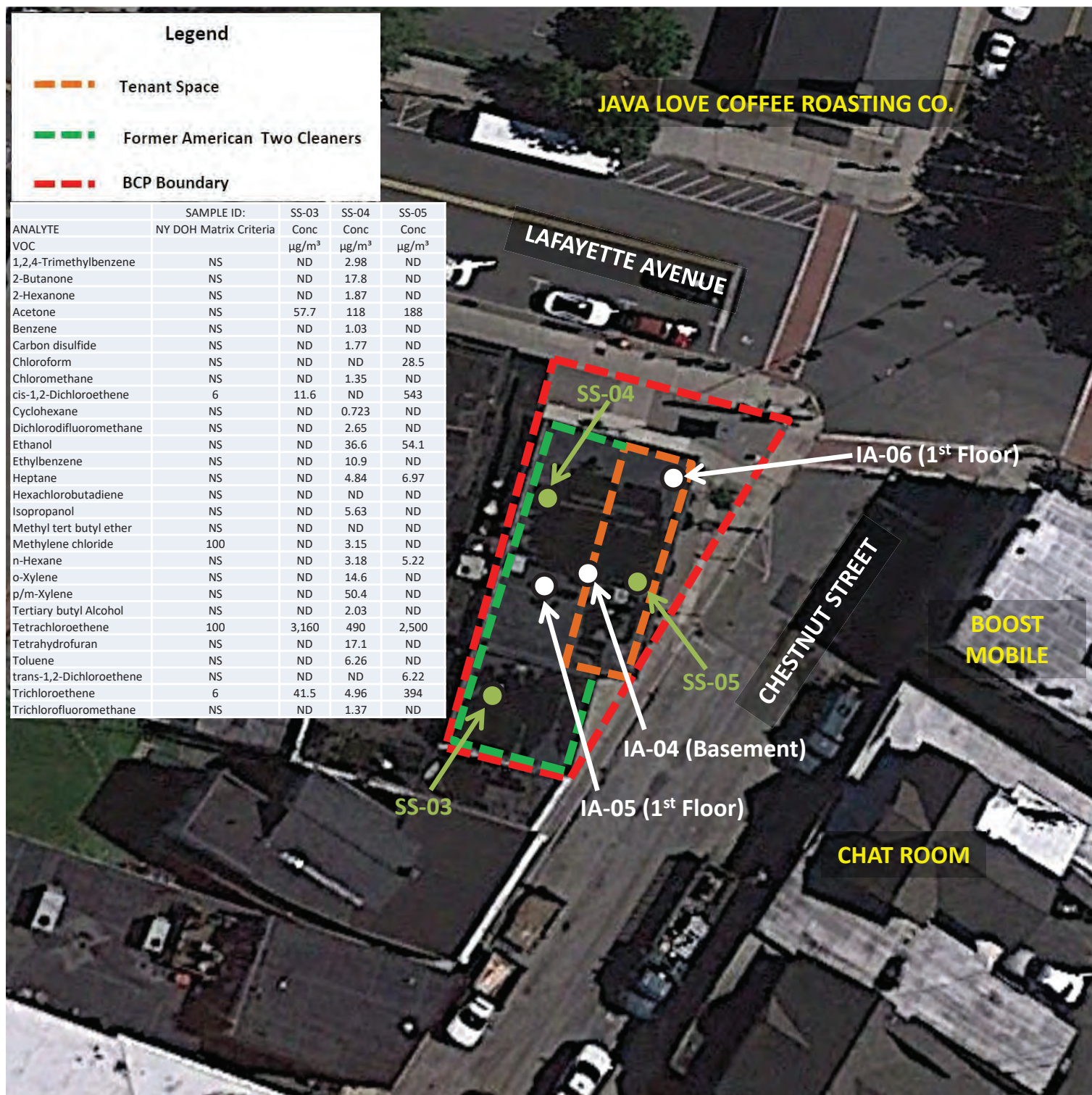
APPROVED BY J.LANG

DRAWN BY J.OSTROW

PROJECT DRAWING NO. S01241-4

FIGURE 4
GROUNDWATER SAMPLE LOCATION MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1":38 feet SITE NO. C344085 DATE 5/13/2022



LEGEND

SOURCE: GOOGLE EARTH PRO,
IMAGE DATE 6/25/2019

- Sub-Slab Sample Location
- Indoor Air Sample Location



APPROVED BY J.LANG

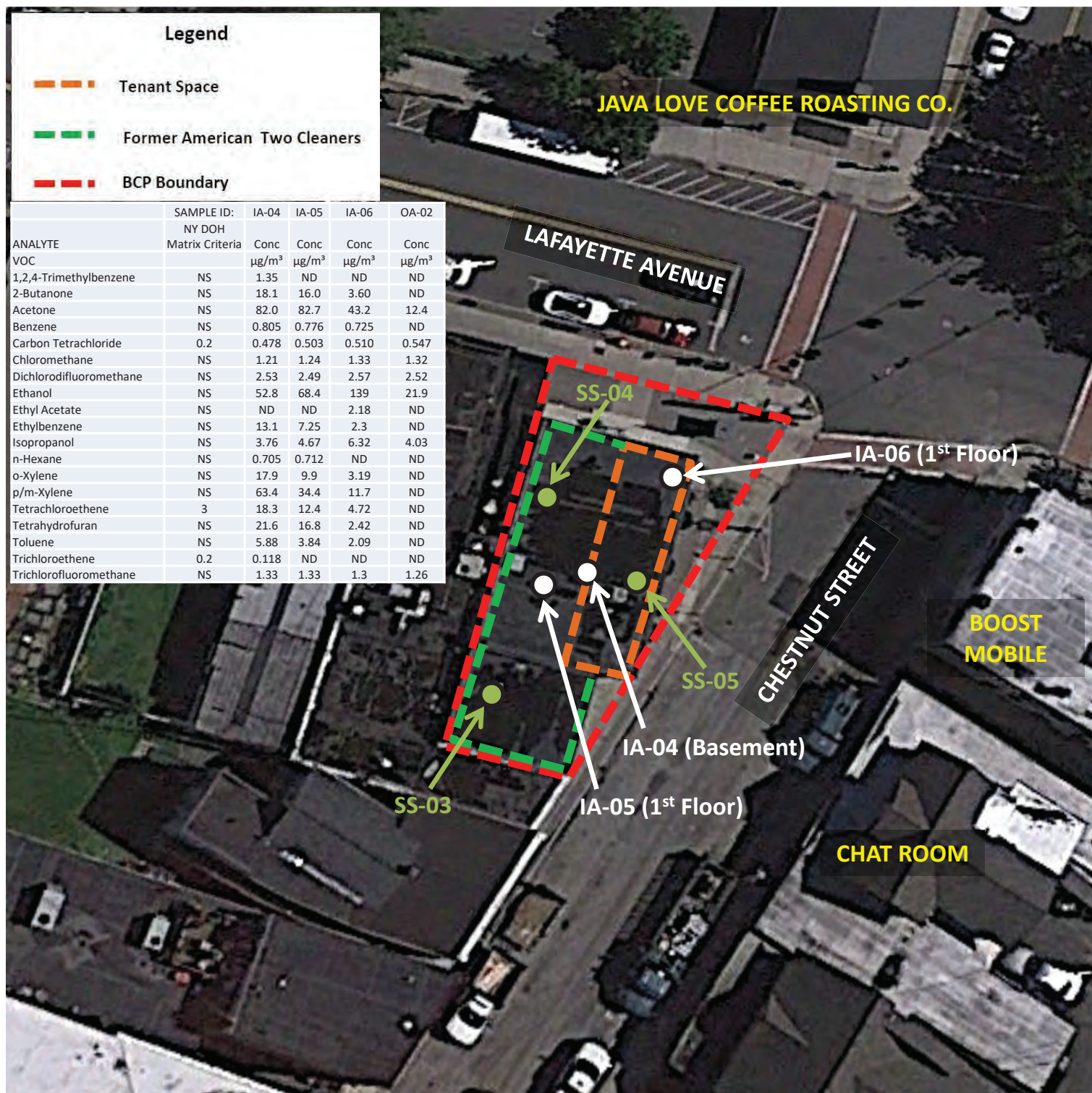
DRAWN BY J.OSTROW

PROJECT DRAWING NO. S01241-5

FIGURE 5

SUB-SLAB VAPOR, INDOOR AIR, CONCRETE SAMPLE
LOCATION AND SOIL VAPOR RESULTS MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1":38 feet SITE NO. C344085 DATE 5/13/2022



LEGEND

SOURCE: GOOGLE EARTH PRO,
IMAGE DATE 6/25/2019

- Sub-Slab Sample Location
- Indoor Air Sample Location



621 SHREWSBURY AVENUE, SUITE 151, SHREWSBURY, NJ 07702

APPROVED BY S.SMITH

DRAWN BY J.OSTROW

PROJECT DRAWING NO. S01241-6

FIGURE 6

SUB-SLAB VAPOR, INDOOR AIR, CONCRETE SAMPLE
LOCATION AND INDOOR AIR RESULTS MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1":38 feet SITE NO. C344085 DATE 4/10/2023

APPENDIX A
STANDARDS, CRITERIA AND GUIDANCE LIST



6 CRR-NY 375-6.8
NY-CRR

STATE COMPILATION OF CODES, RULES AND REGULATIONS OF THE STATE OF NEW YORK
TITLE 6. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CHAPTER IV. QUALITY SERVICES
SUBCHAPTER B. SOLID WASTES
PART 375. ENVIRONMENTAL REMEDIATION PROGRAMS
SUBPART 375-6. REMEDIAL PROGRAM SOIL CLEANUP OBJECTIVES

6 CRR-NY 375-6.8
6 CRR-NY 375-6.8

375-6.8 Soil cleanup objective tables.

(a) Unrestricted use soil cleanup objectives.

Table 375-6.8(a): Unrestricted Use Soil Cleanup Objectives		
Contaminant	CAS Number	Unrestricted Use
Metals		
Arsenic	7440-38-2	13 ^c
Barium	7440-39-3	350 ^c
Beryllium	7440-41-7	7.2
Cadmium	7440-43-9	2.5 ^c
Chromium, hexavalent ^e	18540-29-9	1 ^b
Chromium, trivalent ^e	16065-83-1	30 ^c
Copper	7440-50-8	50
Total Cyanide ^{e, f}		27
Lead	7439-92-1	63 ^c
Manganese	7439-96-5	1600 ^c
Total Mercury		0.18 ^c
Nickel	7440-02-0	30
Selenium	7782-49-2	3.9 ^c
Silver	7440-22-4	2
Zinc	7440-66-6	109 ^c
PCBs/Pesticides		
2,4,5-TP Acid (Silvex) ^f	93-72-1	3.8
4,4'-DDE	72-55-9	0.0033 ^b
4,4'-DDT	50-29-3	0.0033 ^b
4,4'-DDD	72-54-8	0.0033 ^b
Aldrin	309-00-2	0.005 ^c
alpha-BHC	319-84-6	0.02
beta-BHC	319-85-7	0.036
Chlordane (alpha)	5103-71-9	0.094
delta-BHC ^g	319-86-8	0.04
Dibenzofuran ^f	132-64-9	7
Dieldrin	60-57-1	0.005 ^c
Endosulfan I ^{d, f}	959-98-8	2.4
Endosulfan II, ^{d, f}	33213-65-9	2.4
Endosulfan sulfate, ^{d, f}	1031-07-8	2.4
Endrin	72-20-8	0.014
Heptachlor	76-44-8	0.042

Lindane	58-89-9	0.1
Polychlorinated biphenyls	1336-36-3	0.1
Semivolatile organic compounds		
Acenaphthene	83-32-9	20
Acenaphthylene ^f	208-96-8	100 ^a
Anthracene ^f	120-12-7	100 ^a
Benz(a)anthracene ^f	56-55-3	1 ^c
Benzo(a)pyrene	50-32-8	1 ^c
Benzo(b)fluoranthene ^f	205-99-2	1 ^c
Benzo(g,h,i)perylene ^f	191-24-2	100
Benzo(k)fluoranthene ^f	207-08-9	0.8 ^c
Chrysene ^f	218-01-9	1 ^c
Dibenz(a,h)anthracene ^f	53-70-3	0.33 ^b
Fluoranthene ^f	206-44-0	100 ^a
Fluorene	86-73-7	30
Indeno(1,2,3-cd)pyrene ^f	193-39-5	0.5 ^c
m-Cresol ^f	108-39-4	0.33 ^b
Naphthalene ^f	91-20-3	12
o-Cresol ^f	95-48-7	0.33 ^b
p-Cresol ^f	106-44-5	0.33 ^b
Pentachlorophenol	87-86-5	0.8 ^b
Phenanthrene ^f	85-01-8	100
Phenol	108-95-2	0.33 ^b
Pyrene ^f	129-00-0	100
Volatile organic compounds		
1,1,1-Trichloroethane ^f	71-55-6	0.68
1,1-Dichloroethane ^f	75-34-3	0.27
1,1-Dichloroethene ^f	75-35-4	0.33
1,2-Dichlorobenzene ^f	95-50-1	1.1
1,2-Dichloroethane	107-06-2	0.02 ^c
cis -1,2-Dichloroethene ^f	156-59-2	0.25
trans-1,2-Dichloroethene ^f	156-60-5	0.19
1,3-Dichlorobenzene ^f	541-73-1	2.4
1,4-Dichlorobenzene	106-46-7	1.8
1,4-Dioxane	123-91-1	0.1 ^b
Acetone	67-64-1	0.05
Benzene	71-43-2	0.06
n-Butylbenzene ^f	104-51-8	12
Carbon tetrachloride ^f	56-23-5	0.76
Chlorobenzene	108-90-7	1.1
Chloroform	67-66-3	0.37
Ethylbenzene ^f	100-41-4	1
Hexachlorobenzene ^f	118-74-1	0.33 ^b
Methyl ethyl ketone	78-93-3	0.12
Methyl tert-butyl ether ^f	1634-04-4	0.93
Methylene chloride	75-09-2	0.05
n - Propylbenzene ^f	103-65-1	3.9
sec-Butylbenzene ^f	135-98-8	11
tert-Butylbenzene ^f	98-06-6	5.9
Tetrachloroethene	127-18-4	1.3
Toluene	108-88-3	0.7
Trichloroethene	79-01-6	0.47
1,2,4-Trimethylbenzene ^f	95-63-6	3.6
1,3,5-Trimethylbenzene ^f	108-67-8	8.4

Vinyl chloride ^f	75-01-4	0.02
Xylene (mixed)	1330-20-7	0.26
All soil cleanup objectives (SCOs) are in parts per million (ppm).		

^a The SCOs for unrestricted use were capped at a maximum value of 100 ppm. See Technical Support Document (TSD), section 9.

^b 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.

^c For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 1 SCO value for this use of the site.

^d SCO is the sum of endosulfan I, endosulfan II and endosulfan sulfate.

^e The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.

^f Protection of ecological resources SCOs were not developed for contaminants identified in Table 375-6.8(b) with "NS". Where such contaminants appear in Table 375-6.8(a), the applicant may be required by the department to calculate a protection of ecological resources SCO according to the TSD.

(b) Restricted use soil cleanup objectives.

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives							
Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Groundwater
		Residential	Restricted-Residential	Commercial	Industrial		
Metals							
Arsenic	7440-38-2	16 ^f	16 ^f	16 ^f	16 ^f	13 ^f	16 ^f
Barium	7440-39-3	350 ^f	400	400	10,000 ^d	433	820
Beryllium	7440-41-7	14	72	590	2,700	10	47
Cadmium	7440-43-9	2.5 ^f	4.3	9.3	60	4	7.5
Chromium, hexavalent ^h	18540-29-9	22	110	400	800	1 ^e	19
Chromium, trivalent ^h	16065-83-1	36	180	1,500	6,800	41	NS
Copper	7440-50-8	270	270	270	10,000 ^d	50	1,720
Total Cyanide ^h		27	27	27	10,000 ^d	NS	40
Lead	7439-92-1	400	400	1,000	3,900	63 ^f	450
Manganes ^e	7439-96-5	2,000 ^f	2,000 ^f	10,000 ^d	10,000 ^d	1600 ^f	2,000 ^f
Total Mercury		0.81 ^j	0.81 ^j	2.8 ^j	5.7 ^j	0.18 ^f	0.73
Nickel	7440-02-0	140	310	310	10,000 ^d	30	130
Selenium	7782-49-2	36	180	1,500	6,800	3.9 ^f	4 ^f
Silver	7440-22-4	36	180	1,500	6,800	2	8.3
Zinc	7440-66-6	2200	10,000 ^d	10,000 ^d	10,000 ^d	109 ^f	2,480
PCBs/Pesticides							
2,4,5-TP Acid (Silvex)	93-72-1	58	100 ^a	500 ^b	1,000 ^c	NS	3.8
4,4'-DDE	72-55-9	1.8	8.9	62	120	0.0033 ^e	17
4,4'-DDT	50-29-3	1.7	7.9	47	94	0.0033 ^e	136
4,4'-DDD	72-54-8	2.6	13	92	180	0.0033 ^e	14
Aldrin	309-00-2	0.019	0.097	0.68	1.4	0.14	0.19
alpha-BHC	319-84-6	0.097	0.48	3.4	6.8	0.04 ^g	0.02
beta-BHC	319-85-7	0.072	0.36	3	14	0.6	0.09
Chlordane (alpha)	5103-71-9	0.91	4.2	24	47	1.3	2.9
delta-BHC	319-86-8	100 ^a	100 ^a	500 ^b	1,000 ^c	0.04 ^g	0.25
Dibenzofuran	132-64-9	14	59	350	1,000 ^c	NS	210
Dieldrin	60-57-1	0.039	0.2	1.4	2.8	0.006	0.1
Endosulfan I	959-98-8	4.8 ⁱ	24 ⁱ	200 ⁱ	920 ⁱ	NS	102
Endosulfan II	33213-65-9	4.8 ⁱ	24 ⁱ	200 ⁱ	920 ⁱ	NS	102

Endosulfan sulfate	1031-07-8	4.8 ⁱ	24 ⁱ	200 ⁱ	920 ⁱ	NS	1,000 ^c
Endrin	72-20-8	2.2	11	89	410	0.014	0.06
Heptachlor	76-44-8	0.42	2.1	15	29	0.14	0.38
Lindane	58-89-9	0.28	1.3	9.2	23	6	0.1
Polychlorinated biphenyls	1336-36-3	1	1	1	25	1	3.2
Semivolatiles							
Acenaphthene	83-32-9	100 ^a	100 ^a	500 ^b	1,000 ^c	20	98
Acenaphthylene	208-96-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	107
Anthracene	120-12-7	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Benz(a)anthracene	56-55-3	1 ^f	1 ^f	5.6	11	NS	1 ^f
Benzo(a)pyrene	50-32-8	1 ^f	1 ^f	1 ^f	1.1	2.6	22
Benzo(b)fluoranthene	205-99-2	1 ^f	1 ^f	5.6	11	NS	1.7
Benzo(g,h,i)perylene	191-24-2	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Benzo(k)fluoranthene	207-08-9	1	3.9	56	110	NS	1.7
Chrysene	218-01-9	1 ^f	3.9	56	110	NS	1 ^f
Dibenz(a,h)anthracene	53-70-3	0.33 ^e	0.33 ^e	0.56	1.1	NS	1,000 ^c
Fluoranthene	206-44-0	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Fluorene	86-73-7	100 ^a	100 ^a	500 ^b	1,000 ^c	30	386
Indeno(1,2,3-cd)pyrene	193-39-5	0.5 ^f	0.5 ^f	5.6	11	NS	8.2
m-Cresol	108-39-4	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.33 ^e
Naphthalene	91-20-3	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	12
o-Cresol	95-48-7	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.33 ^e
p-Cresol	106-44-5	34	100 ^a	500 ^b	1,000 ^c	NS	0.33 ^e
Pentachlorophenol	87-86-5	2.4	6.7	6.7	55	0.8 ^e	0.8 ^e
Phenanthrene	85-01-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Phenol	108-95-2	100 ^a	100 ^a	500 ^b	1,000 ^c	30	0.33 ^e
Pyrene	129-00-0	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Volatiles							
1,1,1-Trichloroethane	71-55-6	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.68
1,1-Dichloroethane	75-34-3	19	26	240	480	NS	0.27
1,1-Dichloroethene	75-35-4	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.33
1,2-Dichlorobenzene	95-50-1	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1.1
1,2-Dichloroethane	107-06-2	2.3	3.1	30	60	10	0.02 ^f
cis-1,2-Dichloroethene	156-59-2	59	100 ^a	500 ^b	1,000 ^c	NS	0.25
trans-1,2-Dichloroethene	156-60-5	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.19
1,3-Dichlorobenzene	541-73-1	17	49	280	560	NS	2.4
1,4-Dichlorobenzene	106-46-7	9.8	13	130	250	20	1.8
1,4-Dioxane	123-91-1	9.8	13	130	250	0.1 ^e	0.1 ^e
Acetone	67-64-1	100 ^a	100 ^b	500 ^b	1,000 ^c	2.2	0.05
Benzene	71-43-2	2.9	4.8	44	89	70	0.06
Butylbenzene	104-51-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	12
Carbon tetrachloride	56-23-5	1.4	2.4	22	44	NS	0.76
Chlorobenzene	108-90-7	100 ^a	100 ^a	500 ^b	1,000 ^c	40	1.1
Chloroform	67-66-3	10	49	350	700	12	0.37
Ethylbenzene	100-41-4	30	41	390	780	NS	1
Hexachlorobenzene	118-74-1	0.33 ^e	1.2	6	12	NS	3.2
Methyl ethyl ketone	78-93-3	100 ^a	100 ^a	500 ^b	1,000 ^c	100 ^a	0.12
Methyl tert-butyl ether	1634-04-4	62	100 ^a	500 ^b	1,000 ^c	NS	0.93
Methylene chloride	75-09-2	51	100 ^a	500 ^b	1,000 ^c	12	0.05
n-Propylbenzene	103-65-1	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	3.9
sec-Butylbenzene	135-98-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	11
tert-Butylbenzene	98-06-6	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	5.9
Tetrachloroethene	127-18-4	5.5	19	150	300	2	1.3
Toluene	108-88-3	100 ^a	100 ^a	500 ^b	1,000 ^c	36	0.7

Trichloroethene	79-01-6	10	21	200	400	2	0.47
1,2,4-Trimethylbenzene	95-63-6	47	52	190	380	NS	3.6
1,3,5- Trimethylbenzene	108-67-8	47	52	190	380	NS	8.4
Vinyl chloride	75-01-4	0.21	0.9	13	27	NS	0.02
Xylene (mixed)	1330-20-7	100 ^a	100 ^a	500 ^b	1,000 ^c	0.26	1.6
All soil cleanup objectives (SCOs) are in parts per million (ppm).							
NS = Not specified. See Technical Support Document (TSD).							

^a The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm. See TSD section 9.3.

^b The SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.

^c The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm. See TSD section 9.3.

^d The SCOs for metals were capped at a maximum value of 10,000 ppm. See TSD section 9.3.

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

^f For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.

^g This SCO is derived from data on mixed isomers of BHC.

^h The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.

ⁱ This SCO is for the sum of endosulfan I, endosulfan II, and endosulfan sulfate.

^j This SCO is the lower of the values for mercury (elemental) or mercury (inorganic salts). See TSD Table 5.6-1.

6 CRR-NY 375-6.8

Current through February 28, 2023

END OF DOCUMENT

APPENDIX B
CONSTRUCTION HEALTH AND SAFETY PLAN



Health, Safety, Security & Environment

Health and Safety Plan

Project Number:	24.514
Project Name:	45 Lafayette Avenue
Address:	43-45 Lafayette Avenue
City, State	Suffern Village, NY

Prepared By:	Environmental Consulting & Management Services, Inc. (ECMS)
Address:	10 Filmont Drive
City, State, Zip:	New City, NY

Telephone:	(203) 241-1030	Fax:	

Updated: Jan. 1, 2024 (Month, Day, Year)

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APPENDICES

Appendix A	Daily Tailgate Meeting – Outline/Checklist
Appendix D	Five (5) Day Safety Checklist
Appendix E	Job Safety Analysis
Appendix F	Behavior Based Safety Observation Field Checklist

FIGURES

Route to Hospital Map
Site Map
Journey Management Plan Map and Instruction

CONSTRUCTION HEALTH AND SAFETY PLAN

ECMS believes that all work-related injuries and illnesses are preventable and has a goal of zero work related injuries and illnesses for its worksites. This plan outlines the processes and procedures ECMS will employ to achieve this goal.

- The Project Manager or Site Safety Officer (SSO) will hold daily on-site safety meetings **prior to the start of field work** to review site safety concerns, procedures, review key elements of the Construction Health and Safety Plan (HASP) and Job Safety Analyses (JSAs) with all members of the field crew, including ECMS employees and subcontractors. Other site safety meetings will be held as needed. Subcontractor personnel must participate in safety discussions as requested by ECMS. See ECMS's tailgate meeting checklist and guidance document for details (Appendix A).
- All field team members who may be exposed to site impacts during the course of their work, shall have completed OSHA 40-hour HAZWOPER and annual refresher training (29 CFR 1910.120). **Documentation of training shall be readily available.**
- Each ECMS team member must review, sign and date the HASP and the ECMS Acknowledgement Agreement at the end of this document. Each subcontractor employee and visitor must review the HASP and sign, date, and describe their affiliation on the Subcontractor Acknowledgement Agreement at the end of this document.
- The signed HASP is kept in the field and readily available for duration of field work and returned to the project file upon completion of field activities.
- The HASP shall be revised or rewritten if site activities are changed significantly, if areas of differing hazard are involved, or as information about contaminants and hazards changes. Changing conditions may justify either increasing or decreasing HASP restrictions and action levels, depending upon the additional information generated.
- **STOP WORK AUTHORITY—ALL WORKERS HAVE THE AUTHORITY AND RESPONSIBILITY TO STOP ANY WORK, OR REFUSE TO DO WORK, THAT THEY FEEL IS UNSAFE.**

1.0 GENERAL INFORMATION

ECMS PROJECT NUMBER:	24.514		
Client:	Redscrib, LLC	Site Owner:	Redscrib, LLC
Site Name:	43 Lafayette Avenue	Client Claim/PO Number:	
Site Address:	43 Lafayette Ave., Suffern, New York 10901		
Project Manager:			
Plan Prepared by:	Harry Sudwischer	Date:	1/01/2024
Approved by:		Date:	
Revised by:		Date:	
Revision Approved by:		Date:	

Place date(s) in appropriate box (es) for current phase(s) of site activities.

Site Activities	Soil Borings	Monitoring Well Installation	Tank Removal	Soil Excavation	Recovery Well Installation	Pilot Tests	Treatment System Construction	Soil Endpoint Sampling	LNAPL Recovery	Vapor Barrier Installation Oversight
Site Inspection and Construction Oversight										
Remedial Investigation										
Site Remediation Activities				X				X		

2.0 EMERGENCY CONTINGENCY PLAN**2.1 Local Emergency Telephone Numbers**

Can 911 be used at this site? Yes ☒ No ☐ If yes, be certain it is activated and enhanced.

Since cellular telephones may not reach a local 911 operator, also supply the following information.
(provide area code)

Ambulance	911	Fire Department	911
Hospital Emergency Room	845-368-5000	Police Department	911
Poison Control Center	1(800) 222-1222	HazMat Response Unit	911
(List utility companies as appropriate)			

2.2 Hospital Routes

INCLUDE A MAP WITH HIGHLIGHTED EMERGENCY HOSPITAL ROUTE(S) at the end of the HASP.

Emergency Hospital* Name: Good Samaritan Hospital Phone number: 845-368-5000
 Hospital Address: Emergency Department, 255 Lafayette Ave, Suffern, NY 10901
 Hospital Directions: Head east on Lafayette Avenue 1.2 miles
Turn Right Hospital Entrance, and keep right
Destination will be on the right

*** Hospital should be notified immediately if an injury occurs which requires medical attention.**

Estimated driving distance: 1.2 Miles Estimated driving time: 3 Minutes

Does hospital accept chemically contaminated patients? Yes ☒ No ☐

***Inform hospital in advance that chemically contaminated patient is on the way**

2.3 Evacuation Routes

Identify prevailing wind direction, if known. Evacuation route and meeting location must be upwind or crosswind:

PRIMARY EVACUATION ROUTE AND MEETING LOCATION: **UPDATE ON SITE AS NECESSARY**

SECONDARY EVACUATION ROUTE AND MEETING LOCATION: **UPDATE ON SITE AS NECESSARY**

2.4 Emergency Contacts

PHONE NUMBERS (provide area codes)			
	Name or Description	Work	24-hr. Emergency
ECMS Project Manager:	Harry Sudwischer	(203) 241-1030	
Client Contact:	Ms. Cynthia Gray	917-375-6374	

Site Contact:			
Site Owner:	Redscrib, LLC		
Applicable Regulatory Agency:	NYSDEC – Region 3	(845) 256-3000	
		(	

2.5 Reporting Procedures and First Aid

Call emergency services (911) ASAP if situation is an emergency, i.e., workers or the public are in immediate peril.

Report all accidents, injuries, and illnesses IMMEDIATELY to the ECMS PM

Report all NEAR MISSES as soon as reasonably possible (no later than 24 hrs after the event). Use ECMS's online reporting system to submit your near miss. If necessary, use the attached reporting form to capture facts and details immediately while in the field. See Appendix B for reporting form.

2.5.1 First Aid Equipment

- Standard first aid kit/CPR mask
- Portable eye wash

2.5.2 First Aid Procedures

(if an emergency, call 911).

Ingestion:	Follow instructions from Poison Control Center or the SDS, contact Contact Emergency Medical Services as necessary and then ECMS PM.
Inhalation:	Move victim to fresh air. Contact Emergency Medical Services as necessary and then ECMS PM.
Dermal Exposure:	Remove contaminated clothing. Wash thoroughly with soap and water. Contact Emergency Medical Services as necessary and then ECMS PM.

A first aid kit and portable eyewash must be available on site. If a worker suffers a chemical splash in the eye, flush the eye for 15 minutes and arrange for off-site medical treatment immediately. Workers will also be instructed to thoroughly wash with soap and water any unprotected skin that comes in direct contact with contaminated soil or water. Contact Emergency Medical Services as necessary and then ECMS PM.

Trained workers who choose to provide CPR or First Aid must use Universal Precautions to control possible exposure to blood borne and infectious agents.

2.5.3 Site Emergencies

In the event of a fire or explosion, or other imminently dangerous situation (e.g., rupturing a natural gas line), evacuate the site immediately and call the appropriate emergency phone numbers listed in Section 2.1. Call the ECMS PM or Office Leader and inform him/her of the situation as soon as possible.

If a service station product line is damaged, shut down the fuel supply immediately. In many cases, the release from a product line will be contained in the subsurface (e.g., borehole or excavation) limiting the need for immediate spill response. However, if there is a surface release of fuel, call the local fire department or hazardous materials response (HAZMAT) unit. Phone numbers are listed in Section 2.1. Any release of material remaining after the emergency response will be addressed once the area is deemed safe by emergency responders.

a) Small Spills and Releases

Drums containing waste or recovered liquid must be in sound condition (new or reconditioned drums) with lid that seals and can be tightened in place. If possible, drums should be placed on an impermeable surface in a secure location prior to ECMS's field team leaving the site.

For areas where small spills or leaks may occur, suitable quantities of absorbent materials (pads, socks, floor dry, etc.) and salvage drums or containers must be available. Drums and containers used during spill clean-up shall meet the appropriate regulations (DOT, OSHA, and EPA) for the wastes that they contain. Wastes must be properly characterized for disposal.

b) Remediation Systems

See Section 5 (Remediation Systems) for spill prevention measures for remediation systems.

2.6 SITE RESOURCES

If no, identify closest available resource with directions.

Water supply available on site:	Yes	☒	No	☐	Bathrooms available on site:	Yes	☒	No	☐
Telephone available on site:	Yes	☒	No	☐	Electricity available on site:	Yes	☒	No	☐
Other resources available on site:	Yes	☐	No	☒	If "yes", identify:				

2.7 Project HSSE Team

Team Members (list)	
Project Manager:	Harry Sudwischer
Public Information Contact:	
On-site Personnel: (On-site personnel are responsible for site health and safety)	Samantha Steenson, Steve Cutignola
Site Safety Officer:	Harry Sudwischer

PROJECT TEAM OSHA TRAINING RECORDS

(DOCUMENTATION MUST BE AVAILABLE FROM ECMS AND APPROPRIATE CONTRACTORS UPON REQUEST)

Name	40 Hr Training Date	8-Hr Refresher Date	Site Supervisor Training Date
Harry Sudwischer (ECMS)	1/19/2010	2/17/2024	4/19/2016
Gabe Barrett (ECMS)	2/21/2024	-	-
Steve Cutignola	08/25/2011	2/17/2024	-

All workers who have the potential to be exposed to site impacts must have up-to-date HAZWOPER training. In addition, ECMS employees must, at a minimum, have defensive driver training, first aid/CPR and medical monitoring. See subcontractor Section 12 for minimum required subcontractor training.

2.8 Perimeter Establishment

Map/Sketch attached:	Yes	☒	No	☐	Site secured:	Yes	☒	No	☐
Perimeter identified:	Yes	☒	No	☐	Zone(s) of Contamination identified:	Yes	☒	No	☐

2.9 Work Zones

An exclusion zone will be identified for each site or site activity. The exclusion zone will be clearly marked with yellow **CAUTION** tape, barricades and/or cones (recommended cone height – 42 inches), as needed. A contamination reduction zone and support

zone will be established for any site with site contaminant levels that pose a health threat to site workers or the public. No person will be allowed in the exclusion zone or contamination reduction zone without approval from the ECMS Site Safety Officer.

2.10 Site Security

Site security must be determined on a site-specific basis. The need for additional personnel, on-site security guards, fencing, etc. should be discussed with the client site manager, or other members of management. Equipment stored overnight will be locked and secured to prevent vandalism and protect the public. A description of the additional safety requirements should be listed below:

LIST SITE SECURITY MEASURES:

N/A

When work scheduling requires that an excavation be left open overnight, security fencing will be erected to restrict access to the site or work zones described in Section 2.9.

2.11 Site Map

Attach a site map to the “Figures” section at the end of the Construction Health and Safety Plan. The Site Map can also to be used to outline Traffic Control (see Section 10).

3.0 SITE CHARACTERIZATION

A. Summary of Previous Site Investigation(s):

Impacts in soil surrounding sump and soil vapors/ indoor air

B. Source of Previous Site Investigation Information:

Remedial Investigation Report 2023

April 2022 Remedial Investigation

C. General Facility Description:

Gasoline Service Station

☐

Refinery

☐

Bulk Terminal

☐

Other:

Former Parking lot

Description: Active

☒

Years has the site been operating:

☐

Closed/Abandoned

☐

Current property use (operations on-site, products, raw materials used, etc.):

Commercial Building

Was the site previously used for industrial purposes:

Yes

☐

No

X

Describe previous site uses:

Surface cover on-site includes:

☐
☐
☐
☒

Soil/bare ground

Grass

Woods

Buildings

☐
☒
☐
☐

Clay caps

Paving/asphalt

Swamp

Unpaved roads

☐
☐
☐
☐

Plastic cover

Water bodies

Brush/scrub

Other

Approximate site surface area:

5,000

sq. ft. or

acres

Percentage of surface area:

paved 100 %

vegetated %

bare soil %

under water %

Potential for dust generation on-site:

High

☐

Medium

☒

Low

☐

Any site access restrictions:

Yes

☐

No

☒

Please list:

Fenced/locked

☐

Posting (signs)

☐

Security guards

☒

Evidence of public access to the site?

Yes

☐

No

☒

If "yes," describe:

D. Regulatory Contacts

Are regulatory agencies involved with the site (Y/N)?

Federal?

☐

State?

☒

Local?

☐

Name	Agency	Phone (incl. area code)
NYS DEC - Emily Barry	NYSDEC Region 3	

4.0 WASTE CHARACTERIZATION

4.1 Waste/Contaminant Type(s)

Characteristic(s):

☐ Liquid	☒ Soil	☐ Solid	☐ Sludge	☐ Gas
☐ Corrosive	☐ Ignitable	☐ Radioactive	☐ Explosive	☐ Flammable
☒ Volatile	☐ Toxic	☐ Reactive	☒ Unknown	☐ Other

4.2 Major Spills/Releases

Type	Date	Chemical	Quantity	Impacted Media*
NA				

(*air, surface water, soil, or ground water)

Free Product: Yes ☐ No ☒ Dissolved: Yes ☐ No ☐

Have removal actions occurred? Yes ☐ No ☒

If "yes," describe: Only a drum of soil has been generated.

Is there evidence that contaminants present could cause vapor problems in structures on-site?

Yes ☒ No ☐ If "yes," is building mechanically ventilated? Yes ☒ No ☐

Exhaust Ventilation: Via work fans and duct work

General Building Ventilation:

Roof fan/vent is present but inoperable currently.

4.3 Chemicals/Waste Stored On-site (including petroleum products)

	How Many?	Size?	Chemical?
Drums	1	55	Soil -PCE
Tanks	NA	NA	
Gasoline USTs	NA	NA	
Surface impoundments	NA	NA	
Pits/landfills	NA	NA	
Other			

Identify all chemical products ECMS will use or store on site:

NA

Safety Data Sheets (SDS) are **required** for site chemicals.

Please indicate where SDS can be found for this site:

☐ SDS
Log/Binder
(In Field)

☒ Attached
(Additional Info.
Optional)
5.0 REMEDIATION SYSTEM INFORMATION

(If not applicable, continue to the next section.)

Is there a remediation system onsite?

Yes

☐

No

☒

Describe

List the Remediation System hazards identified at this site:

☐
☐
☐

Inadequate Ventilation

Noise Exposures

Energized Equipment
requiring lockout/tagout

☐
☐
☐

Unguarded Equipment

Confined Space

Temperature Extremes

☐
☐
☐

Slip, trip, fall or overhead hazards

Security Issues

List Other:

If building ventilation system is not adequate, identify manual ventilation procedure:

Identify PPE/procedures required to mitigate the remaining system hazards identified above:

Have sound level surveys been conducted on site?

Yes

☐

No

☒

If "Yes," record range of survey results and approximate distance from source. Note: hearing protection must be worn if noise levels prevent normal conversation at a distance of three feet, or anytime noise levels are measured to be over 85 dB.

dBA	Source	Distance from Source	Date

Check all energy sources on the remediation site:

☐
☐
☐

Electrical

Thermal

Chemical

☐
☐
☐

Mechanical

Hydraulic

Pneumatic

☐

Other (describe)

Are written Lockout/Tagout procedures required?

Yes

☐

No

☐

Where are they located?

Remediation Systems in Shutdown Mode (See ECMS's Lockout/tagout practice for details)

Remediation systems that are shut down for **service or maintenance** reasons for extended periods of time, will be locked and tagged in accordance with the requirements of 29 CFR 1910.147, OSHA's Lockout/tagout standard, outlined in ECMS's Lockout/Tagout written practice.

Remediation systems shut down for business reasons **other than equipment service or maintenance** (i.e., outside the scope of 29 CFR 1910.147), and which will be left in that condition at least until the next visit by a ECMS employee, will be secured in accordance with the following procedure.

- a) The system will be locked, using a standard ECMS padlock, so that the power cannot be turned on, and a yellow "caution" tag will be applied. The tag must include the following information:
 - 1) Caution
 - 2) Do not operate
 - 3) Do not remove the tag unless authorized
 - 4) Name of person applying the tag
 - 5) Date tag applied
 - 6) Reason why equipment is shut down
- b) Systems shutdown and locked for other business reasons can only be unlocked and have the tag removed with the approval of the ECMS Project Manager for the site or the Office Leader for that region. However, unlike systems locked and tagged under 29 CFR 1910.147:
 - The person applying or removing the lock and tag does not have to be an authorized LOTO trained employee under 29 CFR 1910.147.
 - The person removing the lock and tag does not have to be the same person who applied the devices.

Remediation System Spill Prevention

ECMS remediation systems are often designed with several controls to prevent spills. Check the controls below found on the system onsite.

☐	high/high alarms	☐	redundant high/high float	☐	List Other:
☐	secondary containment	☐	floor sump		
☐	transfer tank	☐	backwash tank		

Vessels, piping, valves, and other system components should be inspected to detect leaks or the potential for future leaks. Floats should be routinely cleaned and tested to ensure for their proper functionality. Inspections and tests should occur at the frequencies outlined in the system O&M Manual or other maintenance documents.

In case of an emergency: shut down the system (if it is safe to do so), evacuate to the designated meeting point, and follow the emergency contact procedures in Section 2, as necessary.

Have procedures for remediation system shutdown or emergency procedures been provided to site owner or manager?

☐	Yes	☐	No

6.0 HAZARD EVALUATION

Identify all chemicals that are present or are suspected of being present on site and list their maximum concentrations in soil/water. Information on hazardous properties is listed in **Appendix C**. For chemicals not shown in **Appendix C**, enter the hazardous property information in the spaces provided and attach a Material Safety Data Sheet. See notes below.

Based on the results in the Remedial Investigation Report site contamination includes limited Chlorinated Volatile Organic Compounds (CVOCs) in soil vapor related to historic site operations. VOCs, SVOCs and metals were detected as well. ted to direct contact and the risk of exposure is addressed in a similar way to the VOC.

Chemical Name	TLV/PEL	**Maximum Concentration in Soil	*Maximum Concentration in Water	Health Hazards/ Comments
Trichloro-ethene (TCE)	PEL TWA 100 mg/m ³	0.47 mg/kg	5 ug/l	irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]
Tetrachloro-ethene (PCE / PERC)	PEL TWA 100 mg/m	1.3 mg/kg	0.7 ug/l	irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]
Total Lead (elemental)	PEL TWA 0.05 mg/m ³	1630 mg/kg	0.144 ug/l	lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension
Nickel	PEL TWA 1 mg/m ³	682 mg/kg	0.068 ug/l	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]
benzo(a)anthracene	PEL TWA 0.2 mg/m ³	2,400 ug/kg	15 15	dermatitis, bronchitis, [potential occupational carcinogen] [lung, kidney & skin cancer]
benzo(a)pyrene	PEL TWA 0.2 mg/m ³	1,900 ug/kg	14 ug/l	dermatitis, bronchitis, [potential occupational carcinogen] [lung, kidney & skin cancer]
benzo(b)fluoranthene	PEL TWA 0.2 mg/m ³	1,700 ug/kg	8.6 ug/l	dermatitis, bronchitis, [potential occupational carcinogen] [lung, kidney & skin cancer]
benzo(k)fluoranthene	PEL TWA 0.2 mg/m ³	1,500 ug/kg	9.1 ug/l	dermatitis, bronchitis, [potential occupational carcinogen] [lung, kidney & skin cancer]
Chrysene	PEL TWA 0.2 mg/m ³	2,500 ug/kg	17 ug/l	dermatitis, bronchitis, [potential occupational carcinogen] [lung, kidney & skin cancer]

Potential Hazards (check boxes that apply to the site):

☐	corroded containers	☐	open lagoons	☐	underground tanks	☒	emissions
☐	overhead electric lines	☐	visible leachate	☐	surface tanks	☐	visible on-site releases
☐	visible soil contamination	☐	odors	☐	observed tanks	☐	visible off-site releases
☐	observed free product	☒	dust	☐	confined spaces	☐	visible on-site erosion
☐	underground utilities	☒	open pits	☐	excess debris	☐	on-site surface water contamination
☐	building contamination	☐	no hazards	☐	high traffic issues	☐	off-site surface water contamination

List Other excavations, Heavy equipment Traffic, sidewalk traffic, building integrity

7.0 PERSONAL PROTECTION & MONITORING EQUIPMENT GUIDELINES

7.1 Personal Protection

Level of Protection: B ☐ C ☐ D ☒ X ☐ List any modifications: May include additional air exchanges inside building

1. **All personnel working on ECMS sites must wear: long pants, sleeved shirt (short sleeves are acceptable), hard hat, ANSI Class 2 high visibility traffic safety vests, safety glasses and safety boots. Personnel may need to wear additional or more protective eye, ear, and hand PPE appropriate for their work tasks.**
2. Nitrile (list if other) gloves
3. Hearing protection must be worn if noise levels prevent normal conversation at a distance of three feet, or anytime noise levels are measured to be over 85 dB.
4. No smoking, eating, or drinking is allowed in the exclusion or contamination reduction zones. Smoking is only allowed in areas pre-approved by the ECMS PM and client.
5. No ECMS personnel shall conduct a permit required confined space entry. In addition, no personnel shall approach any excavation area where there is danger of a wall collapse.
6. Respiratory protection is dependent on conditions listed below Section 7.2. Minimum Level C respiratory protection for petroleum release sites consists of a half-face air purifying respirator with organic vapor cartridges. However, recommended cartridges for petroleum release sites are combination P100 filters with organic vapor/acid gas cartridges.

7.2 Surveillance Equipment and Materials

1. Calibration: A qualified individual will calibrate before and after field activities the photo ionization detector (PID) or flame ionization detector (FID).
2. Frequency: The worker breathing zone will be initially monitored every hour (at a minimum) during ground disturbance activities. If previous site monitoring data indicates that exposures are below action level, monitoring frequency may be reduced, as long as site conditions have not changed, and site activities will not create new exposures. Periodic monitoring can be stopped when site monitoring data indicates that breathing zone shows no hazardous conditions or air contaminants. However, if monitoring is stopped, data to support this decision must be available onsite for review. In addition to periodic site monitoring, breathing zone monitoring should always be conducted and documented during tasks that may result in continuing or new exposures, such as active drilling, probing, or excavating. If there are more stringent state or federal regulatory requirements for site monitoring, those requirements must be followed.

3. Instrumentation

Instrument	Breathing Zone Reading	PPE Upgrade or Other Actions to Be Taken
<u>Photo ionization detector (PID)</u> or <u>Flame ionization detector (FID)</u>	Total Org.Vapors Bkgd - 2 ppm 2 - 100 ppm 100 - 300 ppm 300- 500 ppm >500 ppm	Level D. Work may continue. Level D. Collect benzene detector tubes (unless there is previous site data to show that benzene at these PID levels is below 0.5 ppm) Level C. Air-purifying respirator with organic vapor canisters required if levels continue for two hours or more in the breathing zone. Workers can choose to don respirators at lower levels if nuisance odors are a concern. Collect benzene detector tubes. Level C if levels continue for 15 minutes in the breathing zone. If levels continue beyond 15 minutes STOP WORK. Contact Corporate HSSE. STOP WORK, leave immediate area -- Contact Corporate HSSE
<u>Benzene Detector Tube (Draeger, Rae, etc.)</u>	< 0.5 ppm 0.5-1 ppm >1 ppm	Level D. Work may continue. Level C. Work may continue. STOP WORK— Contact Corporate HSSE
<u>Explosion Meter</u>	< 10% of LEL 10 - 20% of LEL > 20% of LEL	Work may continue. Evaluate inhalation potential. Work may continue. Eliminate all ignition sources, Reduce the concentration & increase monitoring frequency, consider use of ventilation. Work must stop until LEL is Below 10%!
<u>Oxygen Meter</u>	< 19.5% O ₂ 19.5% to 23.5% O ₂ >23.5% O ₂	Leave area. Re-enter only with SCBA. Work may continue. Investigate causes of changes above/below 21%. Work must stop. Ventilate before returning and retest atmosphere. O ₂ -rich atmospheres pose explosion hazards.
<u>Hydrogen Sulfide (H₂S)</u> Colorimetric Tubes or Monitors -- Some states with high regional H ₂ S have special, local monitoring requirements.	0-5 ppm 5-10 ppm >10 ppm	Continue working. Requires Level B including supplied air respirator or SCBA. Increase monitoring frequency. Contact Corporate HSSE. Supplied air respirator required due to poor warning properties and toxicity.
<u>Sound Level Meter</u>	< 85 dBA 85 - 90 dBA > 90 dBA	Suggest wearing hearing protection when it is necessary to raise voice to be heard at distance of 3 feet. Hearing protection required. Install warning signs for fixed noise sources. Hearing protection required. Employer must have Hearing Conservation Program.

8.0 SAFETY STANDARD OPERATING PROCEDURES (ALSO SEE APPENDIX D FOR SITE SAFETY CHECKLIST)

8.1 Chemical Hazards

A photo ionization detector (PID) or flame ionization detector (FID) will be used to measure the relative concentration of hydrocarbon vapors. Monitoring for exposure to benzene vapors may be done using activated charcoal tubes and vacuum pumps, vapor badges, or benzene colorimetric tubes in the breathing zone when working with heavily contaminated soil or water. Action limits for use of respiratory protective equipment are outlined in Section 7.2 above. All respiratory protection equipment shall be NIOSH/MSHA-approved and use shall conform to OSHA 29 CFR 1910.134. ECMS's written Respiratory Protection Program detailing selection, use, cleaning, storage, medical monitoring, training, and fit testing of respiratory protective equipment is available to all employees via ECMS's intranet.

In addition to being inhalation hazards, hydrocarbon compounds can also be absorbed through the skin. Skin contact with liquid hydrocarbons or fuel hydrocarbon-bearing soil should be prevented. In situations where sampling would result in direct skin contact with hydrocarbon liquids, saturated soil or contaminated equipment, nitrile gloves will be worn.

Drilling or digging may also liberate pockets of hydrogen sulfide (H₂S). While the characteristic "rotten egg" odor of H₂S is detectable at levels as low as 0.0005 ppm, prolonged detection is unreliable due to its olfactory fatigue properties. In open air on a typical petroleum remediation site, risk from exposure to H₂S is minimal. However, should H₂S be encountered or expected, workers shall be instructed to stop drilling/digging and move to an upwind location until the vapors have dissipated, as measured

by H₂S colorimetric detector tubes or other direct-reading instruments. The bore hole or excavation will be immediately backfilled.

When working in areas that are not open air and/or have the potential to accumulate gases or vapors, a combination explosimeter/oxygen (O₂) meter will be available on-site to monitor the levels of flammable gases, such as petroleum vapors and methane. An explosimeter should be used by a subcontractor to verify that the atmosphere inside an underground storage tank has been inerted prior to allowing the tank to be moved from its location.

8.2 Physical Hazards

1. **Mechanical hazards:** Ensure that mechanical equipment is properly guarded, and overhead hazards are removed or secured to prevent being struck or entrapped by moving parts or heavy equipment or falling objects.

Maintain a safe distance from heavy equipment and moving machinery parts.

Tools and equipment used on site shall be in proper working condition. Workers using tools and equipment must be properly trained in their use.

ECMS has adopted a practice to eliminate the wide-spread use of fixed open-bladed knives (FOBKS), such as pocket or utility knives. FOBKS are not allowed on ECMS field sites without prior approval by the ECMS PM. Safer alternatives such as safety knives, shears, etc. should be used in place of FOBKS. See ECMS's FOBK practice for more details.

2. **Electrical hazards:** Be aware of underground and overhead utilities. For protective measures against underground electrical cables see Section 8.3 Underground Utilities.

For overhead power lines, OSHA requires a minimum distance of 10 feet from overhead lines transmitting up to 50kV and an additional 4" of distance for every 10kV after 50kV, from any unguarded, energized overhead line. For example: 15 feet from lines transmitting up to 200kV and 25 feet from 350kV lines. However, because power lines, rig masts and other elevated objects can move due to wind or other forces, **it is ECMS's policy is to maintain at least 20 feet clearance from any lines, or an additional 5 feet from any OSHA minimum distance that exceeds 20 feet.** If it is critical to work within 20 feet of a line, or at OSHA minimum distance, efforts should be made to have the lines covered ("shrouded") or shut off and locked out by the local power company. If neither can be accomplished, contact ECMS Corporate HSSE.

Generators, powered hand tools and extension cords used on ECMS sites must be grounded. Extension cords must be inspected at the start of each work day to ensure that they are not damaged. Frayed or otherwise damaged extension cords shall not be used onsite and must be taken out of service unless they can be properly repaired.

Heavy equipment, including drilling rigs and vacuum trucks, must be grounded when the potential for static electricity buildup and its uncontrolled release exists. Confirm with the equipment operator that equipment is grounded as needed. All equipment will be properly locked/tagged out when required by the Energy Lockout/Tagout Program and Safe Electrical Work Policy and Procedure for ECMS Project Work. Do not stand in water when operating electrical equipment.

3. **Open excavations:** Open excavations deeper than 6 feet that are not clearly visible to site workers and the public must have fall protection measures in place, such as barricades and warning signs. When scheduling or work conditions necessitate leaving excavations open overnight, security fencing will be erected to restrict access to the site or work zones described in Section 2.9

Excavations must be properly constructed and maintained as per Section 8.11 of this HASP.

4. **Hazardous plants or animals:** Poisonous plants, and stinging, biting or other dangerous animals can be encountered on field sites. Identify workers with any allergies. Do not touch any plants that you cannot identify. Clear brush from well locations and other work areas. If necessary, arrange for vegetation removal by a landscaping company. Do not approach or provoke any animals, including spiders or insects. If a worker is bitten or stung by insect or spider, provide first aid and monitor the worker for a reaction. If an insect, or spider bite is suspected to be serious, or a worker is bitten by snake or other animal, seek medical attention immediately.

5. Slip, trip fall hazards: will be minimized by maintaining good housekeeping practices at all times. Keep the work area free of debris, unused tools, extra supplies, or any other objects that could interfere with walking and working surfaces.

8.3 Underground Utilities

A minimum of 72 working hours prior to excavating, Underground Service Alert or the state equivalent:

Name	New York 811 Call Before You Dig	Phone	811

will be contacted and informed of the scheduled field activities. The underground service locator company will identify which underground utilities (e.g., electrical, gas, sewer, water, telephone, cable TV) are present and will notify their respective owners. The utilities will be located by their owners. **Prior to drilling or direct push, air excavate (120% the width of the hole) and to a depth of at least 5 feet will be performed at all times** to ensure no utilities, lines or tanks are in the way. See Excavation Section 8.11. **Look for overhead utilities** as well.

Utility service locator company has been notified? **If applicable attach contact sheet to back of document.**

Date(s)

Confirmation #, if applicable:

If you are planning to drill the same location as a previously installed point and the diameter of the new boring/well is larger, you must manually clear the borehole.

8.4 Work Limitations (time of day, weather, heat/cold stress)

In the event of severe weather, such as high winds, heavy rain or snow, tornadoes, electrical storms, or extreme temperatures, the SSO and PM shall determine whether work can continue without compromising site worker health and safety.

In high ambient temperatures (especially with high humidity), **follow heat-stress precautions**. Drink plenty of cool water and/or electrolyte-replacement beverages (e.g., Gatorade). Take frequent breaks out of direct sunlight, removing protective clothing. Provide shade to workers if necessary. Increase number of breaks if pulse does not return to normal resting pulse during breaks. Alter schedules so work is conducted during early morning or evening. Work shall progress only under conditions of adequate lighting.

Symptoms of heat exhaustion and heat stress include:

- Profuse sweating **or** complete cessation of sweating;
- Changes in skin color;
- Increased respiration;
- Vision problems, confusion;
- Body temperatures in excess of 100°F; and
- Increased heart rate.

Any member of the work team who exhibits these symptoms should immediately be removed from the area and observed while resting in a shaded area after removal of impervious or restrictive clothing and after consumption of cool water or electrolyte fluid. If symptoms persist, immediate medical attention shall be sought.

In cold temperatures, especially when combined with high wind, follow hypothermia precautions:

- Drink warm liquids and take frequent work breaks in a wind-sheltered area. Monitor co-workers for signs of shivering, lack of coordination, or confusion. and remove workers exhibiting these signs from the work area to a heated warming shelter.
- Dress in removable layers of insulated clothing to prevent sweating and use protective waterproof gear.
- Frostbite (superficial or deep tissue) can occur on any exposed skin at temperatures of 30.2°F or colder.
- If available clothing does not give adequate protection to prevent hypothermia or frostbite (which can occur on any exposed skin), work should be modified or suspended until adequate clothing is available or until conditions improve.

If extreme cold conditions are encountered (e.g., < 10°F), discuss proper clothing requirements and a warming break schedule with the Project Manager. Consider rescheduling the work if possible.

8.5 Fire and Explosion Hazards

Each site will be inspected for fire and explosion hazards during a pre-work site walk-through.

During the course of underground storage tank removal, drilling, or remediation of petroleum impacted soil or ground water, the potential for fire and explosion of flammable vapors exists. Extreme caution should be taken to monitor for the presence of flammable vapors or conditions that could create flammable conditions. Explosimeters are available for this monitoring and action levels are defined in Section 7.2. Fire extinguishers must be available on all sites with the potential for flammable vapors or electrical fires (i.e., systems, control panels). Use of fire extinguishers by employees trained in their use is limited to employee rescue or extinguishing relatively small, controllable fires. ECMS does not expect or require its employees to fight fires.

In the event of a fire or explosion, the following action plan should be followed:

Shut down equipment and shut off all supply lines immediately if this can be done safely. (Notify the site operator to shut down operations if necessary.)

Evacuate the immediate area. At this point you may not know if a soil vapor fire has started or if a supply line, natural gas line, etc. has been hit. Tank, supply line, or remediation system fires are extremely hazardous and precautions must be taken to evacuate the area immediately.

Call 911 to notify the fire department. ECMS employees are not trained fire brigades. Every fire should be treated as an emergency. Even if site personnel extinguish the fire, professional fire departments should evaluate the situation to ensure that the danger is over and that a fire will not reoccur.

Evaluate the situation to identify the source of the flammable vapors and to assess the danger to employees, the public and property. From a safe distance, try to determine if the fire is due to a ruptured supply line, ignited soil vapors or methane, or is electrical. This information should be communicated to the fire department. Small fires from known sources (i.e., engine fires, electrical panel fires, etc.) may be extinguished if the employee can do it without high risk. A soil vapor fire may eventually burn itself out. Soil stockpiles must be placed away from nearby structures and property lines. Extinguishing fires in fuel vapor-laden soils with clean soil may be possible. **Employees or subcontractors shall not enter an excavation to attempt to extinguish a fire.**

Fire, Explosion and Vacuum Truck Operations—vacuum truck operators must ensure that the truck and hoses are properly bonded and grounded prior to initiating vacuum operations and that vacuum truck hoses are properly tested for continuity each work shift.

Vacuum truck operators must ensure that the materials to be collected are compatible with residual materials that may already be in the truck or the truck must be washed prior to use. Hydrocarbons and other vapors created by the vacuum pump exhaust shall be vented away from the work area and away from areas where people are present.

8.6 Noise/Hearing Protection

Workers shall be instructed in the recognition of noise hazards and shall be provided, and trained in the use of, hearing protective devices. If monitoring has not been performed for suspected noise sources, hearing protection must be worn. As a general rule, hearing protection should be worn when working around heavy equipment, particularly drill rigs, or when background noise is such that a worker has to raise their voice to be heard at a distance of 3 feet.

8.7 Levels of Protection

Work on petroleum remediation sites must be performed, at a minimum, in the following Level D protection:

- hard hat (an ECMS requirement, unless wearing the hard hat creates additional safety risks and there are no overhead hazards present),
- steel-toed (safety-toed) work shoes/boots, meeting ANSI/ASTM standards
- sleeved shirt (short sleeve minimum) and long pants, or cotton coveralls
- eye protection- safety glasses (ANSI Z87), goggles or face shield as required
- high visibility safety vest (ANSI Class 2)
- gloves- sampling (nitrile) or work (leather, synthetic leather, Kevlar, etc. depending on work tasks), and
- hearing protection, as needed.

If monitoring equipment or site conditions indicate the need to upgrade the level of protection to Level C at a petroleum release site, air-purifying respirators with organic vapor canisters (at a minimum) will be donned, Tyvek coveralls with hoods, chemical resistant inner and outer gloves, and disposable boot covers will be donned as necessary. Contact Corporate HSSE regarding dermal protection.

At no time will an ECMS employee conduct work on any site requiring Level A protection. On work sites requiring Level B protection, workers will be provided with additional training and equipment. Corporate HSSE must review and approve the work plan for Level B work before the work can be performed.

8.8 Decontamination Procedure

Level: B. ☐ C. ☐ D. ☒

Contamination may result from walking through contaminated soils or liquids, splashing liquids during sampling, use of or contact with contaminated equipment, or contact with air contaminants. Due to the volatile nature of petroleum hydrocarbons that may be encountered during drilling, hand-augering and sample collection procedures, the need to decontaminate equipment and vehicles will be minimal. Field team workers will be instructed to observe the following precautions to assure contaminants will not remain in contact with their skin.

- Tools, equipment, and personnel will be decontaminated using procedure appropriate for level of personal protection worn.
- All contaminated, disposable clothing will be properly bagged for disposal and left on site. All personnel will be instructed to wash hands, face, neck, and forearms at the end of the work shift and to shower at the end of the workday.
- No eating or drinking will be permitted in the vicinity of heavy equipment and/or drilling and excavating activities. Smoking is only permitted in pre-designated area when approved by ECMS and the client.

Special decontamination requirements: _____

8.9 Confined Spaces

If entry into a confined space is necessary, a trained ECMS subcontractor shall be used and a Confined Space Entry Permit must be completed and authorized, and confined space entry procedures followed. Detailed information on ECMS's Confined Space Entry procedures can be found in the ECMS Health & Safety Manual. Contact Corporate HSSE before any permit required confined space entry.

Does this site have any permit-required confined spaces?	Yes ☐	No ☒
Does someone need to enter the permit-required confined space as part of the work?	Yes ☐	No ☒

If "yes," the ECMS project team must confirm the subcontractor's permit required confined space program and employee training have been reviewed as part of the ECMS pre-qualification process.

8.10 Investigation – Derived Material Disposal

Soil cuttings and well development or sampling water shall be placed in 55-gallon drums on-site unless on-site disposal is allowed under both regulatory and client requirements. Drums must be in sound condition (new or reconditioned drums) with lid that seals and can be tightened in place. Disposal methods of drummed soil and water will be determined based on laboratory analytical data.

Drums stored on site until disposal shall be labeled, sealed, and if possible, placed on an impermeable surface in a secure location prior to ECMS's field team leaving the site. At a minimum, non-hazardous waste containers must be marked with a description of the material, and emergency contact information (company name and phone number). Hazardous waste must be marked and labeled so that the container complies with applicable DOT or RCRA requirements. Drums must be removed within 90 days of waste generation.

9.0 INTRUSIVE ACTIVITIES HEALTH AND SAFETY GUIDANCE PROCEDURES

9.1 Preparation

Prior to conducting any subsurface intrusive work, a markout must ALWAYS be called in (approximately three working days before field work is scheduled - depending on the area). In some areas, not all markouts are performed by the "Call Before You Dig System," thus contacting the appropriate utility companies and assuring their markouts must be tracked by ECMS or the subcontractor responsible for the markouts. Private utility mark-outs should also be arranged when site work and conditions warrant it.

- Always search the file and request the client search files for an as-built of the site.

9.2 When on Site

- Subcontractors are required to perform an on-site inspection of their heavy machinery each day prior to the start of fieldwork. The ECMS Site Safety Officer (SSO) will observe the inspection. Any safety concerns identified by the subcontractor must be addressed prior to the use of the equipment. During the inspection, the subcontractor must verify that all rig/vehicle kill switches are working properly. ECMS employees on-site must be informed of the location of the kill switches and how to operate them.
- As part of your on-site health and safety meeting, walk the site with the field team to identify any additional site hazards and determine possible boring locations (make sure the locations shown on the work plan/site plan are in areas free of utilities/subsurface structures). Make sure all utilities have been marked out properly. It is ECMS's responsibility to ensure all boring or excavation locations are clear of utilities prior to drilling. Often "as-builts" are incorrect or not available.
- Attempt to determine how all utilities are running. For the most part, utilities can run anywhere and can bend and twist in any direction but, there are a few basic things to keep in mind. Usually, water and sewer lines will run to a bathroom. Electrical lines will run in between on-site lights, the kiosk, service station and car wash buildings. Storm water drains usually tie into one another and you can get a general idea of how they run by looking into them and seeing what direction the line is going. Obviously any cut outs in the asphalt should be avoided, especially if observed around the USTs (often, leak detection is an afterthought and is added following the completion of the service station rebuild and its location is obvious due to a continuous cut out in the asphalt around the tank field).
- WE SHOULD NOT DRILL OR EXCAVATE WITHIN TEN FEET OF THE TANK FIELD, USTs, OR PUMP ISLANDS. IN ADDITION, DO NOT DRILL IN BETWEEN THE PUMP ISLAND OR THE TANK FIELD, unless required by government agencies and approved by the client. Should drilling be required within Ten feet of the above noted systems, an "air knife" should be utilized to a depth of at least ten feet below grade surface (bgs). Drilling within five feet of the above noted systems will require the station and tank systems to be shut down. It may be helpful to open up tank field manways and identify the general direction that the product lines are running.
- ALWAYS AIR EXCAVATE (120% the width of the proposed hole) TO A DEPTH ONE FOOT BELOW THE ESTIMATED DEPTH OF UTILITIES AND AT LEAST FIVE FEET bgs. If you are drilling in the same location as a previously installed point and the diameter of the new boring/well is larger, you must manually clear the borehole. In addition, if you didn't advance the "old" boring yourself, you can't assume that it is a safe drilling location. Refusal may have been encountered in the "old"

location. If refusal is encountered prior to five feet, move to a new location. If you make three attempts without success, call the project manager to discuss alternatives. If you can't reach the PM contact your Office Leader for further instruction.

- If you encounter pea-gravel while excavating STOP. Call the ECMS PM for further instruction. Utilities or USTs may be present.
- If you hit/damage any utility/subsurface feature IMMEDIATELY contact the office for further instruction. If you can't reach the PM contact your Office Leader for further instruction.

9.3 Intrusive Activities

- Drilling operations shall at all times be under the immediate supervision of a contractor's representative who has authority to modify the work methods as necessary to ensure safety.
- Contractors shall ensure properly designed cribbing (i.e., wooden mats) is always carried with mobile drill rig to work site.
- Where practical, drilling should always take place on "level" surfaces. If the proposed site is not level, consideration should be given to selecting another suitable site that is level, or to leveling the site by re-grading.
- Drilling locations must be clear of underground and overhead hazards as discussed in this HASP.
- Additionally, the guidance provided in the Environmental Remediation Drilling Safety Guidelines (ERDSG) industry document **should** be followed.

10.0 TRAFFIC CONTROL AND ON-SITE VEHICLES/MOBILE EQUIPMENT

Site work frequently necessitates working in parking lots, streets, or other areas with vehicular traffic. In such instances, the work team will be wearing high visibility traffic safety vests (ANSI Class 2 minimum recommended) and will use a combination of traffic cones (recommended height - 42-inches) and barricades as necessary to prevent contact between workers, pedestrians, and motor vehicles. Proper placement of large contractor vehicles such as field trucks and drill rigs to add a layer of protection should be considered.

Check for specific DOT requirements when working in or near a road or road right-of-way. In such cases, traffic control set up will need to be subcontracted to a traffic control subcontractor.

The PM shall develop a **Site-Specific Traffic Control Plan** for high traffic sites, or other high-risk locations. The plan (map) should include known site traffic patterns and the control equipment set up used to divert or restrict traffic and to define site work (exclusion) zones. **Include Traffic Control Plan in the "Figures" section at the end of the HASP.**

Onsite Vehicles:

- Enter and exit through the gates or pathway provided and designated for this use.
- Vehicles will not be driven over unprotected hoses or exposed piping.
- Vehicles may be left running **only** when operating auxiliary equipment or lights, and then only when driver can ensure the vehicle is secure with the transmission in park or neutral, the parking brake set, and the wheels chocked.

Earth Moving Activities:

All mobile earth-moving equipment on-site must comply with 29 CFR 1926.602 for back-up alarms or signal persons.

Dig and Haul Projects:

Dump trucks should only dump the load on **level** ground so the hazard of "tip-over" is avoided. If absolutely necessary, the dump truck can dump into the slope (i.e., back of truck facing directly uphill).

Any truck that has a raised bed dumping feature (i.e., dump-truck) must always lower bed before driving forward to leave the immediate work area. This is due to two hazards:

- *Tip-over* due to change in gravity of raised bed and
- *Hitting overhead obstacles* (like power lines or canopies).

11.0 JOURNEY MANAGEMENT PLAN

Provide directions for the preferred route from ECMS's office to the field site, with the preferred/safest exit and entry points to the site. Also, provide any specific information of problem traffic areas that should be avoided when traveling in the area of the site. Information can be provided via maps, written instruction, or both, as appropriate and available. Use the "Figures" section at the end of the HASP. (Information regarding onsite traffic flow and mobile equipment is provided in ECMS's Traffic Control Plan in Section 10.)

Additional Comments:

- Seatbelts must be worn by all occupants in traveling vehicles
- Including the requirements for drivers to have all appropriate licenses, and to have received defensive driver training within the last two years.

11.1 Lone or Isolated Worker

Workers should not be put into a situation where they are left alone or isolated with no means of quickly summoning help should he/she become incapacitated due to injury or vehicle accident.

- A positive means of communication, i.e., a device such as a walkie-talkie, vehicle radio or cell phone, should be provided to all field personnel.
- Lone employees should check in with their supervisor or their field office at the start of the day, mid-day, and a final status report call at the end of the day (so others know where the worker is and that he/she is safe).
- In high hazard/crime affected areas, operations teams should consider assigning two workers or hiring a security guard during site work. If the area appears too dangerous, work should be postponed until an appropriate security plan can be developed.

12.0 SUBCONTRACTOR TRAINING AND SAFETY DOCUMENTS

All subcontractors must meet OSHA training requirements for the work they will perform while onsite. Subcontractor workers that have the potential to be exposed to site impacts must have initial HAZWOPER training and up-to-date annual 8-hr refresher training. In addition, subcontractors driving on ECMS business must have completed a defensive driver training class within the last two years.

Subcontractors shall be responsible for the development and implementation of their own HASP and/or JSAs to cover duties and hazards specific to that subcontractor's area of expertise or on-site functions. Subcontractors are given the opportunity to review ECMS's HASP, and must sign the document, prior to the start of on-site work. Subcontractors are required to provide job safety analyses (JSAs) or written safety standard operating procedures, for the primary tasks they perform on-site. Contractors are required to review these safety documents with the work team during the appropriate on-site safety meetings (tailgate, etc.). Any discrepancies or conflicting safety requirements between ECMS and subcontractor HASPs shall be addressed prior to the start of field work.

All subcontractor employees must attend and participate in all on-site safety meetings as required by ECMS. All on-site subcontractor workers must be able to effectively communicate with all field workers in English. If not, a translator/mentor must be assigned to those employees that cannot communicate in English to assure that all employees understand the safety information communicated on-site.

Any hazardous work situations, unsafe acts and conditions, near misses, or other safety incidents must be reported to the ECMS Site Safety Officer immediately so that corrective measures may be taken, and the information can be reported to ECMS management in a timely manner.

13.0 BEHAVIORAL SAFETY OBSERVATIONS

Behavior Based Safety is an established method of using reinforcement to change unsafe individual behaviors. The process starts with a behavioral hazard analysis to identify "at-risk" behaviors. These can be determined by using near miss/incident reviews, JSAs, audits, etc. Using the inventory of at-risk behaviors, a checklist is then developed to assist in the observation of work behavior. Observers record safe and at-risk behaviors and provide feedback to workers about their performance. The feedback reinforces the necessity for safe behaviors. Observation data also is used to identify barriers to safe behavior. Removing these barriers lowers the workers' exposure to at-risk conditions and makes it easier for employees to work safely. ECMS has developed a behavior-based safety observation (BBSO) checklist from an analysis of its near miss/incident data, JSAs and auditing data.

The checklist is attached as Appendix F. Field teams should perform one BBSO per field event. BBSOs can be performed on ECMS employees or subcontractors.

14.0 ACKNOWLEDGMENT AGREEMENT**14.1 ECMS Employee****CONSTRUCTION HEALTH AND SAFETY PLAN REVIEW RECORD**

I acknowledge that I have read and understood the contents of this Construction Health and Safety Plan, and I agree to abide by all provisions as set forth. I have also checked in with the site client contact to alert them of our presence and for any daily safety issues. Please note: "no implements are to be brought on a ECMS site, or while performing ECMS business that are, or are intended to be used, as weapons (such as: guns, knives, etc.)". Firearms are expressly prohibited. By signing below, you are certifying, that this policy is upheld. ECMS retains the option to audit your personnel and equipment to assure your compliance.

NAME	SIGNATURE	CELL PHONE	DATE

SITE HEALTH AND SAFETY PLAN REVIEW RECORD

I have been given the opportunity to review the Health and Safety Plan for this site and have been briefed on its contents and on the nature of the contaminants and the level and degree of exposure likely as a result of participation in this project. I agree to conform to all the requirements of this plan. (This HASP does not replace the requirement or liability for your company to have its own safety program and HASP.) I also acknowledge that this plan is specific for this ECMS site and may not address unforeseen hazards not included in the Construction Health and Safety Plan or your specific contracted task. Please note: "no implements are to be brought on a ECMS site, or while performing ECMS business that are, or are intended to be used, as weapons (such as: guns, knives, etc.)". Firearms are expressly prohibited.

By signing below, I am certifying that this policy is upheld. ECMS retains the option to audit your personnel and equipment to assure your compliance.

ALL WORKERS HAVE THE AUTHORITY TO STOP, AND/OR REFUSE TO PERFORM, ANY UNSAFE WORK.

NAME & AFFILIATION	SIGNATURE	CELL PHONE	DATE

**APPENDIX A
DAILY TAILGATE MEETING
OUTLINE/CHECKLIST**

DAILY TAILGATE MEETING OUTLINE/CHECKLIST

SITE INFORMATION

Date:	
Site Name:	
Site Location:	
Project / Site Number:	
Name of ECMS Employee Leading Meeting	
Title of ECMS Employee Leading Meeting:	

	YES	NO
Are all field team members in attendance for the tailgate meeting?		
Are there potential language barriers or concerns?		
Is safety information provided in language(s) that all workers understand? (If no interpreter is required.)		
Identified worker with the least years of experience. Name:		
Company:		
How many years (or months) experience for worker? # of yrs / months:		
How many workers have less than 1 year experience?		
Is each one assigned an on-site mentor?		

TAILGATE DISCUSSIONS POINTS (see next page for additional guidelines)

COVERED YES NO

INTRODUCTION - site background, field team introductions, training documentation review		
SITE HAZARDS - perform site walk-thru with team, locate utility markings, work locations, ID any site hazards		
Locate site/facility Emergency Stop switches		
EMERGENCY ACTION PLAN - emergency #s, evacuation signal & routes (walk them), 1st aid kits, training, etc.		
WORK HAZARDS - scope-of-work, etc.		
ECMS discuss safety of ECMS tasks to be performed- review JSAs		
Contractor(s) discusses safety of contractor work tasks to be performed- review JSAs		
List JSAs reviewed		
Heavy machinery inspection, kill switches located and tested		
Hand tools, power tools and other equipment inspected INSPECT portable fire extinguishers onsite		
On-site impacts, other chemical on-site- monitoring procedures, PPE upgrade and action levels		
ONSITE VEHICLE MOVEMENT AND SPOTTER REQUIREMENTS - discuss movement of work vehicles and spotter procedures		
HIGHLIGHT SPECIFIC WORK CONCERNS - e.g., excavation, drilling, utilities, power lines, traffic, weather, etc.		
PPE REVIEW - review standard PPE, upgrades needed		
Gloves available on site match the glove type(s) listed in the JSAs for today's work? <i>NOTE: Any gloves not listed in JSA cannot be used onsite without management approval and field editing of onsite JSA</i>		
ECMS OR CLIENT SPECIFIC SAFETY PROTOCOLS - FOBK practice, utility clearance requirements, etc.		
REQUIRED PERMITS. LIST:		
PROACTIVE SAFETY ACTIONS - report all near misses, stop work authority, STOP WORK as needed,		
FEEDBACK - Worker questions, comments, concerns		
Have all worker signed the site health and safety plan?		

DAILY TAILGATE MEETING OUTLINE/CHECKLIST

[illegible]

AFTERNOON TAILGATE MEETING		YES	NO
Afternoon Tailgate held?			
List Topics:			
Name & Title or worker leading afternoon tailgate meeting:			

DAILY TAILGATE MEETING OUTLINE/CHECKLIST

DAILY TAILGATE MEETINGS

Daily tailgate meetings shall be held at the start of each work day, shift or task change.

The daily tailgate meetings shall review the planned work activities for the day, discuss and resolve the risks and mitigations, discuss any Health, Safety, Security and Environment (HSSE) concerns, and raise the HSSE consciousness of each worker before they start work.

These meetings shall include, but are not limited to:

- A review of relevant Construction Health and Safety Plan (CHASP) elements to be performed at an appropriate frequency. A review shall be done whenever the HASP is updated and should also be done regularly to remind workforce of relevant elements.
- A Hazard Communication (HAZCOM) review.
- Address the risks of any issues arising from the site walk and the location of on-site equipment and materials.
- Complete the tailgate safety meeting forms.
- A review of applicable permit/s.
- A review of the right and obligation to 'Stop Work.'
- Complete and review *Job Safety Analyses* (JSAs) for the tasks to be completed. The focus should be on how to complete activities on a given site during that work day and activity. The JSA discussion should include identification of 'Stop Work' triggers.
- Implement the controls set forth in the HASP and JSAs. Verify that all parties on site have a complete understanding of the work plan and controls that are in place.
- In addition, allocate resources and complete permits.

PARTICIPATION AND PREPARATION

Effective daily tailgate meetings require participation. Team members should recognize the connection between the meetings and their personal safety.

Involvement of all team members is a critical factor for a successful meeting.

The conductor of the daily tailgate meeting shall prepare by achieving a thorough understanding of: JSAs, HASP, the scope of work, the subcontractors on site, and client requirements.

Additionally, the conductor of the meeting should have the required checklists available to verify that he or she covers all applicable and necessary topics.

TAILGATE MEETING LOCATIONS

When selecting the location of the meetings, the following shall be considered:

- Safety of personnel.
- Background noise.
- Uncomfortable or cramped locations.
- Weather and environment.

APPENDIX B
I-3 FIRST REPORT FIELD FORM

DAILY TAILGATE MEETING OUTLINE/CHECKLIST

GENERAL INFORMATION

ECMS Employee Name Reporting:	
Date of Incident:	
City/State of ECMS Office:	
Site Project/ID Number:	
Site Location (Street, City, State):	
ECMS Project Manager Name:	
Subcontractor Name (if applicable):	
Incident Location (Street, City, State):	
Short Description of Incident:	

CONDITIONS

Weather:		Temperature:		Lighting:	

WHEN DID INCIDENT OCCUR

	Month	Day	Year	Time (hrs)	(min)	AM/PM
Occurred						
Reported						

DETAILS

Witness Name (s)	Employee/Contractor/Other	Phone #

Equipment Involved:	
Incident Type:	

Environmental Release Info	Product / Material	Amount	Unit

Full Description of Incident:	
Immediate Actions Taken:	

Reported by:	
Date:	

DAILY TAILGATE MEETING OUTLINE/CHECKLIST

APPENDIX D FIVE (5) DAY SAFETY CHECKLIST

DAILY TAILGATE MEETING OUTLINE/CHECKLIST

5 DAY SITE SAFETY CHECKLIST

Site Name:	
Project Number:	

DATE:			
Pre-Mobilization		OK	NA
Updated health and safety plan			
Emergency phone numbers for utilities included			
Proper personal protective equipment (PPE) selected & inspected			
• Hard Hat			
• Safety Glasses (with side shields)			
• Safety Vest			
• Work Gloves			
• Sampling gloves (PM specify type):			
• Protective coveralls (specify, Tyvek, Nomex, etc.):			
• Safety Boots			
• Respirator/cartridges (PM identify proper cartridges) :			
Other Protective Equipment			
Eye wash (check expiration date)			
Fire extinguisher (visually inspected within last 30 days)			
First aid kit (inventory and check expiration dates)			
Safety cones (or flashing traffic light)			
Underground utility hazards identified and addressed			
Underground utility hazards identified and addressed (provide public utility one-call ticket or job number			

On-Site Pre-Work	DATE (mm/dd/yy)				
Review site hazards and HASP w/ site workers					
Review route to hospital					
Site workers sign HASP acknowledgement page					
Place HASP and emergency numbers in visible location					
Designate evacuation signal and meeting place					
Delineate exclusion zone					
Check subcontractor PPE-					
• Hard Hat					
• Safety Glasses (with side shields)					
• Work Gloves					
• Sampling Gloves					
• Protective Coveralls (specify, Tyvek, Nomex, etc.).					
• Safety Boots					
• Respirator					
• Subcontractors					

DAILY TAILGATE MEETING OUTLINE/CHECKLIST

5 DAY SITE SAFETY CHECKLIST (OPTIONAL) (continued)

On-Site Pre-Work	DATE (mm/dd/yy)				
Subcontractors-					
• Subcontractor has own HASP or field SOPs on-site (when required)					
• Confirm sub. Equipment (e.g., drill rig, ext. cords) is in sound working condition)					
• <i>Drilling subcontractor</i> : drill rig kill switch identified, located, and tested					

On-Site Work	DATE (mm/dd/yy)				
Proper PPE worn by site workers					
Breathing zone monitoring performed and recorded					

(Specify any new hazards identified on-site not addressed by site HASP. If new hazard cannot be mitigated by the existing scope-of-work and/or available equipment on-site, stop work and immediately contact the site project manager.)

(Sign and date at the end of the field work.)

Name:	
Signature:	
Date:	

REPORT ALL INCIDENTS AND NEAR MISSES IMMEDIATELY

DAILY TAILGATE MEETING OUTLINE/CHECKLIST

APPENDIX E JOB SAFETY ANALYSIS

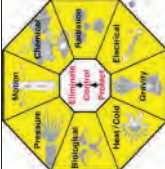
JOB SAFETY ANALYSIS



Job Safety Analysis for: (State Task)		ECMS Consultants	
CONTRACTOR:			DATE:
PROJECT MANAGER/SITE SUPERVISOR (List Name(s)::			
PERMITS REQUIRED (Y/N) List Type: ?			
JSA TEAM MEMBERS:			
LOCATION OF WORKSITE		Street, w/Cross Street:	
		City, State, Zip:	
DESCRIPTION OF WORK:			
Team Leader Reviewed by Signature:			Date:

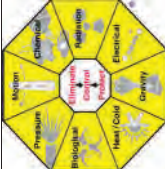
Sequence of Basic Job/Task Steps <i>List the tasks required to perform the activity in the sequence they are carried out.</i>	Potential Hazards (Energy Sources) Involved with Task/Environment <i>Against each task list the hazards that could cause injury when the task is performed.</i>	Control Measures (Eliminate, Control, Protect) <i>List the control measures required to eliminate or minimize the risk of injury arising from the identified hazard.</i>	Stop Work Triggers 

JOB SAFETY ANALYSIS



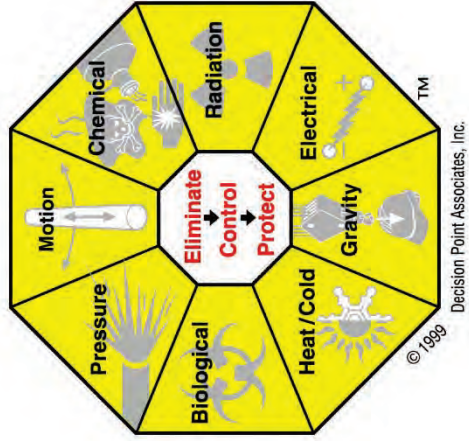
Sequence of Basic Job/Task Steps <i>List the tasks required to perform the activity in the sequence they are carried out.</i>	Potential Hazards (Energy Sources) Involved with Task/Environment <i>Against each task list the hazards that could cause injury when the task is performed.</i>	Control Measures (Eliminate, Control, Protect) <i>List the control measures required to eliminate or minimize the risk of injury arising from the identified hazard.</i>	Stop Work Triggers 

JOB SAFETY ANALYSIS



Sequence of Basic Job/Task Steps <i>List the tasks required to perform the activity in the sequence they are carried out.</i>	Potential Hazards (Energy Sources) Involved with Task/Environment <i>Against each task list the hazards that could cause injury when the task is performed.</i>	Control Measures (Eliminate, Control, Protect) <i>List the control measures required to eliminate or minimize the risk of injury arising from the identified hazard.</i>	Stop Work Triggers 

HRP Team Process
Worksite Hazard Assessment Tool
(WHAT energy is present?)



For use with a JSA big picture or a worksite HSE inspection. Using the HRP Octagon in a clockwise manner starting with Energy of Motion, assess the worksite and determine what energy sources are present and/or what recognized hazards are associated with those energy sources.

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Use the following to help you DRAFT the job steps before starting the JSA:

DRAFT STEPS

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

ADDITIONAL FIELD NOTES/OBSERVATIONS:

APPENDIX F

BEHAVIOR BASED SAFETY OBSERVATION FIELD CHECKLIST

BEHAVIOR BASED SAFETY OBSERVATION FIELD CHECKLIST

Date:		Time:	
Site Name:		Worker Observed:	
Project Number:		Observer:	

Observations	Safe	Unsafe
	Write NA for any Non-applicable items	
Attended/participated in tailgate meeting		
Follows JSA and HASP work steps and safety procedures		
Works safely within defined work areas, traffic control/exclusion zone set up		
Wears required PPE		
PPE is good condition		
Uses correct tool(s) for job		
Tools inspected and/or in safe working condition		
Maintains good housekeeping		
Uses safe lifting techniques/ does not lift over 50 lbs without assistance		
Overall assessment of worker behaviors		

Feedback
Other Observations/Comments (areas of strong performance and areas for improvement):

Commitment (observed worker please sign)

I, _____ (print name), have been informed of the above assessment, I understand all feedback, and I am committed to performing my work safely by:

- reporting to work physically rested and mentally alert
- observing and coaching my co-workers to ensure they work safely
- following procedures and not taking short cuts or improvising
- stopping all unsafe work, and
- demonstrating ZERO tolerance for willful unsafe actions.

Signature:		Date:	

FIGURES

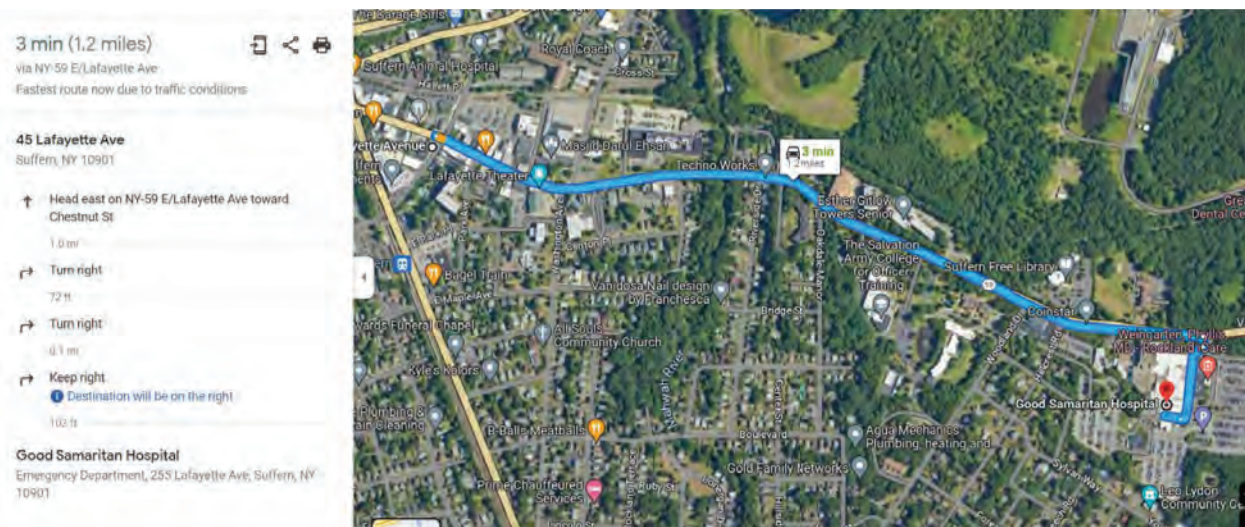
ROUTE TO HOSPITAL MAP

SITE MAP

JOURNEY MANAGEMENT PLAN MAP AND INSTRUCTION

TRAFFIC CONTROL PLAN MAP

ROUTE TO HOSPITAL MAP: NEW YORK PRESBYTERIAN LOWER MANHATTAN HOSPITAL



SITE MAP



Notes: Soil boring locations able to be advanced to 25-30 feet will be converted into a monitoring well. With an exception of SB-A due to its placement inside the former basement sump.
Boring Locations: SB-A inside basement sump SB-B inside former boiler room closest to former dry-cleaning equipment SB-C located under the former dry cleaning machine.
SB-D placed adjacent the boring with the most field evidence of impacts it's placement will be determined in the field.

Environmental Consulting &
Management Services, Inc.
10 Filmont Drive, New City, NY 10958



SOURCE: GOOGLE EARTH PRO.
IMAGE DATE 6/25/2019

APPROVED BY H. Sudwischer

DRAWN BY H. Sudwischer

PROJECT DRAWING NO. 23.514

FIGURE 1
Proposed Sample Location Map
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1"=38 feet

DATE 2/14/23

JOURNEY MANAGEMENT PLAN MAP AND INSTRUCTION

10 Filmont Dr

New City, NY 10956

↑ Head north on Filmont Dr toward N Little Tor Rd

0.2 mi

↘ Turn right onto N Little Tor Rd

1.2 mi

↶ Turn left onto S Mountain Rd

1.7 mi

↗ Slight right to stay on S Mountain Rd

72 ft

↘ Turn right onto NY-45 N

0.6 mi

↶ Use the left 2 lanes to turn left onto US-202 W

📍 Pass by Wells Fargo Bank (on the right)

8.4 mi

↶ Turn left onto Lafayette Ave

📍 Destination will be on the right

0.1 mi

21 min (12.1 mi)

45 Lafayette Ave

Suffern, NY 10901

45 Lafayette Ave

Suffern, NY 10901

↑ Head west on Lafayette Ave toward Orange Ave

0.1 mi

↘ Turn right onto Orange Ave

269 ft

↘ Turn right onto US-202 E/Wayne Ave

📍 Continue to follow US-202 E

📍 Pass by Wells Fargo Bank (on the left in 8.3 mi)

8.3 mi

↘ Turn right onto NY-45 S

0.6 mi

↶ Turn left onto S Mountain Rd

1.7 mi

↘ Turn right onto N Little Tor Rd

1.2 mi

↶ Turn left onto Filmont Dr

📍 Destination will be on the right

0.2 mi

22 min (12.1 mi)

10 Filmont Dr

New City, NY 10956

ALUMINUM METAL – SAFETY DATA SHEET

ALUMINUM METAL – SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

Importer / Supplier / Distributor:

Unified Alloys
8835 – 50th Avenue
Edmonton, Alberta CANADA
T6E 5H4
Emergency Phone #: (780) 468-5656 (on-call service)

The conditions or methods of handling, storage, use, and disposal of the product are beyond our control and may be beyond knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with the handling, storage, use, or disposal of the product.

NOTE: This product contains no other hazardous ingredients requiring disclosure under current regulations.

2. HAZARD IDENTIFICATION

Classification: Aluminum and its alloys are considered as non- hazardous in its soiled form. However, certain process such as cutting, milling, grinding and welding could result in some hazardous material being emitted.

SYMBOLS	HAZARD	HAZARD STATEMENTS
	Carcinogenicity Respiratory sensitizer Toxics to reproduction	May cause cancer May cause allergy or asthma symptoms or breathing difficulties if inhaled May cause genetic effects.
	Skin Sensitizer repeated exposure	May cause skin allergies prolong exposure may damage internal organs
	Acute toxic to aquatic life Chronic to Aquatic life	Toxic to aquatic life with long lasting effects. Chronic to Aquatic life if exposure is prolonged.
	Fire & explosion (if in dust form)	Flammability (category -1 under GHS classification)

Label Element: No labeling is applicable

Other hazards: According to OSHA hazard communication, this product is classified as Non hazardous material.

3. COMPOSITION INFORMATION ON INGREDIENTS

Component (*)	CAS Number	% Weight	OSHA PEL (mg/m ³)	ACGIH TLV (mg/m ³)
Base Metal: Aluminum (Al)	7429-90-5	90 - 99.7	10.0 dust / 5.0 respirable	1.0 respirable
Alloying Elements				
Chromium (Cr)	7440-47-3	<0.01 - 0.4	0.5 metal	0.01 insoluble
Copper (Cu)	7440-50-8	<0.06 - 6.0	0.1 fume / 1.0 dust	0.2 fume / 1.0 dust
Iron (Fe)	1309-37-7	<0.35 - 1.0	5.0 (oxide fume)	5.0 respirable
Magnesium (Mg)	1309-48-4	<0.03 - 4.0	10.0 total particulate (oxide)	10.0 total particulate (oxide)
Manganese (Mn)	7439-96-5	<0.02 - 1.5	0.2 fume or dust	0.02 respirable
Silicon (Si)	7440-21-3	<0.25 - 1.2	10.0 dust / 5.0 respirable	Not established
Titanium (Ti)	13463-67-7	<0.02 - 0.2	See PNOR	10.0 (dioxide)
Zinc (Zn)	1314-13-2	<0.05 - 6.1	10.0 dust / 5.0 respirable (oxide)	2.0 respirable (oxide)
Bismuth (Bi)	7440-69-9	<0.40 - 0.7	Not established	Not established
Boron (B)	7440-42-8	0.06 max	Not established	Not established

Lead (Pb)	7439-92-1	<0.40 - 0.7	0.05	0.05
Vanadium (V)	1314-62-1	0.05 max	Not established	0.05

NOTE: This product contains no other hazardous ingredients requiring disclosure under current regulations.

4. FIRST-AID MEASURES

Inhalation: Move to fresh air. If condition continues, consult a physician.

Ingestion: Rare in industry. If significant amount of metal is ingested, consult a physician.

Eyes: Flush thoroughly with water to remove particulate; obtain medical attention.

Skin Contact: Remove particles by washing thoroughly with soap and water. Seek medical attention if condition persists.

Notes: Respiratory disorders may be aggravated by exposure to metallic and/or organic/inorganic coating dusts or fumes. Consult a Physician if condition persists.

Do not induce vomiting or give liquids to an unconscious person.

5. FIRE AND EXPLOSION HAZARD

1. Conditions of Flammability: Steel products (Aluminum Metal) does not present fire or explosion hazards under normal conditions. Fine metal particles such as those produced in grinding or sawing can burn. High concentrations of metal filings may present an explosion hazard.

2. Means of extinction: For molten metal use dry powder or sand. Do NOT use water on molten metals.

3. Flashpoint and method of determination: N/A (under normal conditions)

4/5. Upper and Lower Flammable Limit: N/A (under normal conditions)

6. Auto-ignition temperature: N/A (under normal conditions)

7. Hazardous Combustion Products: N/A (under normal conditions)

8. Explosion Data: sensitivity to mechanical impact: N/A (under normal conditions)

9. Explosion Data: sensitivity to static discharge: N/A (under normal conditions)

6. ACCIDENTAL RELEASE MEASURES

Leak and Spill Procedures: Not applicable to soiled state, no effect on Environment and Human lives. Solid metal does not pose any problems. Dust spills should be cleaned up avoiding dust generation. Collect and recycle to process. Wash down with water if in contact with acids.

7. HANDLING AND STORAGE

Storage Requirements: Store away from corrosive chemicals.

Special Shipping Information: N/A

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Personal Protective Equipment: Dependent upon processes being performed on material. Each operator must be addressed for suitable equipment.

Gloves: Protective gloves should be worn during welding, burning or handling operations.

Clothing: As required. Dependent on the operations and local welding codes.

Respiratory: NIOSH / MSHA approved dust and fume respirator should be used to avoid excessive inhalation of particles when exposure exceeds TLV's.

Footwear: CSA Z195-02 Steel Toed, safety shoes.

Eye: safety glasses, goggles or face shield should be worn as required by exposure.

Other: With molten metals, use full body cover clothing, including gloves, eyewear and footwear suitably treated to prevent burns

Engineering Controls: Engineering controls required if incase welding, milling, cutting and grinding work is performed. (e.g. ventilation, enclosures, specify) Depending on type of process performed a specific equipment and PPE's are required to perform the job safely.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties

Physical State	Solid
Odor	NA
Evaporation Rate	NA
Boiling Point	NA
Melting Point	900-1200 Degree Celsius
PH	NA
Solubility in Water	NA
Vapor Pressure	NA
Density	8.94

Appearance	Silver Grey
Volatility	NA
Odor threshold	NA
Specific gravity	(H2O=1): 2.5-2.9
Freezing Point	NA

10. STABILITY AND REACTIVITY

Chemical Stability: STABLE (under normal conditions of use and storage)

Conditions of Reactivity: HYDROGEN GAS. Avoid storage or potential contact with oxidizing agents.

Hazardous Decomposition Products: Aluminum products under normal conditions are stable during use, storage and transportation. Halogen acids and sodium hydroxide in contact with aluminum may generate explosive mixtures of hydrogen. Finely divided aluminum, such as small chips and fines will form explosive mixtures in air. It also will form explosive mixtures in air in the presence of bromates, iodates, or ammonium nitrate. Strong oxidizers cause violent reactions with considerable heat generation.

Incompatibilities: Reacts with strong acids to form hydrogen gas.

Possibility of hazardous Reactions: Hazardous polymerization cannot occur.

Reactivity: This product is not reactive as supplied.

11. TOXICOLOGICAL PROPERTIES

Effects of Acute Exposure to Material:

In standard operations, including melting, cutting and grinding, aluminum alloys present a low health risk by inhalation and are usually considered a nuisance dust.

Effects of Acute Chronic Exposure to Material:

Welding and plasma cutting of alloys high in Aluminum (2000 and 7000 series) may present the potential for overexposure to Aluminum fumes which can result in upper respiratory tract irritation, nausea and metal fume fever. Overexposure to lead fumes over an extended period of time can result in such toxic effects as central nervous system disturbances, renal changes, peripheral neuropathy, gastrointestinal disturbances, anemia, and chromosomal changes. The welding of aluminum alloys may generate carbon monoxide, ozone, nitrogen oxides, infrared radiation, and ultraviolet radiation.

Route of Entry:

Prolonged skin contact with coated steel may cause skin irritation in sensitive individuals. Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding or machining may pose acute or chronic health effects.

Irritancy of Material: N/A

Sensitization to Material: N/A

Mutagenicity of Material: N/A

Reproductive Effects: N/A

Teratogenicity of Material: N/A

Synergistic Materials: N/A

Carcinogenicity of Material: N/A

IARC lists certain hexavalent chromium compounds under its group 1 category - "Confirmed Human Carcinogen."

IARC lists nickel and certain nickel compounds under its group 2A category - "Suspected Human Carcinogen."

NOTE: Iron containing welding fumes has an exposure limit of 5 mg/m3 (ACGIH – TLV's 1988-89). Welding fumes may also contain contaminants from fluxes or welding consumables.

12. ECOLOGICAL INFORMATION

Eco-toxicity: No data available for Aluminum and its alloys in their natural solid state.

Presence of Degradability: NO data available

Bioaccumulation Potential: NO data available

Mobility in soil: NO data available

Other adverse effects: None known.

13. DISPOSAL CONSIDERATION

Waste Disposal: Recover Aluminum for recycling. Follow applicable regulations. Dispose of in compliance with local regulations.

14. TRANSPORT INFORMATION

General Shipping Information: Material not regulated for shipping.

Un Number: NA

Hazard Class: NA

Special Shipping Information: N/A

15. REGULATORY INFORMATION

Domestic Substances List: the components of this material are on the federal DSL inventory.

Other Canadian Regulations: NA

WHMIS: Class D2, materials causing Reactive flammable or other Toxic effects when other processes are performed (Welding, cutting and grinding)

16. OTHER INFORMATION

Prepared By: UnifiedAlloy

Telephone: (780) 468-5656

Note: Contact Supplier (Quality Department) for additional information

Preparation Date: December / 20 / 2018

IMPORTANT! Read this SDS before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of the information before use or other exposure. This SDS has been prepared in accordance with the Globally Harmonized System of Chemical and Labeling of Chemicals (GHS) Fifth Edition and the OSHA Hazard Communication Standard [29 CFR 1910.1200]. The SDS information is based on sources believed to be reliable. Available data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, Unified Alloys makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user's responsibility to determine the suitability of this product and to evaluate risks and exercise appropriate precautions for protection of employees and others prior to use.



MATERIAL SAFETY DATA SHEET

MATERIAL SAFETY DATA SHEET - NO. M10

1. PRODUCT AND COMPANY IDENTIFICATION

Beryllium Solid

MANUFACTURER

Materion Brush Inc.
14710 West Portage River Road South
Elmore, Ohio 43416
Phone: (419) 862-2745
Fax: (419) 862-4477

SYNONYMS: Metallic Beryllium
I220H
S200F
S200FC
S65
PF10
O-30
UHP Beryllium
.9999 Beryllium
Be

Glucinium
IF-1
S200FH
SR200
PS200
PF60
I-70
I-70H
B-26D

24-HR. EMERGENCY ASSISTANCE

Transportation Emergency

Call Chemtrec at:
Domestic: (800) 424-9300
International: (703) 527-3887

Other Emergency

Call: (800) 862-4118

Revised: 03-08-11
Replaces: MSDS M10 (01-01-10)

CHEMICAL FAMILY Beryllium

CUSTOMER SERVICE

Materion Brush Inc.
Product Stewardship Department
6070 Parkland Boulevard
Mayfield Heights, Ohio 44124
Phone: (800) 862-4118 or (216) 486-4200
Fax: (216) 383-4091
Website: www.materion.com

2. HAZARD IDENTIFICATION

2.1 EMERGENCY OVERVIEW

Metallic product which poses little or no immediate hazard in solid form. See label in Section 16. If the material is involved in a fire; pressure-demand self-contained breathing apparatus and protective clothing must be worn by persons potentially exposed to the airborne particulate during or after a fire.

2.2 POTENTIAL HEALTH EFFECTS

Exposure to the elements listed in Section 3 by inhalation, ingestion, and skin contact can occur when melting, casting, gross handling, pickling, chemical cleaning, heat treating, abrasive cutting, welding, grinding, sanding, polishing, milling, crushing, or otherwise heating or abrading the surface of this material in a manner which generates particulate.

Exposure may also occur during repair or maintenance activities on contaminated equipment such as: furnace rebuilding, maintenance or repair of air cleaning equipment, structural renovation, welding, etc.

Particulate depositing on hands, gloves, and clothing, can be transferred to the breathing zone and inhaled during normal hand to face motions such as rubbing of the nose or eyes, sneezing, coughing, etc.

2.2.1. Inhalation

Particulate containing those elements listed in Section 3 can cause irritation to the nose, throat, lungs and mucous membranes.

Beryllium: The beryllium in this product is not known to cause acute health effects. Inhaling particulate containing beryllium may cause a serious, chronic lung disease called Chronic Beryllium Disease (CBD) in some individuals. See Section 2.2.5 Chronic (long-term health effects).

2.2.2. Ingestion

Ingestion can occur from hand, clothing, food and drink contact with particulate during hand to mouth activities such as eating, drinking, smoking, nail biting, etc.

Beryllium: The health effect of ingestion of beryllium in the form found in this product is unknown.

2.2.3. Skin

Beryllium: Particulate that becomes lodged under the skin has the potential to induce sensitization and skin lesions.

2.2.4. Eyes

Exposure may result from direct contact with airborne particulate or contact to the eye with contaminated hands or clothing. Damage can result from irritation or mechanical injury to the eyes by particulate.

2.2.5. Chronic (long-term health effects)

Beryllium: Inhaling particulate containing beryllium may cause a serious, chronic lung disease called chronic beryllium disease (CBD) in some individuals. Over time, lung disease can be fatal. Chronic beryllium disease is a hypersensitivity or allergic condition in which the tissues of the lungs become inflamed. This inflammation, sometimes with accompanying fibrosis (scarring), may restrict the exchange of oxygen between the lungs and the bloodstream. Medical science suggests that CBD may be related to genetic factors.

2.2.6. Carcinogenic References

Beryllium: The International Agency for Research on Cancer (IARC) lists beryllium as a Group 1 – Known Human Carcinogen. The National Toxicology Program (NTP) lists beryllium as known to be human carcinogens.

IARC lists beryllium as a known human carcinogen (Group 1) and notes that the work environment of workers involved in refining, machining and producing beryllium metal was associated with an increased risk of lung cancer, “the greater excess was in workers hired before 1950 when exposures to beryllium in the work place were relatively uncontrolled and much higher than in subsequent decades”; and “the highest risk for lung cancer being observed among individuals diagnosed with acute beryllium-induced pneumonitis, who represent a group that had the most intense exposure to beryllium.” IARC further noted that “Prior to 1950, exposure to beryllium in working environments was usually very high, and concentrations exceeding 1 mg/m³ [1000 micrograms per cubic meter] were not unusual.”

2.2.7. Medical Conditions Aggravated by Exposure

Persons with impaired pulmonary function, airway diseases, or conditions such as asthma, emphysema, chronic bronchitis, etc. may incur further impairment if particulate is inhaled. If prior damage or disease to the neurologic (nervous), circulatory, hematologic (blood), or urinary (kidney) systems has occurred, proper screening or examinations should be conducted on individuals who may be exposed to further risk where handling and use of this material may cause exposure.

Beryllium: The effects of chronic beryllium disease on the lungs and heart are additive to the effects of other health conditions.

2.3 POTENTIAL ENVIRONMENTAL EFFECTS

See Ecological Information (Section 12)

3. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL COMPOSITION (Percent by Weight)

PRODUCT		
CONSTITUENTS	CAS Numbers	Beryllium Solid
Beryllium	7440-41-7	~100

Hazard Communication regulations of the U.S. Occupational Safety and Health Administration apply to this product.

NOTE: As used in this Material Safety Data Sheet, the term "particulate" refers to dust, mist, fume, fragments, particles and/or powder.

4. FIRST AID MEASURES

4.1 FIRST AID PROCEDURES

INHALATION: Breathing difficulty caused by inhalation of particulate requires immediate removal to fresh air. If breathing has stopped, perform artificial respiration and obtain medical help.

INGESTION: Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

SKIN: Thoroughly wash skin cuts or wounds to remove all particulate debris from the wound. Seek medical attention for wounds that cannot be thoroughly cleansed. Treat skin cuts and wounds with standard first aid practices such as cleansing, disinfecting and covering to prevent wound infection and contamination before continuing work. Obtain medical help for persistent irritation. Material accidentally implanted or lodged under the skin must be removed.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

4.2 NOTE TO PHYSICIANS

Treatment of Chronic Beryllium Disease: There is no known treatment which will cure chronic beryllium disease. Prednisone or other corticosteroids are the most specific treatment currently available. They are directed at suppressing the immunological reaction and can be effective in diminishing signs and symptoms of chronic beryllium disease. In cases where steroid therapy has had only partial or minimal effectiveness, other immunosuppressive agents, such as cyclophosphamide, cyclosporine, or methotrexate, have been used. These latter agents remain investigational. Further, in view of the potential side effects of all the immunosuppressive medications, including steroids such as prednisone, they should be used only under the direct care of a physician. In general, these medications should be reserved for cases with significant symptoms and/or significant loss of lung function. Other symptomatic treatment, such as oxygen, inhaled steroids or bronchodilators, may be prescribed by some physicians and can be effective in selected cases.

The decision about when and with what medication to treat is a judgment situation for individual physicians. For the most part, treatment is reserved for those persons with symptoms and measurable loss of lung function. The value of starting oral steroid treatment, before signs or symptoms are evident, remains a medically unresolved issue.

The effects of continued low exposure to beryllium are unknown for individuals who are sensitized to beryllium or who have a diagnosis of chronic beryllium disease. It is generally recommended that persons who are sensitized to beryllium or who have CBD terminate their occupational exposure to beryllium.

5. FIRE FIGHTING MEASURES

Flash Point	Not Applicable to Solids
Explosive Limits	Not Applicable to Solids
Extinguishing Media	Only in powder or other finely divided form does this material present a special fire problem. To extinguish a metal powder fire, use Class D fire extinguishing powder.
Unusual Fire and Explosion Hazards	Do not use water to extinguish fires around operations involving molten metal due to the potential for steam explosions. In addition, water may disassociate when in contact with burning metal particulate or chips releasing flammable hydrogen gas which could burn and result in an explosion. Ventilation duct work which has accumulated a fine coating of this material as a particulate on its internal surface poses a potentially serious fire hazard. Extinguish using Class D fire extinguisher media and shut down or isolate the affected portion of the ventilation system. Because of this potential risk, sources of ignition such as flame, spark from machining of other materials, welding spark, etc. must not be allowed to enter the ventilation duct work. Also, duct work must be made of non-combustible material. See Section 8 for further information regarding personal protective measures.
Special Fire Fighting Procedures	Pressure-demand self-contained breathing apparatus must be worn by firefighters or any other persons potentially exposed to the particulate released during or after a fire.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

If this material is a particulate, establish a restricted entry zone based on the severity of the spill. Persons entering the restricted zone must wear adequate respiratory protection and protective clothing appropriate for the severity of the spill (see Section 8). Cleanup spills with a vacuum system utilizing a high efficiency particulate air (HEPA) filtration system followed by wet cleaning methods. Special precautions must be taken when changing filters on HEPA vacuum cleaners used to clean up hazardous materials. Be careful to minimize airborne generation of particulate and avoid contamination of air and water. Depending upon the quantity of material released into the environment, the incident may be required to be reported to the National Response Center at (800) 424-8802 as well as the State Emergency Response Commission and Local Emergency Planning Committee.

7. HANDLING AND STORAGE

7.1 HANDLING

Particulate may enter the body through cuts, abrasions or other wounds on the surface of the skin. Wear gloves when handling parts with loose surface particulate or sharp edges.

7.2 STORAGE

Store in a dry area.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

8.1 VENTILATION AND ENGINEERING CONTROLS

Whenever possible, the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne particulate. Where utilized, exhaust inlets to the ventilation system must be positioned as close as possible to the source of airborne generation. Avoid disruption of the airflow in the area of a local exhaust inlet by equipment such as a man-cooling fan. Check ventilation equipment regularly to ensure it is functioning properly. Provide training on the use and operation of ventilation to all users. Use qualified professionals to design and install ventilation systems.

8.2 WORK PRACTICES

Develop work practices and procedures that prevent particulate from coming in contact with worker skin, hair, or personal clothing. If work practices and/or procedures are ineffective in controlling airborne exposure or visual particulate from deposition on skin, hair, or clothing, provide appropriate cleaning/washing facilities. Procedures should be written that clearly communicate the facility's requirements for protective clothing and personal hygiene. These clothing and personal hygiene requirements help keep particulate from being spread to non-production areas or from being taken home by the worker. Never use compressed air to clean work clothing or other surfaces.

Fabrication processes may leave a residue of particulate on the surface of parts, products or equipment that could result in employee exposure during subsequent material handling activities. As necessary, clean loose particulate from parts between processing steps. As a standard hygiene practice, wash hands before eating or smoking.

To prevent exposure, remove surface scale or oxidation formed on cast or heat treated products in an adequately ventilated process prior to working the surface.

8.3 WET METHODS

Machining operations conducted under a flood of liquid coolant require complete hooded containment and local exhaust ventilation. Openings into the hood must be baffled to prevent release of fast moving particulate. The cycling through a machine of liquid lubricant/coolant containing finely divided beryllium particulate in suspension can result in the concentration building to a point where the particulate may become airborne during use. Prevent coolant from splashing onto floor areas, external structures or operators' clothing. Utilize a coolant filtering system to remove particulate from the coolant.

8.4 RESPIRATORY PROTECTION

When airborne exposures exceed or have the potential to exceed the occupational limits shown in Section 8.15, approved respirators must be used as specified by an Industrial Hygienist or other qualified professional. Respirator users must be medically evaluated to determine if they are physically capable of wearing a respirator. Quantitative and/or qualitative fit testing and respirator training must be satisfactorily completed by all personnel prior to respirator use. Users of tight fitting respirators must be clean shaven on those areas of the face where the respirator seal contacts the face. Exposure to unknown concentrations of particulate requires the wearing of a pressure-demand airline respirator or pressure-demand self-contained breathing apparatus (SCBA). Use pressure-demand airline respirators when performing jobs with high potential exposures such as changing filters in a baghouse air cleaning device.

8.5 OTHER PROTECTIVE EQUIPMENT

Protective overgarments or work clothing must be worn by persons who may become contaminated with particulate during activities such as machining, furnace rebuilding, air cleaning equipment filter changes, maintenance, furnace tending, etc. Contaminated work clothing and overgarments must be managed in a

controlled manner to prevent secondary exposure to workers of third parties, to prevent the spread of particulate to other areas, and to prevent particulate from being taken home by workers.

8.6 PROTECTIVE GLOVES

Wear gloves to prevent contact with particulate or solutions. Wear gloves to prevent metal cuts and skin abrasions during handling.

8.7 EYE PROTECTION

Wear safety glasses, goggles, face shield or welder's helmet when risk of eye injury is present, particularly during melting, casting, machining, grinding, welding, powder handling, etc.

8.8 HOUSEKEEPING

Use vacuum and wet cleaning methods for particulate removal from surfaces. Be certain to de-energize electrical systems, as necessary, before beginning wet cleaning. Use vacuum cleaners with high efficiency particulate air (HEPA). Do not use compressed air, brooms, or conventional vacuum cleaners to remove particulate from surfaces as this activity can result in elevated exposures to airborne particulate. Follow the manufacturer's instructions when performing maintenance on HEPA filtered vacuums used to clean hazardous materials.

8.9 MAINTENANCE

During repair or maintenance activities the potential exists for exposures to particulate in excess of the occupational standards. Under these circumstances, protecting workers can require the use of specific work practices or procedures involving the combined use of ventilation, wet and vacuum cleaning methods, respiratory protection, decontamination, special protective clothing, and when necessary, restricted work zones.

8.10 WELDING

In accordance with OSHA regulation 29 CFR 1910.252 welding of materials containing beryllium is regulated as follows: Welding or cutting indoors, outdoors, or in confined spaces involving beryllium containing base or filler metals shall be done using local exhaust ventilation and pressure-demand airline respirators unless atmospheric tests under the most adverse conditions have established that the workers' exposure is within the acceptable concentrations defined by 29 CFR 1910.1000. In all cases, workers in the immediate vicinity of the welding or cutting operations shall be protected as necessary by local exhaust ventilation or airline respirators.

8.11 CORROSION PROTECTION

Beryllium is corrosion-resistant in air and water up to 600°C. This is attributed to the formation of an adherent oxide layer on the surface.

The presence of salts in water, particularly chloride, dramatically accelerates the corrosion of beryllium. This corrosion can be further accelerated (galvanic corrosion) if beryllium is in contact with a less reactive metal. Contrarily, beryllium can be protected from corrosion by contact with a more reactive metal (anodic protection).

Generally, some corrosion protection should be applied to beryllium. Salts from handling beryllium without gloves along with humidity in the air are sufficient to cause "finger print" corrosion on a bare beryllium part. A chromate conversion coating is an effective protection for non-severe service.

For applications where beryllium is exposed to salt spray or mist, an integral coating is needed to prevent corrosion. The conversion coating alone will not protect beryllium in salt spray applications. Conversion coating in combination with anodic protection with manganese or magnesium has been effective in protecting

beryllium brake components on aircraft carrier based planes. Electroless nickel, epoxy paint and other integral coatings are effective corrosion barriers in salt spray applications.

8.12 EXPOSURE CHARACTERIZATION

Determine exposure to airborne particulate by air sampling in the employee breathing zone, work area, and department. Utilize an Industrial Hygienist or other qualified professional to specify the frequency and type of air sampling. Develop and utilize a sampling strategy which identifies the extent of exposure variation and provides statistical confidence in the results. Conduct an exposure risk assessment of processes to determine if conditions or situations exist which dictate the need for additional controls or improved work practices. Make air sample results available to employees.

8.13 MEDICAL SURVEILLANCE

Beryllium: Medical surveillance for beryllium health effects includes (1) skin examination, (2) respiratory history, (3) examination of the lungs, (4) lung function tests (FVC and FEV1), and (5) periodic chest x-ray. In addition, a specialized, specific, immunological blood test, the beryllium blood lymphocyte proliferation test (BLPT), is available to assist in the diagnosis of beryllium related reactions. Individuals who have an abnormal BLPT are normally referred to a lung specialist for additional specific tests to determine if chronic beryllium disease is present. Note: Substantial inter- and intra-laboratory disagreement exists among the laboratories that conduct this test. The BLPT does not at this time meet the criteria for a screening test. Despite its limitations, however, the BLPT remains a useful disease surveillance tool.

8.14 RISK FACTORS

Specific genetic factors have been identified and have been shown to increase an individual's susceptibility to CBD. Medical testing is available to detect genetic factors in individuals.

8.15 OCCUPATIONAL EXPOSURE LIMITS

Following good industrial hygiene practice, which includes reducing airborne exposures to the lowest feasible level for all constituents in this product, is recommended. It is also recommended that users of beryllium-containing materials maintain worker exposures to airborne beryllium to levels reliably below its recommended exposure guideline (REG) of 0.0002 milligrams beryllium per cubic meter of air.

CONSTITUENTS	OSHA*			ACGIH*		NIOSH RTECS NUMBER
	PEL	CEILING	PEAK	TLV	TLV-STEL	
Beryllium	0.002	0.005	0.025	0.00005	N/A	DS1750000

*ALL CONCENTRATIONS ARE IN MILLIGRAMS PER CUBIC METER OF AIR
(at the concentrations noted above, these constituents may not be visible to the human eye)

A leading scientific body recommending occupational standards is the American Conference of Governmental Industrial Hygienists (ACGIH). The ACGIH recommends standards for all listed substances. The ACGIH defines a threshold limit value (standard) as follows: "Threshold Limit Values refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. Because of wide variation in individual susceptibility, however, a small percentage of workers may experience discomfort from some substances at concentrations at or below the threshold limit; a smaller percentage may be affected more seriously by aggravation of a pre-existing condition or by development of an occupational illness." "Individuals may also be hypersusceptible or otherwise unusually responsive to some industrial chemicals because of genetic factors, age, personal habits (smoking, alcohol, or other drugs), medication, or previous exposures. Such workers may not be adequately protected from adverse health effects from certain chemicals at concentrations at or below the threshold limits."

ACGIH	=	American Conference of Governmental Industrial Hygienists
OSHA	=	Occupational Safety and Health Administration
PEL	=	Eight-Hour Average Permissible Exposure Limit (OSHA)
CEILING	=	Not To Be Exceeded Except for Peak Limit (OSHA)
PEAK	=	30-Minute Maximum Duration Concentration Above Ceiling Limit (OSHA)
TLV	=	Eight-Hour Average Threshold Limit Value (ACGIH)
TLV-STEL	=	15-Minute Short Term Exposure Limit (ACGIH)
CAS	=	Chemical Abstract Service
NIOSH	=	National Institute for Occupational Safety and Health
RTECS	=	Registry of Toxic Effects of Chemical Substances
N/A	=	Not Applicable

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Boiling Point (°F):	5378	Radioactivity:	Not Applicable
Evaporation Rate:	Not Applicable	Solubility:	None
Freezing Point (°F):	Not Applicable	Sublimes At (°F):	Not Applicable
Odor:	None	Vapor Density (Air = 1):	Not Applicable
pH:	Not Applicable	Vapor Pressure (mmHg):	Not Applicable
Physical State:	Solid	% Volatiles By Volume:	None
Color:	Gray Metallic	Melting Point (°F):	2345
Density (lb/in3):	0.067	Atomic Number	4
Atomic Weight	9.01	Molecular Weight	9.01

10. STABILITY AND REACTIVITY

General Reactivity	This Material is Stable
Incompatibility (materials to avoid)	Avoid contact with mineral acids and strong bases which generate hydrogen gas. Hydrogen gas can be an explosion hazard.
Hazardous Decomposition Products	None under normal conditions of use.
Hazardous Polymerization	Will not occur

11. TOXICOLOGICAL INFORMATION

For questions concerning toxicological information, write to: Medical Director, Materion Brush Inc., 14710 West Portage River South Road, Elmore, Ohio 43416-9502.

12. ECOLOGICAL INFORMATION

This material can be recycled; contact your Sales Representative.

13. DISPOSAL CONSIDERATIONS

13.1 BYPRODUCT RECYCLING

When recycled (used in a process to recover metals), this material is not classified as hazardous waste under federal law. Seal particulate or particulate containing materials inside two plastic bags, place in a DOT approved container, and label appropriately.

13.2 SOLID WASTE MANAGEMENT

When spent products are declared solid wastes (no longer recyclable), they must be labeled, managed and disposed of, in accordance with federal, state and local requirements. This material is not classified a hazardous waste under federal law.

The U.S. Environmental Protection Agency has classified beryllium powder (P015) as a hazardous waste under the Resource Conservation and Recovery Act (RCRA). In Section 40 CFR 261.33(e) of RCRA, beryllium powder is considered hazardous when it is in the form of a "discarded commercial chemical product, off-specification species, container residue and spill residue, thereof." This designation only applies to commercially pure products or manufacturing intermediates in which beryllium is the "sole active ingredient." Due to the limited scope of this definition, we believe the only form of beryllium to which it applies is waste commercially pure metallic beryllium powder.

Beryllium scrap, chips, and powder are normally recycled as by-products and are not classified a waste. In cases where this is not justified, seal any off-specification metallic beryllium powder in two plastic bags and then place in a DOT container approved for flammable solids. If being disposed, the outer container must be labeled with the appropriate EPA hazardous waste label and DOT hazard warning label(s) and shipped under a uniform hazardous waste manifest to an approved hazardous waste management facility. Dispose of dust collector filters contaminated with metallic beryllium powder following the above procedure, with the exception of the hazardous waste manifest and hazardous waste container label.

14. TRANSPORT INFORMATION

There are no U.S. Department of Transportation hazardous material regulations which apply to the packaging and labeling of this product as shipped.

Hazard Communication regulations of the U.S. Occupational Safety and Health Administration require this product be labeled.

15. REGULATORY INFORMATION

15.1 UNITED STATES FEDERAL REGULATIONS

15.1.1. Occupational Safety and Health Administration (OSHA)

Air contaminants, 29 CFR 1910.1000
Hazard Communication Standard, 29 CFR 1910.1200

15.1.2. Environmental Protection Agency (EPA)

AMBIENT AIR EMISSIONS: Beryllium-containing materials are subject to the National Emission Standard for Beryllium as promulgated by EPA (40 CFR 61, Subpart C). The National Emission Standard for beryllium is 0.01 micrograms per cubic meter (30-day average) in ambient air for those production facilities which have been qualified to be regulated through ambient air monitoring. Other facilities must meet a 10 gram per 24-hour total site emission limit. Most process air emission sources will require an air permit from a local and/or state air pollution control agency. The use of air cleaning equipment may be necessary to achieve the permissible emission. Tempered makeup air should be provided to prevent excessive negative pressure in a building. Direct recycling of cleaned process exhaust air is not recommended. Plant exhausts should be located so as not to re-enter the plant through makeup air or other inlets. Regular maintenance and inspection of air cleaning equipment and monitoring of operating parameters is recommended to ensure adequate efficiency is maintained.

WASTEWATER: Wastewater regulations can vary considerably. Contact your local and state governments to determine their requirements.

TOXIC SUBSTANCES CONTROL ACT: Component(s) of this material is/are listed on the TSCA Chemical Substance Inventory of Existing Chemical Substances

SARA TITLE III REPORTING REQUIREMENTS: On February 16, 1988, the U.S. Environmental Protection Agency (EPA) issued a final rule that implements the requirements of the Superfund Amendments and Reauthorization Act (SARA) Title III, Section 313 (53) Federal Register 4525. Title III is the portion of SARA concerning emergency planning and community right-to-know issues. Section 313 covers annual emission reporting on specific chemicals which are manufactured, processed or used at certain U.S. Industrial facilities.

This product is reportable under the Section 313.

You may obtain additional information by calling the EPA SARA Title III Hotline at 1-800-535-0202 (or 703-412-9810).

15.2 STATE REGULATIONS

Beryllium

- Is listed on the following state right-to-know lists: California, New Jersey, Florida, Pennsylvania, Minnesota and Massachusetts.
- The following statement is made in order to comply with the California State Drinking Water Act - Warning: This product contains BERYLLIUM, a chemical known to the state of California to cause cancer.
- California No Significant Risk Level: CAS# 7440-41-7: No significant risk level = 0.1 µg/day

15.3 CANADA

<u>Constituent</u>	<u>DSL/NDSL</u>	<u>WHMIS Classification</u>	<u>Ingredient Disclosure List</u>
Beryllium	Yes/No	D2A,D2B	Yes

16. OTHER INFORMATION

Following is the label which accompanies this product during shipment.

M10  Beryllium Solid  WARNING INHALING DUST OR FUMES MAY CAUSE CHRONIC BERYLLIUM DISEASE, A SERIOUS CHRONIC LUNG DISEASE, IN SOME INDIVIDUALS. CANCER HAZARD. OVER TIME, LUNG DISEASE AND CANCER CAN BE FATAL. TARGET ORGAN IS PRIMARILY THE LUNG. READ THE MATERIAL SAFETY DATA SHEET (MSDS) ON FILE WITH YOUR EMPLOYER BEFORE WORKING WITH THIS MATERIAL. Overexposure to beryllium by inhalation may cause chronic beryllium disease, a serious chronic lung disease. • If processing or recycling produces airborne dust, fumes, or mists, use exhaust ventilation or other controls designed to prevent exposure to workers. Examples of such activities include melting, machining, welding, grinding, abrasive sawing, sanding and polishing. Any activity which abrades the surface of this material can generate airborne dust. • The Occupational Safety and Health Administration (OSHA) has set mandatory limits on occupational exposures. • Beryllium metal, in solid form and as contained in finished products presents no special health risks. • Sold for manufacturing purposes only. This product can be recycled; contact your sales representative. The Occupational Safety and Health Administration requires employers to provide training in the proper use of this product. For further information, please telephone or write to: Product Stewardship Department, Materion Brush Inc., 6070 Parkland Boulevard, Mayfield Heights, Ohio 44124, telephone: (800) 862-4118, www.materion.com. For transportation emergency call Chemtrec at (800) 424-9300. M10

*Label may vary in size

*Label color (light gray edge with black lettering)

This MSDS has been revised following the guidelines outlined in the American National Standard for Hazardous Industrial Chemicals -“Material Safety Data Sheets - Preparation.” Z400.1-2004

MSDS Status: Change in company name

IMPORTANT: If you have any questions or require additional information regarding the materials described in this Material Safety Data Sheet, please telephone or write to the Product Stewardship Department at the location given on page 1. Additional product safety information, such as Safety Facts, is available from your sales representative or at <http://www.materion.com/>.

Additional information and guidance on the safe use and handling of these materials is available in the “Interactive Guide to Working Safely with Beryllium and Beryllium-containing Materials.” This innovative, computer based tool can be accessed online at www.berylliumsafety.com. A copy of the Interactive Guide on compact disc (CD) can be obtained by contacting the Product Stewardship Department at the location given on page 1.

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : 1,1,1-Trichloroethane

Product Number : T54704
Brand : Aldrich
Index-No. : 602-013-00-2
CAS-No. : 71-55-6**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheetCompany : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATESTelephone : +1 314 771-5765
Fax : +1 800 325-5052**1.4 Emergency telephone**Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**Acute toxicity, Inhalation (Category 4), H332
Carcinogenicity (Category 1B), H350
Short-term (acute) aquatic hazard (Category 3), H402
Hazardous to the ozone layer (Category 1), H420

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word

Danger



Hazard statement(s)	
H332	Harmful if inhaled.
H350	May cause cancer.
H402	Harmful to aquatic life.
H420	Harms public health and the environment by destroying ozone in the upper atmosphere.
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 mist or vapors.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.
P502	Refer to manufacturer/ supplier for information on recovery/ recycling.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	: C ₂ H ₃ Cl ₃
Molecular weight	: 133.4 g/mol
CAS-No.	: 71-55-6
EC-No.	: 200-756-3
Index-No.	: 602-013-00-2

Component	Classification	Concentration
1,1,1-Trichloroethane		
	Acute Tox. 4; Aquatic Acute 3; Ozone 1; H332, H402, H420	<= 100 %
1,4-Dioxane		
	Flam. Liq. 2; Eye Irrit. 2A; Carc. 1B; STOT SE 3; H225, H319, H350, H335 Concentration limits: >= 20 %: STOT SE 3, H335;	>= 1 - < 5 %



SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water Foam Carbon dioxide (CO₂) Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Hydrogen chloride gas

Combustible.

Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.



SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Test for peroxide formation periodically and before distillation.

Storage class

Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters



Component	CAS-No.	Value	Control parameters	Basis
1,1,1-Trichloroethane	71-55-6	TWA	350 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Not classifiable as a human carcinogen		
		STEL	450 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Not classifiable as a human carcinogen		
		C	350 ppm 1,900 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	350 ppm 1,900 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	350 ppm 1,900 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	450 ppm 2,450 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		C	800 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
1,4-Dioxane	123-91-1	TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	25 ppm 90 mg/m3	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		Skin notation		
		TWA	100 ppm 360 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		
		C	1 ppm 3.6 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen		
		PEL	0.28 ppm 1 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis



1,1,1-Trichloroethane	71-55-6	Methyl chloroform	20parts per million	In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
	Remarks	Prior to last shift of workweek			
		Methyl chloroform	700 µg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift			

8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact

Material: Viton®

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 60 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Body Protection

protective clothing

Respiratory protection

required when vapours/aerosols are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains.



SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid
b) Odor	No data available
c) Odor Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point: -30.4 °C (-22.7 °F)
f) Initial boiling point and boiling range	74 °C 165 °F at 1,013 hPa
g) Flash point	()No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 15.5 %(V) Lower explosion limit: 8.0 %(V)
k) Vapor pressure	No data available
l) Vapor density	No data available
m) Density	1.34 g/cm ³ at 20 °C (68 °F)
Relative density	No data available
n) Water solubility	1.25 g/l at 20 °C (68 °F)
o) Partition coefficient: n-octanol/water	log Pow: 2.49 at 20 °C (68 °F) - Bioaccumulation is not expected., (ECHA)
p) Autoignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	none

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Formation of peroxides possible.

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10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .
Contains the following stabilizer(s):
1,4-Dioxane (>1 - <=3 %)

10.3 Possibility of hazardous reactions

Risk of explosion with:
nitrogen dioxide
Potassium
Risk of ignition or formation of inflammable gases or vapours with:
Generates dangerous gases or fumes in contact with:
Exothermic reaction with:
alkali hydroxides
Aluminum
magnesium
Oxygen
Aluminum
aluminium oxide
Heavy metals
Alkaline earth metals
magnesium
hydrides
Oxygen

10.4 Conditions to avoid

Moisture.

10.5 Incompatible materials

Aluminum, various plastics

10.6 Hazardous decomposition products

Peroxides
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 9,600 mg/kg
Symptoms: Nausea, Vomiting, Risk of aspiration upon vomiting., Aspiration may cause pulmonary edema and pneumonitis.
Remarks: (RTECS)
Acute toxicity estimate Inhalation - 4 h - 11 mg/l - vapor(Calculation method)

Inhalation: absorption
Dermal: absorption

Skin corrosion/irritation

Remarks: Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product.

Serious eye damage/eye irritation

Remarks: No data available



Respiratory or skin sensitization

Maximization Test - Guinea pig

Result: negative

(OECD Test Guideline 406)

Germ cell mutagenicity

Test Type: Ames test

Test system: Salmonella typhimurium

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 471

Result: negative

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (1,4-Dioxane)

IARC: 2A - Group 2A: Probably carcinogenic to humans (1,1,1-Trichloroethane)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (1,4-Dioxane)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

11.2 Additional Information

RTECS: KJ2975000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Exposure to and/or consumption of alcohol may increase toxic effects., prolonged or repeated exposure can cause:, narcosis, Liver injury may occur., Kidney injury may occur.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Systemic effects:

After absorption:

Headache

Dizziness

Tiredness

narcosis

drop in blood pressure

Unconsciousness

After uptake of large quantities:

depressed respiration

cardiovascular disorders



SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Pimephales promelas (fathead minnow) - 52.8 mg/l - 96 h (US-EPA)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - > 530 mg/l - 48 h (US-EPA)
Toxicity to algae	static test EC50 - Pseudokirchneriella subcapitata (algae) - 41 mg/l - 72 h (OECD Test Guideline 201) static test NOEC - Pseudokirchneriella subcapitata (green algae) - 7.8 mg/l - 72 h (OECD Test Guideline 201) IC50 - Scenedesmus capricornutum (fresh water algae) - > 670 mg/l - 96 h Remarks: (Lit.)
Toxicity to bacteria	EC50 - Sewage sludge - 360 mg/l - 30 min (OECD Test Guideline 209)

12.2 Persistence and degradability

Biodegradability	Result: 0 % - Not readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

Biological effects:

Hazard for drinking water supplies.

Further information on ecology

Substance which may present a danger to the structure and/or the functioning of the stratospheric ozone layer according to EC Regulation No 2037/2000 (listed in Annex I, Group V).

Discharge into the environment must be avoided.



SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)

UN number: 2831 Class: 6.1 Packing group: III
Proper shipping name: 1,1,1-Trichloroethane
Reportable Quantity (RQ): 1000 lbs
Reportable Quantity (RQ): 10 lbs
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 2831 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: 1,1,1-TRICHLOROETHANE

IATA

UN number: 2831 Class: 6.1 Packing group: III
Proper shipping name: 1,1,1-Trichloroethane

SECTION 15: Regulatory information

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,1,1-Trichloroethane	71-55-6	2020-07-14
1,4-Dioxane	123-91-1	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Reportable Quantity :
F001 lbs
F002 lbs

Massachusetts Right To Know Components

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1,1,1-Trichloroethane	CAS-No. 71-55-6	Revision Date 2020-07-14
1,4-Dioxane	123-91-1	2007-07-01
Pennsylvania Right To Know Components		
1,1,1-Trichloroethane	CAS-No. 71-55-6	Revision Date 2020-07-14
1,4-Dioxane	123-91-1	2007-07-01
California Prop. 65 Components		
, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov .	CAS-No. 123-91-1	Revision Date 2007-09-28

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.5

Revision Date: 03/17/2023

Print Date: 12/09/2023



SAFETY DATA SHEET

Version 8.11
Revision Date 12/07/2023
Print Date 01/22/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : Diphenylmethane 4,4'-diisocyanate (mixture of di- and triisocyanates) for synthesis

Product Number : 8.20797
Catalogue No. : 820797
Brand : Millipore
Index-No. : 615-005-00-9
CAS-No. : 101-68-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Chemical for synthesis

1.3 Details of the supplier of the safety data sheet

Company : EMD Millipore Corporation
400 Summit Drive
BURLINGTON MA 01803
UNITED STATES

Telephone : +1 800-645-5476

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Respiratory sensitization (Category 1), H334
Skin sensitization (Category 1), H317
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure, Inhalation (Category 2), Respiratory system, H373

Millipore - 8.20797

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For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word

Danger

Hazard Statements

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H373	May cause damage to organs (Respiratory system) through prolonged or repeated exposure if inhaled.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing must not be allowed out of the workplace.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P285	In case of inadequate ventilation wear respiratory protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P342 + P311	If experiencing respiratory symptoms: Call a POISON CENTER/ doctor.
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

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : C₁₅H₁₀N₂O₂
Molecular weight : 250.26 g/mol
CAS-No. : 101-68-8
EC-No. : 202-966-0
Index-No. : 615-005-00-9

Component	Classification	Concentration
diphenylmethane-4,4'-diisocyanate		
	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Resp. Sens. 1; Skin Sens. 1; Carc. 2; STOT SE 3; STOT RE 2; H332, H315, H319, H334, H317, H351, H335, H373 Concentration limits: >= 5 %: Eye Irrit. 2, H319; >= 5 %: STOT SE 3, H335; >= 5 %: Skin Irrit. 2, H315; >= 0.1 %: Resp. Sens. 1, H334;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Carbon dioxide (CO₂) Dry powder

Unsuitable extinguishing media

Foam Water

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Nitrogen oxides (NO_x)

Combustible.

Caution! in contact with water product releases:

carbon dioxide

Fire may cause evolution of:

nitrogen oxides

Vapors are heavier than air and may spread along floors.

Forms explosive mixtures with air on intense heating.

Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Keep workplace dry. Do not allow product to come into contact with water. Work under hood. Do not inhale substance/mixture.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Protected from light. Dry. Tightly closed. Dry. Keep locked up or in an area accessible only to qualified or authorized persons.

Recommended storage temperature see product label.

Storage class

Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
diphenylmethane-4,4'-diisocyanate	101-68-8	TWA	0.0050 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Respiratory sensitization		
		C	0.02 ppm 0.2 mg/m ³	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		C	0.02 ppm 0.2 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m ³ is approximate. Ceiling limit is to be determined from breathing-zone air samples.		

		TWA	0.0050 ppm 0.05 mg/m ³	USA. NIOSH Recommended Exposure Limits
		10 minute ceiling value		
		C	0.2 ppm 0.2 mg/m ³	USA. NIOSH Recommended Exposure Limits
		10 minute ceiling value		

8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact

Material: butyl-rubber

Minimum layer thickness: 0.7 mm

Break through time: 120 min

Material tested: Butoject® (KCL 898)

Body Protection

protective clothing

Respiratory protection

Recommended Filter type: Filter B-(P3)

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

These measures have to be properly documented.

required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid Color: brown
b) Odor	No data available

c) Odor Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: 39 - 43 °C (102 - 109 °F) - Regulation (EC) No. 440/2008, Annex, A.1
f) Initial boiling point and boiling range	> 300 °C > 572 °F at 1,013 hPa - Regulation (EC) No. 440/2008, Annex, A.2
g) Flash point	211 °C (412 °F) - closed cup - Regulation (EC) No. 440/2008, Annex, A.9
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapor pressure	No data available
l) Vapor density	No data available
m) Density	1.239 g/cm ³ at 20 °C (68 °F)
Relative density	1.3220 °C
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	log Pow: 4.51 at 22 °C (72 °F) - Potential bioaccumulation
p) Autoignition temperature	> 601 °C (> 1114 °F) at 1,013 hPa
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	none

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Forms explosive mixtures with air on intense heating.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:

Water
alkalines
Alcohols
Amines
acids

10.4 Conditions to avoid

Strong heating.

10.5 Incompatible materials

nonferrous metals, Copper, Copper alloys, Mild steel, Zinc

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 4,130 mg/kg

Remarks: (RTECS)

Acute toxicity estimate Inhalation - 4 h - 1.5 mg/l - dust/mist

(Expert judgment)

Inhalation: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

LD50 Dermal - Rabbit - > 9,000 mg/kg

Remarks: (External MSDS)

Skin corrosion/irritation

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Serious eye damage/eye irritation

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Respiratory or skin sensitization

Sensitisation test: - Guinea pig

Result: positive

Remarks: (HSDB)

Germ cell mutagenicity

Test Type: Ames test

Test system: S. typhimurium

Metabolic activation: with and without metabolic activation

Method: Directive 67/548/EEC, Annex V, B.13.

Result: negative

Test Type: In vivo micronucleus test

Species: Rat

Millipore - 8.20797

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Application Route: Inhalation
Method: Mutagenicity (micronucleus test)
Result: negative

Carcinogenicity

Suspected of causing cancer.

- IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
- OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

Inhalation - May cause respiratory irritation. - Respiratory system

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Specific target organ toxicity - repeated exposure

Inhalation - May cause damage to organs through prolonged or repeated exposure.

- Respiratory system

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Aspiration hazard

No data available

11.2 Additional Information

Cough, Shortness of breath, Headache, Nausea, Vomiting, Pulmonary edema. Effects may be delayed.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation Cyprinus carpio (Carp) - 28 d
 - 0.0008 mg/l(diphenylmethane-4,4'-diisocyanate)

Bioconcentration factor (BCF): 92

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

Do not empty into drains.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

Further information

Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

Millipore - 8.20797

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diphenylmethane-4,4'-diisocyanate

101-68-8

1993-02-16

Massachusetts Right To Know Components

diphenylmethane-4,4'-diisocyanate

CAS-No.
101-68-8

Revision Date
1993-02-16

Pennsylvania Right To Know Components

diphenylmethane-4,4'-diisocyanate

CAS-No.
101-68-8

Revision Date
1993-02-16

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 8.11

Revision Date: 12/07/2023

Print Date: 01/22/2024

1. Identification

Product identifier	4,4'-DDE	
Other means of identification		
Item	N-10875	
CAS number	72-55-9	
Synonyms	1,1'-(Dichloroethenylidene)bis(4-chlorobenzene) * 2,2-Bis(4-chlorophenyl) 1,1-dichloroethene	
Recommended use	For Laboratory Use Only	
Recommended restrictions	None known.	
Manufacturer/Importer/Supplier/Distributor information		
Manufacturer		
Company name	Chem Service, Inc.	
Address	660 Tower Lane West Chester, PA 19380 United States	
Telephone	Toll Free	800-452-9994
	Direct	610-692-3026
Website	www.chemservice.com	
E-mail	info@chemservice.com	
Emergency phone number	Chemtrec US	800-424-9300
	Chemtrec outside US	+1 703-527-3887

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Acute toxicity, oral	Category 4
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1
OSHA defined hazards	Not classified.	

Label elements



Signal word	Warning
Hazard statement	Harmful if swallowed. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.
Precautionary statement	
Prevention	Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment.
Response	If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth. Collect spillage.
Storage	Store away from incompatible materials.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	100% of the mixture consists of component(s) of unknown acute dermal toxicity.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
4,4'-DDE	1,1'-(Dichloroethenylidene)bis(4-chlorobenzene) 2,2-Bis(4-chlorophenyl) 1,1-dichloroethene	72-55-9	100

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical advice/attention if you feel unwell.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	The product is immiscible with water and will spread on the water surface. This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Do not taste or swallow. When using, do not eat, drink or smoke. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits	This substance has no PEL, TLV, or other recommended exposure limit.
Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Face shield is recommended. Wear safety glasses with side shields (or goggles).
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves.
Other	Wear suitable protective clothing.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Solid.
Form	Crystalline.
Color	White
Odor	Not available.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	192.2 °F (89 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	0.0000008 kPa (77 °F (25 °C))
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Insoluble
Partition coefficient (n-octanol/water)	6.51
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Molecular formula	C14-H8-Cl4

Molecular weight	318.03 g/mol
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	No adverse effects due to inhalation are expected.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Harmful if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity	Harmful if swallowed.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.

Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity	Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.

12. Ecological information

Ecotoxicity	Very toxic to aquatic life with long lasting effects.

Product	Species		Test Results
4,4'-DDE (CAS 72-55-9)			
Aquatic			
Crustacea	EC50	Brown shrimp (Penaeus aztecus)	0.028 mg/l, 48 hours

Product	Species	Test Results
Fish	LC50 Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.026 - 0.04 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

6.51

Mobility in soil

No data available.

Other adverse effects

No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions

Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations

Dispose in accordance with all applicable regulations.

Hazardous waste code

The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging

Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN3077
UN proper shipping name	Environmentally hazardous substances, solid, n.o.s. (4,4'-DDE RQ = 1 LBS)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Label(s)	9
Packing group	III
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	8, 146, 335, A112, B54, IB8, IP3, N20, T1, TP33
Packaging exceptions	155
Packaging non bulk	213
Packaging bulk	240

IATA

UN number	UN3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (4,4'-DDE)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	9L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (4,4'-DDE)

Transport hazard class(es)**Class** 9**Subsidiary risk** -**Packing group** III**Environmental hazards****Marine pollutant** No.**EmS** F-A, S-F**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.**Transport in bulk according to** Not applicable.**Annex II of MARPOL 73/78 and
the IBC Code****DOT; IATA; IMDG****General information**

IMDG Regulated Marine Pollutant. DOT Regulated Marine Pollutant.

15. Regulatory information**US federal regulations**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

4,4'-DDE (CAS 72-55-9) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)**Hazard categories**Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No**SARA 302 Extremely hazardous substance**

Not listed.

**SARA 311/312 Hazardous
chemical** Yes**SARA 313 (TRI reporting)**

Not regulated.

Other federal regulations**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

4,4'-DDE (CAS 72-55-9)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

**Clean Water Act (CWA)
Section 112(r) (40 CFR
68.130)**Priority pollutant
Bioaccumulative chemical of concern
Toxic pollutant**Safe Drinking Water Act
(SDWA)**

Monitoring

US state regulations

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

4,4'-DDE (CAS 72-55-9) Listed: January 1, 1989

US - California Proposition 65 - CRT: Listed date/Developmental toxin

4,4'-DDE (CAS 72-55-9) Listed: March 30, 2010

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

4,4'-DDE (CAS 72-55-9) Listed: March 30, 2010

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

4,4'-DDE (CAS 72-55-9)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	09-17-2014
Revision date	12-23-2020
Version #	02
NFPA ratings	Health: 2 Flammability: 0 Instability: 0

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This document has undergone significant changes and should be reviewed in its entirety.

Revision information

Safety Data Sheet

acc. to OSHA HCS

Printing date 03/31/2019

Version Number 2

Reviewed on 03/31/2019

1 Identification

- **Product identifier**
- **Trade name:** beta-BHC (beta-HCH) Standard (1X1 mL)
- **Part number:** PST-072M1000
- **Application of the substance / the mixture** Reagents and Standards for Analytical Chemical Laboratory Use
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051 USA
- **Information department:**
Telephone: 800-227-9770
e-mail: pdl-msds_author@agilent.com
- **Emergency telephone number:** CHEMTREC®: 1-800-424-9300

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS02 Flame

Flam. Liq. 2 H225 Highly flammable liquid and vapor.



GHS06 Skull and crossbones

Acute Tox. 3 H331 Toxic if inhaled.



GHS08 Health hazard

Carc. 2 H351 Suspected of causing cancer.

STOT SE 1 H370 Causes damage to organs.

- **Label elements**
- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms**



GHS02



GHS06



GHS08

- **Signal word** Danger
- **Hazard-determining components of labeling:**
methanol
- **Hazard statements**
Highly flammable liquid and vapor.
Toxic if inhaled.
Suspected of causing cancer.

(Contd. on page 2)

Safety Data Sheet acc. to OSHA HCS

Printing date 03/31/2019

Version Number 2

Reviewed on 03/31/2019

Trade name: beta-BHC (beta-HCH) Standard (1X1 mL)

(Contd. of page 1)

Causes damage to organs.

Precautionary statements

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Ground/bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting/equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

Do not breathe dust/fume/gas/mist/vapors/spray.

Wash thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Wear protective gloves/protective clothing/eye protection/face protection.

If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

IF exposed or concerned: Get medical advice/attention.

Specific treatment (see on this label).

In case of fire: Use for extinction: CO₂, powder or water spray.

Store in a well-ventilated place. Keep container tightly closed.

Store in a well-ventilated place. Keep cool.

Store locked up.

Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:

NFPA ratings (scale 0 - 4)



Health = 1

Fire = 3

Reactivity = 0

HMIS-ratings (scale 0 - 4)



Health = *1

Fire = 3

Reactivity = 0

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixtures

Description: Mixture of the substances listed below with nonhazardous additions.

Dangerous components:

67-56-1	methanol	99.874%
319-85-7	(1alpha,2beta,3alpha,4beta,5alpha,6beta)-1,2,3,4,5,6-hexachlorocyclohexane	0.126%

(Contd. on page 3)

Safety Data Sheet acc. to OSHA HCS

Printing date 03/31/2019

Version Number 2

Reviewed on 03/31/2019

Trade name: **beta-BHC (beta-HCH) Standard (1X1 mL)**

(Contd. of page 2)

4 First-aid measures

- **Description of first aid measures**
- **General information:**
Immediately remove any clothing soiled by the product.
Remove breathing apparatus only after contaminated clothing have been completely removed.
In case of irregular breathing or respiratory arrest provide artificial respiration.
- **After inhalation:**
Supply fresh air or oxygen; call for doctor.
In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
- **After swallowing:** If symptoms persist consult doctor.
- **Information for doctor:**
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
- **Advice for firefighters**
- **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
- **Protective Action Criteria for Chemicals**

· PAC-1:

67-56-1	methanol	530 ppm

· PAC-2:

67-56-1	methanol	2,100 ppm

(Contd. on page 4)

Safety Data Sheet acc. to OSHA HCS

Printing date 03/31/2019

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Trade name: beta-BHC (beta-HCH) Standard (1X1 mL)

(Contd. of page 3)

· PAC-3:

67-56-1 methanol

7200* ppm

7 Handling and storage

· Handling:
· Precautions for safe handling

Ensure good ventilation/exhaustion at the workplace.

Open and handle receptacle with care.

Prevent formation of aerosols.

· Information about protection against explosions and fires:

Keep ignition sources away - Do not smoke.

Protect against electrostatic charges.

Keep respiratory protective device available.

· Conditions for safe storage, including any incompatibilities
· Storage:
· Requirements to be met by storerooms and receptacles: Store in a cool location.

· Information about storage in one common storage facility: Not required.

· Further information about storage conditions:

Keep receptacle tightly sealed.

Store in cool, dry conditions in well sealed receptacles.

· Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

· Additional information about design of technical systems: No further data; see item 7.

· Control parameters
· Components with limit values that require monitoring at the workplace:
67-56-1 methanol

PEL Long-term value: 260 mg/m³, 200 ppm

REL Short-term value: 325 mg/m³, 250 ppm

Long-term value: 260 mg/m³, 200 ppm

Skin

TLV Short-term value: 328 mg/m³, 250 ppm

Long-term value: 262 mg/m³, 200 ppm

Skin; BEI

· Ingredients with biological limit values:
67-56-1 methanol

BEI 15 mg/L

Medium: urine

Time: end of shift

Parameter: Methanol (background, nonspecific)

· Additional information: The lists that were valid during the creation were used as basis.

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Trade name: beta-BHC (beta-HCH) Standard (1X1 mL)

(Contd. of page 4)

- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
- **Breathing equipment:**
When used as intended with Agilent instruments, the use of the product under normal laboratory conditions and with standard practices does not result in significant airborne exposures and therefore respiratory protection is not needed.
Under an emergency condition where a respirator is deemed necessary, use a NIOSH or equivalent approved device/equipment with appropriate organic or acid gas cartridge.
- **Protection of hands:**
Although not recommended for constant contact with the chemicals or for clean-up, nitrile gloves 11-13 mil thickness are recommended for normal use. The breakthrough time is 1 hr. For cleaning a spill where there is direct contact of the chemical, butyl rubber gloves are recommended 12-15 mil thickness with breakthrough times exceeding 4 hrs. Supplier recommendations should be followed.
- **Material of gloves**
For normal use: nitrile rubber, 11-13 mil thickness
For direct contact with the chemical: butyl rubber, 12-15 mil thickness
- **Penetration time of glove material**
For normal use: nitrile rubber: 1 hour
For direct contact with the chemical: butyl rubber: >4 hours
- **Eye protection:**



Tightly sealed goggles

9 Physical and chemical properties

· Information on basic physical and chemical properties

· General Information

· Appearance:

Form:	Fluid
Color:	Colorless
Odor:	Alcohol-like
Odor threshold:	Not determined.

· pH-value: Not determined.

· Change in condition

Melting point/Melting range:	-98 °C (-144.4 °F)
Boiling point/Boiling range:	64.7 °C (148.5 °F)

· Flash point: 9 °C (48.2 °F)

· Flammability (solid, gaseous): Not applicable.

· Ignition temperature: 455 °C (851 °F)

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Trade name: beta-BHC (beta-HCH) Standard (1X1 mL)

(Contd. of page 5)

· Decomposition temperature:	Not determined.
· Auto igniting:	Product is not selfigniting.
· Danger of explosion:	Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
· Explosion limits:	
Lower:	5.5 Vol %
Upper:	44 Vol %
· Vapor pressure at 20 °C (68 °F):	100 hPa (75 mm Hg)
· Density at 20 °C (68 °F):	0.8 g/cm ³ (6.676 lbs/gal)
· Relative density	Not determined.
· Vapor density	Not determined.
· Evaporation rate	Not determined.
· Solubility in / Miscibility with Water:	Not miscible or difficult to mix.
· Partition coefficient (n-octanol/water):	Not determined.
· Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
· Solvent content:	
Organic solvents:	99.9 %
VOC content:	99.87 %
	998.7 g/l / 8.33 lb/gal
Solids content:	0.0 %
· Other information	No further relevant information available.

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**
ATE (Acute Toxicity Estimate)

Inhalative	LC50/4 h	3 mg/L

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Trade name: beta-BHC (beta-HCH) Standard (1X1 mL)

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67-56-1 methanol

Oral	LD50	5,628 mg/kg (rat)
Dermal	LD50	15,800 mg/kg (rabbit)
319-85-7 (1alpha,2beta,3alpha,4beta,5alpha,6beta)-1,2,3,4,5,6-hexachlorocyclohexane		
Oral	LD50	6,000 mg/kg (rat)

Primary irritant effect:

- **on the skin:** No irritant effect.
- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.

Additional toxicological information:

The product shows the following dangers according to internally approved calculation methods for preparations:
Toxic

Carcinogenic categories

IARC (International Agency for Research on Cancer)

319-85-7 (1alpha,2beta,3alpha,4beta,5alpha,6beta)-1,2,3,4,5,6-hexachlorocyclohexane	2B

NTP (National Toxicology Program)

319-85-7 (1alpha,2beta,3alpha,4beta,5alpha,6beta)-1,2,3,4,5,6-hexachlorocyclohexane	R

OSHA-Ca (Occupational Safety & Health Administration)

None of the ingredients is listed.

12 Ecological information

Toxicity

- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability:** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential:** No further relevant information available.
- **Mobility in soil:** No further relevant information available.

Additional ecological information:

General notes:

Water hazard class 1 (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

Results of PBT and vPvB assessment

- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects:** No further relevant information available.

13 Disposal considerations

Waste treatment methods

Recommendation:

Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

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Trade name: beta-BHC (beta-HCH) Standard (1X1 mL)

(Contd. of page 7)

- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **Not Regulated, De minimus Quantities** -

· **UN-Number**
· **DOT, IMDG, IATA** UN1230

· **UN proper shipping name**
· **DOT** Methanol solution
· **IMDG** METHANOL solution
· **IATA** METHANOL mixture

· **Transport hazard class(es)**

· **DOT**

· **Class** 3 Flammable liquids
· **Label** 3, 6.1

· **IMDG**

· **Class** 3 Flammable liquids
· **Label** 3/6.1

· **IATA**

· **Class** 3 Flammable liquids
· **Label** 3 (6.1)

· **Packing group**
· **DOT, IMDG, IATA** II

· **Environmental hazards:** Not applicable.

· **Special precautions for user** Warning: Flammable liquids
· **Danger code (Kemler):** 336
· **EMS Number:** F-E,S-D
· **Stowage Category** B
· **Stowage Code** SW2 Clear of living quarters.

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Trade name: beta-BHC (beta-HCH) Standard (1X1 mL)

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· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
· Transport/Additional information:	
· DOT	
· Quantity limitations	On passenger aircraft/rail: 1 L On cargo aircraft only: 60 L
· IMDG	
· Limited quantities (LQ)	1L
· Excepted quantities (EQ)	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· UN "Model Regulation":	UN 1230 METHANOL SOLUTION, 3 (6.1), II

15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
- Sara

· Section 355 (extremely hazardous substances):

None of the ingredients is listed.

· Section 313 (Specific toxic chemical listings):

67-56-1 | methanol

· TSCA (Toxic Substances Control Act):

All ingredients are listed.

· TSCA new (21st Century Act): (Substances not listed)

319-85-7 | (1alpha,2beta,3alpha,4beta,5alpha,6beta)-1,2,3,4,5,6-hexachlorocyclohexane

· Proposition 65

· Chemicals known to cause cancer:

319-85-7 | (1alpha,2beta,3alpha,4beta,5alpha,6beta)-1,2,3,4,5,6-hexachlorocyclohexane

· Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed.

· Chemicals known to cause reproductive toxicity for males:

None of the ingredients is listed.

· Chemicals known to cause developmental toxicity:

67-56-1 | methanol

· Carcinogenic categories

· EPA (Environmental Protection Agency)

319-85-7 | (1alpha,2beta,3alpha,4beta,5alpha,6beta)-1,2,3,4,5,6-hexachlorocyclohexane

C

· TLV (Threshold Limit Value established by ACGIH)

None of the ingredients is listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

None of the ingredients is listed.

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· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.**16 Other information**

The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

· **Department issuing SDS:** Document Control / Regulatory· **Contact:** regulatory@ultrasci.com· **Date of preparation / last revision** 03/31/2019 / 1· **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

BEI: Biological Exposure Limit

Flam. Liq. 2: Flammable liquids – Category 2

Acute Tox. 3: Acute toxicity – Category 3

Carc. 2: Carcinogenicity – Category 2

STOT SE 1: Specific target organ toxicity (single exposure) – Category 1

· *** Data compared to the previous version altered.**

US

SAFETY DATA SHEET

Version 6.11
Revision Date 12/07/2023
Print Date 01/27/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : Benzene

Product Number : 319953
Brand : SIGALD
Index-No. : 601-020-00-8
CAS-No. : 71-43-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Germ cell mutagenicity (Category 1B), H340
Carcinogenicity (Category 1A), H350
Specific target organ toxicity - repeated exposure (Category 1), Blood, H372
Aspiration hazard (Category 1), H304
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 3), H412

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For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word

Danger

Hazard Statements

H225	Highly flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H340	May cause genetic defects.
H350	May cause cancer.
H372	Causes damage to organs (Blood) through prolonged or repeated exposure.
H401	Toxic to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe mist or vapors.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal

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plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : C₆H₆
Molecular weight : 78.11 g/mol
CAS-No. : 71-43-2
EC-No. : 200-753-7
Index-No. : 601-020-00-8

Component	Classification	Concentration
benzene		
	Flam. Liq. 2; Skin Irrit. 2; Eye Irrit. 2A; Muta. 1B; Carc. 1A; STOT RE 1; Asp. Tox. 1; Aquatic Chronic 3; H225, H315, H319, H340, H350, H372, H304, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air. Call in physician.

In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed

After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Pulmonary failure possible after aspiration of vomit. Call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

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SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Carbon dioxide (CO₂) Foam Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Flash back possible over considerable distance., Container explosion may occur under fire conditions.

Combustible.

Pay attention to flashback.

Vapors are heavier than air and may spread along floors.

Development of hazardous combustion gases or vapours possible in the event of fire.

Forms explosive mixtures with air at ambient temperatures.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.

Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class

Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
benzene	71-43-2	TWA	0.5 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Leukemia Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed human carcinogen Danger of cutaneous absorption		
		STEL	2.5 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Leukemia Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed human carcinogen Danger of cutaneous absorption		

		TWA	10 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.40-1969		
		CEIL	25 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.40-1969		
		Peak	50 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.40-1969		
		See 1910.1028. See Table Z-2 for the limits applicable in the operations or sectors excluded in 1910.1028 The final benzene standard in 1910.1028 applies to all occupational exposures to benzene except some subsegments of industry where exposures are consistently under the action level (i.e., distribution and sale of fuels, sealed containers and pipelines, coke production, oil and gas drilling and production, natural gas processing, and the percentage exclusion for liquid mixtures); for the excepted subsegments, the benzene limits in Table Z-2 apply.		
		TWA	0.1 ppm	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		ST	1 ppm	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		

8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

Recommended Filter type: Filter A-(P3)

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid Color: clear, colorless
b) Odor	No data available
c) Odor Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: 5.5 °C (41.9 °F) - lit.
f) Initial boiling point and boiling range	80 °C 176 °F - lit.
g) Flash point	-11 °C (12 °F) - DIN 51755 Part 1
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 8.0 %(V) Lower explosion limit: 1.2 %(V)

k) Vapor pressure	100 hPa at 20 °C (68 °F)
l) Vapor density	No data available
m) Density	0.874 g/cm ³ at 25 °C (77 °F) - lit.
Relative density	No data available
n) Water solubility	ca.1.88 g/l at 23.5 °C (74.3 °F) - soluble
o) Partition coefficient: n-octanol/water	log Pow: 2.13 at 25 °C (77 °F) - Bioaccumulation is not expected., (ECHA)
p) Autoignition temperature	498 °C (928 °F) at 1,013.5 hPa
q) Decomposition temperature	No data available
r) Viscosity	0.604 mm ² /s at 25 °C (77 °F) -
s) Explosive properties	No data available
t) Oxidizing properties	none

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Vapors may form explosive mixture with air.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Exothermic reaction with:

halogens

Halogenated hydrocarbon

in the presence of:

Light metals

Risk of explosion with:

halogen-halogen compounds

Nitric acid

Boranes

Ozone

peroxi compounds

perchlorates

permanganic acid

perchloryl fluoride

Strong oxidizing agents

Chlorine

fluorides

uranium hexafluoride

Oxygen

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liquid
Risk of ignition or formation of inflammable gases or vapours with:
chromium(VI) oxide
Fluorine
nitril compounds
Oxygen
oxyhalogenic compounds
Violent reactions possible with:
mineral acids
sulfur

10.4 Conditions to avoid

Warming.

10.5 Incompatible materials

rubber, various plastics

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male - > 2,000 mg/kg

(OECD Test Guideline 401)

Symptoms: Nausea

LD50 Oral - Rat - male and female - 3,002 mg/kg

(OECD Test Guideline 401)

Symptoms: Risk of aspiration upon vomiting., Aspiration may cause pulmonary edema and pneumonitis.

Inhalation: No data available

Symptoms: mucosal irritations

LD50 Dermal - Rabbit - 13,630 mg/kg

Remarks: (IUCLID)

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: irritating

(OECD Test Guideline 404)

Remarks: (ECHA)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Irritating to eyes.

(OECD Test Guideline 405)

Remarks: (IUCLID)

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Respiratory or skin sensitization

Maximization Test - Guinea pig

Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity

May cause genetic defects.

Test Type: Ames test

Test system: Escherichia coli/Salmonella typhimurium

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 471

Result: negative

Test Type: In vitro mammalian cell gene mutation test

Test system: mouse lymphoma cells

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 476

Result: negative

Test Type: Chromosome aberration test in vitro

Test system: Chinese hamster lung cells

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 473

Result: negative

Test Type: Mutagenicity (mammal cell test): micronucleus.

Species: Mouse

Cell type: Bone marrow

Application Route: inhalation (vapor)

Method: OECD Test Guideline 474

Result: positive

Carcinogenicity

May cause cancer. Positive evidence from human epidemiological studies.

IARC: 1 - Group 1: Carcinogenic to humans (benzene)

NTP: Known - Known to be human carcinogen (benzene)

OSHA: OSHA specifically regulated carcinogen (benzene)

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Causes damage to organs through prolonged or repeated exposure.

- Blood

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Aspiration hazard

Aspiration may cause pulmonary edema and pneumonitis.

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 13 Weeks - NOAEL (No observed adverse effect level) - 600 mg/kg

RTECS: CY1400000

Nausea, Dizziness, Headache, narcosis, Inhalation of high concentrations of benzene may have an initial stimulatory effect on the central nervous system characterized by exhilaration, nervous excitation and/or giddiness, depression, drowsiness, or fatigue. The victim may experience tightness in the chest, breathlessness, and loss of consciousness. Tremors, convulsions, and death due to respiratory paralysis or circulatory collapse can occur in a few minutes to several hours following severe exposures. Aspiration of small amounts of liquid immediately causes pulmonary edema and hemorrhage of pulmonary tissue. Direct skin contact may cause erythema. Repeated or prolonged skin contact may result in drying, scaling dermatitis, or development of secondary skin infections. The chief target organ is the hematopoietic system. Bleeding from the nose, gums, or mucous membranes and the development of purpuric spots, pancytopenia, leukopenia, thrombocytopenia, aplastic anemia, and leukemia may occur as the condition progresses. The bone marrow may appear normal, aplastic or hyperplastic, and may not correlate with peripheral blood-forming tissues. The onset of effects of prolonged benzene exposure may be delayed for many months or years after the actual exposure has ceased., Blood disorders

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption of large quantities:

narcosis
respiratory arrest
Convulsions

Possible damages:

Damage to:

Liver
Kidney
Central nervous system

Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - <i>Oryzias latipes</i> (Orange-red killifish) - > 100 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	semi-static test EC50 - <i>Daphnia magna</i> (Water flea) - > 1,000 mg/l - 48 h (OECD Test Guideline 202)
	semi-static test NOEC - <i>Daphnia magna</i> (Water flea) - > 1,000 mg/l - 48 h

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	(OECD Test Guideline 202)
Toxicity to algae	static test ErC50 - <i>Pseudokirchneriella subcapitata</i> (green algae) - > 1,000 mg/l - 72 h (OECD Test Guideline 201)
	static test NOEC - <i>Pseudokirchneriella subcapitata</i> (green algae) - > = 1,000 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	static test EC50 - activated sludge - > 1,000 mg/l - 3 h (OECD Test Guideline 209)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - <i>Pimephales promelas</i> (fathead minnow) - 0.8 mg/l - 32 d Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test LC50 - <i>Daphnia magna</i> (Water flea) - > 100 mg/l - 21 d (OECD Test Guideline 211)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 96 % - Readily biodegradable. (OECD Test Guideline 301F)

12.3 Bioaccumulative potential

Bioaccumulation	<i>Leuciscus idus</i> (Golden orfe) - 3 d - 0.05 mg/l(benzene)

Bioconcentration factor (BCF): 10

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

Endangers drinking-water supplies if allowed to enter soil or water.
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 1114 Class: 3 Packing group: II
Proper shipping name: Benzene
Reportable Quantity (RQ): 10 lbs
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 1114 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: BENZENE

IATA

UN number: 1114 Class: 3 Packing group: II
Proper shipping name: Benzene

SECTION 15: Regulatory information

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
benzene	71-43-2	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Reportable Quantity D018 lbs

Massachusetts Right To Know Components

	CAS-No.	Revision Date
benzene	71-43-2	2007-07-01

Pennsylvania Right To Know Components

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benzene

CAS-No.
71-43-2

Revision Date
2007-07-01

California Prop. 65 Components

, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov/benzene

CAS-No.
71-43-2

Revision Date
2009-02-01

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact misbranding@sial.com.

Version: 6.11

Revision Date: 12/07/2023

Print Date: 01/27/2024

1. Identification

Product identifier	Benzo(b)fluoranthene		
Other means of identification			
Item	N-11165		
Recommended use	For Laboratory Use Only		
Recommended restrictions	None known.		
Manufacturer/Importer/Supplier/Distributor information			
Manufacturer			
Company name	Chem Service, Inc.		
Address	660 Tower Lane West Chester, PA 19380 United States		
Telephone	Toll Free	800-452-9994	
	Direct	610-692-3026	
Website	www.chemservice.com		
E-mail	info@chemservice.com		
Emergency phone number	Chemtrec US	800-424-9300	
	Chemtrec outside US	+1 703-527-3887	

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Carcinogenicity	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1
OSHA defined hazards	Not classified.	
Label elements		



Signal word	Danger
Hazard statement	May cause cancer. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.
Precautionary statement	
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.
Response	If exposed or concerned: Get medical advice/attention. Collect spillage.
Storage	Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	Not applicable.

3. Composition/information on ingredients**Substances**

Chemical name	Common name and synonyms	CAS number	%
Benzo(b)fluoranthene		205-99-2	100

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
General information	IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO ₂).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways. Stop the flow of material, if this is without risk. Collect spillage. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Contact local authorities in case of spillage to drain/aquatic environment. Prevent further leakage or spillage if safe to do so. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Avoid release to the environment. Do not empty into drains.
Conditions for safe storage, including any incompatibilities	Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits	No exposure limits noted for ingredient(s).
Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Use personal protective equipment as required.

Skin protection	
Hand protection	Use personal protective equipment as required.
Other	Use personal protective equipment as required.
Respiratory protection	Use personal protective equipment as required.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state	Solid.
Form	Solid. Crystalline Solid
Color	Pale yellow
Odor	Not available.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	334.4 °F (168 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	0.0000001 kPa at 25 °C
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	6.6
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Molecular formula	C20-H12
Molecular weight	252.32 g/mol

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	No adverse effects due to inhalation are expected.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.

Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity	Not available.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not available.
Skin sensitization	This product is not expected to cause skin sensitization.

Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity	May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Benzo(b)fluoranthene (CAS 205-99-2)	2B Possibly carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens

Benzo(b)fluoranthene (CAS 205-99-2)	Reasonably Anticipated to be a Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not available.
Chronic effects	Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity	Very toxic to aquatic life with long lasting effects. Accumulation in aquatic organisms is expected.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	Not available.

Partition coefficient n-octanol / water (log Kow)

6.6

Mobility in soil	No data available.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. This material and its container must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging

Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information**DOT**

UN number	UN3077
UN proper shipping name	Environmentally hazardous substances, solid, n.o.s. (Benzo(b)fluoranthene RQ = 1 LBS)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Label(s)	9
Packing group	III
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	8, 146, 335, A112, B54, IB8, IP3, N20, T1, TP33
Packaging exceptions	155
Packaging non bulk	213
Packaging bulk	240

IATA

UN number	UN3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (Benzo(b)fluoranthene)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	9L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed.
Cargo aircraft only	Allowed.

IMDG

UN number	UN3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo(b)fluoranthene)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-F
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

DOT; IATA; IMDG

**General information**

DOT Regulated Marine Pollutant. IMDG Regulated Marine Pollutant.

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
One or more components are not listed on TSCA.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Benzo(b)fluoranthene (CAS 205-99-2) Listed.

SARA 304 Emergency release notification

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - No
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Benzo(b)fluoranthene	205-99-2	100

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Benzo(b)fluoranthene (CAS 205-99-2)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)

Priority pollutant
Toxic pollutant

Safe Drinking Water Act (SDWA)

Not regulated.

US state regulations

US - New Jersey RTK - Substances: Listed substance

Benzo(b)fluoranthene (CAS 205-99-2)

US - Pennsylvania RTK - Hazardous Substances: Special hazard

Benzo(b)fluoranthene (CAS 205-99-2)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Benzo(b)fluoranthene (CAS 205-99-2)

US. Massachusetts RTK - Substance List

Benzo(b)fluoranthene (CAS 205-99-2)

US. New Jersey Worker and Community Right-to-Know Act

Benzo(b)fluoranthene (CAS 205-99-2)

US. Pennsylvania RTK - Hazardous Substances

Benzo(b)fluoranthene (CAS 205-99-2)

US. Pennsylvania Worker and Community Right-to-Know Law

Benzo(b)fluoranthene (CAS 205-99-2)

US. Rhode Island RTK

Benzo(b)fluoranthene (CAS 205-99-2)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Benzo(b)fluoranthene (CAS 205-99-2)

Listed: July 1, 1987

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 04-29-2015

Version # 01

NFPA ratings Health: 0
Flammability: 0
Instability: 0

Disclaimer

The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded SDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

This Safety Data Sheet (SDS) is intended only for use with Chem Service, Inc. products and should not be relied on for use with materials from any other supplier even if the chemical name(s) on the product are identical! Whenever using an SDS for a solution or mixture the user should refer to the SDS for every component of the solution or mixture. Chem Service warrants that this SDS is based upon the most current information available to Chem Service at the time it was last revised. THIS WARRANTY IS EXCLUSIVE, AND CHEM SERVICE, INC. MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. This SDS is provided gratis and CHEM SERVICE, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR CONTINGENT DAMAGES.

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This product is furnished FOR LABORATORY USE ONLY.

SAFETY DATA SHEET

Version 6.8
Revision Date 03/18/2023
Print Date 01/13/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : Chloroform

Product Number : 288306
Brand : Sigma-Aldrich
Index-No. : 602-006-00-4
CAS-No. : 67-66-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 3), H331
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Specific target organ toxicity - repeated exposure, Oral (Category 1), Liver, Kidney, H372
Short-term (acute) aquatic hazard (Category 3), H402

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Sigma-Aldrich - 288306

Page 1 of 13

Pictogram



Signal Word

Danger

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure if swallowed.
H402	Harmful to aquatic life.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe mist or vapors.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Trichloromethane
Methylidyne trichloride

Formula : CHCl_3

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Molecular weight : 119.38 g/mol
 CAS-No. : 67-66-3
 EC-No. : 200-663-8
 Index-No. : 602-006-00-4

Component	Classification	Concentration
Chloroform		
	Acute Tox. 4; Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; Repr. 2; STOT SE 3; STOT RE 1; Aquatic Acute 3; H302, H331, H315, H319, H351, H361, H336, H372, H402 Concentration limits: 20 %: STOT SE 3, H336;	<= 100 %
ethanol		
	Flam. Liq. 2; Eye Irrit. 2A; H225, H319 Concentration limits: >= 50 %: Eye Irrit. 2A, H319;	>= 1 - < 5 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

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SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water Foam Carbon dioxide (CO₂) Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Hydrogen chloride gas

Combustible.

Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Chloroform	67-66-3	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans		
		ST	2 ppm 9.78 mg/m ³	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen		
		C	50 ppm 240 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	2 ppm 9.78 mg/m ³	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
ethanol	64-17-5	TWA	1,000 ppm 1,900 mg/m ³	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		TWA	1,000 ppm 1,900 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	1,000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Confirmed animal carcinogen with unknown relevance to humans		

		TWA	1,000 ppm 1,900 mg/m ³	USA. NIOSH Recommended Exposure Limits
		PEL	1,000 ppm 1,900 mg/m ³	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact

Material: Viton®

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact

Material: butyl-rubber

Minimum layer thickness: 0.7 mm

Break through time: 10 min

Material tested: Butoject® (KCL 898)

Body Protection

protective clothing

Respiratory protection

required when vapours/aerosols are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid, clear Color: colorless
b) Odor	sweet
c) Odor Threshold	205 ppm
d) pH	No data available
e) Melting point/freezing point	Melting point: -64 °C (-83 °F)
f) Initial boiling point and boiling range	60.5 - 61.5 °C 140.9 - 142.7 °F at 1,013.25 hPa
g) Flash point	() - Regulation (EC) No. 440/2008, Annex, A.9 does not flash
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapor pressure	210 hPa at 20 °C (68 °F)
l) Vapor density	4.12 - (Air = 1.0)
m) Density	1.49 g/cm ³ at 25 °C (77 °F)
Relative density	No data available
n) Water solubility	8.7 g/l at 23 °C (73 °F) - OECD Test Guideline 105 - soluble
o) Partition coefficient: n-octanol/water	No data available
p) Autoignition temperature	No data available
q) Decomposition temperature	Distillable in an undecomposed state at normal pressure.
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	none

9.2 Other safety information

Solubility in other solvents	organic solvent at 20 °C (68 °F) - miscible
Relative vapor density	4.12 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Sensitivity to light heat-sensitive

The product is chemically stable under standard ambient conditions (room temperature) .

Contains the following stabilizer(s):

ethanol (≥ 0.5 - ≤ 1 %)

10.3 Possibility of hazardous reactions

Risk of explosion with:

Ammonia

Amines

nitrogen oxides

bases

Oxygen

alkali amides

organic nitro compounds

strong alkalis

Fluorine

peroxi compounds

Alkaline earth metals

Alkali metals

Powdered metals

Methanol

with

alcoholates

Methanol

with

strong alkalis

Iron

in powder form

various alloys

sensitive to shock

Methanol

with

Sodium hydroxide

magnesium

in powder form

Oxygen

with

alkali compounds

Aluminum

in powder form

Acetone

with

alkali compounds

Potassium

sensitive to shock

sodium

sensitive to shock

Violent reactions possible with:

phosphines

bis(dimethylamino)dimethyl tin
nonmetallic hydrogen compounds
Powdered metals
Light metals
Ketones
mineral acids
Strong oxidizing agents
semimetallic hydrogen compounds

10.4 Conditions to avoid

no information available

10.5 Incompatible materials

rubber, various plastics

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Acute toxicity estimate Oral - 912.56 mg/kg

(Calculation method)

LD50 Oral - Rat - male - 908 mg/kg

(OECD Test Guideline 401)

Acute toxicity estimate Inhalation - 4 h - 3.12 mg/l - vapor (Calculation method)

LC50 Inhalation - Rat - 6 h - 9.17 mg/l - vapor

Acute toxicity estimate Inhalation - Expert judgment - 4 h - 3.1 mg/l - vapor

Dermal: No data available

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Irritating to skin. - 24 h

Remarks: (ECHA)

Remarks: Drying-out effect resulting in rough and chapped skin.

Skin - Rabbit

Result: slight irritation

Remarks: (IUCLID)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Irritating to eyes.

Remarks: (ECHA)

Remarks: (Regulation (EC) No 1272/2008, Annex VI)

Respiratory or skin sensitization

Maximization Test - Guinea pig

Result: negative
(Regulation (EC) No. 440/2008, Annex, B.6)

Germ cell mutagenicity

Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Result: negative
Remarks: (ECHA)
Test Type: unscheduled DNA synthesis assay
Test system: Liver
Metabolic activation: without metabolic activation
Result: negative
Remarks: (ECHA)

Test Type: Micronucleus test
Species: Rat
Cell type: Red blood cells (erythrocytes)
Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

Test Type: unscheduled DNA synthesis assay
Species: Rat
Cell type: Liver cells
Application Route: Oral
Method: OECD Test Guideline 486
Result: negative

Test Type: in vivo assay
Species: Mouse

Application Route: Inhalation

Result: negative
Remarks: (ECHA)

Carcinogenicity

Suspected of causing cancer.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chloroform)
NTP: RAHC - Reasonably anticipated to be a human carcinogen (Chloroform)
OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

Suspected of damaging the unborn child.

Specific target organ toxicity - single exposure

May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure

Oral - Causes damage to organs through prolonged or repeated exposure.
- Liver, Kidney

Aspiration hazard

No data available

11.2 Additional Information

Repeated dose toxicity - Rat - female - Oral - NOAEL (No observed adverse effect level) - 34 mg/kg

Vomiting, Cough, irritant effects, Shortness of breath, respiratory arrest, narcosis, Dizziness, Nausea, agitation, spasms, inebriation, Headache, Stomach/intestinal disorders, ataxia (impaired locomotor coordination), cardiovascular disorders

Drying-out effect resulting in rough and chapped skin.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to algae	static test ErC50 - Chlamydomonas reinhardtii (green algae) - 13.3 mg/l - 72 h Remarks: (ECHA) (Chloroform)

Toxicity to bacteria	Remarks: (ECHA) (Chloroform)

Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Oryzias latipes - 0.15 mg/l - 9 Months Remarks: (ECHA)

Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - 6.3 mg/l - 21 d Remarks: (ECHA)

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)

UN number: 1888 Class: 6.1 Packing group: III
Proper shipping name: ChloroformSOLUTION

Reportable Quantity (RQ): 10 lbs
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 1888 Class: 6.1 Packing group: III EMS-
No: F-A, S-A
Proper shipping name: CHLOROFORMSOLUTION

IATA

UN number: 1888 Class: 6.1 Packing group: III
Proper shipping name: ChloroformSOLUTION

SECTION 15: Regulatory information

SARA 302 Components

Chloroform	CAS-No. 67-66-3	Revision Date 2008-11-03

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

Chloroform	CAS-No. 67-66-3	Revision Date 2008-11-03

Reportable Quantity : D022 lbs

Massachusetts Right To Know Components

Chloroform	CAS-No. 67-66-3	Revision Date 2008-11-03
	64-17-5	1993-04-24

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ethanol

Pennsylvania Right To Know Components

Chloroform	CAS-No. 67-66-3	Revision Date 2008-11-03
ethanol	64-17-5	1993-04-24

California Prop. 65 Components

, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov	CAS-No. 67-66-3	Revision Date 2011-09-01

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.8

Revision Date: 03/18/2023

Print Date: 01/13/2024

1. Identification

Product identifier	4,4'-DDT	
Other means of identification		
Item	N-10876	
CAS number	50-29-3	
Synonyms	1,1,1-TRICHLORO-2,2-BIS(4-CHLOROPHENYL)ETHANE * 4,4'-Dichlorodiphenyl trichloroethane	
Recommended use	For Laboratory Use Only	
Recommended restrictions	None known.	
Manufacturer/Importer/Supplier/Distributor information		
Manufacturer		
Company name	Chem Service, Inc.	
Address	660 Tower Lane West Chester, PA 19380 United States	
Telephone	Toll Free	800-452-9994
	Direct	610-692-3026
Website	www.chemservice.com	
E-mail	info@chemservice.com	
Emergency phone number	Chemtrec US	800-424-9300
	Chemtrec outside US	+1 703-527-3887

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Acute toxicity, oral	Category 3
	Acute toxicity, dermal	Category 3
	Carcinogenicity	Category 2
	Specific target organ toxicity, repeated exposure	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1
OSHA defined hazards	Not classified.	
Label elements		



Signal word	Danger
Hazard statement	Toxic if swallowed. Toxic in contact with skin. Suspected of causing cancer. Causes damage to organs through prolonged or repeated exposure. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.
Precautionary statement	
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.
Response	If swallowed: Immediately call a poison center/doctor. Rinse mouth. If on skin: Wash with plenty of water. If exposed or concerned: Get medical advice/attention. Call a poison center/doctor if you feel unwell. Take off immediately all contaminated clothing and wash it before reuse. Collect spillage.

Storage	Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
4,4'-DDT	1,1,1-TRICHLORO-2,2-BIS(4-CHLOROPHENYL)ETHANE 4,4'-Dichlorodiphenyl trichloroethane	50-29-3	100

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Take off immediately all contaminated clothing. Wash off with soap and water. Get medical advice/attention if you feel unwell. Get medical attention if irritation develops and persists. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
Most important symptoms/effects, acute and delayed	Convulsions. Headache. Dizziness. Nausea, vomiting. Prolonged exposure may cause chronic effects.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	Take off immediately all contaminated clothing. IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Water spray. Foam. Powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

The product is immiscible with water and will spread on the water surface. Prevent entry into waterways, sewer, basements or confined areas.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage**Precautions for safe handling**

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not taste or swallow. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. When using, do not eat, drink or smoke. Should be handled in closed systems, if possible. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Wash contaminated clothing before reuse. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection**Occupational exposure limits**

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Material	Type	Value
4,4'-DDT (CAS 50-29-3)	PEL	1 mg/m3

US. ACGIH Threshold Limit Values

Material	Type	Value
4,4'-DDT (CAS 50-29-3)	TWA	1 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Material	Type	Value
4,4'-DDT (CAS 50-29-3)	TWA	0.5 mg/m3

Biological limit values

No biological exposure limits noted for the ingredient(s).

Exposure guidelines**US - California OELs: Skin designation**

4,4'-DDT (CAS 50-29-3) Can be absorbed through the skin.

US - Tennessee OELs: Skin designation

4,4'-DDT (CAS 50-29-3) Can be absorbed through the skin.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

4,4'-DDT (CAS 50-29-3) Can be absorbed through the skin.

Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Observe any medical surveillance requirements. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties**Appearance**

Physical state Solid.

Form Crystalline Solid

Color Colorless

Odor Not available.

Odor threshold Not available.

pH Not available.

Melting point/freezing point 227.3 °F (108.5 °C)

Initial boiling point and boiling range 500 °F (260 °C)

366.8 °F (186 °C) 0.006666 kPa

Flash point 162.0 - 171.0 °F (72.2 - 77.2 °C) Closed Cup

Evaporation rate Not available.

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not available.

Flammability limit - upper (%) Not available.

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure < 0.0000001 kPa (68 °F (20 °C))

Vapor density Not available.

Relative density Not available.

Solubility(ies)

Solubility (water) Insoluble

Partition coefficient (n-octanol/water) 6.91

Auto-ignition temperature Not available.

Decomposition temperature 230 °F (110 °C)

Viscosity Not available.

Other information

Density 1.56 g/cm³ at 15 °C

Explosive properties Not explosive.

Molecular formula C₁₄H₉Cl₅

Molecular weight 354.49 g/mol

Oxidizing properties Not oxidizing.

10. Stability and reactivity

Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.

Chemical stability Material is stable under normal conditions.

Possibility of hazardous reactions No dangerous reaction known under conditions of normal use.

Conditions to avoid Avoid temperatures exceeding the decomposition temperature. Avoid temperatures exceeding the flash point. Contact with incompatible materials.

Incompatible materials Strong oxidizing agents.

Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful.
Skin contact	Toxic in contact with skin.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Toxic if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics
Convulsions. Headache. Dizziness. Nausea, vomiting.

Information on toxicological effects

Acute toxicity	Toxic in contact with skin. Toxic if swallowed.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.

Germ cell mutagenicity
No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity
Suspected of causing cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

4,4'-DDT (CAS 50-29-3) 2A Probably carcinogenic to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

4,4'-DDT (CAS 50-29-3) Reasonably Anticipated to be a Human Carcinogen.

Reproductive toxicity
This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure
Not classified.

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
Not an aspiration hazard.

Chronic effects
Causes damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity
Very toxic to aquatic life with long lasting effects.

Product	Species		Test Results
4,4'-DDT (CAS 50-29-3)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0.0005 - 0.001 mg/l, 48 hours
Fish	LC50	Bluegill (Lepomis macrochirus)	0.0013 - 0.002 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)
6.91

Mobility in soil
No data available.

Other adverse effects
No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
US RCRA Hazardous Waste U List: Reference	
4,4'-DDT (CAS 50-29-3)	U061
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

UN number	UN2811
UN proper shipping name	Toxic solid, organic, n.o.s. (4,4'-DDT)
Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	6L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN2811
UN proper shipping name	TOXIC SOLID, ORGANIC, N.O.S. (4,4'-DDT)
Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-A
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

IATA; IMDG



General information IMDG Regulated Marine Pollutant.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

4,4'-DDT (CAS 50-29-3) 0.1 % One-Time Export Notification only.

CERCLA Hazardous Substance List (40 CFR 302.4)

4,4'-DDT (CAS 50-29-3) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

4,4'-DDT (CAS 50-29-3)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130) Hazardous substance
Priority pollutant
Bioaccumulative chemical of concern
Toxic pollutant

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

4,4'-DDT (CAS 50-29-3) Listed: October 1, 1987

US - California Proposition 65 - CRT: Listed date/Developmental toxin

4,4'-DDT (CAS 50-29-3) Listed: May 15, 1998

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

4,4'-DDT (CAS 50-29-3) Listed: May 15, 1998

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

4,4'-DDT (CAS 50-29-3) Listed: May 15, 1998

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

4,4'-DDT (CAS 50-29-3)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No

Country(s) or region	Inventory name	On inventory (yes/no)*
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	06-09-2014
Revision date	02-25-2020
Version #	02
NFPA ratings	Health: 3 Flammability: 0 Instability: 0

Disclaimer

Chem Service, Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded SDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

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This product is furnished FOR LABORATORY USE ONLY.

Revision information

This document has undergone significant changes and should be reviewed in its entirety.

SAFETY DATA SHEET

Version 8.11
Revision Date 12/07/2023
Print Date 01/22/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : Ethylbenzene reference substance for gas chromatography

Product Number : 1.09635
Catalogue No. : 109635
Brand : Millipore
Index-No. : 601-023-00-4
CAS-No. : 100-41-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for analysis

1.3 Details of the supplier of the safety data sheet

Company : EMD Millipore Corporation
400 Summit Drive
BURLINGTON MA 01803
UNITED STATES

Telephone : +1 800-645-5476

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure (Category 2), hearing organs, H373
Aspiration hazard (Category 1), H304
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word

Danger

Hazard Statements

H225	Highly flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H332	Harmful if inhaled.
H351	Suspected of causing cancer.
H373	May cause damage to organs (hearing organs) through prolonged or repeated exposure.
H401	Toxic to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ 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.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P331	Do NOT induce vomiting.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

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Formula : C₈H₁₀
 Molecular weight : 106.17 g/mol
 CAS-No. : 100-41-4
 EC-No. : 202-849-4
 Index-No. : 601-023-00-4

Component	Classification	Concentration
ethylbenzene		
	Flam. Liq. 2; Acute Tox. 4; Carc. 2; STOT RE 2; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 3; H225, H332, H351, H373, H304, H401, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed

After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Pulmonary failure possible after aspiration of vomit. Call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water Carbon dioxide (CO₂) Foam Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Combustible.

Pay attention to flashback.

Vapors are heavier than air and may spread along floors.

Development of hazardous combustion gases or vapours possible in the event of fire.

Forms explosive mixtures with air at ambient temperatures.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.

Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemisorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures

Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Recommended storage temperature see product label.

Storage class

Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
ethylbenzene	100-41-4	TWA	100 ppm 435 mg/m ³	USA. NIOSH Recommended Exposure Limits
		ST	125 ppm 545 mg/m ³	USA. NIOSH Recommended Exposure Limits
		TWA	100 ppm 435 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	30 ppm 130 mg/m ³	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	5 ppm 22 mg/m ³	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis

ethylbenzene	100-41-4	Sum of mandelic acid and phenyl glyoxylic acid	0.15g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact

Material: Viton®

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 10 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

Recommended Filter type: Filter A (acc. to DIN 3181) for vapours of organic compounds

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

These measures have to be properly documented.

required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid Color: colorless
b) Odor	aromatic
c) Odor Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	-94.9 °C (-138.8 °F) at 101.3 hPa - (ECHA)
f) Initial boiling point and boiling range	136.1 °C 277.0 °F at 1,013.3 hPa
g) Flash point	23 °C (73 °F) - closed cup - Regulation (EC) No. 440/2008, Annex, A.9
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 6.7 %(V) Lower explosion limit: 1 %(V)
k) Vapor pressure	9.52 hPa at 20 °C (68 °F) - OECD Test Guideline 104
l) Vapor density	No data available
m) Density	0.87 g/cm ³ at 20 °C (68 °F)
Relative density	0.86 - 0.8720 °C
n) Water solubility	0.2 g/l at 25 °C (77 °F) - Regulation (EC) No. 440/2008, Annex, A.6 - slightly soluble
o) Partition coefficient: n-octanol/water	Pow: 4,170; log Pow: 3.6 at 20 °C (68 °F) - Regulation (EC) No. 440/2008, Annex, A.8
p) Autoignition temperature	430 °C (806 °F) at 1,013 hPa
q) Decomposition temperature	No data available
r) Viscosity	0.773 mm ² /s at 20 °C (68 °F) - OECD Test Guideline 114 -
s) Explosive properties	No data available
t) Oxidizing properties	none

9.2 Other safety information

Surface tension	71.2 mN/m at 23 °C (73 °F)

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SECTION 10: Stability and reactivity

10.1 Reactivity

Vapors may form explosive mixture with air.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:

Strong oxidizing agents

10.4 Conditions to avoid

Warming.

10.5 Incompatible materials

rubber, various plastics

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male and female - 3,500 mg/kg

Remarks: (ECHA)

LC50 Inhalation - Rat - male - 4 h - 17.8 mg/l - vapor

Remarks: (ECHA)

LD50 Dermal - Rabbit - 15,433 mg/kg

Remarks: (RTECS)

Skin corrosion/irritation

Skin - Rabbit

Result: Moderate skin irritation - 24 h

Remarks: (ECHA)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation

Remarks: (ECHA)

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

Test Type: Chromosome aberration test in vitro

Test system: Chinese hamster ovary cells

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 473
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative

Test Type: Micronucleus test
Species: Mouse
Cell type: Bone marrow
Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

Test Type: unscheduled DNA synthesis assay
Species: Mouse

Application Route: Inhalation
Method: OECD Test Guideline 486
Result: negative

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (ethylbenzene)
NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

- hearing organs

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Aspiration hazard

Aspiration may cause pulmonary edema and pneumonitis.

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 28 d - NOAEL (No observed adverse effect level) - 75 mg/kg

Central nervous system depression, Nausea, Headache, Vomiting, Ataxia., Tremors
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Systemic effects:

CNS disorders
Tiredness
Drowsiness
Dizziness
Convulsions
Headache
narcosis

Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - 4.2 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 1.8 - 2.4 mg/l - 48 h (US-EPA)
Toxicity to algae	static test EC50 - Pseudokirchneriella subcapitata (green algae) - 3.6 mg/l - 96 h (US-EPA)
Toxicity to bacteria	EC50 - Photobacterium phosphoreum - 9.68 mg/l - 30 min Remarks: (IUCLID)

12.2 Persistence and degradability

Biodegradability aerobic - Exposure time 28 d
Result: ca.79 % - Readily biodegradable.
(ISO 14593)

12.3 Bioaccumulative potential

Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 1175 Class: 3 Packing group: II
Proper shipping name: Ethylbenzene
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 1175 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ETHYLBENZENE

IATA

UN number: 1175 Class: 3 Packing group: II
Proper shipping name: Ethylbenzene

SECTION 15: Regulatory information

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
ethylbenzene	100-41-4	2007-07-01

Massachusetts Right To Know Components

	CAS-No.	Revision Date
ethylbenzene	100-41-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
ethylbenzene	100-41-4	2007-07-01

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California Prop. 65 Components

, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov/ethylbenzene

CAS-No.
100-41-4

Revision Date
2007-09-28

SECTION 16: Other information**Further information**

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact misbranding@sial.com.

Version: 8.11

Revision Date: 12/07/2023

Print Date: 01/22/2024

1. Identification

Product identifier	Benzo(b)fluoranthene		
Other means of identification			
Item	N-11165		
Recommended use	For Laboratory Use Only		
Recommended restrictions	None known.		
Manufacturer/Importer/Supplier/Distributor information			
Manufacturer			
Company name	Chem Service, Inc.		
Address	660 Tower Lane West Chester, PA 19380 United States		
Telephone	Toll Free	800-452-9994	
	Direct	610-692-3026	
Website	www.chemservice.com		
E-mail	info@chemservice.com		
Emergency phone number	Chemtrec US	800-424-9300	
	Chemtrec outside US	+1 703-527-3887	

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Carcinogenicity	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1
OSHA defined hazards	Not classified.	
Label elements		



Signal word	Danger	
Hazard statement	May cause cancer. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.	
Precautionary statement		
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.	
Response	If exposed or concerned: Get medical advice/attention. Collect spillage.	
Storage	Store locked up.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Hazard(s) not otherwise classified (HNOC)	None known.	
Supplemental information	Not applicable.	

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
Benzo(b)fluoranthene		205-99-2	100

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
General information	IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO ₂).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways. Stop the flow of material, if this is without risk. Collect spillage. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Contact local authorities in case of spillage to drain/aquatic environment. Prevent further leakage or spillage if safe to do so. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Avoid release to the environment. Do not empty into drains.
Conditions for safe storage, including any incompatibilities	Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits	No exposure limits noted for ingredient(s).
Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Use personal protective equipment as required.

Skin protection	
Hand protection	Use personal protective equipment as required.
Other	Use personal protective equipment as required.
Respiratory protection	Use personal protective equipment as required.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state	Solid.
Form	Solid. Crystalline Solid
Color	Pale yellow
Odor	Not available.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	334.4 °F (168 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	0.0000001 kPa at 25 °C
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	6.6
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Molecular formula	C20-H12
Molecular weight	252.32 g/mol

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	No adverse effects due to inhalation are expected.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.

Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity	Not available.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not available.
Skin sensitization	This product is not expected to cause skin sensitization.

Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity	May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Benzo(b)fluoranthene (CAS 205-99-2)	2B Possibly carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens

Benzo(b)fluoranthene (CAS 205-99-2)	Reasonably Anticipated to be a Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not available.
Chronic effects	Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity	Very toxic to aquatic life with long lasting effects. Accumulation in aquatic organisms is expected.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	Not available.

Partition coefficient n-octanol / water (log Kow)

6.6

Mobility in soil	No data available.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. This material and its container must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging

Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information**DOT**

UN number	UN3077
UN proper shipping name	Environmentally hazardous substances, solid, n.o.s. (Benzo(b)fluoranthene RQ = 1 LBS)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Label(s)	9
Packing group	III
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	8, 146, 335, A112, B54, IB8, IP3, N20, T1, TP33
Packaging exceptions	155
Packaging non bulk	213
Packaging bulk	240

IATA

UN number	UN3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (Benzo(b)fluoranthene)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	9L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed.
Cargo aircraft only	Allowed.

IMDG

UN number	UN3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo(b)fluoranthene)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-F
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

DOT; IATA; IMDG

**General information**

DOT Regulated Marine Pollutant. IMDG Regulated Marine Pollutant.

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
One or more components are not listed on TSCA.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Benzo(b)fluoranthene (CAS 205-99-2) Listed.

SARA 304 Emergency release notification

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - No
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Benzo(b)fluoranthene	205-99-2	100

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Benzo(b)fluoranthene (CAS 205-99-2)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130) Priority pollutant
Toxic pollutant

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US - New Jersey RTK - Substances: Listed substance

Benzo(b)fluoranthene (CAS 205-99-2)

US - Pennsylvania RTK - Hazardous Substances: Special hazard

Benzo(b)fluoranthene (CAS 205-99-2)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Benzo(b)fluoranthene (CAS 205-99-2)

US. Massachusetts RTK - Substance List

Benzo(b)fluoranthene (CAS 205-99-2)

US. New Jersey Worker and Community Right-to-Know Act

Benzo(b)fluoranthene (CAS 205-99-2)

US. Pennsylvania RTK - Hazardous Substances

Benzo(b)fluoranthene (CAS 205-99-2)

US. Pennsylvania Worker and Community Right-to-Know Law

Benzo(b)fluoranthene (CAS 205-99-2)

US. Rhode Island RTK

Benzo(b)fluoranthene (CAS 205-99-2)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Benzo(b)fluoranthene (CAS 205-99-2)

Listed: July 1, 1987

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 04-29-2015

Version # 01

NFPA ratings Health: 0
Flammability: 0
Instability: 0

Disclaimer

The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded SDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

This Safety Data Sheet (SDS) is intended only for use with Chem Service, Inc. products and should not be relied on for use with materials from any other supplier even if the chemical name(s) on the product are identical! Whenever using an SDS for a solution or mixture the user should refer to the SDS for every component of the solution or mixture. Chem Service warrants that this SDS is based upon the most current information available to Chem Service at the time it was last revised. THIS WARRANTY IS EXCLUSIVE, AND CHEM SERVICE, INC. MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. This SDS is provided gratis and CHEM SERVICE, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR CONTINGENT DAMAGES.

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This product is furnished FOR LABORATORY USE ONLY.

SAFETY DATA SHEET

Creation Date 02-Nov-2009

Revision Date 13-Oct-2023

Revision Number 8

1. Identification

Product Name Iron, reference standard solution 1000 ppm

Cat No. : SI124-100; SI124-500

Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Thermo Fisher Scientific
Technology Drive , PA 15219 USA
Telephone: 412-770-2326
Fax: 412-770-2224

Emergency Telephone Number

CHEMTREC®, Inside the USA: 800-424-9300

CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Corrosive to metals	Category 1
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 1

Label Elements

Signal Word

Danger

Hazard Statements

May be corrosive to metals

Causes skin irritation

Causes serious eye damage

**Precautionary Statements****Prevention**

Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Keep only in original container

Skin

IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician

Spills

Absorb spillage to prevent material damage

Storage

Store in corrosive resistant polypropylene container with a resistant inliner

Hazards not otherwise classified (HNOC)

None identified

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Water	7732-18-5	> 94
Nitric acid ...% [C ≤ 70 %]	7697-37-2	< 5
Iron(III) nitrate nonahydrate	7782-61-8	< 1

4. First-aid measures

General Advice	If symptoms persist, call a physician.
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water.
Most important symptoms and effects	Causes eye burns. Causes severe eye damage.
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media	No information available

Flash Point Not applicable
Method - No information available

Autoignition Temperature No information available

Explosion Limits

Upper No data available

Lower No data available

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors. In the event of fire and/or explosion do not breathe fumes.

Hazardous Combustion Products

Nitrogen oxides (NOx). Thermal decomposition can lead to release of irritating gases and vapors.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
3

Flammability
0

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions

Use personal protective equipment as required. Ensure adequate ventilation.

Environmental Precautions

Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling

Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation.

Storage.

Keep containers tightly closed in a dry, cool and well-ventilated place. Do not store in metal containers. Corrosives area. Keep in properly labeled containers. Incompatible Materials. Strong oxidizing agents. Strong bases. Metals.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Nitric acid ...% [C ≤ 70 %]	TWA: 2 ppm STEL: 4 ppm	(Vacated) TWA: 2 ppm (Vacated) TWA: 5 mg/m ³ (Vacated) STEL: 4 ppm (Vacated) STEL: 10 mg/m ³ TWA: 2 ppm TWA: 5 mg/m ³	IDLH: 25 ppm TWA: 2 ppm TWA: 5 mg/m ³ STEL: 4 ppm STEL: 10 mg/m ³	TWA: 2 ppm STEL: 4 ppm
Iron(III) nitrate nonahydrate	TWA: 1 mg/m ³	(Vacated) TWA: 1 mg/m ³	TWA: 1 mg/m ³	TWA: 1 mg/m ³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Tight sealing safety goggles. Face protection shield.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Recommended Filter type: Particulates filter conforming to EN 143.

Hygiene Measures Keep away from food, drink and animal feeding stuffs. When using do not eat, drink or smoke. Contaminated work clothing should not be allowed out of the workplace. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes or clothing. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wear suitable gloves and eye/face protection.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear
Odor	Odorless
Odor Threshold	No information available
pH	< 1
Melting Point/Range	> 0 °C / 32 °F
Boiling Point/Range	< 100 °C / 212 °F
Flash Point	Not applicable
Evaporation Rate	> 1 (Ether = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	14 mmHg
Vapor Density	No information available
Specific Gravity	~ 1.0
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat. Exposure to air or moisture over prolonged periods.
Incompatible Materials	Strong oxidizing agents, Strong bases, Metals
Hazardous Decomposition Products	Nitrogen oxides (NOx), Thermal decomposition can lead to release of irritating gases and vapors
Hazardous Polymerization	Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50

Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Dermal LD50

Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Vapor LC50

Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-
Nitric acid ...% [C ≤ 70 %]	Not listed	Not listed	LC50 = 2500 ppm. (Rat) 1h
Iron(III) nitrate nonahydrate	LD50 = 3250 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Severe eye irritant. Irritating to skin.

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Nitric acid ...% [C ≤ 70 %]	7697-37-2	Not listed	Not listed	Not listed	Not listed	Not listed
Iron(III) nitrate nonahydrate	7782-61-8	Not listed	Not listed	Not listed	Not listed	Not listed

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

Group 2A - Probably Carcinogenic to Humans

Group 2B - Possibly Carcinogenic to Humans

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains. .

Persistence and Degradability Miscible with water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Nitric acid ...% [C ≤ 70 %]	-2.3

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3264
 Proper Shipping Name Corrosive liquid, acidic, inorganic, n.o.s.
 Technical Name (NITRIC ACID)
 Hazard Class 8
 Packing Group III

TDG

UN-No UN3264
 Proper Shipping Name Corrosive liquid, acidic, inorganic, n.o.s.
 Hazard Class 8
 Packing Group III

IATA

UN-No UN3264
 Proper Shipping Name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.*
 Hazard Class 8
 Packing Group III

IMDG/IMO

UN-No UN3264
 Proper Shipping Name Corrosive liquid, acidic, inorganic, n.o.s.
 Hazard Class 8
 Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Nitric acid ...% [C ≤ 70 %]	7697-37-2	X	ACTIVE	-
Iron(III) nitrate nonahydrate	7782-61-8	-	-	-

Legend:

TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT)

Not applicable

TSCA 12(b) - Notices of Export

Not applicable

International Inventories

Canada (DSL/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	X		X	X	KE-35400
Nitric acid ...% [C ≤ 70 %]	7697-37-2	X	-	231-714-2	X	X	X	X	X	KE-25911
Iron(III) nitrate nonahydrate	7782-61-8	-	-	-	X	X		X	X	-

KECL - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Nitric acid ...% [C ≤ 70 %]	7697-37-2	< 5	1.0
Iron(III) nitrate nonahydrate	7782-61-8	< 1	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Nitric acid ...% [C ≤ 70 %]	X	1000 lb	-	-

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Nitric acid ...% [C ≤ 70 %]	-	TQ: 500 lb

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
Nitric acid ...% [C ≤ 70 %]	1000 lb	1000 lb

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Nitric acid ...% [C ≤ 70 %]	X	X	X	X	X
Iron(III) nitrate nonahydrate	-	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product contains the following DHS chemicals:
Legend - STQs = Screening Threshold Quantities, APA = A placarded amount

Component	DHS Chemical Facility Anti-Terrorism Standard
Nitric acid ...% [C ≤ 70 %]	Release STQs - 15000lb Theft STQs - 400lb

Other International Regulations

Mexico - Grade

No information available

Authorisation/Restrictions according to EU REACH

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Water	7732-18-5	-	-	-
Nitric acid ...% [C ≤ 70 %]	7697-37-2	-	Use restricted. See item 75. (see link for restriction details)	-
Iron(III) nitrate nonahydrate	7782-61-8	-	-	-

REACH links

<https://echa.europa.eu/substances-restricted-under-reach>

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Water	7732-18-5	Listed	Not applicable	Not applicable	Not applicable
Nitric acid ...% [C ≤ 70 %]	7697-37-2	Listed	Not applicable	Not applicable	Not applicable
Iron(III) nitrate nonahydrate	7782-61-8	Not applicable	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?

Not applicable

Other International Regulations

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Water	7732-18-5	Not applicable	Not applicable	Not applicable	Not applicable
Nitric acid ...% [C ≤ 70 %]	7697-37-2	Not applicable	Not applicable	Not applicable	Annex I - Y34
Iron(III) nitrate nonahydrate	7782-61-8	Not applicable	Not applicable	Not applicable	Not applicable

16. Other information

Prepared By

Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date

02-Nov-2009

Revision Date

13-Oct-2023

Print Date

13-Oct-2023

Revision Summary

This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the

date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Appendix G Safety Data Sheets

MSDS Number: **C5170** * * * * * Effective Date: **02/23/06** * * * * * Supersedes: **02/12/04**

MSDS**Material Safety Data Sheet**

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



Mallinckrodt
CHEMICALS



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

COPPER METAL

1. Product Identification

Synonyms: C.I. 77400; Arwood Copper

CAS No.: 7440-50-8

Molecular Weight: 63.546

Chemical Formula: Cu

Product Codes:

J.T. Baker: 1714, 1720, 1732, 1736

Mallinckrodt: 1733, 4649

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
-----	-----	-----	-----
Copper	7440-50-8	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION

TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS THE LIVER AND KIDNEYS. CHRONIC EXPOSURE MAY CAUSE TISSUE DAMAGE.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Life)

Flammability Rating: 1 - Slight

Reactivity Rating: 2 - Moderate

Contact Rating: 1 - Slight

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD;
PROPER GLOVES

Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:

Inhalation of dusts and fumes of metallic copper causes irritation of the upper respiratory tract, congestion of nasal mucous membranes, ulceration and perforation of the nasal septum, and pharyngeal congestion. Inhalation of copper fumes may give rise to metal fume fever (high temperature, metallic taste, nausea, coughing, general weakness, muscle aches, and exhaustion).

Ingestion:

Copper ingestion causes nausea, vomiting, abdominal pain, metallic taste, and diarrhea. Ingestion of large doses may cause stomach and intestine ulceration, jaundice, and kidney and liver damage.

Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain. Exposure to copper dust may cause a greenish-black skin discoloration.

Eye Contact:

Small copper particles in the eyes may cause irritation, discoloration, and damage.

Chronic Exposure:

Prolonged or repeated exposure to copper can discolor skin and hair and irritate the skin; may cause mild dermatitis, runny nose, and irritation of the mucous membranes. Repeated ingestion may damage the liver and kidneys. Repeated inhalation can cause chronic respiratory disease.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or impaired liver, kidney, or pulmonary function or pre-existing Wilson's disease may be more susceptible to the effects of this material.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard since the bulk solid does not burn, but very finely divided particles (ultra-fine powder) may burn in air.

Explosion:

Not considered to be an explosion hazard. Reactions with incompatibles may pose an explosion hazard. Liquid copper explodes on contact with water. High concentrations of finely divided copper particles in the air may present an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Avoid exposure to air and moisture. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

Copper Dust and Mists, as Cu:

- OSHA Permissible Exposure Limit (PEL) -
1 mg/m³ (TWA)
- ACGIH Threshold Limit Value (TLV) -
1 mg/m³ (TWA)

Copper Fume:

- OSHA Permissible Exposure Limit (PEL) -
0.1 mg/m³ (TWA)
- ACGIH Threshold Limit Value (TLV) -
0.2 mg/m³ (TWA)

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece particulate respirator (NIOSH type N100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Reddish, metallic solid.

Odor:

Odorless.

Solubility:

Insoluble in water.

Density:

8.94

pH:

No information found.

% Volatiles by volume @ 21C (70F):

0

Boiling Point:

2595C (4703F)

Melting Point:

1083C (1981F)

Vapor Density (Air=1):

Not applicable.

Vapor Pressure (mm Hg):

1 @ 1628C (2962F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Copper becomes dull when exposed to air; on exposure to moist air it gradually converts to the carbonate. On long standing, a white, highly explosive peroxide deposit may form.

Hazardous Decomposition Products:

No information found.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Copper is incompatible with oxidizers, alkalis, acetylene, chlorine plus oxygen difluoride, phosphorus, nitric acid, potassium peroxide, 1-bromo-2-propyne, sulfur plus chlorates. Reacts violently with ammonium nitrate, bromates, iodates, chlorates, ethylene oxide, hydrozoic acid, potassium oxide, dimethyl sulfoxide plus trichloroacetic acid, hydrogen peroxide, sodium peroxide, sodium azide, sulfuric acid, hydrogen sulfide plus air, and lead azide. A potentially explosive reaction occurs with acetylenic compounds. Copper ignites on contact with chlorine, fluorine (above 121C), chlorine trifluoride, and hydrazinum nitrate (above 70C). An incandescent reaction occurs with potassium dioxide.

Conditions to Avoid:

Incompatibles and prolonged exposure to air and moisture.

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure. Investigated as a tumorigen and a reproductive effector.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	

Copper (7440-50-8)	No	No	None

12. Ecological Information

Environmental Fate:

No information found.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

Ingredient	TSCA	EC	Japan	Australia
Copper (7440-50-8)	Yes	Yes	No	Yes

Ingredient	Korea	DSL	Phil.
Copper (7440-50-8)	Yes	Yes	Yes

Ingredient	-SARA 302- RQ	TPQ	-SARA 313- List	Chemical Catg.
Copper (7440-50-8)	No	No	Yes	No

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Copper (7440-50-8)	5000	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
 Reactivity: No (Pure / Solid)

Australian Hazchem Code: None allocated.**Poison Schedule:** None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 0 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS THE LIVER AND KIDNEYS. CHRONIC EXPOSURE MAY CAUSE TISSUE DAMAGE.

Label Precautions:

Avoid contact with eyes, skin and clothing.

Wash thoroughly after handling.

Avoid breathing dust or vapors.

Keep container closed.

Use only with adequate ventilation.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 3.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **L2347** * * * * * Effective Date: **07/05/07** * * * * * Supersedes: **05/07/07**

MSDS**Material Safety Data Sheet**

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



Mallinckrodt
CHEMICALS



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Chemtec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

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LEAD METAL

1. Product Identification

Synonyms: Granular lead, pigment metal; C.I. 77575

CAS No.: 7439-92-1

Molecular Weight: 207.19

Chemical Formula: Pb

Product Codes:

J.T. Baker: 2256, 2266

Mallinckrodt: 5668

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
-----	-----	-----	-----
Lead	7439-92-1	95 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES

IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Lead can be absorbed through the respiratory system. Local irritation of bronchia and lungs can occur and, in cases of acute exposure, symptoms such as metallic taste, chest and abdominal pain, and increased lead blood levels may follow. See also Ingestion.

Ingestion:

POISON! The symptoms of lead poisoning include abdominal pain and spasms, nausea, vomiting, headache. Acute poisoning can lead to muscle weakness, "lead line" on the gums, metallic taste, definite loss of appetite, insomnia, dizziness, high lead levels in blood and urine with shock, coma and death in extreme cases.

Skin Contact:

Lead and lead compounds may be absorbed through the skin on prolonged exposure; the symptoms of lead poisoning described for ingestion exposure may occur. Contact over short periods may cause local irritation, redness and pain.

Eye Contact:

Absorption can occur through eye tissues but the more common hazards are local irritation or abrasion.

Chronic Exposure:

Lead is a cumulative poison and exposure even to small amounts can raise the body's content to toxic levels. The symptoms of chronic exposure are like those of ingestion poisoning; restlessness, irritability, visual disturbances, hypertension and gray facial color may also be noted.

Aggravation of Pre-existing Conditions:

Persons with pre-existing kidney, nerve or circulatory disorders or with skin or eye problems may be more susceptible to the effects of this substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard. Powder/dust is flammable when heated or exposed to flame.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Can produce toxic lead fumes at elevated temperatures and also react with oxidizing materials.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Areas in which exposure to lead metal or lead compounds may occur should be identified by signs or appropriate means, and access to the area should be limited to authorized persons. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all

warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

For lead, metal and inorganic dusts and fumes, as Pb:

-OSHA Permissible Exposure Limit (PEL): 0.05 mg/m³ (TWA)

For lead, elemental and inorganic compounds, as Pb:

-ACGIH Threshold Limit Value (TLV): 0.05 mg/m³ (TWA), A3 animal carcinogen

ACGIH Biological Exposure Indices (BEI): 30 ug/100ml, notation B (see actual Indices for more information).

For lead, inorganic:

-NIOSH Recommended Exposure Limit (REL): 0.1 mg/m³ (TWA)

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face high efficiency particulate respirator (NIOSH type N100 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency particulate respirator (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Other Control Measures:

Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing lead compounds are handled, processed, or stored. See OSHA substance-specific standard for more information on personal protective equipment, engineering and work practice controls, medical surveillance, record keeping, and reporting requirements. (29 CFR 1910.1025).

9. Physical and Chemical Properties

Appearance:

Small, white to blue-gray metallic shot or granules.

Odor:

Odorless.

Solubility:

Insoluble in water.

Density:

11.34

pH:

No information found.

% Volatiles by volume @ 21C (70F):

0

Boiling Point:

1740C (3164F)

Melting Point:

327.5C (622F)

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

1.77 @ 1000C (1832F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Does not decompose but toxic lead or lead oxide fumes may form at elevated temperatures.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Ammonium nitrate, chlorine trifluoride, hydrogen peroxide, sodium azide, zirconium, disodium acetylide, sodium acetylide and oxidants.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:

Investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

Lead and other smelter emissions are human reproductive hazards. (Chemical Council on Environmental Quality; Chemical Hazards to Human Reproduction, 1981).

Carcinogenicity:

EPA / IRIS classification: Group B2 - Probable human carcinogen, sufficient animal evidence.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Lead (7439-92-1)	No	No	2B

12. Ecological Information

Environmental Fate:

When released into the soil, this material is not expected to leach into groundwater. This material may bioaccumulate to some extent.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Lead (7439-92-1)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	--Canada--		Phil.
		DSL	NDSL	
Lead (7439-92-1)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.

Lead (7439-92-1)	No	No	Yes	No
-----\Federal, State & International Regulations - Part 2\-----				
Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)	
-----	-----	-----	-----	
Lead (7439-92-1)	10	No	No	

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
 Reactivity: No (Pure / Solid)

WARNING:

THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: None allocated.

Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **1** Reactivity: **0**

Label Hazard Warning:

POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

Label Precautions:

Do not get in eyes, on skin, or on clothing.
 Do not breathe dust.
 Keep container closed.
 Use only with adequate ventilation.
 Wash thoroughly after handling.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 3.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **M1599** * * * * * *Effective Date: 12/19/05* * * * * * *Supersedes: 08/10/04*

MSDS**Material Safety Data Sheet**

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



Mallinckrodt
CHEMICALS



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

MERCURY

1. Product Identification

Synonyms: Quicksilver; hydrargyrum; Liquid Silver

CAS No.: 7439-97-6

Molecular Weight: 200.59

Chemical Formula: Hg

Product Codes:

J.T. Baker: 2564, 2567, 2569

Mallinckrodt: 1278, 1280, 1288

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
-----	-----	-----	-----
Mercury	7439-97-6	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! CORROSIVE. CAUSES BURNS TO SKIN, EYES, AND RESPIRATORY

TRACT. MAY BE FATAL IF SWALLOWED OR INHALED. HARMFUL IF ABSORBED THROUGH SKIN. AFFECTS THE KIDNEYS AND CENTRAL NERVOUS SYSTEM. MAY CAUSE ALLERGIC SKIN REACTION.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Life)

Flammability Rating: 0 - None

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: White (Corrosive)

Potential Health Effects

Inhalation:

Mercury vapor is highly toxic via this route. Causes severe respiratory tract damage. Symptoms include sore throat, coughing, pain, tightness in chest, breathing difficulties, shortness of breath, headache, muscle weakness, anorexia, gastrointestinal disturbance, ringing in the ear, liver changes, fever, bronchitis and pneumonitis. Can be absorbed through inhalation with symptoms similar to ingestion.

Ingestion:

May cause burning of the mouth and pharynx, abdominal pain, vomiting, corrosive ulceration, bloody diarrhea. May be followed by a rapid and weak pulse, shallow breathing, paleness, exhaustion, tremors and collapse. Delayed death may occur from renal failure. Gastrointestinal uptake of mercury is less than 5% but its ability to penetrate tissues presents some hazard. Initial symptoms may be thirst, possible abdominal discomfort.

Skin Contact:

Causes irritation and burns to skin. Symptoms include redness and pain. May cause skin allergy and sensitization. Can be absorbed through the skin with symptoms to parallel ingestion.

Eye Contact:

Causes irritation and burns to eyes. Symptoms include redness, pain, blurred vision; may cause serious and permanent eye damage.

Chronic Exposure:

Chronic exposure through any route can produce central nervous system damage. May cause muscle tremors, personality and behavior changes, memory loss, metallic taste, loosening of the teeth, digestive disorders, skin rashes, brain damage and kidney damage. Can cause skin allergies and accumulate in the body. Repeated skin contact can cause the skin to turn gray in color. A suspected reproductive hazard; may damage the developing fetus and decrease fertility in males and females.

Aggravation of Pre-existing Conditions:

Persons with nervous disorders, or impaired kidney or respiratory function, or a history of allergies or a known sensitization to mercury may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Undergoes hazardous reactions in the presence of heat and sparks or ignition. Smoke may contain toxic mercury or mercuric oxide. Smoke may contain toxic mercury or mercuric oxide.

6. Accidental Release Measures

Ventilate area of leak or spill. Clean-up personnel require protective clothing and respiratory protection from vapor.

Spills: Pick up and place in a suitable container for reclamation or disposal in a method that does not generate misting. Sprinkle area with sulfur or calcium polysulfide to suppress mercury. Do not flush to sewer. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker CINNASORB® and RESISORB® are recommended for spills of this product.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Do not use or store on porous work surfaces (wood, unsealed concrete, etc.). Follow strict hygiene practices. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

- OSHA Acceptable Ceiling Concentration:
mercury and mercury compounds: 0.1 mg/m³ (TWA), skin
- ACGIH Threshold Limit Value (TLV):
inorganic and metallic mercury, as Hg: 0.025 mg/m³ (TWA) skin, A4 Not classifiable as a human carcinogen.
- ACGIH Biological Exposure Indices:
total inorganic mercury in urine (preshift): 35 ug/g creatinine;
total inorganic mercury in blood (end of shift): 15 ug/l.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face respirator with a mercury vapor or chlorine gas cartridge may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with a mercury vapor or chlorine gas cartridge may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator.

WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Silver-white, heavy, mobile, liquid metal.

Odor:

Odorless.

Solubility:

Insoluble in water.

Density:

13.55

pH:

No information found.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

356.7C (675F)

Melting Point:

-38.87C (-38F)

Vapor Density (Air=1):

7.0

Vapor Pressure (mm Hg):

0.0018 @ 25C (77F)

Evaporation Rate (BuAc=1):

4

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

At high temperatures, vaporizes to form extremely toxic fumes.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Acetylenes, ammonia, ethylene oxide, chlorine dioxide, azides, metal oxides, methyl silane, lithium, rubidium, oxygen, strong oxidants, metal carbonyls.

Conditions to Avoid:

Heat, flames, ignition sources, metal surfaces and incompatibles.

11. Toxicological Information

Toxicological Data:

Investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

All forms of mercury can cross the placenta to the fetus, but most of what is known has been learned from experimental animals. See Chronic Health Hazards.

Carcinogenicity:

EPA / IRIS classification: Group D1 - Not classifiable as a human carcinogen.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Mercury (7439-97-6)	No	No	3

12. Ecological Information

Environmental Fate:

This material has an experimentally-determined bioconcentration factor (BCF) of greater than 100. This material is expected to significantly bioaccumulate.

Environmental Toxicity:

This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are less than 1 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, MERCURY

Hazard Class: 8

UN/NA: UN2809

Packing Group: III

Information reported for product/size: 1LB

International (Water, I.M.O.)

Proper Shipping Name: MERCURY

Hazard Class: 8

UN/NA: UN2809

Packing Group: III

Information reported for product/size: 1LB

International (Air, I.C.A.O.)

Proper Shipping Name: MERCURY

Hazard Class: 8

UN/NA: UN2809

Packing Group: III

Information reported for product/size: 1LB

15. Regulatory Information

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Mercury (7439-97-6)                         Yes   Yes   No     Yes

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-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  DSL   NDSL  Phil.
-----
Mercury (7439-97-6)                         Yes   Yes   No     Yes

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-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ      TPQ      List  Chemical Catg.
-----
Mercury (7439-97-6)                         No     No     Yes    No

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```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     CERCLA  -RCRA-  -TSCA-
                                     1       261.33  8(d)
-----
Mercury (7439-97-6)                         1       U151    No

```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
 Reactivity: No (Pure / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 2Z

Poison Schedule: S7

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 3 Flammability: 0 Reactivity: 0

Label Hazard Warning:

DANGER! CORROSIVE. CAUSES BURNS TO SKIN, EYES, AND RESPIRATORY TRACT. MAY BE FATAL IF SWALLOWED OR INHALED. HARMFUL IF ABSORBED THROUGH SKIN. AFFECTS THE KIDNEYS AND CENTRAL NERVOUS SYSTEM. MAY CAUSE ALLERGIC SKIN REACTION.

Label Precautions:

Do not get in eyes, on skin, or on clothing.
 Do not breathe vapor.
 Keep container closed.
 Use only with adequate ventilation.

Wash thoroughly after handling.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 3.

Disclaimer:

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Prepared by: Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **Z3705** * * * * * Effective Date: **12/05/05** * * * * * Supersedes: **05/07/03**

MSDS**Material Safety Data Sheet**

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



Mallinckrodt
CHEMICALS



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ZINC OXIDE

1. Product Identification

Synonyms: Chinese white; zinc white; flowers of zinc; calamine

CAS No.: 1314-13-2

Molecular Weight: 81.38

Chemical Formula: ZnO

Product Codes:

J.T. Baker: 4358, 4360, 5070

Mallinckrodt: 3419, 7030, 8824, 8825, 8832, 8843

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
-----	-----	-----	-----
Zinc Oxide	1314-13-2	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY IRRITATE RESPIRATORY TRACT.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 1 - Slight

Reactivity Rating: 0 - None

Contact Rating: 1 - Slight

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:

May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath. Inhalation can cause a flu-like illness (metal fume fever). This 24- to 48-hour illness is characterized by chills, fever, aching muscles, dryness in the mouth and throat and headache.

Ingestion:

Large oral doses may cause irritation to the gastrointestinal tract.

Skin Contact:

Not expected to be a health hazard from skin exposure.

Eye Contact:

Not expected to be a health hazard.

Chronic Exposure:

No information found.

Aggravation of Pre-existing Conditions:

Persons with a pre-existing heart condition or impaired respiratory function may be more susceptible to the effects of this substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. Get medical attention for any breathing difficulty.

Ingestion:

Not expected to require first aid measures. If large amounts were swallowed, give water to drink and get medical advice.

Skin Contact:

Not expected to require first aid measures. Wash exposed area with soap and water. Get medical advice if irritation develops.

Eye Contact:

Not expected to require first aid measures. Wash thoroughly with running water. Get medical advice if irritation develops.

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard.

Explosion:

Finely divided powder presents an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Zinc oxide fume may be released when heated.

6. Accidental Release Measures

Clean-up personnel require protective clothing and respiratory protection from dust. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

Zinc oxide:

-OSHA Permissible Exposure Limit (PEL):

fume: 5 mg/m³ (TWA)

respirable fraction: 5 mg/m³ (TWA)

total dusts: 15 mg/m³ (TWA)

-ACGIH Threshold Limit Value (TLV):

2 mg/m³ (TWA), 10 mg/m³ (STEL), Respirable fraction

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face dust/mist respirator may be worn for up to ten

times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece dust/mist respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear protective gloves and clean body-covering clothing.

Eye Protection:

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

White to yellowish-white amorphous powder.

Odor:

Odorless.

Solubility:

Insoluble in water, alcohol; soluble in dilute acids.

Specific Gravity:

5.67

pH:

No information found.

% Volatiles by volume @ 21C (70F):

0

Boiling Point:

Sublimes.

Melting Point:

1975C (3587F)

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

No information found.

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Absorbs carbon dioxide from air.

Hazardous Decomposition Products:

When heated to very high temperatures, zinc oxide sublimes to produce toxic fumes.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Has exploded when mixed with chlorinated rubber. Reacts violently with magnesium, linseed oil. Zinc oxide and magnesium can react explosively when heated.

Conditions to Avoid:

Heat, incompatibles.

11. Toxicological Information

Investigated as a mutagen, reproductive effector.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	

Zinc Oxide (1314-13-2)	No	No	None

12. Ecological Information

Environmental Fate:

No information found.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
	-----	-----	-----	-----
Zinc Oxide (1314-13-2)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----

Ingredient	Korea	--Canada--		
		DSL	NDSL	Phil.
Zinc Oxide (1314-13-2)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Zinc Oxide (1314-13-2)	No	No	No	Zinc compoun

-----\Federal, State & International Regulations - Part 2\-----

Ingredient	CERCLA	-RCRA-		-TSCA-
		261.33		8(d)
Zinc Oxide (1314-13-2)	No	No		No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
 Reactivity: No (Pure / Solid)

Australian Hazchem Code: None allocated.

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**

Label Hazard Warning:

CAUTION! MAY IRRITATE RESPIRATORY TRACT.

Label Precautions:

Avoid breathing dust.

Keep container closed.

Use with adequate ventilation.

Label First Aid:

If inhaled, remove to fresh air. Get medical attention for any breathing difficulty.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 3.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by

a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

SAFETY DATA SHEET

Version 6.14
Revision Date 12/07/2023
Print Date 01/13/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : Perfluorooctanoic acid

Product Number : 171468
Brand : Aldrich
CAS-No. : 335-67-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Skin corrosion (Category 1C), H314
Serious eye damage (Category 1), H318
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 1B), H360
Effects on or via lactation, H362
Specific target organ toxicity - repeated exposure (Category 1), Liver, H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word

Danger

Hazard Statements

H302 + H332

Harmful if swallowed or if inhaled.

H314

Causes severe skin burns and eye damage.

H351

Suspected of causing cancer.

H360

May damage fertility or the unborn child.

H362

May cause harm to breast-fed children.

H372

Causes damage to organs (Liver) through prolonged or repeated exposure.

Precautionary Statements

P201

Obtain special instructions before use.

P202

Do not handle until all safety precautions have been read and understood.

P260

Do not breathe dust.

P263

Avoid contact during pregnancy/ while nursing.

P264

Wash skin thoroughly after handling.

P270

Do not eat, drink or smoke when using this product.

P271

Use only outdoors or in a well-ventilated area.

P280

Wear protective gloves/ protective clothing/ eye protection/ face protection.

P301 + P312 + P330

IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.

P301 + P330 + P331

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303 + P361 + P353

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.

P304 + P340 + P310

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.

P305 + P351 + P338 + P310

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.

P308 + P313

IF exposed or concerned: Get medical advice/ attention.

P363

Wash contaminated clothing before reuse.

P405

Store locked up.

P501

Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms

: Pentadecafluorooctanoic acid
Perfluorocaprylic acid
Perfluorooctanoic acid

Formula : C₈HF₁₅O₂
Molecular weight : 414.07 g/mol
CAS-No. : 335-67-1
EC-No. : 206-397-9

Component	Classification	Concentration
pentadecafluorooctanoic acid		
	Acute Tox. 4; Skin Corr. 1C; Eye Dam. 1; Carc. 2; Repr. 1B; Lact. ; STOT RE 1; H302, H332, H314, H318, H351, H360, H362, H372	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed

After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water Foam Carbon dioxide (CO₂) Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Hydrogen fluoride

Combustible.

Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class

Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: KCL 741 Dermatrill® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: KCL 741 Dermatrill® L

Body Protection

Acid-resistant protective clothing

Respiratory protection

Recommended Filter type: Filter type P3

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

These measures have to be properly documented.
required when dusts are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance	Form: flakes Color: colorless
b) Odor	stinging
c) Odor Threshold	No data available
d) pH	2.6 at 1 g/l at 20 °C (68 °F)
e) Melting point/freezing point	Melting point/range: 55 - 56 °C (131 - 133 °F) - lit.
f) Initial boiling point and boiling range	189 °C 372 °F at 981 hPa - lit.
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapor pressure	0.69 hPa at 25 °C (77 °F)
l) Vapor density	No data available
m) Density	1.8 g/cm ³ at 20 °C (68 °F)
Relative density	No data available
n) Water solubility	3.4 g/l at 20 °C (68 °F)

- o) Partition coefficient: log Pow: 6.30 - Potential bioaccumulation, (Lit.)
n-octanol/water
- p) Autoignition temperature No data available
- q) Decomposition temperature > 300 °C (> 572 °F) -
- r) Viscosity No data available
- s) Explosive properties No data available
- t) Oxidizing properties none

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:

Strong oxidizing agents

Strong acids

Bases

10.4 Conditions to avoid

no information available

10.5 Incompatible materials

No data available

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Acute toxicity estimate Oral - 500.1 mg/kg

(Expert judgment)

Acute toxicity estimate Inhalation - 4 h - 11.1 mg/l - vapor

(Expert judgment)

Dermal: No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

Suspected of causing cancer.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (pentadecafluorooctanoic acid)

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

May damage the unborn child.

Studies indicating a hazard to babies during the lactation period

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Causes damage to organs through prolonged or repeated exposure.

- Liver

Aspiration hazard

No data available

11.2 Additional Information

RTECS: RH0781000

Cough, Shortness of breath, Headache, Nausea, Vomiting

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:

gastric pain

Nausea

Vomiting

Drowsiness

somnolence

Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

No data available

Toxicity to daphnia and other aquatic invertebrates	Remarks: No data available (pentadecafluorooctanoic acid)

Toxicity to algae	Remarks: No data available (pentadecafluorooctanoic acid)

Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	Remarks: No data available (pentadecafluorooctanoic acid)

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information**DOT (US)**

UN number: 3261 Class: 8 Packing group: III
Proper shipping name: Corrosive solid, acidic, organic, n.o.s. (pentadecafluorooctanoic acid)
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG

UN number: 3261 Class: 8 Packing group: III EMS-No: F-A, S-B
Proper shipping name: CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.
(pentadecafluorooctanoic acid)

IATA

UN number: 3261 Class: 8 Packing group: III
Proper shipping name: Corrosive solid, acidic, organic, n.o.s. (pentadecafluorooctanoic acid)

SECTION 15: Regulatory information**SARA 302 Components**

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
pentadecafluorooctanoic acid	335-67-1	2021-01-12

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

California Prop. 65 Components

	CAS-No.	Revision Date
, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm.	335-67-1	2022-02-25

For more information go to
www.P65Warnings.ca.gov.pentadecafluorooctanoic
acid

SECTION 16: Other information**Further information**

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent

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Version: 6.14

Revision Date: 12/07/2023

Print Date: 01/13/2024

Safety Data Sheet

acc. to OSHA HCS

Printing date 04/01/2019

Version Number 2

Reviewed on 04/01/2019

1 Identification

- **Product identifier**
- **Trade name:** Perfluorooctane Sulfonic Acid (PFOS) Standard (1X1 mL)
- **Part number:** PFA-101-1
- **Application of the substance / the mixture** Reagents and Standards for Analytical Chemical Laboratory Use
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051 USA
- **Information department:**
Telephone: 800-227-9770
e-mail: pdl-msds_author@agilent.com
- **Emergency telephone number:** CHEMTREC®: 1-800-424-9300

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS02 Flame

Flam. Liq. 2 H225 Highly flammable liquid and vapor.



GHS06 Skull and crossbones

Acute Tox. 3 H331 Toxic if inhaled.



GHS08 Health hazard

STOT SE 1 H370 Causes damage to organs.

- **Label elements**
- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms**



GHS02



GHS06



GHS08

- **Signal word** Danger
- **Hazard-determining components of labeling:**
methanol
- **Hazard statements**
Highly flammable liquid and vapor.
Toxic if inhaled.
Causes damage to organs.

(Contd. on page 2)

-US-

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Trade name: Perfluorooctane Sulfonic Acid (PFOS) Standard (1X1 mL)

(Contd. of page 1)

Precautionary statements

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
 Ground/bond container and receiving equipment.
 Use explosion-proof electrical/ventilating/lighting/equipment.
 Use only non-sparking tools.
 Take precautionary measures against static discharge.
 Do not breathe dust/fume/gas/mist/vapors/spray.
 Wash thoroughly after handling.
 Do not eat, drink or smoke when using this product.
 Use only outdoors or in a well-ventilated area.
 Wear protective gloves/protective clothing/eye protection/face protection.
 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 IF exposed: Call a POISON CENTER or doctor/physician.
 Specific treatment (see on this label).
 In case of fire: Use for extinction: CO₂, powder or water spray.
 Store in a well-ventilated place. Keep container tightly closed.
 Store in a well-ventilated place. Keep cool.
 Store locked up.
 Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:

NFPA ratings (scale 0 - 4)



Health = 1
 Fire = 3
 Reactivity = 0

HMIS-ratings (scale 0 - 4)



Health = *1
 Fire = 3
 Reactivity = 0

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixtures

Description: Mixture of the substances listed below with nonhazardous additions.

Dangerous components:

67-56-1	methanol	99.987%

4 First-aid measures

Description of first aid measures

General information:

Immediately remove any clothing soiled by the product.

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(Contd. of page 2)

Remove breathing apparatus only after contaminated clothing have been completely removed.

In case of irregular breathing or respiratory arrest provide artificial respiration.

· After inhalation:

Supply fresh air or oxygen; call for doctor.

In case of unconsciousness place patient stably in side position for transportation.

· After skin contact: Immediately wash with water and soap and rinse thoroughly.

· After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.

· After swallowing: If symptoms persist consult doctor.

· Information for doctor:
· Most important symptoms and effects, both acute and delayed No further relevant information available.

· Indication of any immediate medical attention and special treatment needed

No further relevant information available.

5 Fire-fighting measures

· Extinguishing media
· Suitable extinguishing agents:

CO₂, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

· For safety reasons unsuitable extinguishing agents: Water with full jet

· Special hazards arising from the substance or mixture

During heating or in case of fire poisonous gases are produced.

· Advice for firefighters
· Protective equipment: Mouth respiratory protective device.

6 Accidental release measures

· Personal precautions, protective equipment and emergency procedures

Mount respiratory protective device.

Wear protective equipment. Keep unprotected persons away.

· Environmental precautions: Do not allow to enter sewers/ surface or ground water.

· Methods and material for containment and cleaning up:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

· Reference to other sections

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

· Protective Action Criteria for Chemicals
· PAC-1:

67-56-1 methanol

530 ppm

· PAC-2:

67-56-1 methanol

2,100 ppm

· PAC-3:

67-56-1 methanol

7200* ppm

US

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Trade name: Perfluorooctane Sulfonic Acid (PFOS) Standard (1X1 mL)

(Contd. of page 3)

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Prevent formation of aerosols.
- **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Keep respiratory protective device available.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** Store in a cool location.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:**
Keep receptacle tightly sealed.
Store in cool, dry conditions in well sealed receptacles.
- **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see item 7.
- **Control parameters**

Components with limit values that require monitoring at the workplace:

67-56-1 methanol

PEL	Long-term value: 260 mg/m ³ , 200 ppm
REL	Short-term value: 325 mg/m ³ , 250 ppm
	Long-term value: 260 mg/m ³ , 200 ppm
	Skin
TLV	Short-term value: 328 mg/m ³ , 250 ppm
	Long-term value: 262 mg/m ³ , 200 ppm
	Skin; BEI

Ingredients with biological limit values:

67-56-1 methanol

BEI	15 mg/L
	Medium: urine
	Time: end of shift
	Parameter: Methanol (background, nonspecific)

- **Additional information:** The lists that were valid during the creation were used as basis.
- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.

(Contd. on page 5)

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Trade name: Perfluorooctane Sulfonic Acid (PFOS) Standard (1X1 mL)

(Contd. of page 4)

Breathing equipment:

When used as intended with Agilent instruments, the use of the product under normal laboratory conditions and with standard practices does not result in significant airborne exposures and therefore respiratory protection is not needed.

Under an emergency condition where a respirator is deemed necessary, use a NIOSH or equivalent approved device/equipment with appropriate organic or acid gas cartridge.

Protection of hands:

Although not recommended for constant contact with the chemicals or for clean-up, nitrile gloves 11-13 mil thickness are recommended for normal use. The breakthrough time is 1 hr. For cleaning a spill where there is direct contact of the chemical, butyl rubber gloves are recommended 12-15 mil thickness with breakthrough times exceeding 4 hrs. Supplier recommendations should be followed.

Material of gloves

For normal use: nitrile rubber, 11-13 mil thickness

For direct contact with the chemical: butyl rubber, 12-15 mil thickness

Penetration time of glove material

For normal use: nitrile rubber: 1 hour

For direct contact with the chemical: butyl rubber: >4 hours

Eye protection:


Tightly sealed goggles

9 Physical and chemical properties

Information on basic physical and chemical properties
General Information
Appearance:

Form: Fluid

Color: Colorless

Odor: Alcohol-like

Odor threshold: Not determined.

pH-value: Not determined.

Change in condition

Melting point/Melting range: -98 °C (-144.4 °F)

Boiling point/Boiling range: 64.7 °C (148.5 °F)

Flash point: 9 °C (48.2 °F)

Flammability (solid, gaseous): Not applicable.

Ignition temperature: 455 °C (851 °F)

Decomposition temperature: Not determined.

Auto igniting: Product is not selfigniting.

Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

Explosion limits:

Lower: 5.5 Vol %

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Trade name: Perfluorooctane Sulfonic Acid (PFOS) Standard (1X1 mL)

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Upper:	44 Vol %
· Vapor pressure at 20 °C (68 °F):	100 hPa (75 mm Hg)
· Density at 20 °C (68 °F):	0.80006 g/cm ³ (6.6765 lbs/gal)
· Relative density	Not determined.
· Vapor density	Not determined.
· Evaporation rate	Not determined.
· Solubility in / Miscibility with Water:	Not miscible or difficult to mix.
· Partition coefficient (n-octanol/water):	Not determined.
· Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
· Solvent content:	
Organic solvents:	100.0 %
VOC content:	99.99 %
	800.0 g/l / 6.68 lb/gal
· Solids content:	0.0 %
· Other information	No further relevant information available.

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**
ATE (Acute Toxicity Estimate)

Inhalative	LC50/4 h	3 mg/L

67-56-1 methanol

Oral	LD50	5,628 mg/kg (rat)
Dermal	LD50	15,800 mg/kg (rabbit)

- **Primary irritant effect:**
- **on the skin:** No irritant effect.
- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.

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Trade name: Perfluorooctane Sulfonic Acid (PFOS) Standard (1X1 mL)

(Contd. of page 6)

· **Additional toxicological information:**

The product shows the following dangers according to internally approved calculation methods for preparations:
Toxic

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**

None of the ingredients is listed.

· **NTP (National Toxicology Program)**

None of the ingredients is listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients is listed.

12 Ecological information

· **Toxicity**

· **Aquatic toxicity:** No further relevant information available.

· **Persistence and degradability** No further relevant information available.

· **Behavior in environmental systems:**

· **Bioaccumulative potential** No further relevant information available.

· **Mobility in soil** No further relevant information available.

· **Additional ecological information:**

· **General notes:**

Water hazard class 2 (Self-assessment): hazardous for water

Do not allow product to reach ground water, water course or sewage system.

Danger to drinking water if even small quantities leak into the ground.

· **Results of PBT and vPvB assessment**

· **PBT:** Not applicable.

· **vPvB:** Not applicable.

· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**

· **Recommendation:**

Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packagings:**

· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **Not Regulated, De minimus Quantities** -

· **UN-Number**

· **DOT, IMDG, IATA** UN1230

· **UN proper shipping name**

· **DOT** Methanol solution

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Trade name: Perfluorooctane Sulfonic Acid (PFOS) Standard (1X1 mL)

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· **IMDG, IATA** METHANOL solution

· **Transport hazard class(es)**

· **DOT**

· **Class** 3 Flammable liquids
· **Label** 3, 6.1

· **IMDG**

· **Class** 3 Flammable liquids
· **Label** 3/6.1

· **IATA**

· **Class** 3 Flammable liquids
· **Label** 3 (6.1)

· **Packing group**

· **DOT, IMDG, IATA** II

· **Environmental hazards:** Not applicable.

· **Special precautions for user** Warning: Flammable liquids

· **Danger code (Kemler):** 336

· **EMS Number:** F-E,S-D

· **Stowage Category** B

· **Stowage Code** SW2 Clear of living quarters.

· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

· **Transport/Additional information:**

· **DOT**

· **Quantity limitations** On passenger aircraft/rail: 1 L
On cargo aircraft only: 60 L

· **IMDG**

· **Limited quantities (LQ)** 1L

· **Excepted quantities (EQ)** Code: E2

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 500 ml

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Trade name: Perfluorooctane Sulfonic Acid (PFOS) Standard (1X1 mL)

(Contd. of page 8)

· UN "Model Regulation": UN 1230 METHANOL SOLUTION, 3 (6.1), II

15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
- Sara

· Section 355 (extremely hazardous substances):

None of the ingredients is listed.

· Section 313 (Specific toxic chemical listings):

67-56-1 | methanol

· TSCA (Toxic Substances Control Act):

All ingredients are listed.

· Proposition 65

· Chemicals known to cause cancer:

None of the ingredients is listed.

· Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed.

· Chemicals known to cause reproductive toxicity for males:

None of the ingredients is listed.

· Chemicals known to cause developmental toxicity:

All ingredients are listed.

· Carcinogenic categories

· EPA (Environmental Protection Agency)

None of the ingredients is listed.

· TLV (Threshold Limit Value established by ACGIH)

None of the ingredients is listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

None of the ingredients is listed.

- Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

- Date of preparation / last revision 04/01/2019 / 1

· Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

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CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

BEI: Biological Exposure Limit

Flam. Liq. 2: Flammable liquids – Category 2

Acute Tox. 3: Acute toxicity – Category 3

STOT SE 1: Specific target organ toxicity (single exposure) – Category 1

· * **Data compared to the previous version altered.**

US

SAFETY DATA SHEET

Revision Date 24-Dec-2021

Revision Number 4

1. Identification

Product Name Sodium Metal

Cat No. : S135-1LB; S206-1LB

Synonyms Natrium.

Recommended Use Laboratory chemicals.

Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Substances/mixtures which, in contact with water, emit flammable gases	Category 1
Skin Corrosion/Irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word

Danger

Hazard Statements

In contact with water releases flammable gases which may ignite spontaneously
Causes severe skin burns and eye damage
May cause respiratory irritation

**Precautionary Statements****Prevention**

Do not breathe dust/fume/gas/mist/vapors/spray

Wash face, hands and any exposed skin thoroughly after handling

Wear protective gloves/protective clothing/eye protection/face protection

Use only outdoors or in a well-ventilated area

Keep away from any possible contact with water, because of violent reaction and possible flash fire

Handle under inert gas. Protect from moisture

Response

Immediately call a POISON CENTER or doctor/physician

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Skin

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower

Wash contaminated clothing before reuse

Brush off loose particles from skin. Immerse in cool water/wrap with wet bandages

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

Ingestion

IF SWALLOWED: Rinse mouth. DO NOT induce vomiting

Fire

In case of fire: Use CO₂, dry chemical, or foam for extinction

Storage

Store locked up

Store in a well-ventilated place. Keep container tightly closed

Store in a dry place. Store in a closed container

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Reacts violently with water

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Sodium	7440-23-5	100

4. First-aid measures

General Advice

Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required. Keep eye wide open while rinsing.

Skin Contact

Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Call a physician immediately.

Inhalation

Remove to fresh air. If not breathing, give artificial respiration. Call a physician or poison control center immediately. Do not use mouth-to-mouth method if victim ingested or inhaled

	the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
Ingestion	Immediate medical attention is required. Do NOT induce vomiting. Drink plenty of water. Never give anything by mouth to an unconscious person.
Most important symptoms and effects	Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	CO ₂ , dry chemical, dry sand, alcohol-resistant foam. approved class D extinguishers.
Unsuitable Extinguishing Media	Water may be ineffective
Flash Point Method -	Not applicable No information available
Autoignition Temperature	115 °C / 239 °F
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

The product causes burns of eyes, skin and mucous membranes. Reacts violently with water.

Hazardous Combustion Products

Hydrogen.

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
3

Flammability
3

Instability
2

Physical hazards
W

6. Accidental release measures

Personal Precautions	Use personal protective equipment as required. Evacuate personnel to safe areas. Avoid contact with skin, eyes or clothing. No special precautions required.
Environmental Precautions	Should not be released into the environment. Do not allow material to contaminate ground water system. See Section 12 for additional Ecological Information.
Methods for Containment and Clean Up	Sweep up and shovel into suitable containers for disposal. Avoid dust formation. Do not expose spill to water. Pick up and transfer to properly labelled containers.

7. Handling and storage

Handling	Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe dust. Do not ingest. If swallowed then seek immediate medical assistance. Do not allow contact with water.
Storage.	Corrosives area. Keep away from water or moist air. Keep in a dry place. Keep away from acids. Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures

None under normal use conditions. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

No special protective equipment required.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Light grey
Odor	Odorless
Odor Threshold	No information available
pH	
Melting Point/Range	98 °C / 208.4 °F
Boiling Point/Range	883 °C / 1621.4 °F
Flash Point	Not applicable
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1 mmHg @ 440 °C
Vapor Density	Not applicable
Specific Gravity	0.9684 @ 20°C
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	115 °C / 239 °F
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	Na
Molecular Weight	22.99

10. Stability and reactivity

Reactive Hazard	Yes
Stability	Stable under normal conditions.
Conditions to Avoid	Exposure to moist air or water. Exposure to moisture.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Hydrogen

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing. Reacts violently with water.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium	7440-23-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Persistence and Degradability Insoluble in water

Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN1428
 Proper Shipping Name SODIUM
 Hazard Class 4.3
 Packing Group I
 TDG Forbidden

IATA

UN-No UN1428
 Proper Shipping Name SODIUM
 Hazard Class 4.3
 Packing Group I

IMDG/IMO

UN-No UN1428
 Proper Shipping Name SODIUM
 Hazard Class 4.3
 Packing Group I

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Sodium	7440-23-5	X	ACTIVE	-

Legend:

TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

- - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Sodium	7440-23-5	X	-	231-132-9	X	X	X	X	X	KE-31338

KECL - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)**U.S. Federal Regulations**

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Sodium	X	10 lb	-	-

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

Component	Hazardous Substances RQs	CERCLA EHS RQs
Sodium	10 lb	-

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
 DOT Marine Pollutant N
 DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations**Mexico - Grade**

No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Sodium	-	Use restricted. See item 75. (see link for restriction details)	-

<https://echa.europa.eu/substances-restricted-under-reach>

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Sodium	7440-23-5	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Sodium	7440-23-5	Not applicable	Not applicable	Not applicable	Not applicable

16. Other information

Prepared By

Regulatory Affairs
 Thermo Fisher Scientific
 Email: EMSDS.RA@thermofisher.com

Revision Date

24-Dec-2021

Print Date

24-Dec-2021

Revision Summary

This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 10-Dec-2009

Revision Date 24-Dec-2021

Revision Number 6

1. Identification

Product Name Tetrachloroethylene

Cat No. : AC138010000; AC138010010; AC138010025; AC138010100;
AC138015000

CAS No 127-18-4
Synonyms Perchloroethylene

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 / **Europe**: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 / **Europe**:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Blood.	

Label Elements

Signal Word

Danger

Hazard Statements

Causes skin irritation

Causes serious eye irritation

May cause an allergic skin reaction

May cause drowsiness or dizziness

May cause cancer

May cause damage to organs through prolonged or repeated exposure

**Precautionary Statements****Prevention**

Obtain special instructions before use

Do not handle until all safety precautions have been read and understood

Use personal protective equipment as required

Wash face, hands and any exposed skin thoroughly after handling

Contaminated work clothing should not be allowed out of the workplace

Do not breathe dust/fume/gas/mist/vapors/spray

Use only outdoors or in a well-ventilated area

Wear protective gloves/protective clothing/eye protection/face protection

Response

IF exposed or concerned: Get medical attention/advice

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Skin

IF ON SKIN: Wash with plenty of soap and water

Take off contaminated clothing and wash before reuse

If skin irritation or rash occurs: Get medical advice/attention

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

If eye irritation persists: Get medical advice/attention

Storage

Store locked up

Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Toxic to aquatic life with long lasting effects

WARNING. Cancer - <https://www.p65warnings.ca.gov/>.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Tetrachloroethylene	127-18-4	>95

4. First-aid measures

General Advice

If symptoms persist, call a physician.

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water.
Most important symptoms and effects	None reasonably foreseeable. May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO ₂), dry chemical, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors. Containers may explode when heated.

Hazardous Combustion Products

Chlorine. Phosgene. Hydrogen chloride gas.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
2

Flammability
0

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment as required. Ensure adequate ventilation.
Environmental Precautions	Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling	Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Ensure adequate ventilation. Avoid ingestion and inhalation.

Storage.

Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from sunlight. Incompatible Materials. Strong acids. Strong oxidizing agents. Strong bases. Metals. Zinc. Amines. Aluminium.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Tetrachloroethylene	TWA: 25 ppm STEL: 100 ppm	(Vacated) TWA: 25 ppm (Vacated) TWA: 170 mg/m ³ Ceiling: 200 ppm TWA: 100 ppm	IDLH: 150 ppm	TWA: 25 ppm STEL: 100 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures

Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment**Eye/face Protection**

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Characteristic, sweet
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-22 °C / -7.6 °F
Boiling Point/Range	120 - 122 °C / 248 - 251.6 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	6.0 (Ether = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	18 mbar @ 20 °C
Vapor Density	No information available
Density	1.619
Specific Gravity	1.625
Solubility	0.15 g/L water (20°C)
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	> 150°C

Viscosity	0.89 mPa s at 20 °C
Molecular Formula	C2 Cl4
Molecular Weight	165.83

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat. Exposure to moist air or water.
Incompatible Materials	Strong acids, Strong oxidizing agents, Strong bases, Metals, Zinc, Amines, Aluminium
Hazardous Decomposition Products	Chlorine, Phosgene, Hydrogen chloride gas
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Tetrachloroethylene	LD50 = 2629 mg/kg (Rat)	LD50 > 10000 mg/kg (Rat)	LC50 = 27.8 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Tetrachloroethylene	127-18-4	Group 2A	Reasonably Anticipated	A3	X	A3

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)

Known - Known Carcinogen

Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens

A1 - Confirmed Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Confirmed Animal Carcinogen

A4 - Not Classifiable as a Human Carcinogen

A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)
STOT - repeated exposure Kidney Liver Blood

Aspiration hazard No information available

Symptoms / effects, both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information

Component	EU - Endocrine Disruptors Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Tetrachloroethylene	Group II Chemical	Not applicable	Not applicable

Other Adverse Effects Tumorigenic effects have been reported in experimental animals.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Tetrachloroethylene	EC50: > 500 mg/L, 96h (Pseudokirchneriella subcapitata)	LC50: 12.4 - 14.4 mg/L, 96h flow-through (Pimephales promelas) LC50: 8.6 - 13.5 mg/L, 96h static (Pimephales promelas) LC50: 11.0 - 15.0 mg/L, 96h static (Lepomis macrochirus) LC50: 4.73 - 5.27 mg/L, 96h flow-through (Oncorhynchus mykiss)	EC50 = 100 mg/L 24 h EC50 = 112 mg/L 24 h EC50 = 120.0 mg/L 30 min	EC50: 6.1 - 9.0 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability Insoluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility. Will likely be mobile in the environment due to its volatility.

Component	log Pow
Tetrachloroethylene	2.88

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Tetrachloroethylene - 127-18-4	U210	-

14. Transport information

DOT

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

TDG

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

IATA

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

IMDG/IMO

UN-No UN1897
 Proper Shipping Name TETRACHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Tetrachloroethylene	127-18-4	X	ACTIVE	-

Legend:

TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

- - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Tetrachloroethylene	127-18-4	X	-	204-825-9	X	X	X	X	X	KE-33294

KECL - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)**U.S. Federal Regulations****SARA 313**

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Tetrachloroethylene	127-18-4	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Tetrachloroethylene	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors

Tetrachloroethylene	X		-

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Tetrachloroethylene	100 lb 1 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Tetrachloroethylene	127-18-4	Carcinogen	14 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Tetrachloroethylene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant Y
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Tetrachloroethylene	-	Use restricted. See item 75. (see link for restriction details)	-

<https://echa.europa.eu/substances-restricted-under-reach>

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Tetrachloroethylene	127-18-4	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Tetrachloroethylene	127-18-4	Not applicable	Not applicable	Not applicable	Annex I - Y45

16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Creation Date	10-Dec-2009
Revision Date	24-Dec-2021
Print Date	24-Dec-2021
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 11-Jun-2009

Revision Date 25-Dec-2021

Revision Number 6

1. Identification

Product Name Toluene

Cat No. : AC326980000; AC326980010; AC326980025; AC326981000;
AC326982500

CAS No 108-88-3
Synonyms Tol; Methylbenzene

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 / **Europe**: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 / **Europe**:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Reproductive Toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system, Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, spleen, Blood, Neurological effects, Eyes, Ears.	
Aspiration Toxicity	Category 1

Label Elements

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause drowsiness or dizziness
Suspected of damaging the unborn child
May cause damage to organs through prolonged or repeated exposure

**Precautionary Statements****Prevention**

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool

Response

IF exposed or concerned: Get medical attention/advice

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Skin

If skin irritation occurs: Get medical advice/attention

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower

Wash contaminated clothing before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

If eye irritation persists: Get medical advice/attention

Ingestion

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician

Do NOT induce vomiting

Fire

In case of fire: Use CO₂, dry chemical, or foam for extinction

Storage

Store locked up

Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Harmful to aquatic life with long lasting effects

WARNING. Reproductive Harm - <https://www.p65warnings.ca.gov/>.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Toluene	108-88-3	<=100

4. First-aid measures

General Advice	If symptoms persist, call a physician.
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur. Risk of serious damage to the lungs (by aspiration).
Ingestion	Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting. Call a physician or poison control center immediately. If vomiting occurs naturally, have victim lean forward.
Most important symptoms and effects	. Causes central nervous system depression: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO ₂), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.
Unsuitable Extinguishing Media	No information available
Flash Point	4 °C / 39.2 °F
Method -	No information available
Autoignition Temperature	535 °C / 995 °F
Explosion Limits	
Upper	7.1 vol %
Lower	1.1 vol %
Oxidizing Properties	Not oxidising
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Hazardous Combustion Products

Carbon monoxide (CO). Carbon dioxide (CO₂).

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.

NFPAHealth
3Flammability
3Instability
0Physical hazards
N/A**6. Accidental release measures****Personal Precautions**

Use personal protective equipment as required. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions

Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage**Handling**

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Ensure adequate ventilation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

Storage.

Keep containers tightly closed in a dry, cool and well-ventilated place. Flammables area. Keep away from heat, sparks and flame. Incompatible Materials. Strong oxidizing agents. Strong acids. Strong bases. Halogenated compounds.

8. Exposure controls / personal protection**Exposure Guidelines**

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Toluene	TWA: 20 ppm	(Vacated) TWA: 100 ppm (Vacated) TWA: 375 mg/m ³ Ceiling: 300 ppm (Vacated) STEL: 150 ppm (Vacated) STEL: 560 mg/m ³ TWA: 200 ppm	IDLH: 500 ppm TWA: 100 ppm TWA: 375 mg/m ³ STEL: 150 ppm STEL: 560 mg/m ³	TWA: 20 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures

Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting equipment. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment**Eye/face Protection**

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	aromatic
Odor Threshold	1.74 ppm
pH	No information available
Melting Point/Range	-95 °C / -139 °F
Boiling Point/Range	111 °C / 231.8 °F @ 760 mmHg
Flash Point	4 °C / 39.2 °F
Evaporation Rate	2.4 (Butyl acetate = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	7.1 vol %
Lower	1.1 vol %
Vapor Pressure	29 mbar @ 20 °C
Vapor Density	3.1
Specific Gravity	0.866
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	535 °C / 995 °F
Decomposition Temperature	No information available
Viscosity	0.6 mPa.s @ 20 °C
Molecular Formula	C7 H8
Molecular Weight	92.14

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition.
Incompatible Materials	Strong oxidizing agents, Strong acids, Strong bases, Halogenated compounds
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO ₂)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Toluene	> 5000 mg/kg (Rat)	12000 mg/kg (Rabbit)	26700 ppm (Rat) 1 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation	Irritating to eyes, respiratory system and skin
Sensitization	No information available
Carcinogenicity	The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Toluene	108-88-3	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects	Not mutagenic in AMES Test
Reproductive Effects	Experiments have shown reproductive toxicity effects on laboratory animals.
Developmental Effects	Developmental effects have occurred in experimental animals.
Teratogenicity	Possible risk of harm to the unborn child.
STOT - single exposure	Respiratory system Central nervous system (CNS)
STOT - repeated exposure	Kidney Liver spleen Blood Neurological effects Eyes Ears
Aspiration hazard	No information available
Symptoms / effects, both acute and delayed	Causes central nervous system depression: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Endocrine Disruptor Information	No information available
Other Adverse Effects	The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

The product contains following substances which are hazardous for the environment. Contains a substance which is: Toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Toluene	EC50: = 12.5 mg/L, 72h static (Pseudokirchneriella subcapitata) EC50: > 433 mg/L, 96h (Pseudokirchneriella subcapitata)	50-70 mg/L LC50 96 h 5-7 mg/L LC50 96 h 15-19 mg/L LC50 96 h 28 mg/L LC50 96 h 12 mg/L LC50 96 h	EC50 = 19.7 mg/L 30 min	EC50: = 11.5 mg/L, 48h (Daphnia magna) EC50: 5.46 - 9.83 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability	Persistence is unlikely
Bioaccumulation/ Accumulation	No information available.
Mobility	Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Toluene	2.7

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
Toluene - 108-88-3	U220	-

14. Transport information

DOT

UN-No	UN1294
Proper Shipping Name	TOLUENE
Hazard Class	3
Packing Group	II

TDG

UN-No UN1294
 Proper Shipping Name TOLUENE
 Hazard Class 3
 Packing Group II

IATA

UN-No UN1294
 Proper Shipping Name TOLUENE
 Hazard Class 3
 Packing Group II

IMDG/IMO

UN-No UN1294
 Proper Shipping Name TOLUENE
 Hazard Class 3
 Packing Group II

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Toluene	108-88-3	X	ACTIVE	-

Legend:

TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Toluene	108-88-3	X	-	203-625-9	X	X	X	X	X	KE-33936

KECL - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)

U.S. Federal Regulations**SARA 313**

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Toluene	108-88-3	<=100	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Toluene	X	1000 lb	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Toluene	X		-

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Toluene	1000 lb 1 lb	-

California Proposition 65

This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Toluene	108-88-3	Developmental	-	Developmental

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Toluene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
 DOT Marine Pollutant N
 DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations**Mexico - Grade**

Serious risk, Grade 3

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Toluene	-	Use restricted. See item 48. (see link for restriction details) Use restricted. See item 75. (see link for restriction details)	-

<https://echa.europa.eu/substances-restricted-under-reach>

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Toluene	108-88-3	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Toluene	108-88-3	Not applicable	Not applicable	Not applicable	Annex I - Y42

16. Other information

Prepared By

Regulatory Affairs
 Thermo Fisher Scientific

Email: EMSDS.RA@thermofisher.com

Creation Date 11-Jun-2009**Revision Date** 25-Dec-2021**Print Date** 25-Dec-2021**Revision Summary** This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).**Disclaimer**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Version 8.10
Revision Date 12/07/2023
Print Date 01/22/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : Xylenes (isomeric mixture) for analysis
EMPARTA® ACS

Product Number : 1.08633
Catalogue No. : 108633
Brand : Millipore

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for analysis, Solvent

1.3 Details of the supplier of the safety data sheet

Company : EMD Millipore Corporation
400 Summit Drive
BURLINGTON MA 01803
UNITED STATES

Telephone : +1 800-645-5476

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure (Category 2), hearing organs, H373
Aspiration hazard (Category 1), H304
Short-term (acute) aquatic hazard (Category 2), H401

Long-term (chronic) aquatic hazard (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word

Danger

Hazard Statements

H226	Flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H312 + H332	Harmful in contact with skin or if inhaled.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs (hearing organs) through prolonged or repeated exposure.
H401	Toxic to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe mist or vapors.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.

P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component		Classification	Concentration
m-xylene			
CAS-No.	108-38-3	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; STOT SE 3; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 3; H226, H332, H312, H315, H318, H335, H304, H401, H412	>= 30 - < 50 %
EC-No.	203-576-3		
Index-No.	601-022-00-9		
Registration number	01-2119484621-37-XXXX		
p-xylene			
CAS-No.	106-42-3	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 3; H226, H332, H312, H315, H319, H335, H304, H401, H412	>= 20 - < 30 %
EC-No.	203-396-5		
Index-No.	601-022-00-9		
Registration number	01-2119484661-33-XXXX		
ethylbenzene			
CAS-No.	100-41-4	Flam. Liq. 2; Acute Tox. 4; Carc. 2; STOT RE 2; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 3; H225, H332, H351, H373, H304, H401, H412	>= 10 - < 20 %
EC-No.	202-849-4		
Index-No.	601-023-00-4		
Registration number	01-2119489370-35-XXXX		
o-xylene			
CAS-No.	95-47-6	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 3; H226, H332, H312, H315, H319, H335, H304, H401, H412	>= 10 - < 20 %
EC-No.	202-422-2		
Index-No.	601-022-00-9		
Registration number	01-2119485822-30-XXXX		
Toluene			
CAS-No.	108-88-3	Flam. Liq. 2; Skin Irrit. 2;	>= 0.1 - < 1

Millipore - 1.08633

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EC-No.	203-625-9	Repr. 2; STOT SE 3; STOT	%
Index-No.	601-021-00-3	RE 2; Asp. Tox. 1; Aquatic	
Registration	01-2119471310-51-	Acute 2; Aquatic Chronic	
number	XXXX	3; H225, H315, H361, H336, H373, H304, H401, H412 Concentration limits: 20 %: STOT SE 3, H336;	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed

After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Pulmonary failure possible after aspiration of vomit. Call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Carbon dioxide (CO₂) Dry powder Foam

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Combustible.

Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemisorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Recommended storage temperature see product label.

Storage class

Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
m-xylene	108-38-3	TWA	100 ppm 435 mg/m ³	USA. NIOSH Recommended Exposure Limits
		ST	150 ppm 655 mg/m ³	USA. NIOSH Recommended Exposure Limits
		TWA	100 ppm 435 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Ototoxicant Not classifiable as a human carcinogen		
p-xylene	106-42-3	TWA	100 ppm 435 mg/m ³	USA. NIOSH Recommended Exposure Limits
		ST	150 ppm 655 mg/m ³	USA. NIOSH Recommended Exposure Limits
		TWA	100 ppm 435 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Ototoxicant Not classifiable as a human carcinogen		

ethylbenzene	100-41-4	TWA	100 ppm 435 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	125 ppm 545 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	30 ppm 130 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	5 ppm 22 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
o-xylene	95-47-6	ST	150 ppm 655 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100 ppm 435 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Ototoxicant Not classifiable as a human carcinogen		
		TWA	100 ppm 435 mg/m3	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		STEL	150 ppm 655 mg/m3	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
Toluene	108-88-3	TWA	100 ppm 375 mg/m3	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		STEL	150 ppm 560 mg/m3	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		TWA	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.12-1967		
		CEIL	300 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.12-1967		
		Peak	500 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.12-1967		
		TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Visual impairment		

		Female reproductive Pregnancy loss 2023 Adoption Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm 375 mg/m ³	USA. NIOSH Recommended Exposure Limits
		ST	150 ppm 560 mg/m ³	USA. NIOSH Recommended Exposure Limits

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
m-xylene	108-38-3	Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
p-xylene	106-42-3	Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			
ethylbenzene	100-41-4	Sum of mandelic acid and phenyl glyoxylic acid	0.15g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			
o-xylene	95-47-6	Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			
Toluene	108-88-3	Toluene	0.02 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		Prior to last shift of workweek			
		Toluene	0.03 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			
		o-Cresol	0.3mg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

Recommended Filter type: Filter A (acc. to DIN 3181) for vapours of organic compounds

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

These measures have to be properly documented.

required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid Color: colorless
b) Odor	sweet
c) Odor Threshold	No data available
d) pH	substance/mixture is non-polar/aprotic
e) Melting point/freezing point	Melting point/range: -47 °C (-53 °F)
f) Initial boiling point and boiling range	137 - 143 °C 279 - 289 °F
g) Flash point	26 °C (79 °F) - c.c.
h) Evaporation rate	No data available
i) Flammability (solid,	No data available

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	gas)	
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 6.6 %(V) Lower explosion limit: 1.1 %(V)
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	466 °C (871 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	none

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Vapor/air-mixtures are explosive at intense warming.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:

Strong oxidizing agents

conc. sulfuric acid

sulfur

Risk of explosion with:

Nitric acid

uranium hexafluoride

10.4 Conditions to avoid

Heating.

10.5 Incompatible materials

Rubber, various plastics, Light metals

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity

Acute toxicity estimate Oral - 3,537 mg/kg

(Calculation method)

Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.

Acute toxicity estimate Inhalation - 4 h - 11.7 mg/l - vapor (Calculation method)

Symptoms: Possible symptoms: , mucosal irritations, Cough, Shortness of breath, Possible damages: , damage of respiratory tract

Acute toxicity estimate Dermal - 1,334 mg/kg

(Calculation method)

Skin corrosion/irritation

Remarks: Mixture causes skin irritation.

Serious eye damage/eye irritation

Remarks: Mixture causes serious eye damage.

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

Evidence of a carcinogenic effect.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (ethylbenzene)

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

Suspected of damaging the unborn child.

Suspected of damaging fertility.

Specific target organ toxicity - single exposure

Mixture may cause respiratory irritation.

Specific target organ toxicity - repeated exposure

Mixture may cause damage to organs through prolonged or repeated exposure.

- hearing organs

Aspiration hazard

Aspiration hazard, Aspiration may cause pulmonary edema and pneumonitis.

11.2 Additional Information

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

Components**m-xylene****Acute toxicity**

LD50 Oral - Rat - male - 3,523 mg/kg

(EC Directive 92/69/EEC B.1 Acute Toxicity (Oral))

Symptoms: Risk of aspiration upon vomiting., Aspiration may cause pulmonary edema and pneumonitis.

LC50 Inhalation - Rat - male and female - 4 h - 27.12 mg/l - vapor

(US-EPA)

Symptoms: Inhalation may lead to the formation of oedemas in the respiratory tract.

LD50 Dermal - Rabbit - male - 12,126 mg/kg

Remarks: (ECHA)

Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Skin corrosion/irritation

Skin - Rabbit

Result: Moderate skin irritation - 4 h

(Regulation (EC) No. 440/2008, Annex, B.4)

Remarks: Drying-out effect resulting in rough and chapped skin.

After long-term exposure to the chemical:

Dermatitis

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Severe eye irritation - 24 h

Remarks: (RTECS)

Respiratory or skin sensitization

Local lymph node assay (LLNA) - Mouse

Result: negative

(OECD Test Guideline 429)

Germ cell mutagenicity

Test Type: sister chromatid exchange assay

Test system: Chinese hamster ovary cells

Result: negative

Test Type: Ames test

Test system: Salmonella typhimurium

Result: negative

Remarks: (National Toxicology Program)

Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Result: negative
Method: OECD Test Guideline 478
Species: Mouse - male and female
Result: negative
Method: OECD Test Guideline 474
Species: Mouse - male - Red blood cells (erythrocytes)
Result: negative
Remarks: (IUCLID)

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Reproductive toxicity

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure

Inhalation - May cause respiratory irritation. - Respiratory Tract
Acute oral toxicity - Risk of aspiration upon vomiting., Aspiration may cause pulmonary edema and pneumonitis.
Acute inhalation toxicity - Inhalation may lead to the formation of oedemas in the respiratory tract.

Specific target organ toxicity - repeated exposure

Aspiration hazard

May be fatal if swallowed and enters airways.

p-xylene

Acute toxicity

LD50 Oral - Rat - male - 3,523 mg/kg
(EC Directive 92/69/EEC B.1 Acute Toxicity (Oral))
Acute toxicity estimate Inhalation - 4 h - 10.1 mg/l - vapor
(Expert judgment)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Acute toxicity estimate Dermal - 1,000.1 mg/kg
(Expert judgment)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Skin corrosion/irritation

Skin - Rabbit
Result: Moderate skin irritation - 4 h
(Regulation (EC) No. 440/2008, Annex, B.4)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Remarks: Drying-out effect resulting in rough and chapped skin.
Dermatitis

Serious eye damage/eye irritation

Remarks: Causes serious eye irritation.
(ECHA)

Respiratory or skin sensitization

Local lymph node assay (LLNA) - Mouse
Result: negative
(OECD Test Guideline 429)

Germ cell mutagenicity

Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative
Remarks: (National Toxicology Program)
Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Result: negative
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Result: negative
Method: OECD Test Guideline 474
Species: Mouse - male - Red blood cells (erythrocytes)
Result: negative
Remarks: (IUCLID)
Method: OECD Test Guideline 478
Species: Mouse - male and female
Result: negative

Carcinogenicity

No data available

Reproductive toxicity

May cause reproductive disorders.

Specific target organ toxicity - single exposure

Inhalation - May cause respiratory irritation. - Respiratory Tract

Specific target organ toxicity - repeated exposure**Aspiration hazard**

May be fatal if swallowed and enters airways.

ethylbenzene**Acute toxicity**

LD50 Oral - Rat - male and female - 3,500 mg/kg
Remarks: (ECHA)
LC50 Inhalation - Rat - male - 4 h - 17.8 mg/l - vapor
Remarks: (ECHA)
LD50 Dermal - Rabbit - 15,433 mg/kg
Remarks: (RTECS)

Skin corrosion/irritation

Skin - Rabbit
Result: Moderate skin irritation - 24 h

Remarks: (ECHA)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation

Remarks: (ECHA)

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

Test Type: Chromosome aberration test in vitro

Test system: Chinese hamster ovary cells

Result: negative

Test Type: In vitro mammalian cell gene mutation test

Test system: mouse lymphoma cells

Result: negative

Method: OECD Test Guideline 474

Species: Mouse - male - Bone marrow

Result: negative

Method: OECD Test Guideline 486

Species: Mouse - male and female

Result: negative

Carcinogenicity

No data available

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

- hearing organs

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Aspiration hazard

Aspiration may cause pulmonary edema and pneumonitis.

o-xylene

Acute toxicity

LD50 Oral - Rat - male - 3,523 mg/kg

(EC Directive 92/69/EEC B.1 Acute Toxicity (Oral))

LC50 Inhalation - Rat - male and female - 4 h - 27.12 mg/l - vapor
(US-EPA)

Symptoms: Inhalation may lead to the formation of oedemas in the respiratory tract.

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract

LD50 Dermal - Rabbit - male - 12,126 mg/kg

Remarks: (ECHA)

(Regulation (EC) No 1272/2008, Annex VI)
No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Moderate skin irritation - 4 h

(Regulation (EC) No. 440/2008, Annex, B.4)

Remarks: Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product.

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitization

Local lymph node assay (LLNA) - Mouse

Result: negative

(OECD Test Guideline 429)

Germ cell mutagenicity

Test Type: Ames test

Test system: Salmonella typhimurium

Result: negative

Test Type: Mutagenicity (mammal cell test): chromosome aberration.

Test system: Chinese hamster ovary cells

Result: negative

Test Type: sister chromatid exchange assay

Test system: Chinese hamster ovary cells

Result: negative

Method: OECD Test Guideline 474

Species: Mouse - male - Red blood cells (erythrocytes)

Result: negative

Remarks: (IUCLID)

Method: OECD Test Guideline 478

Species: Mouse - male and female

Result: negative

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

Inhalation - May cause respiratory irritation. - Respiratory system

Acute inhalation toxicity - Inhalation may lead to the formation of oedemas in the respiratory tract.

Acute inhalation toxicity - mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract

Specific target organ toxicity - repeated exposure

Aspiration hazard

May be fatal if swallowed and enters airways. Aspiration hazard, Aspiration may cause pulmonary edema and pneumonitis.

Toluene

Acute toxicity

LD50 Oral - Rat - male - 5,580 mg/kg
(Directive 67/548/EEC, Annex V, B.1.)
LC50 Inhalation - Rat - male - 4 h - 25.7 mg/l - vapor
(OECD Test Guideline 403)
LD50 Dermal - Rabbit - male - > 5,000 mg/kg
Remarks: (ECHA)

Skin corrosion/irritation

Skin - Rabbit
Result: irritating - 4 h
(Regulation (EC) No. 440/2008, Annex, B.4)

Serious eye damage/eye irritation

Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitization

Maximization Test - Guinea pig
Result: negative
(Regulation (EC) No. 440/2008, Annex, B.6)

Germ cell mutagenicity

Test Type: In vitro mammalian cell gene mutation test
Test system: Mouse lymphoma test
Result: negative
Test Type: Ames test
Test system: S. typhimurium
Result: negative
Species: Rat - Bone marrow
Result: negative
Remarks: (ECHA)

Carcinogenicity

No data available

Reproductive toxicity

Suspected of damaging the unborn child.

Specific target organ toxicity - single exposure

Inhalation - May cause drowsiness or dizziness. - Central nervous system
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Specific target organ toxicity - repeated exposure

Inhalation - May cause damage to organs through prolonged or repeated exposure.
- Central nervous system
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Aspiration hazard

Aspiration may cause pulmonary edema and pneumonitis.

SECTION 12: Ecological information

12.1 Toxicity

Mixture

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

Components

m-xylene

Toxicity to fish	static test LC50 - Oncorhynchus mykiss (rainbow trout) - 2.60 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to algae	static test EC50 - Pseudokirchneriella subcapitata - 4.36 mg/l - 73 h (OECD Test Guideline 201)
Toxicity to bacteria	Remarks: (ECHA)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Danio rerio (zebra fish) - 0.71 mg/l - 35 d (OECD Test Guideline 210)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	NOEC - Daphnia magna (Water flea) - 1.57 mg/l - 21 d (OECD Test Guideline 211)
	EC50 - Daphnia magna (Water flea) - 2.9 mg/l - 21 d (OECD Test Guideline 211)

p-xylene

Toxicity to fish	static test LC50 - Oncorhynchus mykiss (rainbow trout) - 2.60 mg/l - 96 h (OECD Test Guideline 203)

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Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 35.50 - 63.10 mg/l - 48 h
Remarks: (ECOTOX Database)

Toxicity to algae static test ErC50 - Pseudokirchneriella subcapitata - 4.36 mg/l - 73 h
(OECD Test Guideline 201)

Toxicity to bacteria static test NOEC - activated sludge - 16.2 mg/l - 28 h
Remarks: (ECHA)

Toxicity to fish(Chronic toxicity) flow-through test NOEC - Danio rerio (zebra fish) - 0.71 mg/l - 35 d
(OECD Test Guideline 210)

Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity) static test EC50 - Daphnia magna (Water flea) - 2.9 mg/l - 21 d
(OECD Test Guideline 211)

static test NOEC - Daphnia magna (Water flea) - 1.57 mg/l - 21 d
(OECD Test Guideline 211)

ethylbenzene

Toxicity to fish semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - 4.2 mg/l - 96 h
(OECD Test Guideline 203)

Toxicity to daphnia and other aquatic invertebrates static test EC50 - Daphnia magna (Water flea) - 1.8 - 2.4 mg/l - 48 h
(US-EPA)

Toxicity to algae static test EC50 - Pseudokirchneriella subcapitata (green algae) - 3.6 mg/l - 96 h
(US-EPA)

Toxicity to bacteria EC50 - Photobacterium phosphoreum - 9.68 mg/l - 30 min
Remarks: (IUCLID)

o-xylene

Toxicity to fish static test LC50 - Oncorhynchus mykiss (rainbow trout) - 2.60 mg/l - 96 h
(OECD Test Guideline 203)

Toxicity to algae static test EC50 - Pseudokirchneriella subcapitata - 4.36 mg/l - 73 h
(OECD Test Guideline 201)

Toxicity to bacteria Remarks: (ECHA)

Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Danio rerio (zebra fish) - 0.71 mg/l - 35 d (OECD Test Guideline 210)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	NOEC - Daphnia magna (Water flea) - 1.57 mg/l - 21 d (OECD Test Guideline 211)
	EC50 - Daphnia magna (Water flea) - 2.9 mg/l - 21 d (OECD Test Guideline 211)

Toluene

Toxicity to fish	flow-through test LC50 - Oncorhynchus kisutch (coho salmon) - 5.5 mg/l - 96 h Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Ceriodaphnia dubia (water flea) - 3.78 mg/l - 48 h (US-EPA)
Toxicity to bacteria	static test EC50 - Bacteria - 84 mg/l - 24 h Remarks: (ECHA)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Oncorhynchus kisutch (coho salmon) - 1.39 mg/l - 40 d Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	NOEC - Ceriodaphnia dubia (water flea) - 0.74 mg/l - 7 d (US-EPA)

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information**DOT (US)**

UN number: 1307 Class: 3 Packing group: III
Proper shipping name: XylenesSOLUTION

Reportable Quantity (RQ): 500 lbs
Reportable Quantity (RQ): 100 lbs
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 1307 Class: 3 Packing group: III EMS-
No: F-E, S-D
Proper shipping name: XYLENESSOLUTION

IATA

UN number: 1307 Class: 3 Packing group: III
Proper shipping name: XylenesSOLUTION

SECTION 15: Regulatory information**SARA 302 Components**

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
m-xylene	108-38-3	2007-07-01
p-xylene	106-42-3	2007-07-01
ethylbenzene	100-41-4	2007-07-01
o-xylene	95-47-6	2007-07-01

Reportable Quantity : F003 lbs
D018 lbs

Massachusetts Right To Know Components

	CAS-No.	Revision Date
m-xylene	108-38-3	2007-07-01

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p-xylene	106-42-3	2007-07-01
ethylbenzene	100-41-4	2007-07-01
o-xylene	95-47-6	2007-07-01
benzene	71-43-2	2007-07-01

Pennsylvania Right To Know Components

m-xylene	CAS-No. 108-38-3	Revision Date 2007-07-01
p-xylene	106-42-3	2007-07-01
ethylbenzene	100-41-4	2007-07-01
o-xylene	95-47-6	2007-07-01
Toluene	108-88-3	2007-07-01
benzene	71-43-2	2007-07-01

California Prop. 65 Components

, which is/are known to the State of California to cause cancer, and ethylbenzene	CAS-No. 100-41-4	Revision Date 2007-09-28

, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov . Toluene	CAS-No. 108-88-3	Revision Date 2009-02-01

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 8.10

Revision Date: 12/07/2023

Print Date: 01/22/2024

APPENDIX C
COMMUNITY AIR MONITORING PLAN



Appendix C

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for 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 DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. A 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, particularly if wind direction changes. 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.

1. 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.
2. 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

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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.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down.
4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) 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.

1. 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.
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 must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

Note:

CAMP readings will be provided on a weekly basis with all exceedances reported to the Department and NYSDOH the same day or next business day if after hours along with the reason for exceedance, what was done to correct it, and if it was effective. CAMP data collected during the execution of the RIWP will be summarized in a qualitative statement in the body of the Remedial Investigation Report.

APPENDIX D
QUALITY ASSURANCE PROJECT PLAN





Prepared for:

**REDS CRIB, LLC
43-45 LAFAYETTE AVENUE
SUFFERN, NEW YORK 10901**

WORK PLAN FOR REMEDIAL INVESTIGATION

**43-45 LAFAYETTE AVENUE
AMERICAN TWO CLEANERS
BCP #C344085
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK**

NOVEMBER 17, 2021

Project number: **SO581/SO1241**

Prepared by: **ENVIROSURE, INC.**

**DYNA KRUMICH-OGONOWSKI
NJ/NY DIRECTOR OF OPERATIONS**

**CHRISTOPHER ZELIZNAK, P.G. (PA & DE)
ENVIRONMENTAL DEPARTMENT DIRECTOR**

**JAMES LANG, NJ LSRP
QUALIFIED PROFESSIONAL**

SIGNATURE OF QUALIFIED ENVIRONMENTAL PROFESSIONAL

We declare that, to the best of our professional knowledge and belief, we meet the definition of Qualified Environmental Professional as defined in NYCCR Part 375 and we have the specific qualifications needed to prepare this Remedial Investigation Work Plan in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10). Our qualifications are presented in **Appendix H**.



James Lang, NJ LSRP
Qualified Environmental Professional



Dyna Krumich-Ogonowski
Director of NJ/NY Operations



Christopher Zeliznak, P.G. (PA & DE)
Environmental Department Director



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November 17, 2021

Project No. SO581/SO1241

Mr. Michael Kilmer, Environmental Engineer
Division of Environmental Remediation - Region 3
New York State Department of Environmental Conservation
21 South Putt Corners Road
New Paltz, New York 12561

RE: WORK PLAN FOR REMEDIAL INVESTIGATION
43-45 Lafayette Avenue
Suffern Village
Rockland County, New York

Dear Mr. Kilmer,

We are pleased to provide the Remedial Investigation Work Plan ("the Work Plan") on behalf of Ms. Cynthia Gray with Reds Crib, LLC ("Volunteer") for the property located at 43-45 Lafayette Avenue in Suffern Village, New York, herein referred to as "the Site" or "the Project".

Should you require additional information or have questions regarding the Work Plan, please contact me at 732.741.1110 or via email at dyna@envirosureinc.com.

Sincerely,
ENVIROSURE, INC.

Dyna Krumich-Ogonowski
EnviroSure, Inc.
Director of NJ/NY Operations

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1.0 INTRODUCTION

Presented in this document is the work plan designed to support a Remedial Investigation (RI) at 43-45 Lafayette Avenue in Suffern Village, New York. Refer to **Figure 1** for the approximate Site location and **Figure 2** for the site layout. Reds Crib, LLC, owns the property ("the Volunteer") and will conduct a remedial investigation under the New York DEC Brownfields Cleanup Program (BCP) as BCP No. C344085.

1.1 Site Description and History

The Site is located at 43-45 Lafayette Avenue in the Village of Suffern, Rockland County, New York in a mixed commercial and residential area. The Site is approximately 0.09 acres with a one-story concrete block structure divided into two suites with a flat, asphalt-covered roof. The building has entrances on the north and east sides and has a basement with a sump pump system.

The Site building has two tenant spaces: 43 Lafayette Avenue is vacant and was formerly occupied by American Two Cleaners (ATC); and 45 Lafayette Avenue is currently occupied by a wellness program tenant. ATC occupied the property for at least six years prior with on-site dry cleaning operations. The Volunteer, Reds Crib, LLC, purchased the property in October 2019 and did not own or operate as a dry cleaners.

As per the Volunteer, the dry-cleaning unit was removed from the Site prior to Reds Crib, LLC ownership as was all equipment related to the dry-cleaning operations. The Volunteer contacted the former ATC operator, who indicated they did not recall the type of equipment. As stated in the NYS DOH Fact Sheet Tetrachloroethene (PERC) in Indoor & Outdoor Air (September 2013), PERC was widely used in the dry-cleaning industry to clean fabrics. The historical ownership and dry-cleaning operations occurred at the Site as early as 1950; therefore, the dry-cleaning unit likely used tetrachloroethene (PCE or PERC).

1.1.1 Topography, Geology and Hydrogeology

As noted on the United States Geological Survey (USGS) Ramsey, New Jersey/New York Quadrangle 7.5-minute series map (2020), the Site is at an elevation of approximately 300 feet above mean sea level. The Site topography slopes gently to the south towards the southern adjoining property along Chestnut Street. The Site is located approximately 0.2-miles south of Interstate 287 and approximately 400-feet east of Route 202 on the southwestern corner of Lafayette Avenue and Chestnut Street.

The Site is underlain by the Lower Jurassic and Upper Triassic- aged Passaic Formation. The Passaic Formation is a Quartzite conglomerate unit (JTrpcq) and is reddish-brown pebble conglomerate, pebbly sandstone, and sandstone, in upward-fining sequences 1 to 2 meter (3 to 6 ft) thick. Clasts are subangular to subrounded, quartz and quartzite in sandstone matrix

(<https://mrdata.usgs.gov/geology/state/map-us.html#place-picker>).

Based on topography of the area surrounding the Site, the inferred direction of regional groundwater flow is southwest, toward the Ramapo River. It should be noted that site-specific groundwater flow may fluctuate based on local geology, local well use, and seasonal variations.

1.2 Project Organization

The following are the lead personnel on the project team and detailed contact information is provided in **Appendix A**:

- Project Manager – Dyna Krumich-Ogonowski
- Qualified Environmental Professional – James Lang, NJ LSRP
- Project Geologist – Christopher Zeliznak, P.G. (PA and DE)
- Project Health and Safety – Dyna Krumich-Ogonowski
- Project QA/QC - Christopher Zeliznak, P.G. (PA and DE)
- Field Scientist - Derek Grothusen
- Analytical Laboratory – Alpha Analytical Laboratories
- Drilling/Excavation Subcontractors – to be determined

2.0 GOALS AND OBJECTIVES

2.1 Overall Remedial Investigation Objectives

In general, a remedial investigation (RI) has the following overall objectives as described in NYCRR Part 375-1.8(e):

- Delineation of the extent of the contamination at, and emanating from, all media at the Site and the nature of that contamination;
- Characterization of the surface and subsurface characteristics of the Site, including topography, surface drainage, stratigraphy, depth to groundwater, and any aquifers that have been impacted or have the potential to be impacted;
- Identification of the sources of contamination, the migration pathways and actual or potential receptors of contaminants;
- Evaluation of actual and potential threats to public health and the environment; and
- Production of data of sufficient quality and quantity to support the necessity for, and the proposed extent of, remediation and to support the evaluation of proposed alternatives.

The scope and goals specific to this work plan are summarized below and are based on the results of investigations completed to date and those remaining to satisfy the objectives listed above. If necessary, the RIWP will be supplemented with additional work plans, as needed, to meet the overall objectives of the RI.

2.2 Specific RI Objectives

Specific objectives of the RI are as follows:

- Assess the Site geology and collect and analyze representative subsurface soil samples to assess the potential source of elevated concentrations in sub-slab soil vapors and indoor air;
- Assess the Site groundwater depth and quality to determine impact and migration; and
- Fill any data gaps resulting from the limited vapor intrusion assessment.

The scope of work to complete these objectives is provided in **Section 5.0** along with a discussion of supplemental field investigations that may be required to fill data gaps.

2.3 Contaminants of Concern

Based on the Limited Vapor Intrusion Investigation Report, the contaminants of concern are chlorinated volatile organic compounds, specifically tetrachloroethylene (PCE) and associated breakdown compounds.

3.0 ENVIRONMENTAL CONDITIONS/PAST INVESTIGATIONS

3.1 Previous Investigations

Historical information indicates the following previous investigations/remedial activities have been completed on the property:

Limited vapor intrusion investigation activities were completed on August 11, 2020 by Environmental Consulting and Management Services, Inc. (ECMS) and EnviroSure on September 15, 2020. As noted in the January 11, 2021 Limited Vapor Intrusion Assessment report (January 2021 Report), EnviroSure concluded that vapor intrusion was a concern for the Site due to PCE and trichloroethylene (TCE) concentrations in sub-slab soil vapors and indoor air greater than the applicable NYSDOH Indoor Air Concentrations Due to Health Exposures Screening Value (IACHE) (Appendix A). The NYSDEC Spill Hotline was notified on September 9, 2020 of the release from historical dry cleaning operations at the Site. The NYSDEC issued Spill No. 2005272 for the case and the owner voluntarily applied to the BCP. The NYSDEC issued a Letter of Completeness on April 30, 2021. The historical investigations environmental reports are included as **Appendix B**.

3.2 Previous Investigation Analytical results

Analytical results from the January 2021 Report, ECMS indoor air samples IA-1 and IA-2 were reported with concentrations of 305 $\mu\text{g}/\text{m}^3$ and 73.9 $\mu\text{g}/\text{m}^3$, respectively. The concentrations are greater than the applicable NYSDOH IACHE of 30 $\mu\text{g}/\text{m}^3$. ECMS sub-slab soil vapor samples SS-1 and SS-2 were reported with concentrations of PCE at 3,470 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and 7,520 $\mu\text{g}/\text{m}^3$, respectively, and concentrations of TCE at 41.1 $\mu\text{g}/\text{m}^3$ and 202 $\mu\text{g}/\text{m}^3$. The concentrations are greater than the applicable NYSDOH Indoor Air Concentrations due to Health Exposures screening value of 2 $\mu\text{g}/\text{m}^3$. The remaining analyzed compounds from the ECMS

samples were either not detected or were detected below the respective NYSDOH Indoor Air Concentrations due to Health Exposures screening values. Review of the analyzed compounds for the EnviroSure indoor air sample (IA-3) were either not detected or were detected below the respective NYSDOH Indoor Air Concentrations due to Health Exposures screening values.

4.0 INTERIM REMEDIAL MEASURES (IRM)

Based on the recommendations made by EnviroSure, all equipment and debris, left by the American Two Cleaners in August 2020, was removed. In September 2020, the Volunteer placed general purpose fans in the first floor and basement of the former dry cleaning space to circulate and remove indoor air to temporarily mitigate the vapor intrusion concern. In January 2021, the Volunteer contracted Sparta Group Construction to clean and seal the basement floor using RadonSeal Plus. These measures were implemented in order to temporarily limit human exposure from the previously released hazardous materials.

Following the remedial investigation, the need for and design of an IRM will be developed, if necessary.

5.0 REMEDIAL INVESTIGATION SCOPE OF WORK

5.1 Introduction

In order to meet the goals and objectives for the Site, the scope of work will assess the nature and extent of contamination in accordance with NYCRR Part 375-1.8(e). All field work will adhere to the Health and Safety Plan provided in **Appendix C** and will take into account public comments resulting from implementation of the Citizen Participation Plan, in **Appendix D**.

5.2 Geophysical Survey

To evaluate the subsurface conditions, a geophysical survey will be conducted at the Site.

A. Electromagnetic Metal Detection Scan: A Fisher Model TW-6 Twinbox (transmitter/receiver) Metal Detector (TW-6) will be used to assist in locating potential USTs and underground metallic piping at the site. The TW-6 transmitter produces an electromagnetic (EM) radio signal which creates a secondary current in subsurface metal objects. The secondary current creates a magnetic field which is detected by the receiver. The unit audible signal will rise in pitch and the analog meter will indicate a rise in response when the unit is over a metallic object. The operator carries the TW-6 and walks a grid pattern over the areas to be scanned. If the TW-6 indicates the presence of metallic objects, the operator will mark the location.

B. Ground-Penetrating Radar (GPR) Survey: GPR data will be collected with a Sensors and Software Inc. Noggin plus SmartCart GPR System (SmartCart) utilizing a 250 MHz antenna. The antenna, containing both a transmitter and a receiver, is rolled

along the ground surface during the GPR survey. The transmitter radiates short pulses of high-frequency EM energy into the ground. When the wave encounters the interface between two materials having different dielectric constants (dielectric permittivity), a portion of the energy is reflected back. The signal is transmitted to a control unit, displayed on a monitor, and digitally recorded. The Noggin plus system records an image of the subsurface by plotting two-way travel time of the reflected EM pulse on the vertical axis with the distance traveled along the ground surface plotted on the horizontal axis. The depth of the reflecting object or stratum is then determined by using known soil velocity functions and calculating two-way travel time values.

GPR data will be collected in the accessible areas at the Site. The maximum depth of investigation is approximately five feet. The data will be processed using Ekko View software. Generally, the survey will be used to identify subsurface objects such as piping, dry wells, and sumps.

5.3 Environmental Media Investigation

5.3.1 Subsurface Soil Assessment

The subsurface conditions on the Site will be investigated by the advancement of soil borings for visual assessment of the soil conditions and for the collection of soil samples for laboratory analysis. The precise location of the soil borings and sampling will be based on field observations and the geophysical survey results. The samples will specifically target potential contaminant features in an effort to gain representative samples across the area of concern while at the same time ensuring that impacted soils are adequately delineated.

A photoionization detector (PID) will be used to screen soil for total volatile organic compound (VOC) concentrations and observations of soil composition, staining, odors, and PID responses will be recorded for inclusion in the summary report.

A total of eight (8) soil borings are planned and samples will be collected from visually impacted soil, those intervals revealing elevated readings on the PID, the six inch interval above the water table, or at soil interfaces with decreased permeability (**Table 1A**). Up to 16 additional soil samples will be collected from the borehole to further characterize on-site soils throughout the vadose zone if needed. The laboratory will extract and hold these samples for future analysis, pending the initial results. The samples will be analyzed by a NYSDOH ELAP certified laboratory and full Contract Laboratory Program (CLP), NYSDEC Category B, or full CLP-type analytical data package deliverables will be provided. All samples will be analyzed for full Target Compound List (TCL) plus the 30 (10 VOCs and 20 SVOCs) including Tentatively Identified Compounds (TICs); full Target Analyte List (TAL), 1,4-dioxane and Per-and Polyfluoroalkyl Substances (PFAS) (**Table 2**).

5.3.2 Groundwater Investigation

If contamination is suspected then an investigation will be conducted to assess groundwater quality as per the NYS DEC DER-10 Technical Guidance for Site

Investigation and Remediation including an assessment of the nearby surface water bodies and complete an initial desktop survey of nearby public/private drinking water supply wells within one-mile of the Site.

Monitoring Well Installation

A licensed driller will be contracted to install three monitoring wells to assess groundwater flow direction and quality. The permanent monitoring wells will be constructed with a 10-foot length of an 0.010-inch slotted schedule 40 PVC screen. The monitoring wells will be installed to a depth depending on depth to groundwater, and extended to ground surface using 2-inch diameter solid PVC riser pipe. Once the wells are installed through the hollow casing, the casing will be removed, and the remaining annulus spaces will be filled with Filpro Quartz Sand from the bottom of the borehole to one-foot above the well screen. The remaining annulus spaces will be filled with cement/bentonite grout. Flush-mount steel casing/lids set in concrete pads will complete the wells at ground surface and the top of the PVC well casings will be secured with lockable caps.

Following well installation, the permanent monitoring wells will be developed by purging the screened interval using a whale pump for approximately an hour and a half at a rate of 1 gallon per minute, surging every 30-minute interval until the water is free of silt and apparent turbidity.

Groundwater Sampling

Well development, surveying and sampling will be in accordance with NYSDEC sampling protocols. Groundwater samples will be submitted to a New York State approved laboratory and analyzed for full TCL plus the 30 including TICs; full TAL, 1,4-dioxane and PFAS (**Table 2**). All sample analysis will be in accordance with ASP, Cat B requirements and all data will be validated. All detected sample concentrations will be included in a table and compared to NYSDEC Groundwater Standards.

Prior to collecting groundwater samples, the monitoring wells will be gauged for groundwater depth using a decontaminated oil-water interface probe. Two rounds of groundwater sampling are proposed and will include groundwater depth measurements to be used to determine groundwater flow (**Table 1B**). Groundwater samples will be collected from each well using low-flow sampling techniques with recorded water quality indicated parameters. The samples will be placed in laboratory-supplied containers and submitted under chain-of-custody in an ice-filled cooler by a NYSDOH ELAP certified laboratory, Alpha Analytical Laboratories in Westborough, Massachusetts. All samples will be analyzed for volatile organic compounds plus TICs (**Table 2**).

Appropriate Quality Assurance/Quality Control (QA/QC) samples will be collected for the groundwater sampling event including one trip blank and one field blank sample. A copy of the Quality Assurance Project Plan/Quality Assurance Plan is included in **Appendix E**.

Table 2A - Proposed Sample Summary

	Analytical Methods	

Media	Number of Samples	Full TCL +30	Full TAL	1,4-Dioxane	PFAS	QA/QC Samples
Soil	8 Samples;	X	X	X		1
	Up to 16 additional samples	E&H	E&H	E&H	X E&H	
Groundwater	3 Samples	X	X	X	X	2

*E&H - Sample will be collected and the laboratory will extract and hold pending the initial results.

According to “Sampling, Analysis, and Assessment of per- and polyfluoroalkyl substances (PFAS)” dated January 2021, PFAS are typically related to firefighting foams and industrial or manufacturing facilities. To the best of the Volunteer and EnviroSure’s knowledge, the Site has never operated as a fire department or training facility nor has there been a fire or manufacturing operations on the property. However, at the request of NYS DEC, the analysis of PFAS will be analyzed as per Table 2.

5.3.3 Vapor Intrusion Investigation

A Vapor Intrusion Investigation (VII) will be conducted at the Site to characterize the sub-slab and indoor air at the Site as per NYS DOH “Guidance for Evaluating Soil Vapor Intrusion”, October 2006 and all applicable updates. The VII will include:

- The NYSDOH Indoor Air Quality Questionnaire and Building Inventory will be completed during sampling;
- Sub-slab soil vapor sampling in the basement and tenant space, up to three (3) sub-slab soil vapor samples;
- Co-located indoor air sampling in the basement, first floor of the former ATC and tenant space; up to three (3) indoor air samples
- Background air sampling at the exterior of the Site building, placement will be wind direction dependent; up to one (1) background air sample.

The samples will be collected during the “heating season” and placed in laboratory-supplied SUMMA canisters for submission under chain-of-custody to a NYSDOH ELAP certified laboratory, Alpha Analytical Laboratories in Westborough, Massachusetts for EPA Method TO-15 (**Table 1C**).

Table 2B - Proposed Sample Summary

Media	Number of Samples	Analytical Methods	QA/QC
Sub-slab soil vapor	3	TO-15	1
Indoor Air/Background	3 (IA); 1(BG)	TO-15	1

6.0 ADDITIONAL SUPPLEMENTAL FIELD INVESTIGATION

The data generated during the RI will be evaluated to determine if additional investigation activities are needed. Additional assessment may include a subsurface boring program and sample analysis limited to contaminants identified during the RI program.

7.0 QUALITATIVE EXPOSURE ASSESSMENT

A qualitative exposure assessment will be completed in accordance with DER-10 Sections 3.3(c)4 and Appendix 3B. The assessment will include what impacts site contaminants may have, if any, on all media (ground/surface water, soil, soil vapor, ambient air and biota). Human health and ecological exposure impacts will be assessed as outlined in DER-10 Appendix 3B Qualitative Human Health Exposure Assessment and Appendix 3C Fish and Wildlife Resources Impact Analysis Decision Key. The Appendix 3C Fish and Wildlife resources Impact Analysis (FWRIA) Decision Key is provided in **Appendix G**.

The qualitative human health exposure assessment (QHHEA) will evaluate the five elements (DER-10 Appendix 3B) associated with exposure pathways, and describe how each of these elements pertains to the Site. The exposure pathway elements that will be addressed include:

- A description of the contaminant source(s) including the location of the contaminant release to the environment (any waste disposal area or point of discharge) or if the original source is unknown, the contaminated environmental medium (soil, indoor or outdoor air, biota, water) at the point of exposure;
- An explanation of the contaminant release and transport mechanisms to the exposed population;
- Identification of all potential exposure point(s) where actual or potential human contact with a contaminated medium may occur;
- Description(s) of the route(s) of exposure (i.e., ingestion, inhalation, dermal absorption); and
- A characterization of the receptor populations who may be exposed to contaminants at a point of exposure.

As called for in DER-10, sufficient field information and sampling data will be provided to identify the presence of contamination, if any, that may leave the site to support qualitative off-site exposure assessments by others.

8.0 OVERSIGHT AND REPORTING

A Remedial Investigation Report will be prepared in accordance with the applicable requirements of DER-10 and Part 375 as well as environmental data deliverables (EDDs) along with Data Usability Summary Reports (DUSRs) will be included as

required in DER-10 Section 1.15 and 2.2(a)(1)(ii).

A schedule is provided in **Appendix E**. It is anticipated that upon completion of the 30 day public comment period, the RI field activities will commence within approximately two to three weeks.

CAMP (**Appendix H**) readings will be provided on a weekly basis with all exceedances reported to the Department and NYSDOH the same day or next business day if after hours along with the reason for exceedance, what was done to correct it, and if it was effective. CAMP data collected during the execution of the RIWP will be summarized in a qualitative statement in the body of the Remedial Investigation Report.

TABLES

Applicant:

Reds Crib, LLC

Site Name:

American Two Cleaners

Site Address:

43-45 Lafayette Avenue, Suffern, NY

Site County:

Rockland

Site Number:

C344085

Table 1A - Detailed Proposed Soil Sample Summary

		Analytical Methods				
Proposed Sample Location	Proposed Number of Samples	Sample Location IDs	Full TCL +30 and 1,4-Dioxane	Full TAL	Sampling Rationale	QA/QC Samples
Basement - 43 Lafayette Ave	6	SB-01, SB-04 through SB-07	X	X	Delineate the nature and extent, assess Site geology	One MS/MSD, One Duplicate and One field blank
Exterior North & Northeast- Lafayette Ave	2	SB-02, SB-08	X	X	Delineate the nature and extent	
Exterior Rear door- Chesnut Avenue	1	SB-03	X	X	Delineate the nature and extent	

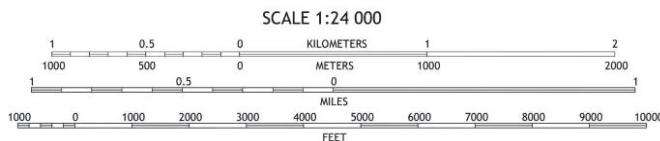
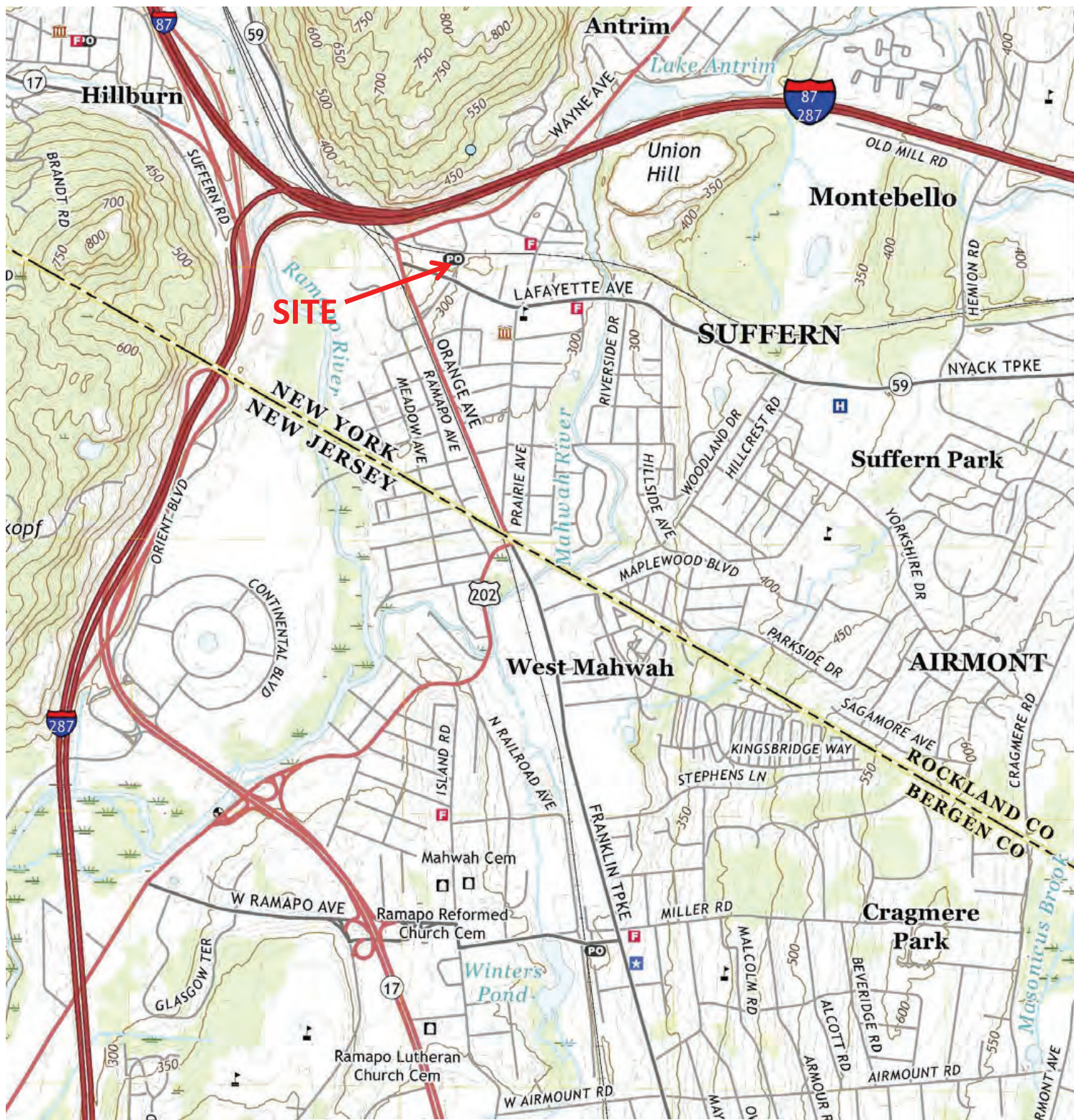
Table 1B - Detailed Proposed Groundwater Sample Summary

		Analytical Methods				
Proposed Sample Location	Proposed Number of Sampling Rounds	Sample Location IDs	Full TCL +30 and 1,4-Dioxane	Full TAL	Sampling Rationale	QA/QC Samples
Basement - Source Well	2	MW-1	X	X	Source well, Delineate the nature and extent	One MS/MSD, One Duplicate and One Trip blank (each sampling round)
Upgradient Well	2	MW-2	X	X	Upgradient well, Delineate the nature and extent	
Downgradient Well	2	MW-3	X	X	Downgradient well, Delineate the nature and extent	

Table 1C - Detailed Proposed Vapor Intrusion Sample Summary

		Analytical Methods					
		Proposed Number of Samples	Sample Location IDs	EPA Method TO-15	Sub-slab soil vapor (SSSV), Indoor Air (IA), Background (BG)	Sampling Rationale	QA/QC Samples
Proposed Sample Location							
Basement - 43 Lafayette Ave		2	SS-03/IA-04, SS-04/IA-05	X	SSSV and IA	Assessing the basement	One Duplicate
Tenant space - 45 Lafayette Ave		1	SS-05/IA-06	X	SSSV and IA	Assessing the tenant space	
Exterior Front		1	OA-02	X	BG	Background ambient air	

FIGURES



LEGEND

SOURCE: RAMSEY
QUADRANGLE, NEW
JERSEY/NEW YORK
7.5 MINUTE SERIES, USGS 2019



EnviroSure Inc.

Quality. Integrity. Reliability.

621 SHREWSBURY AVENUE, SUITE 151, SHREWSBURY, NJ 07702

APPROVED BY D. Ogonowski

DRAWN BY D. Grothusen

PROJECT DRAWING NO. SO833-1

FIGURE 1

SITE LOCATION MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE
1:24,000

CONTOUR INTERVAL
10 feet

DATE
1/7/2021



LEGEND

SOURCE: GOOGLE EARTH PRO,
IMAGE DATE 6/25/2019



621 SHREWSBURY AVENUE, SUITE 151, SHREWSBURY, NJ 07702

APPROVED BY D. OGONOWSKI

DRAWN BY D. GROTHUSEN

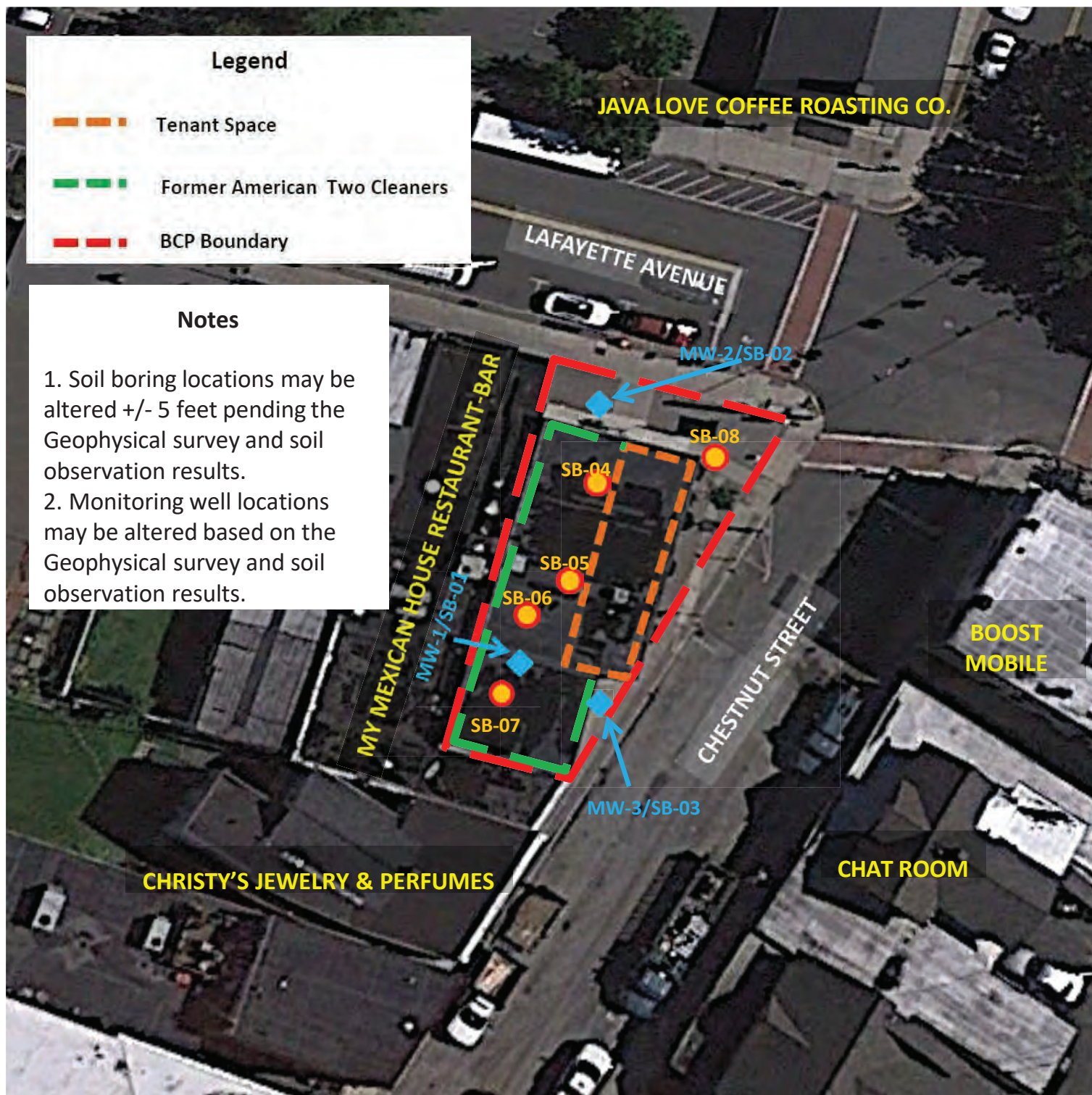
PROJECT DRAWING NO. SO833-2

FIGURE 2

SITE LAYOUT MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1":38 feet

DATE 1/7/2021



LEGEND

SOURCE: GOOGLE EARTH PRO,
IMAGE DATE 6/25/2019

◆ Proposed Monitoring Well and
Soil Boring

● Proposed Soil Boring



621 SHREWSBURY AVENUE, SUITE 151, SHREWSBURY, NJ 07702

APPROVED BY D. OGWOWSKI

DRAWN BY D. GROTHUSEN

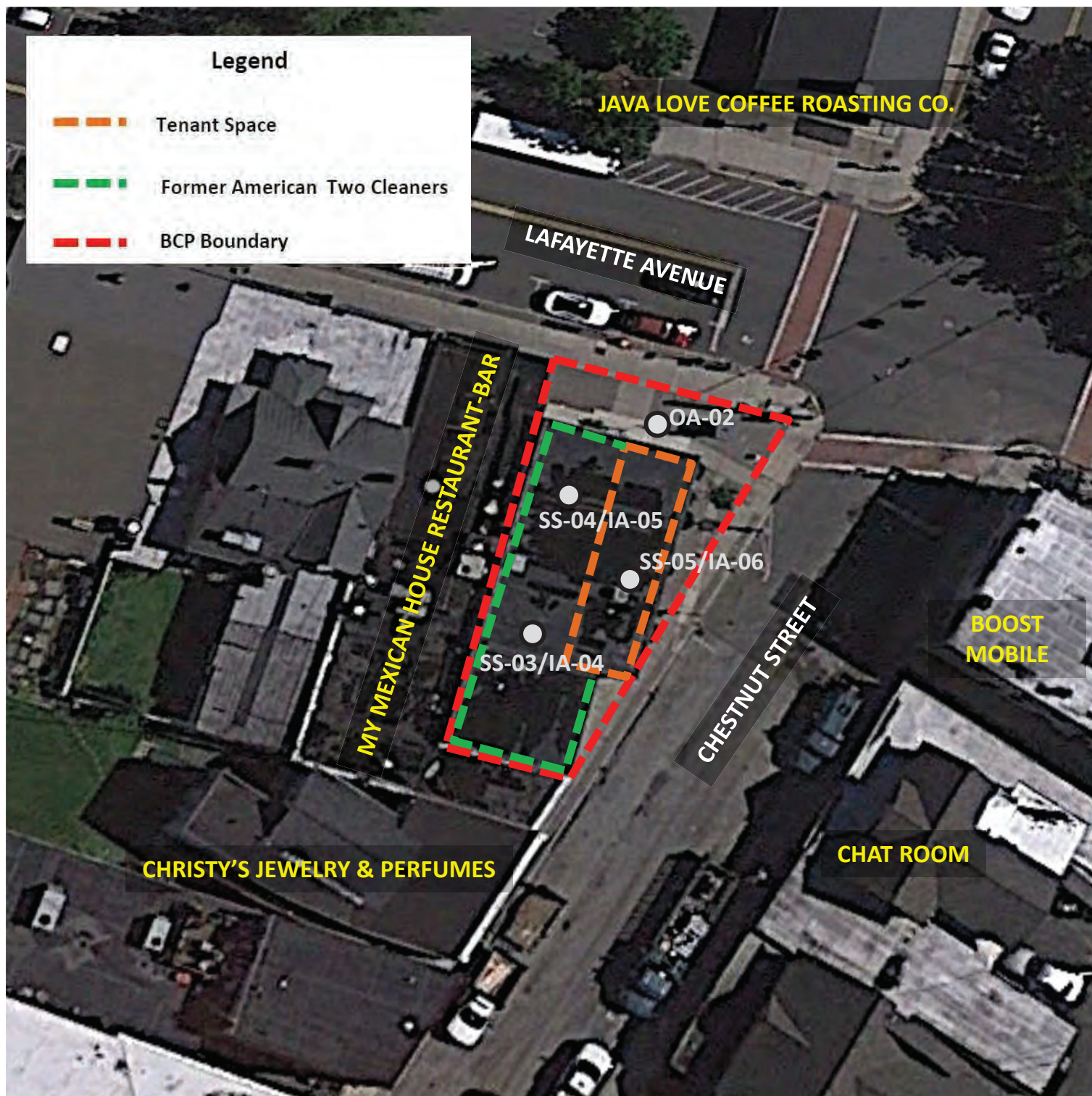
PROJECT DRAWING NO. SO833-2

FIGURE 3

PROPOSED SOIL BORING AND MONITORING
WELL LOCATION MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1":38 feet

DATE 1/7/2021



LEGEND

SOURCE: GOOGLE EARTH PRO,
IMAGE DATE 6/25/2019



Proposed Sub-Slab and
Indoor Air Sample Location



621 SHREWSBURY AVENUE, SUITE 151, SHREWSBURY, NJ 07702

APPROVED BY D. OGWOWSKI

DRAWN BY D. GROTHUSEN

PROJECT DRAWING NO. SO833-2

FIGURE 4

PROPOSED SUB-SLAB AND INDOOR AIR
SAMPLE LOCATION MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1":38 feet

DATE 11/15/2021

APPENDIX A

PROJECT PERSONNEL

PROJECT PERSONNEL AND CONTACT INFORMATION

- **Dyna Krumich-Ogonowski**; *Project Manager, Project Health and Safety Officer*
 - 621 Shrewsbury Avenue, Suite 151, Shrewsbury, NJ
 - 732.741.1110
 - Dyna@EnviroSureInc.com
- **James Lang**; *NJ LSRP, Qualified Environmental Professional*
 - 621 Shrewsbury Avenue, Suite 151, Shrewsbury, NJ
 - 732.741.1110
 - Jim@EnviroSureInc.com
- **Christopher Zeliznak**; *Project Geologist (PA and DE), Project QA/QC*
 - 319 South High Street, 1st Floor, West Chester, PA
 - 610.696.8980
 - Chris@EnviroSureInc.com
- **Derek Grothusen**; *Field Scientist*
 - 621 Shrewsbury Avenue, Suite 151, Shrewsbury, NJ
 - 732.741.1110
 - Derek@EnviroSureInc.com
- **Alpha Analytical Laboratories**
 - 508-898-9220
 - cromero@alphalab.com
- **Licensed Drilling Company - TBD**
- **Cynthia Gray, Reds Crib, LLC; Owner**
 - 43-45 Lafayette Avenue, Suffern, NY
 - 917-375-6374
 - cynleegray@aol.com
- **Daniel R. Lavoie, Esq; Attorney**
 - DRLavoie LLP, 590 Madison Avenue, 21st Floor, New York, NY
 - 203-962-1629
 - Daniel@DRLavoie.com

ENVIRONMENTAL DEPARTMENT DIRECTOR

Total Years Experience:

18

Education:

- ▶ MS, Temple University, Geology
- ▶ BS, Temple University Geology

License(s)/Certification(s):

- ▶ Pennsylvania Licensed Professional Geologist PG004537
- ▶ Delaware Licensed Professional Geologist S4-0001336

Professional Affiliations:

- ▶ Geological Society of America

Publications:

- ▶ Zeliznak, Christopher; Goodwin, P.W.; and Anderson, E.J., 1998. The Superposition of a Hierarchic Allocyclic Fabric Across Lateral Facies and Vertical Stratigraphic Boundaries in the Upper Silurian Williamsport Sandstone and Wills Creek Shale. Geological Society of America, Programs with Abstracts, v.30, n. 1, p. 85.
- ▶ Zeliznak, Christopher; Brown, S.M.; Goodwin, P.W.; and Anderson, E.J., 1997. Facies Patterns that Define Wills Creek 5th and 6th Order Cycles. Geological Society of America, Programs with Abstracts, v. 29, n. 1, p. 10.

Christopher Zeliznak, P.G.

Overview:

Mr. Zeliznak has over 18 years of project management and geologic experience with expertise in environmental remediation. His experience includes leadership roles in most aspects of remediation and his most challenging assignments included being an entry team leader for experimental post-treatment testing related to the Hart Senate Office Building Anthrax Decontamination and team leader/manager of a soil sampling crew at the Libby Asbestos Project, prior to obtaining his Professional Geologist Licensure in the Commonwealth of Pennsylvania and remediating sites through the Pennsylvania Department of Environmental Protection Land Recycling and Corrective Action Process Programs.

Experience:

Project Manager, Coatesville RDA Project, PA. Partnered with the Redevelopment Authority of the City of Coatesville and redeveloper, DEPG Coatesville Associates, LP, to restructure Coatesville as a downtown commercial center. Mr. Zeliznak entered the site into the Pennsylvania Land Recycling Program (Act 2) and completed site investigation efforts that were subsequently summarized in a Remedial Investigation Report and submitted to the PADEP. Coordinated site characterization activities including subsurface geophysical survey to search for underground storage tanks, soil sampling, and installing and sampling a network of groundwater monitoring wells.

Project Manager, Historical Industrial Site, PA. Areas of concern included groundwater impacted with volatile organic compounds (VOCs) including chlorinated VOCs and soil impacted with metals, VOCs, and semi-volatile organic compounds (SVOCs). Issued a Notice of Intent to Remediate (NIR) the site to the PADEP. Coordinated several rounds of groundwater sampling using the existing groundwater monitoring well network. Compiled previous data and recent groundwater sampling data. Created a Work Plan to achieve relief from liability through the Pennsylvania Department of Environmental Protection (PADEP) Land Recycling Program (Act 2).

Project Manager, Multiple Act 2 Sites in Pennsylvania, Confidential Clients.

Conducted site investigations regulated in the PADEP Land Recycling and Storage Tank Cleanup Programs for underground storage tank sites. Managed chlorinated solvent (PCE/TCE) and perfluorinated compound (PFC) remediation sites, evaluating site groundwater conditions using PADEP-approved modeling programs including Biochlor and Pentox groundwater models and Johnson & Ettinger vapor models. Participated in company, office, and personnel management, including staffing, reviews, and mentoring. Served as Company Safety Committee Secretary.

Project Manager/Geologist, Multiple Quarry Sites in Pennsylvania, Confidential Clients.

Directed NX corehole drilling operations, performed structural and stratigraphic investigations and interpretation for exploration of potential quarry expansion areas. Incorporated geologic information into Surface Mining Permits and managed projects for submittals to PADEP Bureau of Mines.

Emergency Management Division Committee Member.

Acted as environmental science consultant for development of company Emergency Management Division. The Division was developed for natural disaster, fire, and environmental hazard response in Eastern Pennsylvania.

Site Manager/Project Geologist, CERCLIS Investigation, Lansdale, Pennsylvania.

Performed site management activities for geologic and hydrogeologic investigation to define DNAPL VOC contaminant plume size, migration and source. Responsibilities included personnel management; coordination between staff, subcontractors, and USGS; and adherence to field protocols for monitoring well installations, sampling, and site safety. Also assisted with video log, downhole geophysical testing, and packer testing data interpretation related to monitoring well installations and placement.

Team Leader, CERCLIS Investigation, Libby, Montana.

Participated in citizen and property screening efforts related to asbestos abatement projects for the Town of Libby, Montana. Team leader of direct push soil sampling effort for 200-acre sawmill site characterization.

Team Leader, Hart Senate Office Building Anthrax Response Team, Washington, D.C.

Team Leader of bacterial spore test strip placement and retrieval crew. Test strip usage was required to quantify the efficacy of the fumigation process for decontamination of personal items potentially contaminated with anthrax. Managed a 10-20 person crew during seven day per week operation and coordinated crew operations with subcontractor support crews.

O&M Technician & Geologist, CERCLIS Remediation, Hatfield, Pennsylvania.

Performed operation and maintenance activities for dual stage air stripping groundwater treatment system. Responsibilities included weekly maintenance, annual cleaning, and monthly NPDES sampling. Conducted quarterly groundwater sampling activities including mobilization, sampling, data reduction and reporting to determine TCE plume concentration and efficacy of treatment system operation. Modeled TCE plume using Rockworks® 2002 subsurface modeling software.

Hydrogeologist, CERCLIS Investigation, Sydney, New York.

Performed field operation and oversight of Army Corps of Engineers subcontractor for multiple 72-hour pumping tests relating to groundwater treatment system design.

Environmental Professional

Total Years Experience:

15

Education:

- ✧ B.S. Marine Science, The Richard Stockton College of New Jersey, Pomona, New Jersey, 2002
- ✧ M.S. Environmental Management, University of Maryland University College, Adelphi, Maryland, 2015

License(s)/Certification(s):

- ✧ 40-Hour Hazardous Materials Incident Response Operations, OSHA 29 CFR 1910.120(e)(3)(i), 2007
- ✧ 8-Hour Hazardous Waste Refresher Course, OSHA 29 CFR 1910.120(e)(8), 2008, 2015, 2018
- ✧ 10-Hour Construction Training Course, OSHA 29 CFR 1910.120(e)(3)(i), 2016
- ✧ CPR and First Aid Certified, 2018
- ✧ Underground Utilities Competent Person, 2009
- ✧ Excavation and Trenching Competent Person, 2010
- ✧ Boating Safety, U.S. Coast Guard Auxiliary, 2009
- ✧ GHS Hazard Communication, 2013
- ✧ 30-Hour Construction Safety and Health Training, 2010
- ✧ Wetland Delineation Certification, Rutgers University, 2008
- ✧ Stream Assessment Training, Stroud Water Research Center, 2006

Dyna Krumich-Ogonowski

Overview:

Ms. Krumich-Ogonowski is a versatile, detail-oriented professional with 15 years of environmental consulting and site inspection experience. Field experience includes vapor intrusion investigations, biological sampling, spill response, and monitoring well installation. She is proficient in the use of the Microsoft Office suite of programs, G-Suite, Adobe, GINT, and Corel.

Experience:

Senior Project Manager. Preparation and review of Work Plans, Phase II Investigations, Remedial Investigation and Action reports, Response Action Objective, Vapor Intrusion models, Receptor and Ecological Evaluations in accordance with NJDEP, PADEP, CTDEEP, or NYSDEC. Preparation of proposals for Phase II Investigations, Site Investigations, and Remedial Actions for commercial and municipality clients. Negotiate contracts, manage project budgets, procurement, and invoicing.

Senior Project Scientist. Preparation of Work Plans, letter reports, Remedial Investigation and Action reports, Biennial Certification reporting, Feasibility Study, Proposed Plan, Vapor Intrusion Mitigation reports, Receptor and Ecological Evaluations in accordance with NJDEP, CERCLA, USEPA, or NYSDEC. Preparation of proposal cost estimates and procurement documents, negotiated budgets managed task budgets and invoices. Coordination of contractors, acting as on-site representative for client during spill response activities. Responsible for ensuring contractor adherence to the bid specifications, ensuring site environmental and regulatory compliance. Managed remedial investigation and action activities including full scale vapor intrusion investigations, biological sampling investigations, and spill response. Experience in multi-media sampling, sample management sub-slab soil gas port installation, monitoring well installation, vapor intrusion sampling, and post-excavation sampling.

Senior Project Manager

James A. Lang, LSRP

Total Years Experience:

30

Education:

- ▶ BS, Geology, University of Maryland, 1985

License(s)/Certification(s):

- ▶ Licensed Site Remediation Professional, New Jersey, No. 573496, 2012
- ▶ 40-Hour OSHA HAZWOPER Training
- ▶ 8-Hour OSHA Annual Refresher

Professional Affiliations:

- ▶ Licensed Site Remediation Professional Association

Overview:

Mr. Lang has more than 30 years of experience as an environmental professional consulting for private companies, municipalities, and the federal government. He has performed and managed environmental investigations and remediations in NJ, NY, PA, CT, MD, CA, TN, MS, NE, and AZ at a variety of industrial, commercial, agricultural, and government-owned properties. He has performed and managed all phases of investigation including preliminary assessment, site investigation, remedial investigation, remedial actions and feasibility studies under a variety of State and Federal Regulations such as CERCLA/Superfund, NEPA, AAI, Brownfields, ISRA, BUST, and SRRA. Mr. Lang's specialties are Brownfield redevelopment projects and due-diligence. Mr. Lang's project experience ranges from evaluating abandoned industrial properties for inclusion on the NPL, to establishing an environmental baseline prior to property transfer, to remedial action during property redevelopment. Since 2010, Mr. Lang has been the LSRP on 28 sites and has issued Remedial Action Outcomes (RAO) for a variety of commercial and industrial sites.

Experience:

Project Manager, National Environmental Policy Act (NEPA), U.S. Department of Housing and Urban Development, U.S. Department of Veterans Affairs.

Mr. Lang has conducted and managed numerous investigations for projects receiving federal funding to comply with NEPA requirements in NJ, NY, CT, and MD. These projects have included housing development in urban centers and enhanced use leasing redevelopment projects at Veterans Administration medical facilities in various states. Reports prepared by Mr. Lang and under his direction include AAI Due-Diligence, Environmental Review Records, Environmental Assessments, Categorical Exemptions, Categorical Exclusions, and Section 106 applicability determinations.

Brownfield Development Areas (BDAs), Municipal and Not-for-Profit Developers.

Mr. Lang conducted and managed work in the West Lake Avenue BDA (Neptune), Springwood Avenue BDA (Asbury Park), and Central Valley BDA in New Jersey. He was responsible for the successful application for the Springwood Avenue BDA and assisted with the preparation of the West Lake Avenue BDA application. Once the BDA status was granted, Mr. Lang applied for funding on behalf of the municipality and designated master developer through the HDSRF program and conducted/managed the investigations including PA, SI, and RI. Mr. Lang planned and managed the remedial action for two projects in conjunction with the planned redevelopment. The projects consisted of a much-needed community/senior center and a multipurpose medical building. During the BDA application process and the following investigations and remediations, Mr. Lang worked closely with the developers, the municipalities, architects, and other project professionals to incorporate the remediation into the redevelopment plans, as well as meeting with the Brownfield Redevelopment Interagency Team.

Emergency Response, Diesel Fuel Release at a Petroleum Terminal on the Arthur Kill, New Jersey. Mr. Lang is managing the Phase 2 recovery of a large diesel fuel release to the Arthur Kill and tributaries that occurred in October 2012 as a result of tropical storm Sandy. Mr. Lang is working with the NJDEP Emergency Management to contain and recover the diesel. Mr. Lang, along with the responsible party and LSRP, developed the Site Conceptual Model (SCM) as the basis for characterization of the release and as the basis to proceed with the Site Investigation. Based on the SCM, Mr. Lang developed the Site Investigation Work Plan (SIWP) to evaluate the soil and sediment along the water ways. Preliminary data indicates that the SCM accurately predicted the behavior of the release and the distribution of the diesel fuel. Mr. Lang coordinated with the residents

impacted by the release and the responsible party to remove debris and return commercial and private marinas to working order and to gain access to complete the necessary investigation which is on-going.

Due-Diligence, Municipal, Federal, Private Clients.

Mr. Lang has conducted and managed due-diligence investigations since 1986 and his clients have included the Resolution Trust Corporation (RTC), the US Department of Veterans Affairs, the City of Asbury Park, Lakewood Township, Newark Housing Authority, and confidential private clients. Often, a due-diligence investigation serves as the foundation for remediation of a property or to identify potential sources of unexpected contamination. Mr. Lang's experience has evolved as regulations and standards were developed by State and Federal Agencies and ASTM. Mr. Lang conducted USEPA and RTC property assessments, ASTM Phase I ESA, USEPA AAI investigations, and NJDEP Preliminary Assessments. The purpose of these due-diligence investigations is varied including pre-purchase base-line evaluations, regulatory compliance for industrial site transfers such as ISRA, and preparation of a site-wide NFA/RAO.

Chlorinated Solvent Investigation at a Shopping Center, Commercial Client, South Freehold, New Jersey. Mr. Lang assumed responsibility of the project after the initial SI was completed. Mr. Lang successfully demonstrated that the soil was not a source of the contamination and that the thick clay sequence located below the site was acting as a barrier to the downward migration of the contaminant. By demonstrating this, he reduced the remedial action cost estimate provided by the previous consultant by more than half. Mr. Lang developed an appropriate remedial action with an estimated cost of approximately \$600,000. The remedial action would be coordinated with planned site improvements to control costs further.

APPENDIX B

HISTORICAL INVESTIGATIONS ENVIRONMENTAL REPORT



Prepared for:

**REDS CRIB, LLC
1 MEMORIAL DRIVE
SUFFERN VILLAGE, NEW YORK 10901**

LIMITED VAPOR INTRUSION ASSESSMENT

**43-45 LAFAYETTE AVENUE
VILLAGE OF SUFFERN
ROCKLAND COUNTY, NEW YORK**

JANUARY 11, 2021

SPILL NO.: 2005272

Project number: SO581 and SO833

Prepared by: **ENVIROSURE, INC.**

**DYNA KRUMICH-OGONOWSKI
Environmental Professional**

**CHRISTOPHER ZELIZNAK, P.G. (PA & DE)
ENVIRONMENTAL PROFESSIONAL**

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1.0 SUMMARY

Reds Crib, LLC (the “Client”) retained EnviroSure, Inc. (EnviroSure) to conduct a Limited Vapor Intrusion Assessment for the property located at 43-45 Lafayette Avenue in the Village of Suffern, Rockland County, New York (the Site). All activities were performed in accordance with New York State (NYS) Department of Health (DOH) “Guidance for Evaluating Soil Vapor Intrusion in the State of New York,” dated October 2016 and May 2017, along with NYS Department of Environmental Conservation (DEC) Technical Guidance for Site Investigation and Remediation (DER-10). EnviroSure’s assessment included review of the August 2020 Environmental Consulting and Management Services, Inc. (ECMS) vapor intrusion sampling event and indoor air sampling at the Site conducted by EnviroSure in September 2020.

1.1 Purpose

Based on the historical dry cleaner operations at the Site, vapor intrusion sampling was conducted to assess the indoor air quality at the Site.

1.2 Scope of Work

Assessment activities consisted of the following:

- Review of ECMS sub-slab soil vapor, indoor air, and ambient air sample analytical results
- Collect indoor air sample from occupied tenant space

The Site location and topographic features are identified on **Figure 1**. A Site Layout Map is included as **Figure 2**.

2.0 SITE DESCRIPTION

The Site is located at 43-45 Lafayette Avenue in the Village of Suffern, Rockland County, New York in a mixed commercial and residential area. The Site is located approximately 0.2-miles south of Interstate 287 and approximately 400-feet east of Route 202. The Site is approximately 0.07 acres with a one-story structure split into two suites and identified in the tax records as Tax ID 54.35-2-25 for General Business/Community Commercial land use. The location and key features of the Site are identified on **Figures 1 and 2**. The Site is accessible on foot from Lafayette Avenue and Chestnut Street.

The following information regarding the physical setting of the Site was obtained through a review of various publications, interviews, and on-site observations.

2.1 Site History

The Site building has two tenant spaces; 43 Lafayette Avenue is vacant and was formerly occupied by American Two Cleaners (ATC) and 45 Lafayette Avenue is occupied by a wellness program tenant. The current property owner, Reds Crib, LLC, purchased the property in October 2019 and the ATC occupied the property for at least six years prior.

2.2 Physical Setting

As noted on the United States Geological Survey (USGS) Ramsey, New Jersey/New York Quadrangle 7.5-minute series map (2020), the Site is at an elevation of approximately 300 feet above mean sea level. The Site slopes gently to the south towards the southern adjoining property along Chestnut Street.

2.2.1 Geology

The Site is underlain by the Triassic-aged Hammer Creek Conglomerate located in the Gettysburg-Newark Lowland Section of the Piedmont Physiographic Province. The Hammer Creek conglomerate is a very coarse quartz conglomerate having abundant pebbles and cobbles of gray quartzite. It has minor beds of coarse red sandstone. Beds are thick to massive and well developed. At its type section, it has a measured thickness of approximately 2,580 feet (USGS 2021).

2.2.2 Hydrogeology

Groundwater was not encountered during Site activities; however, groundwater is assumed to be at depths ranging from 10 to 35 feet below ground surface (fbgs). Groundwater flow direction is southwest.

3.0 FIELD INVESTIGATION ACTIVITIES

Vapor intrusion investigation activities were completed on August 11, 2020 by Environmental Consulting and Management Services, Inc. (ECMS) and EnviroSure on September 15, 2020. Discussions of the sampling efforts and analytical results follows.

3.1 Vapor Intrusion Sampling

The subcontractors used during remediation activities are listed below:

- Phoenix Laboratories, Manchester CT (ECMS)
- Alpha Analytical, Mahwah, NJ

Laboratory data packages are provided in **Appendix A and B**.

The Client contracted ECMS of New City, New York to conduct a vapor intrusion assessment at the former drycleaning space in 43 Lafayette Avenue on the Site. On August 11, 2020, ECMS collected two sub-slab soil vapor samples, two indoor air samples, and one ambient air sample from the Site; the sample locations are identified on **Figure 3**. It should be noted that the ECMS field notes were not supplied to EnviroSure for inclusion in this report; only the sample locations and laboratory data package from Phoenix Environmental Laboratories, Inc, of, Manchester, Connecticut were provided for review and discussion in this report. A copy of the laboratory data package is included in **Appendix A** of this report. As noted on the laboratory Chain of Custody in the laboratory package, all samples were collected over an approximately five to six hour time interval. The vapor intrusion sample locations were identified from the laboratory Chain of Custody and are summarized on the following Sample Location Table:

Sample ID	Location
SS-1	Sub-slab soil vapor in main basement area
SS-2	Sub-slab soil vapor in basement boiler room
IA-1	Indoor air in basement boiler room
IA-2	Indoor Air in first floor former drycleaning space
OA-1	Outdoor ambient air sample from southeast exterior wall (along Chestnut Street)

Upon completion of sampling by ECMS, the samples were submitted to Phoenix Environmental Laboratories, Inc. of Manchester, Connecticut (NY Lab Registration No.

11301) under chain of custody protocol for volatile organic compound (VOC) analysis via USEPA method TO-15.

After review of the ECMS sample laboratory analytical results, discussed in **Section 3.2** of this report, EnviroSure determined that vapor intrusion was a concern for the Site. EnviroSure subsequently notified the NYSDEC Spill Hotline on September 9, 2020 of the release from historical dry cleaning operations at the Site. The NYSDEC issued Spill No. 2005272 for the case.

On September 15, 2020, Ms. Dyna Krumich-Ogonowski with EnviroSure conducted a walk-through of the Site building with the property owner, Ms. Cynthia Gray, President of Reds Crib, LLC. The former drycleaning suite at 43 Lafayette Avenue was vacant and empty. Based on the recommendations made by EnviroSure, general purpose fans have been operated in the first floor and basement of the former drycleaning space to circulate and remove indoor air, to temporarily mitigate the vapor intrusion concern. The wellness program tenant in the suite at 45 Lafayette Avenue is fit out with a countertop for retail wellness drink/smoothie sales with minimal furniture, a restroom, and office space. Two employees were working at the time of the site walk. Review of the building construction during the walk through determined that the basement area is isolated and only accessible from the former dry cleaners suite. The basement floor was observed to be in poor condition with numerous large cracks in the surface along with an open air sump.

To evaluate the indoor air in the occupied tenant space at 45 Lafayette Avenue, EnviroSure collected vapor intrusion sample IA-3 from the occupied tenant space in the main area outside of the office and restroom on September 11, 2020, since the suite was not sampled during the August 11, 2020 sampling event. The sample location is depicted on **Figure 3**. Sampling was conducted in accordance with the NYSDOH guidance documents. The sample canister was submitted to Alpha Analytical Laboratory of Westborough, Massachusetts (NY Lab Registration No. 11627) for VOC analysis via USEPA method TO-15.

3.2 Vapor Intrusion Analytical Results

EnviroSure summarized the provided August 11, 2020 ECMS sample analytical results on **Table 1** and the September 15, 2020 sample analytical results on **Table 2** upon receipt and compared both to the NYSDOH Health Exposures Indoor Air Concentrations and NYSDOH Soil Vapor/Indoor Air Matrix A through C. As noted on **Table 1**, ECMS indoor air samples IA-1 and IA-2 were reported with concentrations of 305 $\mu\text{g}/\text{m}^3$ and 73.9 $\mu\text{g}/\text{m}^3$, respectively, greater than the applicable NYSDOH Indoor Air Concentrations due to Health Exposures screening value of 30 $\mu\text{g}/\text{m}^3$. ECMS sub-slab soil vapor samples SS-1 and SS-2 were reported with concentrations of tetrachlorethylene (PCE) at 3,470 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and 7,520 $\mu\text{g}/\text{m}^3$, respectively, and respective concentrations of trichlorethylene (TCE) at 41.1 $\mu\text{g}/\text{m}^3$ and 202 $\mu\text{g}/\text{m}^3$, greater than the applicable NYSDOH Indoor Air Concentrations due to Health Exposures screening value of 2 $\mu\text{g}/\text{m}^3$. The remaining analyzed compounds

from the ECMS samples were either not detected or were detected below the respective NYSDOH Indoor Air Concentrations due to Health Exposures screening values. Review of the analyzed compounds for the EnviroSure indoor air sample (IA-3) were either not detected or were detected below the respective NYSDOH Indoor Air Concentrations due to Health Exposures screening values. Copies of the laboratory reports are provided in **Appendix A and B**.

4.0 FINDINGS AND CONCLUSIONS

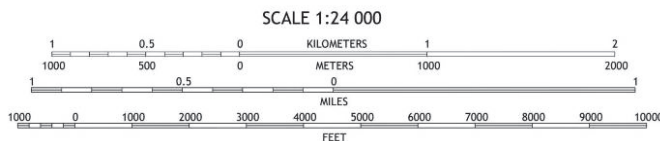
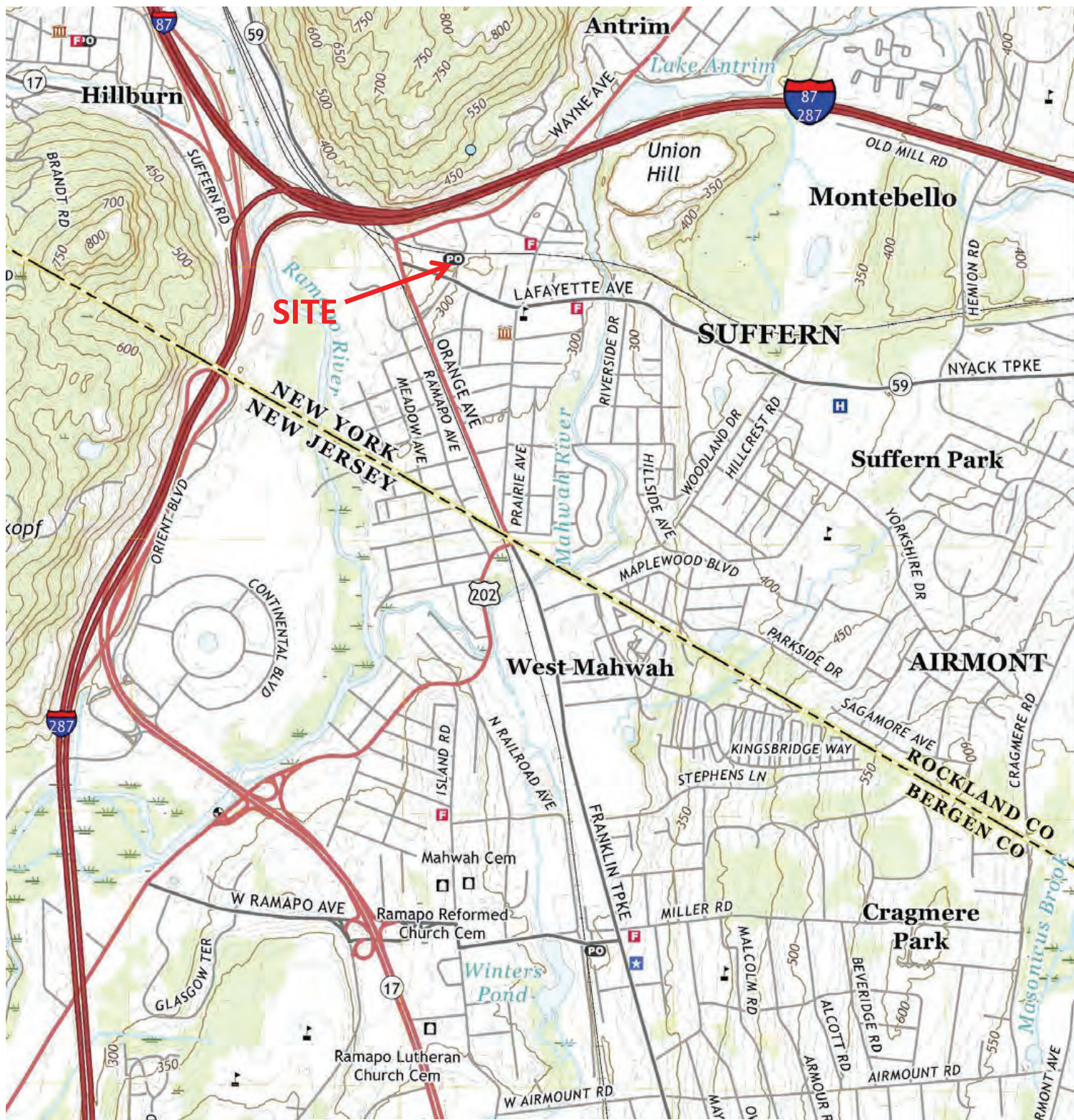
EnviroSure conducted an evaluation of August 11, 2020 data from samples collected by ECMS, as well as a limited vapor intrusion assessment for the Site building on September 15, 2020, by collecting two sub-slab soil vapor samples, three indoor air samples and one outdoor ambient air sample for laboratory analysis and comparison to the respective NYSDOH Indoor Air Concentrations due to Health Exposures screening values. Both ECMS sub-slab soil vapor samples SS-1 and SS-2 contained PCE and TCE concentrations above the NYSDOH exposure concentrations and are listed in the applicable matrix as “mitigate”. Both indoor air samples collected by ECMS from the former dry cleaning suite also contained concentrations of PCE above the applicable NYSDOH exposure concentrations and are listed in the applicable matrix as “mitigate”. The indoor air sample concentrations from the 45 Lafayette Avenue suite were not detected above the respective exposure concentrations.

The sub-slab soil vapor and indoor air samples collected from the former dry cleaning space have concentrations that indicate a potential source is below the basement slab. Due to the floor conditions and open sump, the sub-slab soil vapors are migrating into indoor air. However, the soil vapors do not appear to be migrating into the indoor air of the 43 Lafayette Avenue suite.

EnviroSure determined that vapor intrusion was a concern for the Site. Based on that assessment, EnviroSure subsequently notified the NYSDEC Spill Hotline on September 9, 2020 of the release from historical dry cleaning operations at the Site. The NYSDEC issued Spill No. 2005272 for the case. Following the sampling results from the August 2020 sampling event, the Client put temporary house fans in the 45 Lafayette Avenue space to circulate and remove the indoor air.

Based on the findings from the ECMS vapor intrusion investigation as evaluated by EnviroSure, we recommend sealing the basement floor cracks and sump to minimize the vapor intrusion pathways. Furthermore, EnviroSure recommends additional investigation to determine the source, nature, and extent of impacted media. A voluntary Brownfield Cleanup Program (BCP) application will be completed and submitted to the NYSDEC for review and submission to the BCP.

FIGURES



LEGEND

SOURCE: RAMSEY
QUADRANGLE, NEW
JERSEY/NEW YORK
7.5 MINUTE SERIES, USGS 2019



EnviroSure Inc.

Quality. Integrity. Reliability.

621 SHREWSBURY AVENUE, SUITE 151, SHREWSBURY, NJ 07702

APPROVED BY **D. Ogonowski**

DRAWN BY **D. Grothusen**

PROJECT DRAWING NO. **SO833-1**

FIGURE 1

SITE LOCATION MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE
1:24,000

CONTOUR INTERVAL
10 feet

DATE
1/7/2021



LEGEND

SOURCE: GOOGLE EARTH PRO,
IMAGE DATE 6/25/2019



621 SHREWSBURY AVENUE, SUITE 151, SHREWSBURY, NJ 07702

APPROVED BY D. Ogonowski

DRAWN BY D. Grothusen

PROJECT DRAWING NO. SO833-2

FIGURE 2

SITE LAYOUT MAP
43-45 LAFAYETTE AVENUE
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK

SCALE 1"=38 feet

DATE 1/7/2021



LEGEND SOURCE: GOOGLE EARTH, IMAGE DATE 2019 	 EnviroSure Inc Quality. Integrity. Reliability. 319 S. HIGH STREET, 1st FLOOR, WEST CHESTER, PA 19382	FIGURE 3 SAMPLE LOCATION ANALYTICAL RESULTS 43-45 LAFAYETTE AVENUE ROCKLAND COUNTY, SUFFERN, NEW YORK				
	APPROVED BY				D. OGONOWSKI	
	DRAWN BY				P. MARCINK	
	PROJECT NO.	S0833	SCALE	DATE	DRAWING NO.	
			GRAPHIC	01/06/21	S0833-3	

TABLES

TABLE 1
VAPOR INTRUSION SAMPLE SUMMARY
43-45 LAFAYETTE AVENUE, SUFFERN, NY
ECMS

Project Id : 43 LAFAYETTE ST SUFFERN, NY	Collection Date		8/11/2020												NYSDEC/NYSDOH indoor air concentrations due to Health Exposures	NYSDOH Requirements Established in the Soil Vapor / Indoor Air Matrices
	Client Id	Matrix	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020			
			OA-1	SS-1	SS-2	IA-1	IA-2	Basement sub-slab vapors closest to Lafayette	Basement sub-slab vapors in boiler room	Indoor air in boiler room	Indoor air in main tenant space	Result	Result	Result		
SAMPLE LOCATION			Units	CAS	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
Volatiles (TO15) By TO15																
1,1,1-Trichloroethane			ug/m3	71-55-6	< 1.00	< 5.00	< 5.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	No Guidance/standard established	No Further Action
1,1-Dichloroethene			ug/m3	75-35-4	< 0.20	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 0.20	No Guidance/standard established	No Further Action
Carbon Tetrachloride			ug/m3	56-23-5	0.48	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	0.54	0.41	< 0.20	< 0.20	No Guidance/standard established	No Further Action
Cis-1,2-Dichloroethene			ug/m3	156-59-2	< 0.20	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 0.20	< 0.20	< 0.20	< 0.20	No Guidance/standard established	No Further Action
Methylene Chloride			ug/m3	75-09-2	< 3.00	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	3.24	< 3.00	< 3.00	60	No Guidance/standard established	No Further Action
Tetrachloroethene			ug/m3	127-18-4	3.49	3,470	7,520	305	7,520	305	0.61	73.9	< 0.20	30	Mitigate	Mitigate
Trichloroethene			ug/m3	79-01-6	< 0.20	41.1	202	< 0.20	41.1	202	< 0.20	< 0.20	< 0.20	2	Mitigate	Mitigate
Vinyl Chloride			ug/m3	75-01-4	< 0.20	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 0.20	< 0.20	< 0.20	< 0.20	No Guidance/standard established	No Further Action

TABLE 2
INDOOR AIR SAMPLE SUMMARY
43-45 LAFAYETTE AVENUE, SUFFERN, NY
ENVIROSURE PROJECT No. SO581; NYS DEC SPILL No. 2005272

		Collection Date		9/15/2020		NYSDEC/NYSDOH indoor air concentrations due to Health Exposures		NYSDOH Requirements Established in the Soil Vapor / Indoor Air Matrices	
		Client Id		IA-3					
		Matrix		Air					
		SAMPLE LOCATION		Indoor Air - Rear of occupied tenant space					
Volatiles (TO15) By TO15		CAS	Units	Result	RL				
1,1,1-Trichloroethane		71-55-6	ug/m3	<0.109	1.00			No Further Action	
1,1-Dichloroethene		75-35-4	ug/m3	<0.079	0.20			No Further Action	
Carbon Tetrachloride		56-23-5	ug/m3	0.39	0.20			No Further Action	
Cis-1,2-Dichloroethene		156-59-2	ug/m3	<0.079	0.20			No Further Action	
Methylene Chloride		75-09-2	ug/m3	<1.74	3.00			No Further Action	
Tetrachloroethene		127-18-4	ug/m3	3.76	1.50			No Further Action	
Trichloroethene		79-01-6	ug/m3	<0.107	0.20			No Further Action	
Vinyl Chloride		75-01-4	ug/m3	<0.051	0.20			No Further Action	
Values that Exceed NYSDOH Health Exposure Guidance		(boldened value)							
Yellow highlighted compound/concentration on Soil Vapor/Indoor Air Matrix A									
Light Blue highlighted compound/concentration on Soil Vapor/Indoor Air Matrix B									
Light Green highlighted compound/concentration on Soil Vapor/Indoor Air Matrix C									
Concentration detected									

APPENDIX A

LABORATORY ANALYTICAL RESULTS PACKAGE - AUGUST 2020



Monday, August 17, 2020

Project ID: 43 LAFAYETTE
SDG ID: GCG52680
Sample ID#s: CG52680 - CG52684

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

A handwritten signature in cursive script that reads "Phyllis Shiller".

Phyllis Shiller

Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B

NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823



Sample Id Cross Reference

August 17, 2020

SDG I.D.: GCG52680

Project ID: 43 LAFAYETTE

Client Id	Lab Id	Matrix
SS-1	CG52680	AIR
OA-1	CG52681	AIR
IA-2	CG52682	AIR
SS-2	CG52683	AIR
IA-1	CG52684	AIR



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823



Analysis Report

August 17, 2020

FOR:

Sample Information

Matrix: AIR
Location Code:
Rush Request: 72 Hour
P.O.#:
Canister Id: 19732

Custody Information

Collected by: HS
Received by: SW
Analyzed by: see "By" below

Date

08/11/20
08/12/20

Time

15:54
17:16

Project ID: 43 LAFAYETTE
Client ID: SS-1

Laboratory Data

SDG ID: GCG52680
Phoenix ID: CG52680

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Helium (% volume/volume)	ND	10	ND		08/14/20	KCA	1	1
Volatiles (TO15)								
1,1,1,2-Tetrachloroethane	ND	0.729	ND	5.00	08/13/20	KCA	5	1
1,1,1-Trichloroethane	ND	0.917	ND	5.00	08/13/20	KCA	5	
1,1,2,2-Tetrachloroethane	ND	0.729	ND	5.00	08/13/20	KCA	5	
1,1,2-Trichloroethane	ND	0.917	ND	5.00	08/13/20	KCA	5	
1,1-Dichloroethane	ND	1.24	ND	5.02	08/13/20	KCA	5	
1,1-Dichloroethene	ND	0.252	ND	1.00	08/13/20	KCA	5	
1,2,4-Trichlorobenzene	ND	0.674	ND	5.00	08/13/20	KCA	5	
1,2,4-Trimethylbenzene	22.5	1.02	111	5.01	08/13/20	KCA	5	
1,2-Dibromoethane(EDB)	ND	0.651	ND	5.00	08/13/20	KCA	5	
1,2-Dichlorobenzene	ND	0.832	ND	5.00	08/13/20	KCA	5	
1,2-Dichloroethane	ND	1.24	ND	5.02	08/13/20	KCA	5	
1,2-dichloropropane	ND	1.08	ND	4.99	08/13/20	KCA	5	
1,2-Dichlorotetrafluoroethane	ND	0.716	ND	5.00	08/13/20	KCA	5	
1,3,5-Trimethylbenzene	6.13	1.02	30.1	5.01	08/13/20	KCA	5	
1,3-Butadiene	ND	2.26	ND	5.00	08/13/20	KCA	5	
1,3-Dichlorobenzene	ND	0.832	ND	5.00	08/13/20	KCA	5	
1,4-Dichlorobenzene	ND	0.832	ND	5.00	08/13/20	KCA	5	
1,4-Dioxane	ND	1.39	ND	5.01	08/13/20	KCA	5	
2-Hexanone(MBK)	ND	1.22	ND	4.99	08/13/20	KCA	5	1
4-Ethyltoluene	6.74	1.02	33.1	5.01	08/13/20	KCA	5	1
4-Isopropyltoluene	ND	0.911	ND	5.00	08/13/20	KCA	5	1
4-Methyl-2-pentanone(MIBK)	ND	1.22	ND	4.99	08/13/20	KCA	5	
Acetone	21.8	2.11	51.8	5.01	08/13/20	KCA	5	
Acrylonitrile	ND	2.31	ND	5.01	08/13/20	KCA	5	
Benzene	1.80	1.57	5.75	5.01	08/13/20	KCA	5	

Client ID: SS-1

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	
Benzyl chloride	ND	0.966	ND	5.00	08/13/20	KCA	5
Bromodichloromethane	ND	0.747	ND	5.00	08/13/20	KCA	5
Bromoform	ND	0.484	ND	5.00	08/13/20	KCA	5
Bromomethane	ND	1.29	ND	5.01	08/13/20	KCA	5
Carbon Disulfide	ND	1.61	ND	5.01	08/13/20	KCA	5
Carbon Tetrachloride	ND	0.159	ND	1.00	08/13/20	KCA	5
Chlorobenzene	ND	1.09	ND	5.01	08/13/20	KCA	5
Chloroethane	ND	1.90	ND	5.01	08/13/20	KCA	5
Chloroform	ND	1.02	ND	4.98	08/13/20	KCA	5
Chloromethane	ND	2.42	ND	4.99	08/13/20	KCA	5
Cis-1,2-Dichloroethene	ND	0.252	ND	1.00	08/13/20	KCA	5
cis-1,3-Dichloropropene	ND	1.10	ND	4.99	08/13/20	KCA	5
Cyclohexane	ND	1.45	ND	4.99	08/13/20	KCA	5
Dibromochloromethane	ND	0.587	ND	5.00	08/13/20	KCA	5
Dichlorodifluoromethane	ND	1.01	ND	4.99	08/13/20	KCA	5
Ethanol	135	2.66	254	5.01	08/13/20	KCA	5 1
Ethyl acetate	ND	1.39	ND	5.01	08/13/20	KCA	5 1
Ethylbenzene	18.0	1.15	78.1	4.99	08/13/20	KCA	5
Heptane	3.91	1.22	16.0	5.00	08/13/20	KCA	5
Hexachlorobutadiene	ND	0.469	ND	5.00	08/13/20	KCA	5
Hexane	3.15	1.42	11.1	5.00	08/13/20	KCA	5
Isopropylalcohol	24.1	2.04	59.2	5.01	08/13/20	KCA	5
Isopropylbenzene	ND	1.02	ND	5.01	08/13/20	KCA	5
m,p-Xylene	76.3	1.15	331	4.99	08/13/20	KCA	5
Methyl Ethyl Ketone	ND	1.70	ND	5.01	08/13/20	KCA	5
Methyl tert-butyl ether(MTBE)	ND	1.39	ND	5.01	08/13/20	KCA	5
Methylene Chloride	ND	4.32	ND	15.0	08/13/20	KCA	5
n-Butylbenzene	1.17	0.911	6.42	5.00	08/13/20	KCA	5 1
o-Xylene	24.4	1.15	106	4.99	08/13/20	KCA	5
Propylene	ND	2.91	ND	5.01	08/13/20	KCA	5 1
sec-Butylbenzene	ND	0.911	ND	5.00	08/13/20	KCA	5 1
Styrene	ND	1.17	ND	4.98	08/13/20	KCA	5
Tetrachloroethene	512	1.11	3470	7.52	08/13/20	KCA	30
Tetrahydrofuran	3.03	1.70	8.93	5.01	08/13/20	KCA	5 1
Toluene	60.2	1.33	227	5.01	08/13/20	KCA	5
Trans-1,2-Dichloroethene	ND	1.26	ND	4.99	08/13/20	KCA	5
trans-1,3-Dichloropropene	ND	1.10	ND	4.99	08/13/20	KCA	5
Trichloroethene	7.66	0.186	41.1	1.00	08/13/20	KCA	5
Trichlorofluoromethane	ND	0.891	ND	5.00	08/13/20	KCA	5
Trichlorotrifluoroethane	ND	0.653	ND	5.00	08/13/20	KCA	5
Vinyl Chloride	ND	0.391	ND	1.00	08/13/20	KCA	5
<u>QA/QC Surrogates/Internals</u>							
% Bromofluorobenzene (5x)	101	%	101	%	08/13/20	KCA	5
% IS-1,4-Difluorobenzene (5x)	101	%	101	%	08/13/20	KCA	5
% IS-Bromochloromethane (5x)	101	%	101	%	08/13/20	KCA	5
% IS-Chlorobenzene-d5 (5x)	103	%	103	%	08/13/20	KCA	5
% Bromofluorobenzene (30x)	100	%	100	%	08/13/20	KCA	30
% IS-1,4-Difluorobenzene (30x)	99	%	99	%	08/13/20	KCA	30
% IS-Bromochloromethane (30x)	102	%	102	%	08/13/20	KCA	30

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	
% IS-Chlorobenzene-d5 (30x)	99	%	99	%	08/13/20	KCA	30

1 = This parameter is not certified by the primary accrediting authority (NY NELAC) for this matrix. NY NELAC does not offer certification for all parameters at this time.

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low

QA/QC Surrogates: Surrogates are compounds (preceded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Helium is reported in units of percent (%)

Elevated reporting limits have been reported due to the presence of reported target compounds in the TO15 list above the calibration. Sample was run at an initial dilution.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

August 17, 2020

Reviewed and Released by: Rashmi Makol, Project Manager



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823



Analysis Report

August 17, 2020

FOR:

Sample Information

Matrix: AIR
Location Code:
Rush Request: 72 Hour
P.O.#:
Canister Id: 23332

Custody Information

Collected by: HS
Received by: SW
Analyzed by: see "By" below

Date

08/11/20
08/12/20

Time

16:12
17:16

Project ID: 43 LAFAYETTE
Client ID: OA-1

Laboratory Data

SDG ID: GCG52680
Phoenix ID: CG52681

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution
Volatiles (TO15)							
1,1,1,2-Tetrachloroethane	ND	0.146	ND	1.00	08/13/20	KCA	1
1,1,1-Trichloroethane	ND	0.183	ND	1.00	08/13/20	KCA	1
1,1,2,2-Tetrachloroethane	ND	0.146	ND	1.00	08/13/20	KCA	1
1,1,2-Trichloroethane	ND	0.183	ND	1.00	08/13/20	KCA	1
1,1-Dichloroethane	ND	0.247	ND	1.00	08/13/20	KCA	1
1,1-Dichloroethene	ND	0.051	ND	0.20	08/13/20	KCA	1
1,2,4-Trichlorobenzene	ND	0.135	ND	1.00	08/13/20	KCA	1
1,2,4-Trimethylbenzene	35.6	3.05	175	15.0	08/13/20	KCA	15
1,2-Dibromoethane(EDB)	ND	0.130	ND	1.00	08/13/20	KCA	1
1,2-Dichlorobenzene	ND	0.166	ND	1.00	08/13/20	KCA	1
1,2-Dichloroethane	ND	0.247	ND	1.00	08/13/20	KCA	1
1,2-dichloropropane	ND	0.217	ND	1.00	08/13/20	KCA	1
1,2-Dichlorotetrafluoroethane	ND	0.143	ND	1.00	08/13/20	KCA	1
1,3,5-Trimethylbenzene	10.7	0.204	52.6	1.00	08/13/20	KCA	1
1,3-Butadiene	ND	0.452	ND	1.00	08/13/20	KCA	1
1,3-Dichlorobenzene	ND	0.166	ND	1.00	08/13/20	KCA	1
1,4-Dichlorobenzene	ND	0.166	ND	1.00	08/13/20	KCA	1
1,4-Dioxane	ND	0.278	ND	1.00	08/13/20	KCA	1
2-Hexanone(MBK)	ND	0.244	ND	1.00	08/13/20	KCA	1
4-Ethyltoluene	12.5	0.204	61.4	1.00	08/13/20	KCA	1
4-Isopropyltoluene	0.904	0.182	4.96	1.00	08/13/20	KCA	1
4-Methyl-2-pentanone(MIBK)	ND	0.244	ND	1.00	08/13/20	KCA	1
Acetone	120	6.32	285	15.0	08/13/20	KCA	15
Acrylonitrile	ND	0.461	ND	1.00	08/13/20	KCA	1
Benzene	5.47	0.313	17.5	1.00	08/13/20	KCA	1
Benzyl chloride	ND	0.193	ND	1.00	08/13/20	KCA	1

Client ID: OA-1

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	
Bromodichloromethane	ND	0.149	ND	1.00	08/13/20	KCA	1
Bromoform	ND	0.097	ND	1.00	08/13/20	KCA	1
Bromomethane	ND	0.258	ND	1.00	08/13/20	KCA	1
Carbon Disulfide	ND	0.321	ND	1.00	08/13/20	KCA	1
Carbon Tetrachloride	0.076	0.032	0.48	0.20	08/13/20	KCA	1
Chlorobenzene	ND	0.217	ND	1.00	08/13/20	KCA	1
Chloroethane	ND	0.379	ND	1.00	08/13/20	KCA	1
Chloroform	ND	0.205	ND	1.00	08/13/20	KCA	1
Chloromethane	0.711	0.485	1.47	1.00	08/13/20	KCA	1
Cis-1,2-Dichloroethene	ND	0.051	ND	0.20	08/13/20	KCA	1
cis-1,3-Dichloropropene	ND	0.221	ND	1.00	08/13/20	KCA	1
Cyclohexane	2.32	0.291	7.98	1.00	08/13/20	KCA	1
Dibromochloromethane	ND	0.118	ND	1.00	08/13/20	KCA	1
Dichlorodifluoromethane	0.377	0.202	1.86	1.00	08/13/20	KCA	1
Ethanol	35.6	0.531	67.0	1.00	08/13/20	KCA	1 1
Ethyl acetate	ND	0.278	ND	1.00	08/13/20	KCA	1 1
Ethylbenzene	33.8	0.230	147	1.00	08/13/20	KCA	1
Heptane	9.90	0.244	40.5	1.00	08/13/20	KCA	1
Hexachlorobutadiene	ND	0.094	ND	1.00	08/13/20	KCA	1
Hexane	6.30	0.284	22.2	1.00	08/13/20	KCA	1
Isopropylalcohol	1.66	0.407	4.08	1.00	08/13/20	KCA	1
Isopropylbenzene	1.64	0.204	8.06	1.00	08/13/20	KCA	1
m,p-Xylene	137	3.46	595	15.0	08/13/20	KCA	15
Methyl Ethyl Ketone	5.68	0.339	16.7	1.00	08/13/20	KCA	1
Methyl tert-butyl ether(MTBE)	ND	0.278	ND	1.00	08/13/20	KCA	1
Methylene Chloride	ND	0.864	ND	3.00	08/13/20	KCA	1
n-Butylbenzene	2.21	0.182	12.1	1.00	08/13/20	KCA	1 1
o-Xylene	41.4	3.46	180	15.0	08/13/20	KCA	15
Propylene	4.48	0.581	7.71	1.00	08/13/20	KCA	1 1
sec-Butylbenzene	ND	0.182	ND	1.00	08/13/20	KCA	1 1
Styrene	1.26	0.235	5.36	1.00	08/13/20	KCA	1
Tetrachloroethene	0.515	0.037	3.49	0.25	08/13/20	KCA	1
Tetrahydrofuran	0.729	0.339	2.15	1.00	08/13/20	KCA	1 1
Toluene	124	3.98	467	15.0	08/13/20	KCA	15
Trans-1,2-Dichloroethene	ND	0.252	ND	1.00	08/13/20	KCA	1
trans-1,3-Dichloropropene	ND	0.221	ND	1.00	08/13/20	KCA	1
Trichloroethene	ND	0.037	ND	0.20	08/13/20	KCA	1
Trichlorofluoromethane	0.258	0.178	1.45	1.00	08/13/20	KCA	1
Trichlorotrifluoroethane	ND	0.131	ND	1.00	08/13/20	KCA	1
Vinyl Chloride	ND	0.078	ND	0.20	08/13/20	KCA	1
<u>QA/QC Surrogates/Internals</u>							
% Bromofluorobenzene	101	%	101	%	08/13/20	KCA	1
% IS-1,4-Difluorobenzene	99	%	99	%	08/13/20	KCA	1
% IS-Bromochloromethane	98	%	98	%	08/13/20	KCA	1
% IS-Chlorobenzene-d5	112	%	112	%	08/13/20	KCA	1
% Bromofluorobenzene (15x)	100	%	100	%	08/13/20	KCA	15
% IS-1,4-Difluorobenzene (15x)	100	%	100	%	08/13/20	KCA	15
% IS-Bromochloromethane (15x)	101	%	101	%	08/13/20	KCA	15
% IS-Chlorobenzene-d5 (15x)	100	%	100	%	08/13/20	KCA	15

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By

1 = This parameter is not certified by the primary accrediting authority (NY NELAC) for this matrix. NY NELAC does not offer certification for all parameters at this time.

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low

QA/QC Surrogates: Surrogates are compounds (preceded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

August 17, 2020

Reviewed and Released by: Rashmi Makol, Project Manager



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823



Analysis Report

August 17, 2020

FOR:

Sample Information

Matrix: AIR
Location Code:
Rush Request: 72 Hour
P.O.#:
Canister Id: 12864

Custody Information

Collected by: HS
Received by: SW
Analyzed by: see "By" below

Date

08/11/20
08/12/20

Time

16:18
17:16

Project ID: 43 LAFAYETTE
Client ID: IA-2

Laboratory Data

SDG ID: GCG52680
Phoenix ID: CG52682

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution
Volatiles (TO15)							
1,1,1,2-Tetrachloroethane	ND	0.146	ND	1.00	08/13/20	KCA	1
1,1,1-Trichloroethane	ND	0.183	ND	1.00	08/13/20	KCA	1
1,1,2,2-Tetrachloroethane	ND	0.146	ND	1.00	08/13/20	KCA	1
1,1,2-Trichloroethane	ND	0.183	ND	1.00	08/13/20	KCA	1
1,1-Dichloroethane	ND	0.247	ND	1.00	08/13/20	KCA	1
1,1-Dichloroethene	ND	0.051	ND	0.20	08/13/20	KCA	1
1,2,4-Trichlorobenzene	ND	0.135	ND	1.00	08/13/20	KCA	1
1,2,4-Trimethylbenzene	0.782	0.204	3.84	1.00	08/13/20	KCA	1
1,2-Dibromoethane(EDB)	ND	0.130	ND	1.00	08/13/20	KCA	1
1,2-Dichlorobenzene	ND	0.166	ND	1.00	08/13/20	KCA	1
1,2-Dichloroethane	ND	0.247	ND	1.00	08/13/20	KCA	1
1,2-dichloropropane	ND	0.217	ND	1.00	08/13/20	KCA	1
1,2-Dichlorotetrafluoroethane	ND	0.143	ND	1.00	08/13/20	KCA	1
1,3,5-Trimethylbenzene	0.242	0.204	1.19	1.00	08/13/20	KCA	1
1,3-Butadiene	ND	0.452	ND	1.00	08/13/20	KCA	1
1,3-Dichlorobenzene	ND	0.166	ND	1.00	08/13/20	KCA	1
1,4-Dichlorobenzene	ND	0.166	ND	1.00	08/13/20	KCA	1
1,4-Dioxane	ND	0.278	ND	1.00	08/13/20	KCA	1
2-Hexanone(MBK)	ND	0.244	ND	1.00	08/13/20	KCA	1
4-Ethyltoluene	ND	0.204	ND	1.00	08/13/20	KCA	1
4-Isopropyltoluene	ND	0.182	ND	1.00	08/13/20	KCA	1
4-Methyl-2-pentanone(MIBK)	ND	0.244	ND	1.00	08/13/20	KCA	1
Acetone	9.16	0.421	21.7	1.00	08/13/20	KCA	1
Acrylonitrile	ND	0.461	ND	1.00	08/13/20	KCA	1
Benzene	ND	0.313	ND	1.00	08/13/20	KCA	1
Benzyl chloride	ND	0.193	ND	1.00	08/13/20	KCA	1

Client ID: IA-2

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	
Bromodichloromethane	ND	0.149	ND	1.00	08/13/20	KCA	1
Bromoform	ND	0.097	ND	1.00	08/13/20	KCA	1
Bromomethane	ND	0.258	ND	1.00	08/13/20	KCA	1
Carbon Disulfide	ND	0.321	ND	1.00	08/13/20	KCA	1
Carbon Tetrachloride	0.066	0.032	0.41	0.20	08/13/20	KCA	1
Chlorobenzene	ND	0.217	ND	1.00	08/13/20	KCA	1
Chloroethane	ND	0.379	ND	1.00	08/13/20	KCA	1
Chloroform	ND	0.205	ND	1.00	08/13/20	KCA	1
Chloromethane	0.649	0.485	1.34	1.00	08/13/20	KCA	1
Cis-1,2-Dichloroethene	ND	0.051	ND	0.20	08/13/20	KCA	1
cis-1,3-Dichloropropene	ND	0.221	ND	1.00	08/13/20	KCA	1
Cyclohexane	ND	0.291	ND	1.00	08/13/20	KCA	1
Dibromochloromethane	ND	0.118	ND	1.00	08/13/20	KCA	1
Dichlorodifluoromethane	0.367	0.202	1.81	1.00	08/13/20	KCA	1
Ethanol	94.4	E 0.531	178	1.00	08/13/20	KCA	1 1
Ethyl acetate	0.809	0.278	2.91	1.00	08/13/20	KCA	1 1
Ethylbenzene	ND	0.230	ND	1.00	08/13/20	KCA	1
Heptane	ND	0.244	ND	1.00	08/13/20	KCA	1
Hexachlorobutadiene	ND	0.094	ND	1.00	08/13/20	KCA	1
Hexane	ND	0.284	ND	1.00	08/13/20	KCA	1
Isopropylalcohol	1.17	0.407	2.87	1.00	08/13/20	KCA	1
Isopropylbenzene	ND	0.204	ND	1.00	08/13/20	KCA	1
m,p-Xylene	0.337	0.230	1.46	1.00	08/13/20	KCA	1
Methyl Ethyl Ketone	1.45	0.339	4.27	1.00	08/13/20	KCA	1
Methyl tert-butyl ether(MTBE)	ND	0.278	ND	1.00	08/13/20	KCA	1
Methylene Chloride	ND	0.864	ND	3.00	08/13/20	KCA	1
n-Butylbenzene	ND	0.182	ND	1.00	08/13/20	KCA	1 1
o-Xylene	ND	0.230	ND	1.00	08/13/20	KCA	1
Propylene	ND	0.581	ND	1.00	08/13/20	KCA	1 1
sec-Butylbenzene	ND	0.182	ND	1.00	08/13/20	KCA	1 1
Styrene	ND	0.235	ND	1.00	08/13/20	KCA	1
Tetrachloroethene	10.9	0.037	73.9	0.25	08/13/20	KCA	1
Tetrahydrofuran	3.45	0.339	10.2	1.00	08/13/20	KCA	1 1
Toluene	0.418	0.266	1.57	1.00	08/13/20	KCA	1
Trans-1,2-Dichloroethene	ND	0.252	ND	1.00	08/13/20	KCA	1
trans-1,3-Dichloropropene	ND	0.221	ND	1.00	08/13/20	KCA	1
Trichloroethene	ND	0.037	ND	0.20	08/13/20	KCA	1
Trichlorofluoromethane	0.222	0.178	1.25	1.00	08/13/20	KCA	1
Trichlorotrifluoroethane	ND	0.131	ND	1.00	08/13/20	KCA	1
Vinyl Chloride	ND	0.078	ND	0.20	08/13/20	KCA	1
<u>QA/QC Surrogates/Internals</u>							
% Bromofluorobenzene	102	%	102	%	08/13/20	KCA	1
% IS-1,4-Difluorobenzene	104	%	104	%	08/13/20	KCA	1
% IS-Bromochloromethane	104	%	104	%	08/13/20	KCA	1
% IS-Chlorobenzene-d5	104	%	104	%	08/13/20	KCA	1

Client ID: IA-2

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By

1 = This parameter is not certified by the primary accrediting authority (NY NELAC) for this matrix. NY NELAC does not offer certification for all parameters at this time.

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low

QA/QC Surrogates: Surrogates are compounds (preceded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

E = Estimated value quantitated above calibration range for this compound.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

August 17, 2020

Reviewed and Released by: Rashmi Makol, Project Manager



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823



Analysis Report

August 17, 2020

FOR:

Sample Information

Matrix: AIR
Location Code:
Rush Request: 72 Hour
P.O.#:
Canister Id: 216

Custody Information

Collected by: HS
Received by: SW
Analyzed by: see "By" below

Date

08/11/20
08/12/20

Time

15:40
17:16

Project ID: 43 LAFAYETTE
Client ID: SS-2

Laboratory Data

SDG ID: GCG52680
Phoenix ID: CG52683

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Helium (% volume/volume)	ND	10	ND		08/14/20	KCA	1	1
Volatiles (TO15)								
1,1,1,2-Tetrachloroethane	ND	0.729	ND	5.00	08/13/20	KCA	5	1
1,1,1-Trichloroethane	ND	0.917	ND	5.00	08/13/20	KCA	5	
1,1,2,2-Tetrachloroethane	ND	0.729	ND	5.00	08/13/20	KCA	5	
1,1,2-Trichloroethane	ND	0.917	ND	5.00	08/13/20	KCA	5	
1,1-Dichloroethane	ND	1.24	ND	5.02	08/13/20	KCA	5	
1,1-Dichloroethene	ND	0.252	ND	1.00	08/13/20	KCA	5	
1,2,4-Trichlorobenzene	ND	0.674	ND	5.00	08/13/20	KCA	5	
1,2,4-Trimethylbenzene	21.0	1.02	103	5.01	08/13/20	KCA	5	
1,2-Dibromoethane(EDB)	ND	0.651	ND	5.00	08/13/20	KCA	5	
1,2-Dichlorobenzene	ND	0.832	ND	5.00	08/13/20	KCA	5	
1,2-Dichloroethane	ND	1.24	ND	5.02	08/13/20	KCA	5	
1,2-dichloropropane	ND	1.08	ND	4.99	08/13/20	KCA	5	
1,2-Dichlorotetrafluoroethane	ND	0.716	ND	5.00	08/13/20	KCA	5	
1,3,5-Trimethylbenzene	5.70	1.02	28.0	5.01	08/13/20	KCA	5	
1,3-Butadiene	ND	2.26	ND	5.00	08/13/20	KCA	5	
1,3-Dichlorobenzene	ND	0.832	ND	5.00	08/13/20	KCA	5	
1,4-Dichlorobenzene	ND	0.832	ND	5.00	08/13/20	KCA	5	
1,4-Dioxane	ND	1.39	ND	5.01	08/13/20	KCA	5	
2-Hexanone(MBK)	ND	1.22	ND	4.99	08/13/20	KCA	5	1
4-Ethyltoluene	6.26	1.02	30.8	5.01	08/13/20	KCA	5	1
4-Isopropyltoluene	ND	0.911	ND	5.00	08/13/20	KCA	5	1
4-Methyl-2-pentanone(MIBK)	ND	1.22	ND	4.99	08/13/20	KCA	5	
Acetone	34.9	2.11	82.9	5.01	08/13/20	KCA	5	
Acrylonitrile	ND	2.31	ND	5.01	08/13/20	KCA	5	
Benzene	1.59	1.57	5.08	5.01	08/13/20	KCA	5	

Client ID: SS-2

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	
Benzyl chloride	ND	0.966	ND	5.00	08/13/20	KCA	5
Bromodichloromethane	ND	0.747	ND	5.00	08/13/20	KCA	5
Bromoform	ND	0.484	ND	5.00	08/13/20	KCA	5
Bromomethane	ND	1.29	ND	5.01	08/13/20	KCA	5
Carbon Disulfide	ND	1.61	ND	5.01	08/13/20	KCA	5
Carbon Tetrachloride	ND	0.159	ND	1.00	08/13/20	KCA	5
Chlorobenzene	ND	1.09	ND	5.01	08/13/20	KCA	5
Chloroethane	ND	1.90	ND	5.01	08/13/20	KCA	5
Chloroform	ND	1.02	ND	4.98	08/13/20	KCA	5
Chloromethane	ND	2.42	ND	4.99	08/13/20	KCA	5
Cis-1,2-Dichloroethene	13.2	0.252	52.3	1.00	08/13/20	KCA	5
cis-1,3-Dichloropropene	ND	1.10	ND	4.99	08/13/20	KCA	5
Cyclohexane	ND	1.45	ND	4.99	08/13/20	KCA	5
Dibromochloromethane	ND	0.587	ND	5.00	08/13/20	KCA	5
Dichlorodifluoromethane	ND	1.01	ND	4.99	08/13/20	KCA	5
Ethanol	157	2.66	296	5.01	08/13/20	KCA	5 1
Ethyl acetate	ND	1.39	ND	5.01	08/13/20	KCA	5 1
Ethylbenzene	16.0	1.15	69.4	4.99	08/13/20	KCA	5
Heptane	3.39	1.22	13.9	5.00	08/13/20	KCA	5
Hexachlorobutadiene	ND	0.469	ND	5.00	08/13/20	KCA	5
Hexane	2.78	1.42	9.8	5.00	08/13/20	KCA	5
Isopropylalcohol	23.3	2.04	57.2	5.01	08/13/20	KCA	5
Isopropylbenzene	ND	1.02	ND	5.01	08/13/20	KCA	5
m,p-Xylene	67.9	1.15	295	4.99	08/13/20	KCA	5
Methyl Ethyl Ketone	4.05	1.70	11.9	5.01	08/13/20	KCA	5
Methyl tert-butyl ether(MTBE)	ND	1.39	ND	5.01	08/13/20	KCA	5
Methylene Chloride	ND	4.32	ND	15.0	08/13/20	KCA	5
n-Butylbenzene	1.06	0.911	5.82	5.00	08/13/20	KCA	5 1
o-Xylene	21.8	1.15	94.6	4.99	08/13/20	KCA	5
Propylene	ND	2.91	ND	5.01	08/13/20	KCA	5 1
sec-Butylbenzene	ND	0.911	ND	5.00	08/13/20	KCA	5 1
Styrene	ND	1.17	ND	4.98	08/13/20	KCA	5
Tetrachloroethene	1110	2.77	7520	18.8	08/13/20	KCA	75
Tetrahydrofuran	6.36	1.70	18.7	5.01	08/13/20	KCA	5 1
Toluene	50.8	1.33	191	5.01	08/13/20	KCA	5
Trans-1,2-Dichloroethene	2.15	1.26	8.52	4.99	08/13/20	KCA	5
trans-1,3-Dichloropropene	ND	1.10	ND	4.99	08/13/20	KCA	5
Trichloroethene	37.6	0.186	202	1.00	08/13/20	KCA	5
Trichlorofluoromethane	ND	0.891	ND	5.00	08/13/20	KCA	5
Trichlorotrifluoroethane	ND	0.653	ND	5.00	08/13/20	KCA	5
Vinyl Chloride	ND	0.391	ND	1.00	08/13/20	KCA	5
<u>QA/QC Surrogates/Internals</u>							
% Bromofluorobenzene (5x)	104	%	104	%	08/13/20	KCA	5
% IS-1,4-Difluorobenzene (5x)	100	%	100	%	08/13/20	KCA	5
% IS-Bromochloromethane (5x)	100	%	100	%	08/13/20	KCA	5
% IS-Chlorobenzene-d5 (5x)	103	%	103	%	08/13/20	KCA	5
% Bromofluorobenzene (75x)	98	%	98	%	08/13/20	KCA	75
% IS-1,4-Difluorobenzene (75x)	101	%	101	%	08/13/20	KCA	75
% IS-Bromochloromethane (75x)	101	%	101	%	08/13/20	KCA	75

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	
% IS-Chlorobenzene-d5 (75x)	100	%	100	%	08/13/20	KCA	75

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RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low

QA/QC Surrogates: Surrogates are compounds (preceded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Helium is reported in units of percent (%)

Elevated reporting limits have been reported due to the presence of reported target compounds in the TO15 list above the calibration. Sample was run at an initial dilution.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

August 17, 2020

Reviewed and Released by: Rashmi Makol, Project Manager



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823



Analysis Report

August 17, 2020

FOR:

Sample Information

Matrix: AIR
Location Code:
Rush Request: 72 Hour
P.O.#:
Canister Id: 11289

Custody Information

Collected by: HS
Received by: SW
Analyzed by: see "By" below

Date

08/11/20
08/12/20

Time

15:33
17:16

Project ID: 43 LAFAYETTE
Client ID: IA-1

Laboratory Data

SDG ID: GCG52680
Phoenix ID: CG52684

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Helium (% volume/volume)	ND	10	ND		08/14/20	KCA	1	1
Volatiles (TO15)								
1,1,1,2-Tetrachloroethane	ND	0.146	ND	1.00	08/13/20	KCA	1	1
1,1,1-Trichloroethane	ND	0.183	ND	1.00	08/13/20	KCA	1	
1,1,2,2-Tetrachloroethane	ND	0.146	ND	1.00	08/13/20	KCA	1	
1,1,2-Trichloroethane	ND	0.183	ND	1.00	08/13/20	KCA	1	
1,1-Dichloroethane	ND	0.247	ND	1.00	08/13/20	KCA	1	
1,1-Dichloroethene	ND	0.051	ND	0.20	08/13/20	KCA	1	
1,2,4-Trichlorobenzene	ND	0.135	ND	1.00	08/13/20	KCA	1	
1,2,4-Trimethylbenzene	3.33	0.204	16.4	1.00	08/13/20	KCA	1	
1,2-Dibromoethane(EDB)	ND	0.130	ND	1.00	08/13/20	KCA	1	
1,2-Dichlorobenzene	ND	0.166	ND	1.00	08/13/20	KCA	1	
1,2-Dichloroethane	ND	0.247	ND	1.00	08/13/20	KCA	1	
1,2-dichloropropane	ND	0.217	ND	1.00	08/13/20	KCA	1	
1,2-Dichlorotetrafluoroethane	ND	0.143	ND	1.00	08/13/20	KCA	1	
1,3,5-Trimethylbenzene	1.00	0.204	4.91	1.00	08/13/20	KCA	1	
1,3-Butadiene	ND	0.452	ND	1.00	08/13/20	KCA	1	
1,3-Dichlorobenzene	ND	0.166	ND	1.00	08/13/20	KCA	1	
1,4-Dichlorobenzene	ND	0.166	ND	1.00	08/13/20	KCA	1	
1,4-Dioxane	ND	0.278	ND	1.00	08/13/20	KCA	1	
2-Hexanone(MBK)	ND	0.244	ND	1.00	08/13/20	KCA	1	1
4-Ethyltoluene	0.662	0.204	3.25	1.00	08/13/20	KCA	1	1
4-Isopropyltoluene	0.496	0.182	2.72	1.00	08/13/20	KCA	1	1
4-Methyl-2-pentanone(MIBK)	ND	0.244	ND	1.00	08/13/20	KCA	1	
Acetone	20.1	0.421	47.7	1.00	08/13/20	KCA	1	
Acrylonitrile	ND	0.461	ND	1.00	08/13/20	KCA	1	
Benzene	ND	0.313	ND	1.00	08/13/20	KCA	1	

Client ID: IA-1

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	
Benzyl chloride	ND	0.193	ND	1.00	08/13/20	KCA	1
Bromodichloromethane	ND	0.149	ND	1.00	08/13/20	KCA	1
Bromoform	ND	0.097	ND	1.00	08/13/20	KCA	1
Bromomethane	ND	0.258	ND	1.00	08/13/20	KCA	1
Carbon Disulfide	ND	0.321	ND	1.00	08/13/20	KCA	1
Carbon Tetrachloride	0.086	0.032	0.54	0.20	08/13/20	KCA	1
Chlorobenzene	ND	0.217	ND	1.00	08/13/20	KCA	1
Chloroethane	ND	0.379	ND	1.00	08/13/20	KCA	1
Chloroform	ND	0.205	ND	1.00	08/13/20	KCA	1
Chloromethane	0.733	0.485	1.51	1.00	08/13/20	KCA	1
Cis-1,2-Dichloroethene	ND	0.051	ND	0.20	08/13/20	KCA	1
cis-1,3-Dichloropropene	ND	0.221	ND	1.00	08/13/20	KCA	1
Cyclohexane	ND	0.291	ND	1.00	08/13/20	KCA	1
Dibromochloromethane	ND	0.118	ND	1.00	08/13/20	KCA	1
Dichlorodifluoromethane	0.364	0.202	1.80	1.00	08/13/20	KCA	1
Ethanol	167	3.19	314	6.01	08/13/20	KCA	6 1
Ethyl acetate	2.86	0.278	10.3	1.00	08/13/20	KCA	1 1
Ethylbenzene	ND	0.230	ND	1.00	08/13/20	KCA	1
Heptane	ND	0.244	ND	1.00	08/13/20	KCA	1
Hexachlorobutadiene	ND	0.094	ND	1.00	08/13/20	KCA	1
Hexane	0.562	0.284	1.98	1.00	08/13/20	KCA	1
Isopropylalcohol	2.53	0.407	6.22	1.00	08/13/20	KCA	1
Isopropylbenzene	ND	0.204	ND	1.00	08/13/20	KCA	1
m,p-Xylene	0.680	0.230	2.95	1.00	08/13/20	KCA	1
Methyl Ethyl Ketone	7.69	0.339	22.7	1.00	08/13/20	KCA	1
Methyl tert-butyl ether(MTBE)	ND	0.278	ND	1.00	08/13/20	KCA	1
Methylene Chloride	0.933	0.864	3.24	3.00	08/13/20	KCA	1
n-Butylbenzene	0.210	0.182	1.15	1.00	08/13/20	KCA	1 1
o-Xylene	0.404	0.230	1.75	1.00	08/13/20	KCA	1
Propylene	ND	0.581	ND	1.00	08/13/20	KCA	1 1
sec-Butylbenzene	ND	0.182	ND	1.00	08/13/20	KCA	1 1
Styrene	0.544	0.235	2.32	1.00	08/13/20	KCA	1
Tetrachloroethene	45.0	0.221	305	1.50	08/13/20	KCA	6
Tetrahydrofuran	33.3	0.339	98.2	1.00	08/13/20	KCA	1 1
Toluene	1.22	0.266	4.59	1.00	08/13/20	KCA	1
Trans-1,2-Dichloroethene	ND	0.252	ND	1.00	08/13/20	KCA	1
trans-1,3-Dichloropropene	ND	0.221	ND	1.00	08/13/20	KCA	1
Trichloroethene	0.114	0.037	0.61	0.20	08/13/20	KCA	1
Trichlorofluoromethane	0.241	0.178	1.35	1.00	08/13/20	KCA	1
Trichlorotrifluoroethane	ND	0.131	ND	1.00	08/13/20	KCA	1
Vinyl Chloride	ND	0.078	ND	0.20	08/13/20	KCA	1
<u>QA/QC Surrogates/Internals</u>							
% Bromofluorobenzene	101	%	101	%	08/13/20	KCA	1
% IS-1,4-Difluorobenzene	100	%	100	%	08/13/20	KCA	1
% IS-Bromochloromethane	100	%	100	%	08/13/20	KCA	1
% IS-Chlorobenzene-d5	104	%	104	%	08/13/20	KCA	1
% Bromofluorobenzene (6x)	99	%	99	%	08/13/20	KCA	6
% IS-1,4-Difluorobenzene (6x)	101	%	101	%	08/13/20	KCA	6
% IS-Bromochloromethane (6x)	102	%	102	%	08/13/20	KCA	6

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	
% IS-Chlorobenzene-d5 (6x)	101	%	101	%	08/13/20	KCA	6

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RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low

QA/QC Surrogates: Surrogates are compounds (preceded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Helium is reported in units of percent (%)

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Phyllis Shiller, Laboratory Director

August 17, 2020

Reviewed and Released by: Rashmi Makol, Project Manager



Phoenix
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Canister Sampling Information

August 17, 2020

FOR:

Location Code:

SDG I.D.: GCG52680

Project ID: 43 LAFAYETTE

Client Id	Lab Id	Canister		Reg. Id	Chk Out Date	Laboratory					Field			
		Id	Type			Out Hg	In Hg	Out Flow	In Flow	Flow RPD	Start Hg	End Hg	Sampling Start Date	Sampling End Date
SS-1	CG52680	19732	6.0L	5619	08/10/20	-30	-2	21.7	23.1	6.3	-29	-3.5	08/11/20 12:02	08/11/20 15:54
OA-1	CG52681	23332	6.0L	5615	08/10/20	-30	-2	21.7	21.5	0.9	-30	-2	08/11/20 12:04	08/11/20 16:12
IA-2	CG52682	12864	6.0L	5061	08/10/20	-30	-2	21.7	21.8	0.5	-29	-2.5	08/11/20 12:06	08/11/20 16:18
SS-2	CG52683	216	6.0L	7034	08/10/20	-30	-3	21.7	23.3	7.1	-29	-3	08/11/20 12:09	08/11/20 15:40
IA-1	CG52684	11289	6.0L	2889	08/10/20	-30	-3	21.7	23.2	6.7	-25.5	-3	08/11/20 12:08	08/11/20 15:33



Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823



QA/QC Report

August 17, 2020

QA/QC Data

SDG I.D.: GCG52680

Parameter	Blk ppbv	Blk RL ppbv	Blk ug/m3	Blk RL ug/m3	LCS %	LCSD %	Sample Result ug/m3	Sample Dup ug/m3	Sample Result ppbv	Sample Dup ppbv	DUP RPD	% Rec Limits	% RPD Limits
QA/QC Batch 541227 (ppbv), QC Sample No: CG52615 (CG52680 (5X) , CG52681, CG52682, CG52683 (5X) , CG52684)													
Volatiles													
1,1,1,2-Tetrachloroethane	ND	0.146	ND	1.00	99	98	ND	ND	ND	ND	NC	70 - 130	25
1,1,1-Trichloroethane	ND	0.200	ND	1.09	102	102	ND	ND	ND	ND	NC	70 - 130	25
1,1,2,2-Tetrachloroethane	ND	0.146	ND	1.00	111	110	ND	ND	ND	ND	NC	70 - 130	25
1,1,2-Trichloroethane	ND	0.183	ND	1.00	104	103	ND	ND	ND	ND	NC	70 - 130	25
1,1-Dichloroethane	ND	0.247	ND	1.00	98	101	ND	ND	ND	ND	NC	70 - 130	25
1,1-Dichloroethene	ND	0.100	ND	0.40	103	102	ND	ND	ND	ND	NC	70 - 130	25
1,2,4-Trichlorobenzene	ND	0.250	ND	1.85	88	85	ND	ND	ND	ND	NC	70 - 130	25
1,2,4-Trimethylbenzene	ND	0.204	ND	1.00	113	112	ND	ND	ND	ND	NC	70 - 130	25
1,2-Dibromoethane(EDB)	ND	0.130	ND	1.00	108	106	ND	ND	ND	ND	NC	70 - 130	25
1,2-Dichlorobenzene	ND	0.150	ND	0.90	106	105	ND	ND	ND	ND	NC	70 - 130	25
1,2-Dichloroethane	ND	0.247	ND	1.00	105	105	ND	ND	ND	ND	NC	70 - 130	25
1,2-dichloropropane	ND	0.217	ND	1.00	105	105	ND	ND	ND	ND	NC	70 - 130	25
1,2-Dichlorotetrafluoroethane	ND	0.143	ND	1.00	104	102	ND	ND	ND	ND	NC	70 - 130	25
1,3,5-Trimethylbenzene	ND	0.204	ND	1.00	108	107	ND	ND	ND	ND	NC	70 - 130	25
1,3-Butadiene	ND	0.452	ND	1.00	106	106	ND	ND	ND	ND	NC	70 - 130	25
1,3-Dichlorobenzene	ND	0.150	ND	0.90	101	108	ND	ND	ND	ND	NC	70 - 130	25
1,4-Dichlorobenzene	ND	0.150	ND	0.90	116	105	ND	ND	ND	ND	NC	70 - 130	25
1,4-Dioxane	ND	0.278	ND	1.00	114	116	ND	ND	ND	ND	NC	70 - 130	25
2-Hexanone(MBK)	ND	0.244	ND	1.00	123	122	ND	ND	ND	ND	NC	70 - 130	25
4-Ethyltoluene	ND	0.204	ND	1.00	113	111	ND	ND	ND	ND	NC	70 - 130	25
4-Isopropyltoluene	ND	0.182	ND	1.00	103	103	ND	ND	ND	ND	NC	70 - 130	25
4-Methyl-2-pentanone(MIBK)	ND	0.244	ND	1.00	116	115	ND	ND	ND	ND	NC	70 - 130	25
Acetone	ND	1.00	ND	2.37	104	103	12.7	12.5	5.33	5.27	1.1	70 - 130	25
Acrylonitrile	ND	0.461	ND	1.00	93	91	ND	ND	ND	ND	NC	70 - 130	25
Benzene	ND	0.050	ND	0.16	104	104	ND	ND	ND	ND	NC	70 - 130	25
Benzyl chloride	ND	0.193	ND	1.00	125	123	ND	ND	ND	ND	NC	70 - 130	25
Bromodichloromethane	ND	0.149	ND	1.00	104	102	ND	ND	ND	ND	NC	70 - 130	25
Bromoform	ND	0.097	ND	1.00	98	97	ND	ND	ND	ND	NC	70 - 130	25
Bromomethane	ND	0.258	ND	1.00	105	103	ND	ND	ND	ND	NC	70 - 130	25
Carbon Disulfide	ND	0.321	ND	1.00	101	99	ND	ND	ND	ND	NC	70 - 130	25
Carbon Tetrachloride	ND	0.020	ND	0.13	102	101	0.40	0.41	0.064	0.065	NC	70 - 130	25
Chlorobenzene	ND	0.200	ND	0.92	102	102	ND	ND	ND	ND	NC	70 - 130	25
Chloroethane	ND	0.379	ND	1.00	106	106	ND	ND	ND	ND	NC	70 - 130	25
Chloroform	ND	0.205	ND	1.00	102	101	ND	ND	ND	ND	NC	70 - 130	25
Chloromethane	ND	0.485	ND	1.00	103	101	1.16	1.19	0.563	0.577	NC	70 - 130	25
Cis-1,2-Dichloroethene	ND	0.200	ND	0.79	105	105	ND	ND	ND	ND	NC	70 - 130	25
cis-1,3-Dichloropropene	ND	0.221	ND	1.00	109	107	ND	ND	ND	ND	NC	70 - 130	25
Cyclohexane	ND	0.291	ND	1.00	107	106	ND	ND	ND	ND	NC	70 - 130	25
Dibromochloromethane	ND	0.118	ND	1.00	103	104	ND	ND	ND	ND	NC	70 - 130	25
Dichlorodifluoromethane	ND	0.200	ND	0.99	101	98	2.01	1.87	0.407	0.379	NC	70 - 130	25
Ethanol	ND	0.531	ND	1.00	180	181	16.4	15.7	8.70	8.32	4.5	70 - 130	25

QA/QC Data

SDG I.D.: GCG52680

Parameter	Blk ppbv	Blk RL ppbv	Blk ug/m3	Blk RL ug/m3	LCS %	LCSD %	Sample Result ug/m3	Sample Dup ug/m3	Sample Result ppbv	Sample Dup ppbv	DUP RPD	% Rec Limits	% RPD Limits
Ethyl acetate	ND	0.278	ND	1.00	99	102	ND	ND	ND	ND	NC	70 - 130	25
Ethylbenzene	ND	0.150	ND	0.65	109	108	ND	ND	ND	ND	NC	70 - 130	25
Heptane	ND	0.244	ND	1.00	110	109	ND	ND	ND	ND	NC	70 - 130	25
Hexachlorobutadiene	ND	0.094	ND	1.00	83	81	ND	ND	ND	ND	NC	70 - 130	25
Hexane	ND	0.284	ND	1.00	110	109	ND	ND	ND	ND	NC	70 - 130	25
Isopropylalcohol	ND	0.407	ND	1.00	148	146	2.14	2.09	0.872	0.849	NC	70 - 130	25
Isopropylbenzene	ND	0.204	ND	1.00	101	100	ND	ND	ND	ND	NC	70 - 130	25
m,p-Xylene	ND	0.150	ND	0.65	112	111	ND	ND	ND	ND	NC	70 - 130	25
Methyl Ethyl Ketone	ND	0.339	ND	1.00	102	114	1.24	1.27	0.420	0.431	NC	70 - 130	25
Methyl tert-butyl ether(MTBE)	ND	0.278	ND	1.00	104	104	ND	ND	ND	ND	NC	70 - 130	25
Methylene Chloride	ND	0.400	ND	1.39	98	98	ND	ND	ND	ND	NC	70 - 130	25
n-Butylbenzene	ND	0.182	ND	1.00	112	110	ND	ND	ND	ND	NC	70 - 130	25
o-Xylene	ND	0.150	ND	0.65	109	107	ND	ND	ND	ND	NC	70 - 130	25
Propylene	ND	0.581	ND	1.00	107	107	ND	ND	ND	ND	NC	70 - 130	25
sec-Butylbenzene	ND	0.182	ND	1.00	113	112	ND	ND	ND	ND	NC	70 - 130	25
Styrene	ND	0.235	ND	1.00	115	113	ND	ND	ND	ND	NC	70 - 130	25
Tetrachloroethene	ND	0.100	ND	0.68	103	103	ND	ND	ND	ND	NC	70 - 130	25
Tetrahydrofuran	ND	0.339	ND	1.00	110	111	ND	ND	ND	ND	NC	70 - 130	25
Toluene	ND	0.200	ND	0.75	108	107	0.87	0.87	0.232	0.230	NC	70 - 130	25
Trans-1,2-Dichloroethene	ND	0.252	ND	1.00	107	106	ND	ND	ND	ND	NC	70 - 130	25
trans-1,3-Dichloropropene	ND	0.221	ND	1.00	109	108	ND	ND	ND	ND	NC	70 - 130	25
Trichloroethene	ND	0.037	ND	0.20	102	102	ND	ND	ND	ND	NC	70 - 130	25
Trichlorofluoromethane	ND	0.150	ND	0.84	102	102	6.91	6.91	1.23	1.23	0.0	70 - 130	25
Trichlorotrifluoroethane	ND	0.150	ND	1.15	101	100	ND	ND	ND	ND	NC	70 - 130	25
Vinyl Chloride	ND	0.020	ND	0.05	106	107	ND	ND	ND	ND	NC	70 - 130	25
% Bromofluorobenzene	98	%	98	%	102	101	99	99	99	99	NC	70 - 130	25
% IS-1,4-Difluorobenzene	101	%	101	%	104	105	99	99	99	99	NC	60 - 140	25
% IS-Bromochloromethane	101	%	101	%	105	106	100	100	100	100	NC	60 - 140	25
% IS-Chlorobenzene-d5	100	%	100	%	112	113	99	99	99	99	NC	60 - 140	25

QA/QC Batch 541381 (ppbv), QC Sample No: CG53294 (CG52680 (30X) , CG52681 (15X) , CG52683 (75X) , CG52684 (6X))

Volatiles

1,2,4-Trimethylbenzene	ND	0.500	ND	2.46	111	ND	ND	ND	ND	NC	70 - 130	25
Acetone	ND	0.500	ND	1.19	109	32.8	33.2	13.8	14.0	1.4	70 - 130	25
Ethanol	ND	0.500	ND	0.94	192	286 E	294	152 E	156	2.6	70 - 130	25
m,p-Xylene	ND	1.00	ND	4.34	109	ND	ND	ND	ND	NC	70 - 130	25
o-Xylene	ND	0.500	ND	2.17	107	ND	ND	ND	ND	NC	70 - 130	25
Tetrachloroethene	ND	0.200	ND	1.36	99	4.83	4.92	0.712	0.726	NC	70 - 130	25
Toluene	ND	0.500	ND	1.88	105	3.11	3.26	0.826	0.866	NC	70 - 130	25
% Bromofluorobenzene	97	%	97	%	102	100	99	100	99	NC	70 - 130	25
% IS-1,4-Difluorobenzene	102	%	102	%	106	99	95	99	95	NC	60 - 140	25
% IS-Bromochloromethane	102	%	102	%	107	98	97	98	97	NC	60 - 140	25
% IS-Chlorobenzene-d5	100	%	100	%	113	99	96	99	96	NC	60 - 140	25

I = This parameter is outside laboratory LCS/LCSD specified recovery limits.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
 LCS - Laboratory Control Sample
 LCSD - Laboratory Control Sample Duplicate
 MS - Matrix Spike
 MS Dup - Matrix Spike Duplicate
 NC - No Criteria
 Intf - Interference


 Phyllis Shiller, Laboratory Director
 August 17, 2020

Monday, August 17, 2020
Criteria: None
State: NY

Sample Criteria Exceedances Report
GCG52680 -

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedances. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.



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Analysis Comments

August 17, 2020

SDG I.D.: GCG52680

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

WCLP 2.7

CHAIN OF CUSTODY RECORD

AIR ANALYSES

P.O. # _____ Page 1 of 1



800-827-5426
email: greg@phoenixlabs.com

Data Delivery:
☐ Fax #:
☒ Email:
☒ Phone #:

Project Name: 43 Lafayette

Report to: _____

Customer: _____

Address: _____

Quote Number: _____

Requested Deliverable: _____

Other: _____

Canister Pressure at End ("Hg) _____

Canister Pressure at Start ("Hg) _____

Sample Start Date _____

Sampling End Time _____

Sampling Start Time _____

Flow Controller Setting (ml/min) _____

Flow Regulator ID # _____

Incoming Canister Pressure ("Hg) _____

Outgoing Canister Pressure ("Hg) _____

Canister Size (L) _____

Canister ID # _____

Client Sample ID _____

Phoenix ID # _____

Phoenix ID #	Client Sample ID	Canister ID #	Canister Size (L)	Outgoing Canister Pressure ("Hg)	Incoming Canister Pressure ("Hg)	Flow Regulator ID #	Flow Controller Setting (ml/min)	Sampling Start Time	Sampling End Time	Sample Start Date	Canister Pressure at Start ("Hg)	Canister Pressure at End ("Hg)	Matrix	Soil Gas	Grab (G) Composite (C)	TO-15	APH
52680	SS-1	19732	6.0	-30	-2	5619	21.7	1202	1554	8/11	29	30.5	X	X	X	X	X
52681	OA-1	23332			-2	5615		1204	1612	8/11	30+	2	X	X	X	X	X
52682	IA-2	12864			-2	5061		1206	1618	8/11	29	20.5	X	X	X	X	X
52683	SS-2	216			-3	7034		1209	1540	8/11	29	3	X	X	X	X	X
52684	IA-1	11289			-3	2889		1208	1533	8/11	25.5	3	X	X	X	X	X

Relinquished by: [Signature] Date: 8/12/20

Accepted by: [Signature] Date: 8/12/20

Time: 10:40

Signature: [Signature] Date: 8/11/20

Requested Criteria: (Please Circle) MA: _____ NI: _____ NY: _____ VT: _____

Turnaround Time: ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day ☒ 5 Day

State Where Samples Collected: NY

SPECIAL INSTRUCTIONS, QC REQUIREMENTS, REGULATORY INFORMATION:
(5X6.00)(4L)

Paul Tur 7/12 1716

Indoor Air: Residential, Industrial, Sub-slab, Industrial
Indoor Air: Residential, Non-residential, Industrial
Indoor Air: Residential, Vapor Intrusion
Indoor Air: Residential, Ind/Commercial, Soil Gas, Residential, Ind/Commercial

APPENDIX B

LABORATORY ANALYTICAL RESULTS PACKAGE - SEPTEMBER 2020



ANALYTICAL REPORT

Lab Number:	L2038538
Client:	EnviroSure, Inc. 621 Shrewsbury Avenue Suite 151 Shrewsbury, NJ 07702
ATTN:	Dyna Krumich-Ogonowski
Phone:	(732) 741-1110
Project Name:	SO581 (43-45 LAFAYETTE AVE)
Project Number:	SO581
Report Date:	09/22/20

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com



Project Name: SO581 (43-45 LAFAYETTE AVE)
Project Number: SO581

Lab Number: L2038538
Report Date: 09/22/20

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2038538-01	IA-03	AIR	43-45 LAFAYETTE AVE, SUFFERN NY	09/15/20 14:40	09/16/20



Project Name: SO581 (43-45 LAFAYETTE AVE)
Project Number: SO581

Lab Number: L2038538
Report Date: 09/22/20

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: SO581 (43-45 LAFAYETTE AVE)**Lab Number:** L2038538**Project Number:** SO581**Report Date:** 09/22/20**Case Narrative (continued)**

Volatile Organics in Air

Canisters were released from the laboratory on September 14, 2020. The canister certification results are provided as an addendum.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Christopher J. Anderson

Title: Technical Director/Representative

Date: 09/22/20

AIR

Project Name: SO581 (43-45 LAFAYETTE AVE)**Lab Number:** L2038538**Project Number:** SO581**Report Date:** 09/22/20**SAMPLE RESULTS**

Lab ID: L2038538-01
 Client ID: IA-03
 Sample Location: 43-45 LAFAYETTE AVE, SUFFERN NY

Date Collected: 09/15/20 14:40
 Date Received: 09/16/20
 Field Prep: Not Specified

Sample Depth:
 Matrix: Air
 Analytical Method: 48,TO-15
 Analytical Date: 09/21/20 21:42
 Analyst: TS

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Dichlorodifluoromethane	0.421	0.200	--	2.08	0.989	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	471	5.00	--	887	9.42	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	4.98	1.00	--	11.8	2.38	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	1.98	0.500	--	4.87	1.23	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
Ethyl Acetate	0.704	0.500	--	2.54	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	1.46	0.500	--	4.31	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1



Project Name: SO581 (43-45 LAFAYETTE AVE)**Lab Number:** L2038538**Project Number:** SO581**Report Date:** 09/22/20**SAMPLE RESULTS**

Lab ID: L2038538-01

Client ID: IA-03

Sample Location: 43-45 LAFAYETTE AVE, SUFFERN NY

Date Collected: 09/15/20 14:40

Date Received: 09/16/20

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
n-Hexane	ND	0.200	--	ND	0.705	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1



Project Name: SO581 (43-45 LAFAYETTE AVE)**Lab Number:** L2038538**Project Number:** SO581**Report Date:** 09/22/20**SAMPLE RESULTS**

Lab ID: L2038538-01

Date Collected: 09/15/20 14:40

Client ID: IA-03

Date Received: 09/16/20

Sample Location: 43-45 LAFAYETTE AVE, SUFFERN NY

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	93		60-140
Bromochloromethane	93		60-140
chlorobenzene-d5	98		60-140



Project Name: SO581 (43-45 LAFAYETTE AVE)**Lab Number:** L2038538**Project Number:** SO581**Report Date:** 09/22/20**SAMPLE RESULTS**

Lab ID: L2038538-01

Client ID: IA-03

Sample Location: 43-45 LAFAYETTE AVE, SUFFERN NY

Date Collected: 09/15/20 14:40

Date Received: 09/16/20

Field Prep: Not Specified

Sample Depth:

Matrix: Air

Analytical Method: 48,TO-15-SIM

Analytical Date: 09/21/20 21:42

Analyst: TS

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	0.374	0.200	--	0.772	0.413	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Carbon tetrachloride	0.062	0.020	--	0.390	0.126	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Tetrachloroethene	0.554	0.020	--	3.76	0.136	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	93		60-140
bromochloromethane	92		60-140
chlorobenzene-d5	97		60-140



Project Name: SO581 (43-45 LAFAYETTE AVE)**Lab Number:** L2038538**Project Number:** SO581**Report Date:** 09/22/20

Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15

Analytical Date: 09/21/20 14:33

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab for sample(s): 01 Batch: WG1412637-4								
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	5.00	--	ND	9.42	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1



Project Name: SO581 (43-45 LAFAYETTE AVE)**Lab Number:** L2038538**Project Number:** SO581**Report Date:** 09/22/20

Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15

Analytical Date: 09/21/20 14:33

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab for sample(s): 01 Batch: WG1412637-4								
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1



Project Name: SO581 (43-45 LAFAYETTE AVE)

Lab Number: L2038538

Project Number: SO581

Report Date: 09/22/20

Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15

Analytical Date: 09/21/20 14:33

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab for sample(s): 01 Batch: WG1412637-4								
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1



Project Name: SO581 (43-45 LAFAYETTE AVE)**Lab Number:** L2038538**Project Number:** SO581**Report Date:** 09/22/20

Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15-SIM

Analytical Date: 09/21/20 15:12

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 01 Batch: WG1412638-4								
Chloromethane	ND	0.200	--	ND	0.413	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1



Lab Control Sample Analysis
Batch Quality Control

Project Name: SO581 (43-45 LAFAYETTE AVE)
Project Number: SO581

Lab Number: L2038538
Report Date: 09/22/20

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01 Batch: WG1412637-3								
Dichlorodifluoromethane	84		-		70-130	-		
Chloromethane	68	Q	-		70-130	-		
Freon-114	77		-		70-130	-		
Vinyl chloride	74		-		70-130	-		
1,3-Butadiene	78		-		70-130	-		
Bromomethane	80		-		70-130	-		
Chloroethane	74		-		70-130	-		
Ethanol	77		-		40-160	-		
Vinyl bromide	73		-		70-130	-		
Acetone	60		-		40-160	-		
Trichlorofluoromethane	78		-		70-130	-		
Isopropanol	58		-		40-160	-		
1,1-Dichloroethene	79		-		70-130	-		
Tertiary butyl Alcohol	72		-		70-130	-		
Methylene chloride	81		-		70-130	-		
3-Chloropropene	79		-		70-130	-		
Carbon disulfide	73		-		70-130	-		
Freon-113	85		-		70-130	-		
trans-1,2-Dichloroethene	97		-		70-130	-		
1,1-Dichloroethane	101		-		70-130	-		
Methyl tert butyl ether	92		-		70-130	-		
2-Butanone	100		-		70-130	-		
cis-1,2-Dichloroethene	106		-		70-130	-		



Lab Control Sample Analysis
Batch Quality Control

Project Name: SO581 (43-45 LAFAYETTE AVE)
Project Number: SO581

Lab Number: L2038538
Report Date: 09/22/20

Parameter	LCS		Qual	LCSD		Qual	%Recovery		RPD	Qual		RPD	Limits	
	%Recovery			%Recovery			Limits			Limits				
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01 Batch: WG1412637-3														
Ethyl Acetate	85			-			70-130		-			-		
Chloroform	97			-			70-130		-			-		
Tetrahydrofuran	82			-			70-130		-			-		
1,2-Dichloroethane	93			-			70-130		-			-		
n-Hexane	90			-			70-130		-			-		
1,1,1-Trichloroethane	96			-			70-130		-			-		
Benzene	90			-			70-130		-			-		
Carbon tetrachloride	102			-			70-130		-			-		
Cyclohexane	90			-			70-130		-			-		
1,2-Dichloropropane	89			-			70-130		-			-		
Bromodichloromethane	99			-			70-130		-			-		
1,4-Dioxane	92			-			70-130		-			-		
Trichloroethene	94			-			70-130		-			-		
2,2,4-Trimethylpentane	92			-			70-130		-			-		
Heptane	90			-			70-130		-			-		
cis-1,3-Dichloropropene	96			-			70-130		-			-		
4-Methyl-2-pentanone	94			-			70-130		-			-		
trans-1,3-Dichloropropene	84			-			70-130		-			-		
1,1,2-Trichloroethane	94			-			70-130		-			-		
Toluene	90			-			70-130		-			-		
2-Hexanone	89			-			70-130		-			-		
Dibromochloromethane	100			-			70-130		-			-		
1,2-Dibromoethane	94			-			70-130		-			-		



Lab Control Sample Analysis

Batch Quality Control

Project Name: SO581 (43-45 LAFAYETTE AVE)
Project Number: SO581

Lab Number: L2038538
Report Date: 09/22/20

Parameter	LCS		Qual	LCSD		Qual	%Recovery		RPD	RPD	
	%Recovery			%Recovery			Limits			Limits	
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01 Batch: WG1412637-3											
Tetrachloroethene	96			-			70-130		-		
Chlorobenzene	96			-			70-130		-		
Ethylbenzene	93			-			70-130		-		
p/m-Xylene	95			-			70-130		-		
Bromoform	100			-			70-130		-		
Styrene	95			-			70-130		-		
1,1,2,2-Tetrachloroethane	99			-			70-130		-		
o-Xylene	96			-			70-130		-		
4-Ethyltoluene	97			-			70-130		-		
1,3,5-Trimethylbenzene	98			-			70-130		-		
1,2,4-Trimethylbenzene	101			-			70-130		-		
Benzyl chloride	92			-			70-130		-		
1,3-Dichlorobenzene	100			-			70-130		-		
1,4-Dichlorobenzene	101			-			70-130		-		
1,2-Dichlorobenzene	100			-			70-130		-		
1,2,4-Trichlorobenzene	94			-			70-130		-		
Hexachlorobutadiene	104			-			70-130		-		

Lab Control Sample Analysis
Batch Quality Control

Project Name: SO581 (43-45 LAFAYETTE AVE)
Project Number: SO581

Lab Number: L2038538
Report Date: 09/22/20

Parameter	LCS		LCSD		%Recovery		RPD	
	%Recovery	Qual	%Recovery	Qual	Limits		Qual	Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01 Batch: WG1412638-3								
Chloromethane	70		-		70-130	-		25
Vinyl chloride	74		-		70-130	-		25
1,1-Dichloroethene	80		-		70-130	-		25
cis-1,2-Dichloroethene	103		-		70-130	-		25
1,1,1-Trichloroethane	92		-		70-130	-		25
Carbon tetrachloride	99		-		70-130	-		25
Trichloroethene	91		-		70-130	-		25
Tetrachloroethene	95		-		70-130	-		25



Lab Duplicate Analysis
Batch Quality Control

Project Name: SO581 (43-45 LAFAYETTE AVE)
Project Number: SO581

Lab Number: L2038538
Report Date: 09/22/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1412637-5 QC Sample: L2038538-01 Client ID: IA-03						
Dichlorodifluoromethane	0.421	0.431	ppbV	2		25
Freon-114	ND	ND	ppbV	NC		25
1,3-Butadiene	ND	ND	ppbV	NC		25
Bromomethane	ND	ND	ppbV	NC		25
Chloroethane	ND	ND	ppbV	NC		25
Ethanol	471	472	ppbV	0		25
Vinyl bromide	ND	ND	ppbV	NC		25
Acetone	4.98	5.02	ppbV	1		25
Trichlorofluoromethane	ND	ND	ppbV	NC		25
Isopropanol	1.98	1.90	ppbV	4		25
Tertiary butyl Alcohol	ND	ND	ppbV	NC		25
Methylene chloride	ND	ND	ppbV	NC		25
3-Chloropropene	ND	ND	ppbV	NC		25
Carbon disulfide	ND	ND	ppbV	NC		25
Freon-113	ND	ND	ppbV	NC		25
trans-1,2-Dichloroethene	ND	ND	ppbV	NC		25
1,1-Dichloroethane	ND	ND	ppbV	NC		25
Methyl tert butyl ether	ND	ND	ppbV	NC		25
2-Butanone	ND	ND	ppbV	NC		25
Ethyl Acetate	0.704	0.707	ppbV	0		25
Chloroform	ND	ND	ppbV	NC		25



Lab Duplicate Analysis

Batch Quality Control

Project Name: SO581 (43-45 LAFAYETTE AVE)

Lab Number: L2038538

Project Number: SO581

Report Date: 09/22/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1412637-5 QC Sample: L2038538-01 Client ID: IA-03						
Tetrahydrofuran	1.46	1.47	ppbV	1		25
1,2-Dichloroethane	ND	ND	ppbV	NC		25
n-Hexane	ND	ND	ppbV	NC		25
Benzene	ND	ND	ppbV	NC		25
Cyclohexane	ND	ND	ppbV	NC		25
1,2-Dichloropropane	ND	ND	ppbV	NC		25
Bromodichloromethane	ND	ND	ppbV	NC		25
1,4-Dioxane	ND	ND	ppbV	NC		25
2,2,4-Trimethylpentane	ND	ND	ppbV	NC		25
Heptane	ND	ND	ppbV	NC		25
cis-1,3-Dichloropropene	ND	ND	ppbV	NC		25
4-Methyl-2-pentanone	ND	ND	ppbV	NC		25
trans-1,3-Dichloropropene	ND	ND	ppbV	NC		25
1,1,2-Trichloroethane	ND	ND	ppbV	NC		25
Toluene	ND	ND	ppbV	NC		25
2-Hexanone	ND	ND	ppbV	NC		25
Dibromochloromethane	ND	ND	ppbV	NC		25
1,2-Dibromoethane	ND	ND	ppbV	NC		25
Chlorobenzene	ND	ND	ppbV	NC		25
Ethylbenzene	ND	ND	ppbV	NC		25
p/m-Xylene	ND	ND	ppbV	NC		25



Lab Duplicate Analysis
Batch Quality Control

Project Name: SO581 (43-45 LAFAYETTE AVE)
Project Number: SO581

Lab Number: L2038538
Report Date: 09/22/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1412637-5 QC Sample: L2038538-01 Client ID: IA-03						
Bromoform	ND	ND	ppbV	NC		25
Styrene	ND	ND	ppbV	NC		25
1,1,2,2-Tetrachloroethane	ND	ND	ppbV	NC		25
o-Xylene	ND	ND	ppbV	NC		25
4-Ethyltoluene	ND	ND	ppbV	NC		25
1,3,5-Trimethylbenzene	ND	ND	ppbV	NC		25
1,2,4-Trimethylbenzene	ND	ND	ppbV	NC		25
Benzyl chloride	ND	ND	ppbV	NC		25
1,3-Dichlorobenzene	ND	ND	ppbV	NC		25
1,4-Dichlorobenzene	ND	ND	ppbV	NC		25
1,2-Dichlorobenzene	ND	ND	ppbV	NC		25
1,2,4-Trichlorobenzene	ND	ND	ppbV	NC		25
Hexachlorobutadiene	ND	ND	ppbV	NC		25
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1412638-5 QC Sample: L2038538-01 Client ID: IA-03						
Chloromethane	0.374	0.376	ppbV	1		25
Vinyl chloride	ND	ND	ppbV	NC		25
1,1-Dichloroethene	ND	ND	ppbV	NC		25
cis-1,2-Dichloroethene	ND	ND	ppbV	NC		25
1,1,1-Trichloroethane	ND	ND	ppbV	NC		25
Carbon tetrachloride	0.062	0.060	ppbV	3		25
Trichloroethene	ND	ND	ppbV	NC		25
Tetrachloroethene	0.554	0.558	ppbV	1		25



Project Name: SO581 (43-45 LAFAYETTE AVE)

Project Number: SO581

Serial_No:092222013:43

Lab Number: L2038538

Report Date: 09/22/20

Canister and Flow Controller Information

Samplenum	Client ID	Media ID	Media Type	Date Prepared	Bottle Order	Cleaning Batch ID	Can Leak Check	Initial Pressure (in. Hg)	Pressure on Receipt (in. Hg)	Flow Controller Leak Chk	Flow Out mL/min	Flow In mL/min	% RPD
L2038538-01	IA-03	0562	Flow 5	09/14/20	330114		-	-	-	Pass	4.5	4.2	7
L2038538-01	IA-03	328	2.7L Can	09/14/20	330114	L2036387-01	Pass	-29.5	-2.5	-	-	-	-



Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L2036387
Report Date: 09/22/20

Air Canister Certification Results

Lab ID: L2036387-01
Client ID: CAN 327 SHELF 7
Sample Location:

Date Collected: 09/02/20 16:00
Date Received: 09/03/20
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Analytical Method: 48,TO-15
Analytical Date: 09/04/20 18:44
Analyst: TS

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.861	--		1
Propane	ND	0.500	--	ND	0.902	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Methanol	ND	5.00	--	ND	6.55	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	5.00	--	ND	9.42	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
Ethyl ether	ND	0.200	--	ND	0.606	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1



Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L2036387
Report Date: 09/22/20

Air Canister Certification Results

Lab ID: L2036387-01
Client ID: CAN 327 SHELF 7
Sample Location:

Date Collected: 09/02/20 16:00
Date Received: 09/03/20
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	1.00	--	ND	3.52	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
Xylenes, total	ND	0.600	--	ND	0.869	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,2-Dichloroethene (total)	ND	1.00	--	ND	1.00	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1



Project Name: BATCH CANISTER CERTIFICATION
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Air Canister Certification Results

Lab ID: L2036387-01
Client ID: CAN 327 SHELF 7
Sample Location:

Date Collected: 09/02/20 16:00
Date Received: 09/03/20
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1



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Air Canister Certification Results

Lab ID: L2036387-01
Client ID: CAN 327 SHELF 7
Sample Location:

Date Collected: 09/02/20 16:00
Date Received: 09/03/20
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.21	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
Bromobenzene	ND	0.200	--	ND	0.793	--		1
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1



Project Name: BATCH CANISTER CERTIFICATION**Lab Number:** L2036387**Project Number:** CANISTER QC BAT**Report Date:** 09/22/20**Air Canister Certification Results**

Lab ID: L2036387-01

Date Collected: 09/02/20 16:00

Client ID: CAN 327 SHELF 7

Date Received: 09/03/20

Sample Location:

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								

Results	Qualifier	Units	RDL	Dilution Factor
Tentatively Identified Compounds				
No Tentatively Identified Compounds				

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	95		60-140
Bromochloromethane	100		60-140
chlorobenzene-d5	92		60-140



Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L2036387
Report Date: 09/22/20

Air Canister Certification Results

Lab ID: L2036387-01
Client ID: CAN 327 SHELF 7
Sample Location:

Date Collected: 09/02/20 16:00
Date Received: 09/03/20
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Analytical Method: 48,TO-15-SIM
Analytical Date: 09/04/20 18:44
Analyst: TS

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.100	--	ND	0.264	--		1
Acrolein	ND	0.050	--	ND	0.115	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1



Project Name: BATCH CANISTER CERTIFICATION
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Air Canister Certification Results

Lab ID: L2036387-01
Client ID: CAN 327 SHELF 7
Sample Location:

Date Collected: 09/02/20 16:00
Date Received: 09/03/20
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.100	--	ND	0.461	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
4-Ethyltoluene	ND	0.020	--	ND	0.098	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1



Project Name: BATCH CANISTER CERTIFICATION**Lab Number:** L2036387**Project Number:** CANISTER QC BAT**Report Date:** 09/22/20**Air Canister Certification Results**

Lab ID: L2036387-01

Date Collected: 09/02/20 16:00

Client ID: CAN 327 SHELF 7

Date Received: 09/03/20

Sample Location:

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	101		60-140
bromochloromethane	102		60-140
chlorobenzene-d5	96		60-140



Sample Receipt and Container Information

Were project specific reporting limits specified?												YES			
Cooler Information				Custody Seal											
Cooler				Absent											
NA															
Container Information															
Container ID		Container Type													
L2038538-01A		Canister - 2.7 Liter													
		Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)						
		NA	NA			Y	Absent		TO15-LL(30), TO15-SIM(30)						

Project Name: SO581 (43-45 LAFAYETTE AVE)**Lab Number:** L2038538**Project Number:** SO581**Report Date:** 09/22/20

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCS D	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

Report Format: Data Usability Report

Project Name: SO581 (43-45 LAFAYETTE AVE)
Project Number: SO581

Lab Number: L2038538
Report Date: 09/22/20

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration

Report Format: Data Usability Report



Project Name: SO581 (43-45 LAFAYETTE AVE)**Lab Number:** L2038538**Project Number:** SO581**Report Date:** 09/22/20**Data Qualifiers**

Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Project Name: SO581 (43-45 LAFAYETTE AVE)
Project Number: SO581

Lab Number: L2038538
Report Date: 09/22/20

REFERENCES

- 48 Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air. Second Edition. EPA/625/R-96/010b, January 1999.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

Revision 17

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Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility**EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 8260C:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270D:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.**Mansfield Facility****SM 2540D:** TSS**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.**EPA TO-12** Non-methane organics**EPA 3C** Fixed gases**Biological Tissue Matrix:** EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:**Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:** Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg. **EPA 522.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1** Hg.**SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

APPENDIX C

HEALTH AND SAFETY PLAN



Date: June 10, 2021
BCP # / Name: C344085/AMERICAN TWO CLEANERS
Address: 43-45 LAFAYETTE AVENUE
SUFFERN, NY

EnviroSure Site Representative/H&S Officer: DYNA KRUMICH-OGONOWSKI
Site Contact / Phone Number: DEREK GROTHUSEN/609-707-7284
Project Manager / Phone Number: DYNA KRUMICH-OGONOWSKI/732-688-3274
EnviroSure H&S Officer / Phone Number: Scott Smith, P.E. - 610 405-1959

Project Activities: Geophysical Survey of the basement, exterior near front door and exterior near rear door. Subsurface Soil Investigation involving advancing up to 12 soil borings in the basement and exterior of the building. Soil samples will be collected for VOC analysis. Installation of three monitoring wells; proposed locations are in the basement and two exterior wells. Groundwater samples collected via low-flow sampling method.

Chemical Hazards (list all & attach SDS): Confirmed chlorinated VOCs in sub-slab soil vapor and indoor air.

Physical Hazards (list all): Direct push drill rig, manual drilling equipment
Slips, trip, falls
Heat/cold exhaustion
Hand tools

COVID-19 Precautions: EnviroSure and subcontractors will follow all recommended CDC and OSHA protocol regarding mitigating and preventing the spread of COVID-19 in the workplace.
<https://www.osha.gov/coronavirus/safework>

N	Confined Space Entry? (Include Confined Space Entry Plan)
N	Work conducted in roadway? (Include traffic control plan)

PPE / H&S Equipment: Modified level D - nitrile gloves, steel toe boots, hard hat when drill rig is operating, safety goggles
Face coverings when working inside or in close proximity to others as per COVID-19 protocol.

APPENDIX D

CITIZEN PARTICIPATION PLAN



Brownfield Cleanup Program

Citizen Participation Plan for AMERICAN TWO CLEANERS

October 2021

Contents

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* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **Reds Crib, LLC (“Applicant”)**
Site Name: **American Two Cleaners (“Site”)**
Site Address: **43-45 Lafayette Avenue, Suffern, NY**
Site County: **Rockland County**
Site Number: **C344085**

1. What is New York’s Brownfield Cleanup Program?

New York’s Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as “brownfields” so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:
<http://www.dec.ny.gov/chemical/8450.html> .

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment
- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process
- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process
- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community
- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some

documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The site contact list includes, at a minimum:

- chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the site and properties adjacent to the site;
- the public water supplier which services the area in which the site is located;
- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See <http://www.dec.ny.gov/chemical/61092.html> .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.
- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, the significant threat determination for the site had not yet been made. To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at
<http://www.dec.ny.gov/regulations/2590.html>

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process: • Prepare site contact list • Establish document repository(ies) • Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	
After Execution of Brownfield Site Cleanup Agreement (BCA): • Prepare Citizen Participation (CP) Plan	At time of preparation of application to participate in the BCP. When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time. Before start of Remedial Investigation Note: Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan: • Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation: • Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP): • Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action: • Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action: • Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. Note: The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

Major issues have not been identified regarding the local residents, town board or other stakeholders. The environmental and health concerns are currently limited to the Site boundaries.

4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

- **Location - 43-45 Lafayette Avenue, Suffern Village, Rockland County, New York**
- **Setting - Suburban**
- **Site size - 0.09 acre**
- **Adjacent properties -**
 - My Mexican House Restaurant-Bar (41 Lafayette Ave) - Owner: Ghassan Rabadi and Al Nada Rabadi, (845) 368-0388
 - Cristy's Jewelry and Perfumes (23 Chestnut Street) - Owner: Maria Miranda (845)558-0591
 - Java Love Coffee Roasting Co. (50 Lafayette Ave) - Owner: 50 Lafayette Ave LLC (Capital One Real Estate Administration); Contact Information Unknown.
 - Boost Mobile (47 Lafayette Ave) - Owner: Kiplou Realty Corp; 40 Wayne Avenue #A, Suffern, NY 10901 (845) 369-9210
 - Chat Room (20 Chestnut Street) - Owner: Kiplou Realty Corp; 40 Wayne Avenue #A, Suffern, NY 10901 (845) 369-9210

History of Site Use, Investigation, and Cleanup

- The Site building has two tenant spaces - 43 Lafayette Avenue is vacant and was formerly occupied by American Two Cleaners (ATC) and 45 Lafayette Avenue is occupied by a wellness program tenant. The current property owner, Reds Crib, LLC, purchased the property in October 2019 and ATC occupied the property for

at least six years prior. The contaminants related to the site that are known or suspected are solvents used for dry cleaning operations and it is currently known that sub-slab soil vapors under the Site building have been impacted. A limited vapor intrusion investigation has been conducted at the Site in August and September 2020.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for restricted purposes.

To achieve this goal, the Applicant will conduct investigation activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant has completed a partial site investigation before it entered into the BCP. For the partial investigation, NYSDEC will determine if the data are useable.

The site investigation has several goals:

- 1) define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
- 2) identify the source(s) of the contamination;
- 3) assess the impact of the contamination on public health and the environment; and
- 4) provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant submits a draft “Remedial Investigation Work Plan” to NYSDEC for review and approval. NYSDEC makes the draft plan available to the public review during a 30-day public comment period.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is needed to address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine if the site poses a significant threat to public health or the environment. If the site is a “significant threat,” it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a “Certificate of Completion” (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a “Remedial Work Plan”. The Remedial Work Plan describes the Applicant’s proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a final engineering report that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the final engineering report. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A - Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Mr. Michael Kilmer
Project Manager
NYSDEC
Division of Environmental Remediation
21 South Putt Corners Road
New Paltz, NY 12561-1696
845-633-5463

New York State Department of Health (NYSDOH):

Christine Vooris
Project Manager
NYSDOH
145 Huguenot Street, 6th Floor
New Rochelle, NY 10801-5291
914-654-7000

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

Suffern Free Library
210 Lafayette Avenue
Suffern, NY 10901
Phone: 845-357-1237

Hours:
Monday-Thursday: 10:00am-9:00pm
Friday-Saturday: 10:00am-5:00pm
Sunday: 12:00pm-5:00pm

Appendix B - Site Contact List

- Project Manager, Project Health and Safety Officer
Dyna Krumich-Ogonowski, NJ/NY Director of Operations
EnviroSure, Inc.
621 Shrewsbury Avenue, Suite 151, Shrewsbury, New Jersey 07702
(732) 741-1110
Dyna@EnviroSureInc.com
- Planning Board Chairperson -
 - Rockland County: Ms. Donna G. Silberman, Clerk, 845-638-5221
1 South Main Street, Suite 100, New City, New York 10956
 - Village of Suffern: Ms. Amy Paffenroth, Clerk, 845-357-2600
61 Washington Avenue, Suffern, New York 10901
clerk@suffernny.gov
- Adjoining or adjacent properties -
 - North: Java Love Coffee Roasting Co.
Owner: 50 Lafayette Ave LLC (Capital One Real Estate Administration)
50 Lafayette Avenue, Suffern, New York 10901
Company Phone: (845) 918-1282
 - South: Vacant and Cristy's Jewelry
Owner: Maria Miranda
21-23 Chestnut Street, Suffern, New York 10901
(845) 558-0591
 - East: The Chat Room and Tease Hair Studios
22 Chestnut Street, Suffern, New York
Owner Kiplou Realty Corp
40 Wayne Avenue #A, Suffern, New York 10901
(845) 369-9210
 - West: My Mexican House Restaurant
Owner: Ghassan Rabadi and Al Nada Rabadi
41 Lafayette Avenue, Suffern, New York
(845) 368-0388
- Public Water Supplier -
 - Village of Suffern Department of Public Works/Water Department
61 Washington Avenue, Suffern, New York 10901
(845) 357-1617

Appendix C - Site Location Map

{Instruction to preparer: Insert a map locating the site under the above heading. Alternately, replace this page with such a map. Be sure to label the page/map as Appendix C - Site Location Map and number the page consecutively with the others.}

```

graph TD
    Start([Application Complete]) --> CP1[30-Day Comment Period  
(Fact Sheet, ENB, Newspaper)]
    CP1 --> BCA[Execute BCA]
    BCA --> AP1[Applicant Develops  
RI Work Plan Including  
CP Plan]
    AP1 --> CP2[30-Day Comment  
Period on RI Work Plan  
(Fact Sheet)]
    CP2 --> NYSD1[NYSDEC  
Approves  
RI Work Plan]
    NYSD1 --> AI1[Applicant Completes  
Investigation and  
Submits Investigation  
Report]
    AI1 --> NYSD2[NYSDEC Reviews and  
Approves Investigation  
Report]
    NYSD2 --> PIRM[Perform Interim Remedial Measure (s)  
as/If Necessary]
    PIRM --> AP2[Applicant Develops  
Remedial Work Plan  
with Alternatives  
Analysis]
    AP2 --> NYSD3[NYSDEC Reviews and  
Approves Alternatives  
Analysis]
    NYSD3 --> AC[Applicant Completes  
Construction]
    AC --> ASFER[Applicant Submits Final  
Engineering Report with  
all Certifications]
    ASFER --> NYSD4[NYSDEC Reviews and  
Approves Final  
Engineering Report  
(Fact Sheet)]
    NYSD4 --> ICC[NYSDEC Issues Certificate  
of Completion  
(Fact Sheet)]
    ICC --> ISMR{Is Site  
Management  
Required?}
    ISMR -- Yes --> OMM[Operate, Monitor and  
Maintain Remedy;  
Complete any Annual  
IC/EC Certifications]
    OMM --> PC([PROJECT COMPLETE])
    ISMR -- No --> CN[Construction Notice  
(Fact Sheet)]
    CN --> NYSD5[NYSDEC Finalizes  
Remedial Work Plan]
    NYSD5 --> PM[Public Meeting  
(Optional)]
    PM --> CP3[45-Day Comment  
Period on Proposed  
Remedy  
(Fact Sheet)]
    CP3 --> NYSD6[NYSDEC Selects  
Proposed Remedy]
    NYSD6 --> ASR[Applicant Selects  
Proposed Remedy]
    ASR --> STS{Significant  
Threat Site?}
    STS -- Yes --> PIRM
    STS -- No --> NYSD6
  
```

Note: CP Activities are in **Bold**

A = Brownfield Cleanup Agreement
 = Citizen Participation
 = Engineering Control

PROJECT COMPLETE

BCA = Brownfield Cleanup Agreement
CP = Citizen Participation
EC = Engineering Control
ENB = Environmental Notice Bulletin
IC = Institutional Control
RI = Remedial Investigation

APPENDIX E

QUALITY ASSURANCE/QUALITY CONTROL PLAN

Prepared for:

**REDS CRIB, LLC
43-45 LAFAYETTE AVENUE
SUFFERN, NEW YORK 10901**

BROWNFIELD CLEANUP PROGRAM QUALITY ASSURANCE PROJECT PLAN

**43-45 LAFAYETTE AVENUE
AMERICAN TWO CLEANERS
BCP #C344085
SUFFERN VILLAGE
ROCKLAND COUNTY, NEW YORK**

November 17, 2021

Prepared by: **ENVIROSURE, INC.**



**DYNA KRUMICH-OGONOWSKI
NJ/NY DIRECTOR OF OPERATIONS**



**CHRISTOPHER ZELIZNAK, P.G. (PA & DE)
ENVIRONMENTAL DEPARTMENT DIRECTOR**

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1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) details the protocols and procedures that will be followed during the proposed Remedial Investigation (RI) that will occur at the American Two Cleaners site. The purpose of these protocols and procedures is to ensure that all project activities will be performed in a manner consistent with the data quality objectives (DQOs) established for the project and all data collected during the RI are precise, accurate, representative, comparable, and complete.

1.1 Project Description

The American Two Cleaners site is located at 43-45 Lafayette Avenue in the Village of Suffern, Rockland County, New York in a mixed commercial and residential area. The Site is approximately 0.09 acres with a one-story concrete block structure with a basement that is divided into two suites with a flat, asphalt-covered roof. The building has entrances on the north and east sides and a sump pump system is used in the basement.

The investigation associated with this QAPP is intended to address the results of the limited vapor intrusion investigation. The Site is being investigated in accordance with the NYSDEC Brownfields Cleanup Program (BCP). The RI is designed to delineate the extent of the former dry cleaning impacts observed during the limited vapor intrusion investigation performed in August 2020 and September 2020.

1.2 Scope of work

The scope of work at the Site is described in the May 2009 Remedial Investigation Work Plan. The following tasks will be performed as a part of the RI:

- Pre-investigation coordination (i.e., access agreements)
- Utility clearance
- Mobilization
- Soil boring advancement, subsurface soil sampling and analysis
- Monitoring well installation and development
- Groundwater sampling and analysis
- Additional sub-slab soil vapor and indoor air sampling and analysis (if necessary)
- Investigation-derived waste management
- Data validation evaluation, and reporting

1.3 Data Quality Objectives

The goal of the RI is to bias samples towards suspected areas of highest contamination associated with a potential discharge from the tanks. If no PCE/TCE is detected in the on-site soil, the spill event will be reported to the NYSDEC as an unknown source related to other potential off-site discharges.

The objective of the RI would be to:

- Delineate the horizontal and vertical extent of contaminants in all evaluated media at the site to the applicable remediation standard(s).
- Determine the general surface and subsurface characteristics of the site, including, without limitation, the depth to ground water.
- Delineate contamination by determining the innermost line of samples that meet the appropriate cleanup standards.
- Identify the migration paths and actual or potential receptors of contaminants.
- Collect and evaluate all data necessary to evaluate remedial action alternatives. Data collection to evaluate remedial action alternatives is typically initiated as soon as the general extent of contamination is known, usually after the first delineation phase. These studies should be initiated, and sampling conducted, once the extent of contamination is generally understood.
- Collect data when needed in order to develop permits for any remediation activities.
- Identify and implement containment and/or stabilization remedies for all media to prevent contaminant exposure to receptors and to prevent the offsite migration of contaminants while remedial alternatives are being evaluated.

2.0 PROJECT/TASK ORGANIZATION

This RI will be completed by EnviroSure, Inc., an environmental consulting firm, who will arrange for the drilling and analytical services, conduct the onsite oversight to perform the soil logging, soil sampling, surveying, and groundwater sampling and perform the data interpretation and reporting tasks. Personnel involved in project implementation are listed in the table below.

Table 2.0: Project Implementation Personnel

Professional	Role in Project	Organizational Affiliation
James Lang, LSRP	Qualified Professional	EnviroSure Inc.
Christopher Zeliznak	QA Manager/Officer	EnviroSure Inc.
Dyna Krumich-Ogonowski	Project Manager/ H&S Officer	EnviroSure Inc.
Derek Grothusen	Field Technician	EnviroSure Inc.
Cynthia Romero	Laboratory Project Manager	Alpha Analytical

3.0 LABORATORIES

All samples for VOC analysis will be delivered to Alpha Analytical Laboratories located in Westborough, Massachusetts, a NYSDOH ELAP certified laboratory.

4.0 PROJECT ORGANIZATION

The EnviroSure Project Manager will be responsible for the following activities:

- Produce and update Health and Safety Plan, as needed;
- Maintain official, approved QAPP;
- Oversee implementation of Work Plan; and
- Issue environmental reports to NYS DEC, NYS DOH, Rockland County Health Department and/or Property Owner, as appropriate.

Table 4.0: Schedule of Major Project Tasks

Task Name	Task Description	Start Date	End Date
Goals identification	Evaluation of previous investigation report, Confirmation of Ground Water Flow Direction, Identification of Potential On-Site Source Areas	July 2021	September 2021
Measures identification	Geophysical survey, Collect soil samples from the soil for TCL+30, TAL and 1,4-dioxane analysis. Compare the contaminant concentrations to the appropriate standards. Install ground water monitoring wells and collect samples for TCL+30, TAL and 1,4-dioxane analysis. Survey well elevations and calculate ground water flow.	July 2021	September 2021
Data analysis	Analysis of baseline and site-specific media results.	August 2021	September 2021
Reporting to NYSDEC and Property Owner	Reporting shall include a final RI report with recommendations for follow up.	September 2021	October 2021

5.0 ANALYTICAL METHODS/QUALITY ASSURANCE

Applicable NYSDEC protocol regarding sampling and analytical methodologies are followed. Parameters, sample containers, preservation, holding time, and analytical methods are presented in the following table.

Table 5.0: Analytical Methods

Analytical Parameter	Container	Preservation	Holding Time	Method
Soil				
TCL+30	Encore or Terracore Samplers and laboratory-provided amber glass jars	Cool, 4°C Dark	14 days	USEPA Method SW-846 8260C and 8270D
TAL	laboratory-provided amber glass jars			USEPA 6010C/7471B
1,4-Dioxane				USEPA 8270
PFAS				USEPA 537
Ground Water				
TCL+30	Glass vial, 40 ml (1), Teflon liner.	Cool, 4°C Dark	14 days	SW-846 8260
TAL	laboratory-provided amber glass jars			USEPA 6010C/7471B
1,4-Dioxane				USEPA 8270-SIM
PFAS				USEPA 537
Soil Vapor/Indoor Air				
VOC	1-liter stainless steel Summa canister	NA		TO-15

Table 5.1: Analytical Methods/Quality Assurance Summary Table

Matrix	Number/Frequency of Samples	Field/Trip Blanks	Split Samples	Analytical Parameters
Soil	24	1	1	TCL, TAL, 1,4-dioxane, PFAS
Ground Water	3	2	NA	TCL, TAL, 1,4-dioxane, PFAS
Soil Vapor/Indoor Air	6	NA	NA	VOC

6.0 FIELD AND METHOD BLANKS

A field blank, duplicate and MS/MSD will be collected for the soil investigation. A trip blank and duplicate will be collected for the ground water investigation.

Special Analytical Services (SAS) are only required when initial sampling data at the site is suspect, therefore no SAS will be collected. The laboratory is required to run method blanks as part of its internal QA/QC program and the laboratory analytical results report will be formatted to meet NYSDEC deliverable requirements.

7.0 SAMPLING PROCESS DESIGN

The NYSDEC required sample collection procedures will be utilized for obtaining soil, ground water, and soil gas samples. This procedure represents methods that are used to address the validity of the collection and handling procedures for multi-media data. Sampling methods in the QAPP follow the NYSDEC rules and guidance, as provided in DER-10 Technical Guidance for Site Investigation and Remediation.

7.1 Equipment

A list of equipment that will potentially be used during the sampling events.

1. Disposable sampling trowel, stainless steel sampling tool, disposable polyethylene sampling tube;
2. A sample shuttle containing all appropriate glassware for sample parameters;
3. Photoionization Detector;
4. Two plastic pails;
5. Distilled water;
6. Liquinox/distilled water solution;
7. Acetone (only if the sample is to be analyzed for organic compounds);
8. Stainless Steel or Disposable mixing bowls for homogenization;
9. Sampling TerraCores (VOCs only);
10. Fiber brush;
11. Latex sampling gloves;
12. Mixing bowls (Stainless Steel or Disposable);
13. Clean paper towels.
14. Drill and concrete drill bit
15. Bucket for vacuum sealing soil gas sampling point
16. Brass or Teflon vapor sampling point
17. Polyethylene tubing
18. Helium gas
19. Submersible pump with heat shield

7.2 Personnel and Procedure

EnviroSure Field Samplers/Manager - Dyna Krumich-Ogonowski or Derek Grothusen

Procedure

Sample location will be determined by field assessment based on the areas most likely to be impacted by dry cleaning operations and as outlined in the Work Plan. Samples will be collected in accordance with the applicable NYSDEC guidance documents. If ground water is encountered in the soil borings, soil samples will be collected above the water table based on observed lithology and photoionization detector (PID) readings. Samples will be collected using a direct push sampling device. Field screening methods to basis sample collection will include screening with a calibrated photoionization detector, visual observations, odors, and lithology changes from coarse grained to fine grained. All sampling to be completed in accordance with the appropriate guidance.

1. The soil samples will be collected utilizing a disposable trowel or dedicated sampler from the disposable polyethylene sampling tube. For Volatile Organic samples, a small diameter soil core sampling device (TerraCore) will be used to collect 5 grams of sample (plus or minus 2 grams), and transfer to a preserved glass vial, from the undisturbed material in the sleeve prior to any other sample collection, but after field assessment. The sample will be sealed in accordance with the manufacturer's instructions.
2. Ground water samples will be collected directly from the submersible pump after the monitored parameters have stabilized in accordance with the USEPA Low Flow Sampling Protocol. Ground water will be placed into laboratory supplied 40 ml glass jars preserved with HCl.
3. If needed, sub-slab soil gas samples will be collected directly into the laboratory supplied stainless steel SUMMA canisters. Sample collection will be completed in accordance with NYSDEC/DOH guidance and monitoring will be conducted to demonstrate no ambient air contamination of the sample.
4. A label will be affixed to each sample container identifying the project name, sample number, depth, date, and sampler's initials.
5. The sample containers will be placed in a storage cooler at 4 degrees Centigrade (blue ice or ice cubes) for transport to the laboratory.
6. A chain of custody will be filled out for the samples.

7.3 Sample Collection Documentation

This section of the QAPP describes field documentation procedures that will be followed for this project. Records of field data will be made throughout the project to document critical data that might be needed at a later time, such as during preparation of the report, or for use by the investigators who were not present when the data were collected. Field data will be recorded on the following logs, forms, and/or notebooks.

- Daily Personnel Logs
- Field Notebooks
- Field Data Forms
- Photographs
- Equipment Calibration Logs

- Health and Safety Logs

The Field Manager has the responsibility to maintain the various logs, forms, and notebooks that document daily field activities as discussed below. Individual responsibilities will be delegated to other field staff, as appropriate. Special emphasis will be placed on the completeness and accuracy of all information recorded in the field, and will contain statements that are legible, accurate, and include documentation of project activities. Because the logbooks, field data forms, and chain-of-custody forms provide the basis for future reports, they must contain accurate facts and observations. The language used in recording all field data will be objective, factual, and free of personal interpretations or other terminology that may prove inappropriate. The following sections describe how data collected in the field will be documented, tracked, and controlled.

7.3.1 Health and Safety - Daily Personnel Log

A log will be maintained on site to record the identities of all personnel who are on-site for the duration of the project. The log will record the following information.

Names of field personnel:

- Names of subcontractor personnel
- Names of visitors
- Affiliation of each person on-site
- Time of entry and exit.

7.3.2 Field Logbooks

Field logbooks will provide the means of recording the chronology of data collection activities performed during the investigation. As such, entries will be described in as much detail as possible so that a particular situation could be reconstructed without reliance on memory. Field logbooks will be bound field survey books or notebooks. Logbooks will be assigned to field personnel but will be stored in the project files when not in use. Each logbook will be identified by the project-specific document number. All logbooks will be water resistant and have sequentially numbered pages. The title page of each logbook will contain the following:

- Person to whom the logbook is assigned,
- The logbook number,
- Project name and number,
- Site name and location,
- Site location by longitude and latitude, if known,
- Project start date, and
- End date.

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, and names of all sampling team members present

will be entered. Each page of the logbook will be signed and dated by the person making the entry. Field activities will be fully documented. All entries will be made in permanent ink, signed, and dated and no erasures or obliterations will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark which is initialled and dated by the sampler. The correction shall be written adjacent to the error. Information included in the logbook will include, but may not be limited to:

- Chronology of activities, including entry and exit times;
- Names of all people involved in sampling activities and organizational affiliations;
- Level of personal protection used;
- Any changes made to planned protocol;
- Names of visitors to the site during sampling and reason for their visit;
- Sample location and identification;
- Weather conditions, including temperature and relative humidity;
- Dates (month/day/year) and times (military) of sample collection;
- Measurement equipment identification (model/manufacture) and calibration information;
- Field screening results;
- Site observations;
- Sample collection methods and equipment;
- Sample collection date and time;
- Sample depths;
- Whether grab or composite sample collected;
- How sample composited, if applicable;
- Sample description (color, odor, texture, etc.);
- Sample identification code;
- Tests or analyses to be performed;
- Sample preservation and storage conditions;
- Equipment decontamination procedures;
- QC sample collection;
- Unusual observations;
- Record of photographs;
- Sketches or diagrams; and
- Signature of person recording the information

Field logbooks will be reviewed on a daily basis by the Field Manager. Each field logbook will be numbered, a log will be kept denoting the date each notebook was issued, and the field activity corresponding to each notebook.

Upon receipt of the field logbook for a particular activity, the designated person recording the notes will begin recording notes on a new page. The person recording the notes will indicate the date, time, and weather conditions, prior to recording information about the field activity. The field logbook will indicate whether any Field Data Forms are used and the serial numbers of all forms will be recorded for reference. When the designated person recording the notes either relinquishes the field logbook to another team member or turns the book in at the end of the day, the person relinquishing the

field logbook will affix a signature and date to the bottom of the last page used. If the page is not complete, a diagonal line will be struck across the blank portion of the page.

7.3.3 *Field Data Forms*

Field forms were designed to minimize the potential for critical data loss from the field. Field personnel are instructed to utilize these forms, when appropriate, to record critical data during the field activities for which each form was designed. As with the field logbooks, all documentation will be recorded in permanent ink. Corrections to errors in documentation or recorded calculations will be made by first striking out the error with a single line so as not to obliterate the original entry. Then the replacement entry or value will be inserted where appropriate. The person originating the change will initial and date each separate change. All revisions, deletions, and changes will be made in indelible ink. No field forms are expected to be utilized in this investigation.

7.3.4 *Photographs*

Field personnel will be instructed to photodocument field activities where possible. Examples of items that may require photographic documentation include:

- General site topography
- Sampling locations
- Existing monitoring locations
- Physical appearance of environmental samples
- Physical appearance of soil, recovered drums, drum waste, and sediment
- A field logbook entry or Photograph Log will be used to record the date and time of all photographs taken at the site.

7.3.5 *Equipment Calibration Log*

A field logbook entry or daily log will be used to record which instruments were calibrated each day (identified by manufacturer, model number and serial number), the individual who performed the calibration, and any notes regarding the maintenance of the instrument.

7.3.6 *Health and Safety Log*

A field logbook entry or a Health and Safety Log will be used to record any Health and Safety issues that arise during field activities. Any injuries, illnesses, use of first aid supplies, use of personal protective equipment (for levels A, B or C only, if needed), or possible work-related symptoms will be recorded in the log together with the date, the name(s) of the affected individual(s), and a description of the incident.

7.3.7 *Sample Identification and Labeling*

The establishment of a standard sample designation/labeling protocol is essential to ensure adequate quality assurance/quality control and to allow tracking of each sample and the associated analytical data. Proper labeling allows for the tracking of samples beginning from the time of sample collection, through analysis, and following project completion should future data correlation be deemed necessary. The proper labeling of samples is also critical in ensuring that samples are analyzed within the required sample holding times.

All samples will be identified using a unique sample identification scheme suitable to the project and the sampling protocol. The sample identification number will be recorded on the chain-of-custody forms accompanying each sample shipment submitted for analysis and will be recorded in the field logbooks.

7.4 **Field Sample Custody**

Evidence of sample traceability and integrity is provided by chain-of-custody (COC) procedures. The procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. A sample is considered to be in a person's custody if the sample is:

- In a person's possession
- Maintained in view after possession is accepted and documented
- Locked and tagged with Custody Seals so that no one can tamper with it after having been in physical custody
- In a secured area which is restricted to authorized personnel

A COC record accompanies the sample containers from selection and preparation at the laboratory, during shipment to the field for sample collection and preservation, and during the return to the laboratory (**Attachment 1**). Triplicate copies of the COC must be completed for each sample set collected.

The COC lists the field personnel responsible for taking samples, the project name and number, the name of the analytical laboratory to which the samples are sent, and the method of sample shipment. Also listed on the COC is a unique description of every sample bottle in the set. If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample.

The REMARKS or COMMENTS space on the COC is used to indicate if the sample is a matrix spike, matrix spike duplicate, or any other sample information for the laboratory. Since they are not specific to any one sample point, trip and field blanks are indicated on separate rows. Once all sample containers are properly accounted for on the form, a sampler will write his or her signature and the date and time on the first RELINQUISHED BY space. The sampler will also write the method of shipment, the shipping cooler identification number, and the shipper airbill number on the top of the

COC. Errors in field records will be crossed out with a single line in ink and initiated by the author. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, and the person relinquishing the samples signs their name across the seal. The seal is taped. Following the RECEIVED BY signature of the laboratory-employed courier, one copy of the COC is retained by sampling personnel and the other two copies remain with the laboratory courier. The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the sample will not be analyzed.

7.4.1 Laboratory sample custody

The Project Manager or Field Team Leader will notify the laboratory of upcoming field sampling activities and the subsequent shipment of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The following laboratory sample custody procedures will be used:

- The laboratory will designate a sample custodian who will be responsible for maintaining custody of the samples and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check cooler temperature, and check the original COC documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian will sign the COC record and record the date and time received.
- Care will be exercised to annotate any labeling or descriptive errors. In the event of documentation or sample integrity issues, the laboratory will immediately contact the Project Manager or Field Team Leader as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken or leaking bottles. This assessment will be recorded as part of the incoming COC procedure.
- The soil, water, and air samples will be stored in a secured area until analyses commence, at a temperature of approximately 4 ± 2 °C if required.
- A laboratory tracking record will accompany the sample or sample fraction through final analysis for control.

A copy of the tracking record will accompany the laboratory report and will become a permanent part of the project records

7.5 LABORATORY DATA REPORTING FORMATS

This section of the QAPP describes how project data and information will be documented, tracked and managed by the laboratory.

7.5.1 *Fixed Laboratory Data Package Deliverables*

At a minimum, the data packages from the analytical chemistry laboratories will include the following:

1. Case narrative
 - summary of analytical methods used
 - correlation of field sample identifications and laboratory sample identifications
 - data qualifier definitions
 - deviations from established QA/QC procedures with corrective action
2. Sample results
 - project name
 - field sample identification
 - batch number
 - collection/extraction/analysis dates
 - detection limits
 - dilution factors
 - percent moisture
3. Sample documentation
 - original chains-of-custody
 - shipping documents
 - cooler receipt forms
4. Quality Assurance/Quality Control
 - spike recoveries (surrogates, MS/MSDs, LCSs)
 - measures of precision (laboratory duplicates, MS/MSDs)
 - control limits for accuracy and precision
5. Raw data, including chromatograms, quantitation reports, and spectra

Results for all soil and sediment samples will be reported on a dry weight basis. The laboratories will report values detected between the method detection limit and reportable limit and qualify these results as estimated. The laboratory will report tentatively identified compounds (TICs) for the VOC and SVOC analyses of soil, sediment, and aqueous samples. Up to 10 TICs for VOCs and 15 TICs for SVOCs will be reported for each sample.

7.5.2 *Laboratory Data Reporting Formats*

Laboratory records will be reviewed by the Project Manager to verify adherence to documentation requirements. Information will not be erased or obliterated. Corrections will be made by drawing a single line through the error and entering the correct information adjacent to the cross-out. All changes will be initialled, dated, and, if appropriate, accompanied by a brief explanation.

7.5.3 *Laboratory Internal Reviews*

Prior to the release of any data from the laboratory, the data will be verified and approved by laboratory personnel. The review will consist of a tiered review by the person performing the work, a qualified peer, and by supervisory personnel. Details of the review are provided below. Prior to being released as final, laboratory data will proceed through a tiered review process. Data verification starts with the analyst or technician who performs a 100 percent review of the data to ensure the work was done correctly the first time. It is the responsibility of the analyst or technician to ensure that the verification of data in his or her area is complete. The data reduction and initial verification process must ensure that:

- Sample preparation and analysis information is correct and complete,
- Results are correct and complete,
- The appropriate EPA methods or laboratory Standard Operating Procedures (OPS) have been followed and are identified in the project records,
- Proper documentation procedures have been followed,
- All non-conformances have been documented,
- Project-specific requirements have been met.

Following the completion of the initial verification by the analyst or technician, a systematic check of the data will be performed by the Laboratory. A narrative to accompany the final report will be finalized by the Laboratory Project Manager. This narrative will include relevant comments, including data anomalies and non-conformances. The check will be performed to ensure that initial review has been completed correctly and thoroughly. Included in this review will be an assessment of the acceptability of the data with respect to:

- Adherence of the procedure used to EPA methods and laboratory SOPs, and any project specific methods and specific instructions;
- Correct interpretation of data (e.g., mass spectra, chromatographic interferences, etc.);
- Correctness of numerical input when computer programs are used (checked randomly);
- Numerical correctness of calculations and formulas (checked randomly), Acceptability of QC data;
- Documentation that instruments were operating according to method specification (calibrations, performance checks, etc.);
- Documentation of dilution factors, standard concentrations, etc.;
- Sample holding time assessment;
- Nonconforming events have been addressed by corrective action as defined on a nonconformance memo;
- Results are present for every sample in the analytical batch or reporting group;
- Every parameter or target compound requested is reported;
- The correct units and correct number of significant figures are utilized;

- All non-conformances, including holding time violations, and data evaluation statements that impact the data quality are accompanied by clearly expressed comments from the laboratory;
- The final report is legible, contains all the supporting documentation required by the project, and is in either the standard format or in the client-required format.

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APPENDIX F

PROJECT SCHEDULE

Project Schedule

The relevant milestones associated with this Work Plan are as follows. The schedule shown below is based on the approximate number of weeks following NYSDEC approval of this Work Plan. This schedule is contingent upon EnviroSure, Inc.'s accessibility to the Site, permit approvals, the schedules of our employees and subcontractors at the time of NYSDEC approval

Task	Schedule
Project Kick-off	within 1 week
<i>Subsurface Soil Investigation:</i> Geophysical Survey	2-3 weeks
Soil Sampling	2-3 weeks
Soil Analytical results	3-4 weeks
<i>Groundwater Investigation:</i> Monitoring Well Installation	3-4 weeks
Groundwater Sampling	4-5 weeks
Groundwater Analytical Results	5-6 weeks
DEC and Team Meeting	6-7 weeks
Remedial Investigation Report Submittal	10-12 weeks
Remedial Action Work Plan	12-13 weeks

APPENDIX G

DER-10 APPENDIX 3C FISH AND WILDLIFE RESOURCES IMPACT ANALYSIS DECISION KEY

Appendix 3C Fish and Wildlife Resources Impact Analysis Decision Key		If YES Go to:	If NO Go to:
1.	Is the site or area of concern a discharge or spill event?	13	2
2.	Is the site or area of concern a point source of contamination to the groundwater which will be prevented from discharging to surface water? Soil contamination is not widespread, or if widespread, is confined under buildings and paved areas.	13	3
3.	Is the site and all adjacent property a developed area with buildings, paved surfaces and little or no vegetation?	4	9
4.	Does the site contain habitat of an endangered, threatened or special concern species?	Section 3.10.1	5
5.	Has the contamination gone off-site?	6	14
6.	Is there any discharge or erosion of contamination to surface water or the potential for discharge or erosion of contamination?	7	14
7.	Are the site contaminants PCBs, pesticides or other persistent, bioaccumulable substances?	Section 3.10.1	8
8.	Does contamination exist at concentrations that could exceed ecological impact SCGs or be toxic to aquatic life if discharged to surface water?	Section 3.10.1	14
9.	Does the site or any adjacent or downgradient property contain any of the following resources? i. Any endangered, threatened or special concern species or rare plants or their habitat ii. Any DEC designated significant habitats or rare NYS Ecological Communities iii. Tidal or freshwater wetlands iv. Stream, creek or river v. Pond, lake, lagoon vi. Drainage ditch or channel vii. Other surface water feature viii. Other marine or freshwater habitat ix. Forest x. Grassland or grassy field xi. Parkland or woodland xii. Shrubby area xiii. Urban wildlife habitat xiv. Other terrestrial habitat	11	10
10.	Is the lack of resources due to the contamination?	3.10.1	14
11.	Is the contamination a localized source which has not migrated and will not migrate from the source to impact any on-site or off-site resources?	14	12
12.	Does the site have widespread surface soil contamination that is not confined under and around buildings or paved areas?	Section 3.10.1	12
13.	Does the contamination at the site or area of concern have the potential to migrate to, erode into or otherwise impact any on-site or off-site habitat of endangered, threatened or special concern species or other fish and wildlife resource? (See #9 for list of potential resources. Contact DEC for information regarding endangered species.)	Section 3.10.1	14
14.	No Fish and Wildlife Resources Impact Analysis needed.		

APPENDIX H

COMMUNITY AIR MONITORING PLAN

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for 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 DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. A 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, particularly if wind direction changes. 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.

1. 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.
2. 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.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down.
4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) 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.

1. 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.
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 must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

Note:

CAMP readings will be provided on a weekly basis with all exceedances reported to the Department and NYSDOH the same day or next business day if after hours along with the reason for exceedance, what was done to correct it, and if it was effective. CAMP data collected during the execution of the RIWP will be summarized in a qualitative statement in the body of the Remedial Investigation Report.

APPENDIX E
CITIZEN PARTICIPATION PLAN





Brownfield Cleanup Program

Citizen Participation Plan for AMERICAN TWO CLEANERS

October 2021

Contents

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Appendix B - Site Contact List	13
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Appendix D - Brownfield Cleanup Program Process	15

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **Reds Crib, LLC (“Applicant”)**
Site Name: **American Two Cleaners (“Site”)**
Site Address: **43-45 Lafayette Avenue, Suffern, NY**
Site County: **Rockland County**
Site Number: **C344085**

1. What is New York’s Brownfield Cleanup Program?

New York’s Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as “brownfields” so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:
<http://www.dec.ny.gov/chemical/8450.html> .

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment
- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process
- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process
- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community
- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some

documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The site contact list includes, at a minimum:

- chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the site and properties adjacent to the site;
- the public water supplier which services the area in which the site is located;
- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See <http://www.dec.ny.gov/chemical/61092.html> .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.
- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, the significant threat determination for the site had not yet been made. To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at
<http://www.dec.ny.gov/regulations/2590.html>

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process: • Prepare site contact list • Establish document repository(ies) • Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	
After Execution of Brownfield Site Cleanup Agreement (BCA): • Prepare Citizen Participation (CP) Plan	At time of preparation of application to participate in the BCP. When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time. Before start of Remedial Investigation Note: Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan: • Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation: • Distribute fact sheet to site contact list that describes RI results	After Applicant Completes Remedial Investigation: Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP): • Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC Approves Remedial Work Plan (RWP): Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action: • Distribute fact sheet to site contact list that describes upcoming cleanup action	Before Applicant Starts Cleanup Action: Before the start of cleanup action.
After Applicant Completes Cleanup Action: • Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	After Applicant Completes Cleanup Action: At the time the cleanup action has been completed. Note: The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

Major issues have not been identified regarding the local residents, town board or other stakeholders. The environmental and health concerns are currently limited to the Site boundaries.

4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

- **Location - 43-45 Lafayette Avenue, Suffern Village, Rockland County, New York**
- **Setting - Suburban**
- **Site size - 0.09 acre**
- **Adjacent properties -**
 - My Mexican House Restaurant-Bar (41 Lafayette Ave) - Owner: Ghassan Rabadi and Al Nada Rabadi, (845) 368-0388
 - Cristy's Jewelry and Perfumes (23 Chestnut Street) - Owner: Maria Miranda (845)558-0591
 - Java Love Coffee Roasting Co. (50 Lafayette Ave) - Owner: 50 Lafayette Ave LLC (Capital One Real Estate Administration); Contact Information Unknown.
 - Boost Mobile (47 Lafayette Ave) - Owner: Kiplou Realty Corp; 40 Wayne Avenue #A, Suffern, NY 10901 (845) 369-9210
 - Chat Room (20 Chestnut Street) - Owner: Kiplou Realty Corp; 40 Wayne Avenue #A, Suffern, NY 10901 (845) 369-9210

History of Site Use, Investigation, and Cleanup

- The Site building has two tenant spaces - 43 Lafayette Avenue is vacant and was formerly occupied by American Two Cleaners (ATC) and 45 Lafayette Avenue is occupied by a wellness program tenant. The current property owner, Reds Crib, LLC, purchased the property in October 2019 and ATC occupied the property for

at least six years prior. The contaminants related to the site that are known or suspected are solvents used for dry cleaning operations and it is currently known that sub-slab soil vapors under the Site building have been impacted. A limited vapor intrusion investigation has been conducted at the Site in August and September 2020.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for restricted purposes.

To achieve this goal, the Applicant will conduct investigation activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant has completed a partial site investigation before it entered into the BCP. For the partial investigation, NYSDEC will determine if the data are useable.

The site investigation has several goals:

- 1) define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
- 2) identify the source(s) of the contamination;
- 3) assess the impact of the contamination on public health and the environment; and
- 4) provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant submits a draft “Remedial Investigation Work Plan” to NYSDEC for review and approval. NYSDEC makes the draft plan available to the public review during a 30-day public comment period.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is needed to address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine if the site poses a significant threat to public health or the environment. If the site is a “significant threat,” it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a “Certificate of Completion” (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a “Remedial Work Plan”. The Remedial Work Plan describes the Applicant’s proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a final engineering report that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the final engineering report. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

**Appendix A -
Project Contacts and Locations of Reports and Information**

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Mr. Emily Barry
Project Manager, Assistant Geologist
NYSDEC
Division of Environmental Remediation
21 South Putt Corners Road
New Paltz, NY 12561-1696
(845) 633-5457

New York State Department of Health (NYSDOH):

Johnathan Robinson
Project Manager
NYSDOH
Empire State Plaza –
Corning Tower, Room #1787,
Albany, NY 12237
(518) 402-7881

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

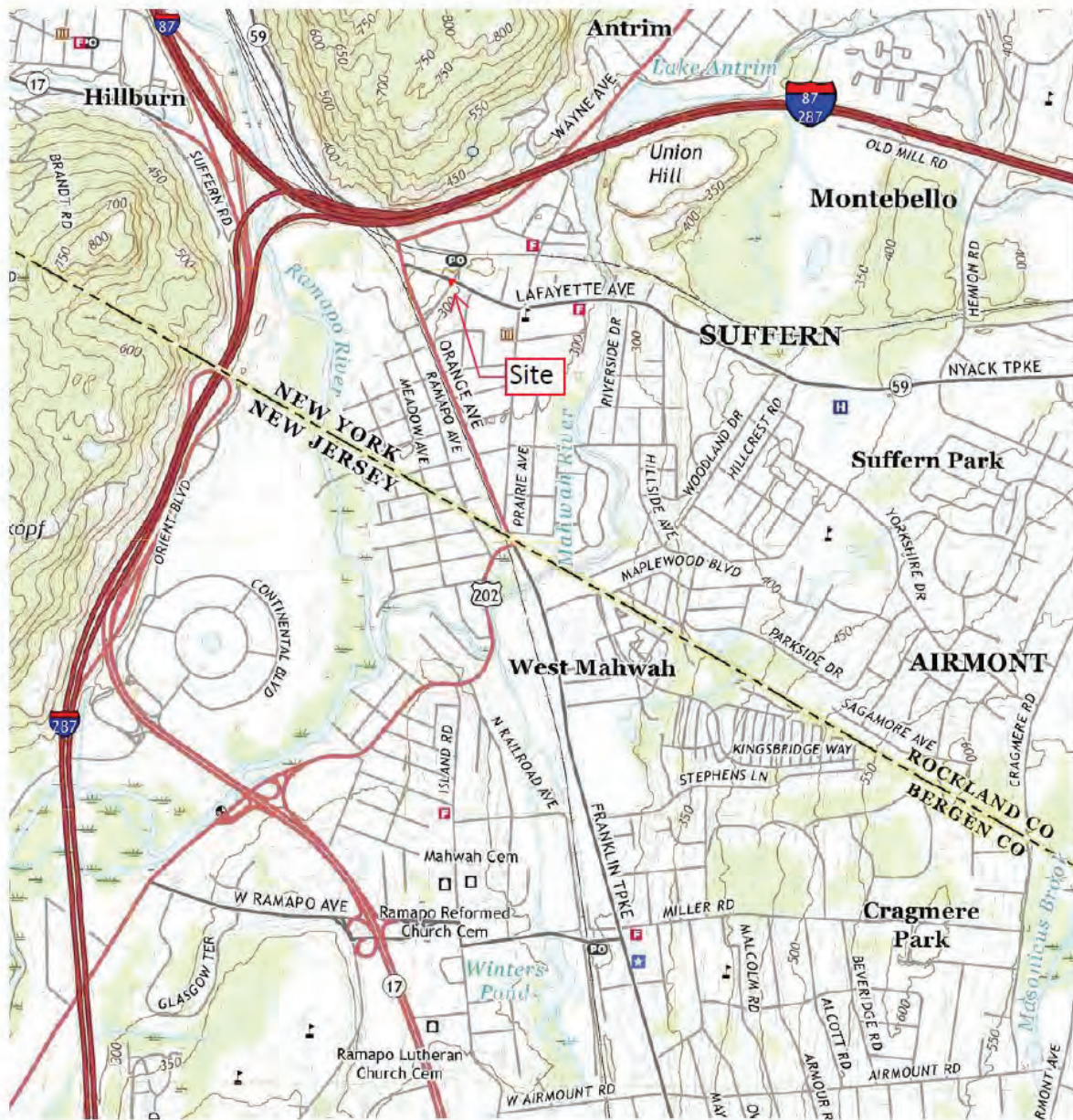
Suffern Free Library
210 Lafayette Avenue
Suffern, NY 10901
Phone: 845-357-1237

Hours:
Monday-Thursday: 10:00am-9:00pm
Friday-Saturday: 10:00am-5:00pm
Sunday: 12:00pm-5:00pm

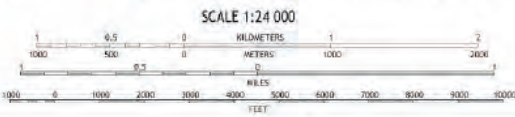
Appendix B - Site Contact List

- Project Manager, Project Health and Safety Officer
Harry Sudwischer, Director of Remediation and Spills
Environmental Consulting & Management Services, Inc.
10 Filmont Drive, New City, New York 10956
(203) 241-1030
Harry.Sudwischer@ecmsny.com
- Planning Board Chairperson -
 - Rockland County: Ms. Donna G. Silberman, Clerk, 845-638-5221
1 South Main Street, Suite 100, New City, New York 10956
 - Village of Suffern: Ms. Amy Paffenroth, Clerk, 845-357-2600
61 Washington Avenue, Suffern, New York 10901
clerk@suffernny.gov
- Adjoining or adjacent properties -
 - North: Java Love Coffee Roasting Co.
Owner: 50 Lafayette Ave LLC (Capital One Real Estate Administration)
50 Lafayette Avenue, Suffern, New York 10901
Company Phone: (845) 918-1282
 - South: Vacant and Cristy's Jewelry
Owner: Maria Miranda
21-23 Chestnut Street, Suffern, New York 10901
(845) 558-0591
 - East: The Chat Room and Tease Hair Studios
22 Chestnut Street, Suffern, New York
Owner Kiplou Realty Corp
40 Wayne Avenue #A, Suffern, New York 10901
(845) 369-9210
 - West: My Mexican House Restaurant
Owner: Ghassan Rabadi and Al Nada Rabadi
41 Lafayette Avenue, Suffern, New York
(845) 368-0388
- Public Water Supplier -
 - Village of Suffern Department of Public Works/Water Department
61 Washington Avenue, Suffern, New York 10901
(845) 357-1617

Appendix C - Site Location Map



SOURCE: RAMSEY QUADRANGLE,
NEW JERSEY/NEW YORK
7.5 MINUTE SERIES, USGS 2019



Environmental Consulting & Management Services, Inc. 10 Filmont Drive, New City, NY 10956 	SOURCE: USGS DATE: 2019		FIGURE 1 Site Location Map 43-45 LAFAYETTE AVENUE SUFFERN VILLAGE ROCKLAND COUNTY, NEW YORK	
	APPROVED BY H. Sudwischer			
	DRAWN BY H. Sudwischer			
	PROJECT DRAWING NO. 23.527	SCALE 1:24,000	Contour Interval: 10 FT	DATE 10/14/23

APPENDIX F
ALTERNATIVES COST ESTIMATE



ITEM #	DESCRIPTION	QUANTITY	UNIT	UNIT MEASURE	TRACK 1 TOTAL COST	TRACK 2 TOTAL COST
1	Mobilization of Remediation Equipment	1	LUMP SUM	\$ 3,250.00	\$ 3,250.00	\$ 3,250.00
2	Vactor Truck and Operator	5	DAYS	\$ 4,600.00	\$ 23,000.00	\$ 23,000.00
3	Utility / Support Vehicle w/ Ancillary Tools / Equipment	5	DAYS	\$ 1,100.00	\$ 5,500.00	\$ 5,500.00
4	Hazardous-Materials Technician	10	MAN/ DAY	\$ 1,300.00	\$ 13,000.00	\$ 13,000.00
5	Personal Protective Equipment	15	MAN/ DAY	\$ 125.00	\$ 1,875.00	\$ 1,875.00
6	Deliver Liquid Tight Hazardous-Material Container	2	BOX	\$ 2,000.00	\$ 4,000.00	\$ 4,000.00
7	Steel Open Head 55-gal Dot Drum	1	EACH DRUM	\$ 100.00	\$ 100.00	\$ 100.00
8	Transportation / Disposal Non-Hazardous PPE	1	EACH	\$ 455.00	\$ 455.00	\$ 455.00
9	Transportation PCE-Haz Soils to Michigan or Similar Facility	2	PER CONTAINER	\$ 10,270.00	\$ 20,540.00	\$ 20,540.00
10	Disposal PCE Hazardous Soil (F002 Soil with Organics < 500 ppm)	25	TON	\$ 1,000.00	\$ 25,000.00	\$ 25,000.00
11	ECMS Environmental Oversight soil removal	6	DAYS	\$ 1,800.00	\$ 10,800.00	\$ 10,800.00
12	EPA 8260 Endpoint Soil Samples	10	EACH	\$ 350.00	\$ 3,500.00	\$ 3,500.00
13	CAMP Air Monitoring (1 week)	1	WEEK	\$ 3,500.00	\$ 3,500.00	\$ 3,500.00
14	Soil Vapor Intrusion - Sampling	6	EACH	\$ 600.00	\$ 3,600.00	\$ 3,600.00
15	Soil Vapor Intrusion - helium meter	1	EACH	\$ 500.00	\$ 500.00	\$ 500.00
16	Soil Vapor Intrusion - helium, materials permanent vapor points, tubing, PID	1	EACH	\$ 800.00	\$ 800.00	\$ 800.00
17	Remedial Action Report	1	LUMP SUM	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00
18	Final Engineering Report	1	LUMP SUM	\$ 6,000.00	\$ 6,000.00	\$ 6,000.00
19	Site Management Plan	1	LUMP SUM	\$ 6,000.00	\$ 6,000.00	\$ 6,000.00
20	Replace removed soils with virgin gravel, compact gravel and restore concrete slab.	1	LUMP SUM	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00
ITEM #	DESCRIPTION	QUANTITY	UNIT	UNIT MEASURE	TRACK 1 TOTAL COST	TRACK 2 TOTAL COST

ITEM #	DESCRIPTION	QUANTITY	UNIT	UNIT MEASURE	TRACK 1 TOTAL COST	TRACK 2 TOTAL COST
21	Water proofing/ Vapor proofing materials 1- 35 x 50 ft basement floor area - 1800sqft , perimeter walls 2- 50x7ft, 700 sqft , shorter perimeter walls 2-35x7ft 245 sqft, plus 15 %	3500	SQUARE FT	\$ 9.00	\$ 31,500.00	\$ 31,500.00
22	Water proofing/ Vapor proofing install	3500	SQUARE FT	\$ 1.00	\$ 3,500.00	\$ 3,500.00
23	Vapor Barrier Environmental Engineer Inspection/sign off	1	LUMP SUM	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00
24	Post-RAWP Soil Vapor-Indoor Air Sampling (one event)	1	Each	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00
25	Post-RAWP Groundwater Sampling event (one event)	1	Each	\$ 2,500.00	\$ 2,500.00	\$ 2,500.00
26	SSDS Annual	1	Each	\$ 3,500.00	\$ -	\$ 3,500.00
27	Groundwater/Indoor Air sampling and PRR Annually	1	Each	\$ 4,000.00	\$ -	\$ 4,000.00
28	Environmental Easement	1	Each	\$ 2,000.00	\$ -	\$ 2,000.00
ITEM #	DESCRIPTION	QUANTITY	UNIT	UNIT MEASURE	TRACK 1 TOTAL COST	TRACK 2 TOTAL COST
Proposed Costs for Track 1 and Track 2	Track 1 Proposed cost	Track 2 Proposed costs (Years 1-5)				
	Year 1	Year 1	Year 2	Year 3	Year 4	Year 5
	\$ 187,920.00	\$ 197,420.00	\$ 7,500.00	\$ 5,000.00	\$ 5,000.00	\$ 6,000.00

APPENDIX G
NYSDEC REQUEST TO IMPORT/REUSE FILL
MATERIALS





**NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION**



Request to Import/Reuse Fill or Soil

This form is based on the information required by DER-10, Section 5.4(e) and 6NYCRR Part 360.13. Use of this form is not a substitute for reading the applicable regulations and Technical Guidance document.

SECTION 1 – SITE BACKGROUND

The allowable site use is:

Have Ecological Resources been identified?

Is this soil originating from the site?

How many cubic yards of soil will be imported/reused?

If greater than 1000 cubic yards will be imported, enter volume to be imported:

SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone?

Does it contain less than 10%, by weight, material that passes a size 100 sieve?

Is this virgin material from a permitted mine or quarry?

Is this material recycled concrete or brick from a DEC registered processing facility?

SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:

Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.

If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.

SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.

If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.

SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

The information provided on this form is accurate and complete.

Signature

Date

Print Name

Firm

APPENDIX H
RETRO-COAT PRODUCT SPECIFICATIONS
SHEETS



Product and Application

This specification describes the application of the Retro-Coat® System. The minimum thickness of the system is between 26-36 mils, including a 20 mil minimum application of Retro-Coat.

Advantages

- Designed specifically to mitigate vapor intrusion in existing structures
- Retro-Coat is a wearing surface, meaning no additional concrete protection is necessary
- No odor and fast cure time reduce building downtime
- Carpet, tile, linoleum or other floor coverings can be applied directly over Retro-Coat, if desired
- Retro-Coat can increase the performance of an existing active sub-slab depressurization system
- Retro-Coat can aid in the retiring of existing active systems
- Available and installed by Land Science certified contractors

Acceptable Manufacturers

Retro-Coat as manufactured by Land Science San Clemente, CA.

Applicator

Applicator must be a certified contractor of Land Science.

Performance Criteria

Retro-Coat as manufactured by Land Science San Clemente, CA.

Property	Test Method	Typical Value
Diffusion Coefficient	Columbia Labs	PCE: $7.6 \times 10^{-14} \text{ m}^2/\text{s}$
		TCE: $8.2 \times 10^{-14} \text{ m}^2/\text{s}$
Tensile Strength	ASTM D-638	8,200 PSI (minimum)
Tensile Elongation	ASTM D-638	5% (minimum)
Flexural Strength	ASTM D-790	10,200 PSI (minimum)
Hardness, Shore D	ASTM D-2240	82 (maximum)
Gardner Impact	ASTM D-2794	80 inch-pounds (minimum)
Bond Strength	-	to concrete: >350 PSI (concrete fails)
Vapor Transmission Rate	ASTM E-96	0.027 perms (maximum)
Water Absorption	ASTM D-570	0.02% in 24 hours (maximum)
60° Gloss	-	100 (minimum)

Materials

Retro-Coat Part A shall be a modified epoxy containing special flexibilizers and specially formulated resins for superior chemical resistance and enhanced resilience. No solvents are allowed.

Retro-Coat Part B shall be customized blend of hardeners specifically formulated to maximize chemical resistance.

Surface Preparation

All existing surfaces that will be covered with the systems specified herein should be mechanically ground, shot blasted or sand blasted to yield a minimum 60 grit surface texture. All loosely adhered coatings will be removed. Any grease and other contaminants found on the concrete must also be removed.

All open cracks $\frac{1}{2}$ " and greater should be v-notched to a $\frac{3}{4}$ " width by $\frac{1}{2}$ " depth and cleaned of any debris. Such cracks should be filled with Retro-Coat Gel and struck off flush with the surrounding surface.

Cut back and/or remove any expansion joint backing or filler strips to a minimum of $1\frac{1}{2}$ " deep. Insert disposable filler in the joints to prevent filling with the overlayment materials and to allow for accurate location of final saw cuts in the overlayment.

Material Application

Only apply Retro-Coat at temperatures above 50° F. It is ok to apply over a damp surface, but not standing water. If hydrostatic pressure is suspected, test for concrete moisture. Contact your Land Science representative for additional information.

Retro-Coat 2-Part Caulk

Apply Retro-Coat 2-Part Caulk around the base of all pipe penetrations making sure to fill any gap between the penetration and concrete slab.

Apply Retro-Coat 2-Part Caulk to the joint created between horizontal and vertical transitions. The caulking material should be applied and pressed into the joint filling any gaps that might be present.

Retro-Coat Primer

Apply Retro-Coat Primer to all areas at a thickness of 6 mil (250 ft²/gal) and allow to dry tack free. In areas where the concrete surface is in need of slight repair or needs to be leveled, a slurry form of Retro-Coat Primer called Retro-Coat Primer-S can be applied with a flat squeegee. Retro-Coat Primer-S is self priming and does not need to be primed again.



Completed surface preparation consisting of shot blasting, Retro-Coat Caulk, to fill joints and cracks and a 6 mil application of Retro-Coat Primer

Retro-Coat

Mix each component of Retro-Coat for 2-3 minutes with a jiffy-style mixer at medium speed before combining. If a pigment pack is required for a custom color, first add the pigment pack to Part A and mix well. Add Part B to Part A (in 2A:1B ratio) and mix for another 2 to 3 minutes. Do not add any solvents.

Immediately pour contents onto floor in a ribbon pattern, squeegee, and then back roll with a $\frac{1}{2}$ " nap roller at a coverage rate of 160 ft²/gallon to achieve a film thickness of 10 mils.

Apply a second 10 mil coat within 7-8 hours to achieve a total thickness of 20 mils. Repeat as necessary to achieve specified thickness.

If a flooring material will be placed over Retro-Coat after it is applied, or appearance is not a priority, a single 20 mil coat can be applied.



Application of Retro-Coat to a 20 mil total thickness

Retro-Coat TOP WB

Retro-Coat TOP WB can be installed for aesthetic purposes to protect the Retro-Coat system from ambering or color fading due to fluorescent and UV light exposure.

Apply Retro-Coat TOP WB over a tack-free Retro-Coat in a single coat at a coverage of 250 ft²/gal (6 wet mil).

Protection of Finished Work

Prohibit foot traffic on floor for 24 hours after application (at 70° F). At 50° F, this time should be extended to 48 hours. The coating will be fully cured after approximately 7 days at 70° F. Cooler temperatures will require up to two weeks to fully cure.

During the curing time, immediately rinse off any chemicals that may come in contact with the freshly laid floor.

Cleanup

Properly dispose of all unused and waste materials.

Tools can be washed in warm, soapy water when wet, but after drying, can only be cleaned by grinding or with a paint stripper.

Unused Part A can be set off with proper amount of Part B hardener and disposed of in regular trash bins.

Floor Care

The standard smooth surface of Retro-Coat should be cleaned on a regular basis by damp mopping the floor with conventional commercial cleaners. It is important to first remove any grease or oils by a suitable cleaner, preferably a citrus based cleaner. Rinse with clear water to help eliminate film buildup and then allow to dry.

Additional steps can also be taken to prolong the look and life of a seamless floor:

- Never use abrasive powder cleaners like Ajax or Comet as they tend to scratch the floor.
- Protect the floor during transference of heavy equipment
- Educate the drivers inside the building of the importance of avoiding “jack-rabbit” starts and stops, as well as keeping the metal forks lifted
- Regular cleaning should take place as to not allow the buildup of abrasive material, such as sand or dirt, on the coating
- Eliminate the use of all metal wheels and instead use light-colored polyurethane wheels.
- Do not slide heavy metal totes, drums or bins across the floor
- Immediately hose down chemical spills, especially on newly laid floors.

Warranty

Land Science warrants Retro-Coat to be free from defects for a period of one (1) year from the date when applied in accordance to Land Science's directions for application.

Bond failure, peeling or delamination due to water or moisture intrusion through the slab substrate will not be covered, nor will any defects to the Retro-Coat layer caused by osmotic vapor blistering.

Due to uncontrolled color tinting from each color batch, colors, textures, patterns, and shading may vary from job to job and throughout larger areas. Color and texture samples used by Land Science are approximate only and may vary from the completed project.

Any damage to the coating that is caused by movement of the underlying substrate (i.e., concrete, joint material or other such underlayment), such as concrete cracking, movement of concrete, and joints expanding, will not be covered by the warranty. Additionally, some tires may leave an amber colored tire tread mark impregnated into the top layer, this is not covered under the warranty.

Any repairs and/or corrections will be for the defective area only, unless deemed otherwise by Land Science. Due to the custom nature of Land Science coatings, any repairs and or corrections may not match the original work. Land Science will not re-install a brand new flooring system to the entire floor due to colors, gloss or sheen difference, texture difference and/or chips not matching.

Resinous coatings are odorous; we recommend turning off air handlers prior to installation. We hold no liability for these chemical odors.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND THE REMEDY PERMITTED HEREIN SHALL BE THE EXCLUSIVE REMEDY OF THE BUYER. SELLER'S LIABILITY SHALL BE LIMITED TO REPLACEMENT OF DEFECTIVE MATERIAL. IN NO EVENT SHALL SELLER BE LIABLE FOR SPECIAL, PUNITIVE, CONSEQUENTIAL OR INCIDENTAL DAMAGES. THIS PARAGRAPH IS NOT APPLICABLE IN CONSUMER TRANSACTION OR WHERE PROHIBITED BY LAW.

Quality Control

Installer shall use a notched squeegee to apply Retro-Coat to the specified mil thickness and calculations shall be done to determine if the correct amount of material has been applied. Retro-Coat contains 100% solids at the time of application; therefore no material shrinkage will occur during the curing process. One gallon will cover 80 square feet at 20 mil.

A wet mil film gauge can be used to spot check the Retro-Coat thickness to make certain the minimum 20 mil thickness has been applied, though some discretion should be used because high points or low points on the underlying surface can adversely affect the thickness measurements.

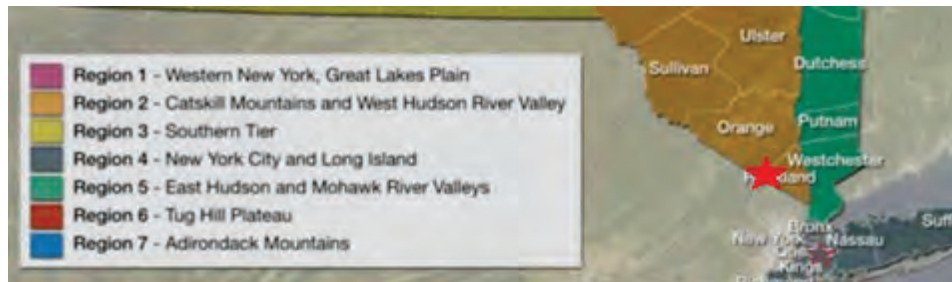
APPENDIX I
Climate Screening Checklist and SEFA Calculations



Climate Screening Checklist

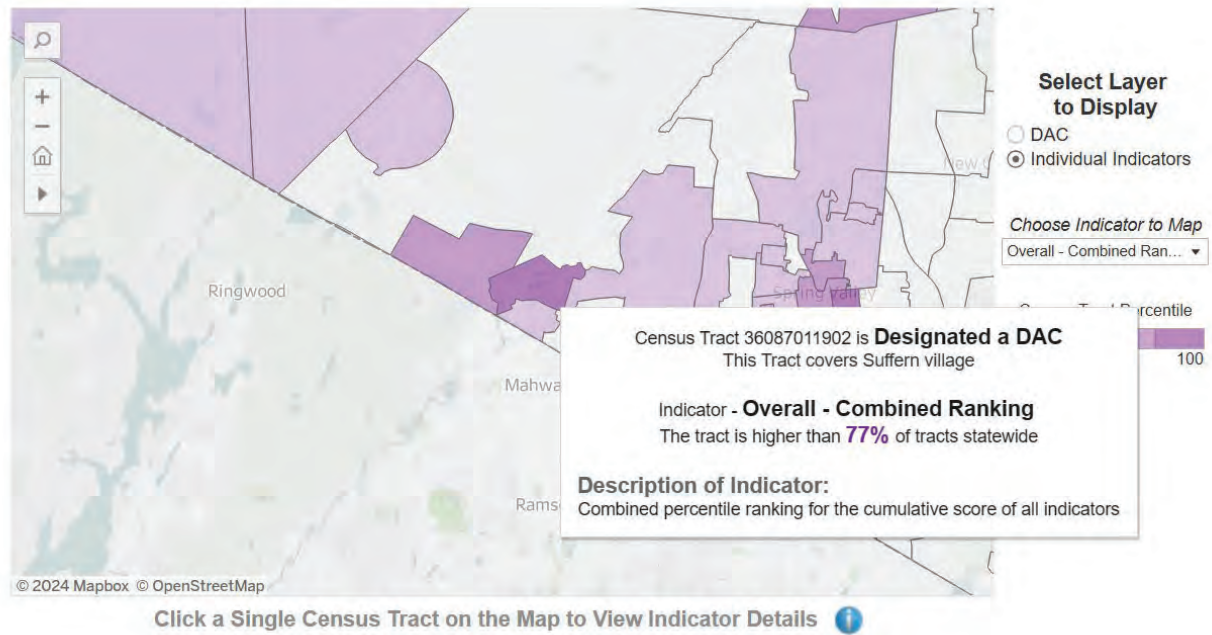
Background Information

- Project Manager: Harry Sudwischer
- Site Name: American Two Cleaners
- Site Number: C344085
- Site Location: 43-45 Lafayette Avenue, Suffern, New York
- Site Elevation (average above sea level): 299 feet
- ClimAID Region ([Responding Climate Change in New York State \(ClimAID\) - NYSDERDA](#)):
 - ☐ Region 2 Catskill mountains and western Hudson River Valley
 - ☐



- Remedial Stage/site classification: Site Classification A (Active)
- Contamination - Media Impacted/ Contaminants of Concern:
 - ☐ Soil PCE and breakdown products (TCE, C1-2,DCE, and VC)
 - ☐ Soil Vapor/ Indoor Air PCE and breakdown products (TCE, C1-2,DCE, and VC)
 - ☐ Perched water PCE and breakdown products (TCE, C1-2,DCE, and VC)
- Proposed/Current Remedy:
 - ☐ Remedial Excavation
- What is the predicted timeframe of the remedy? Will components of the remedy still be in place in 10+ years?
 - ☐ If contaminants are able to be removed from site approximately 6-months
 - ☐ Alternately, 5-10 years a vapor barrier with IC/EC and Environmental Easement and based on testing potentially an SSDS.
- Is the site in proximity to any sensitive receptors? (e.g. wetlands, waterbodies, residential properties, hospitals, schools, drinking water supplies, etc.)
 - ☐ None

Is the site in a disadvantaged community (DAC) or potential environmental justice area (PEJA) (Use DECinfoLocator: [DECinfo Locator \(ny.gov\)](https://decinfo.locator.ny.gov/))?



☒ Yes ☐ No

If the site is in a DAC or PEJA, will climate impacts be magnified? If yes, list how and why.

Environmental Burden & Climate Change Risk

Land Use & Historic Discrimination	Active Landfills	0%
	Housing Vacancy Rate	71%
	Industrial/Manufacturing/Mining La...	99%
	Major Oil Storage Facilities	0%
	Municipal Waste Combustors	0%
	Power Generation Facilities	42%
	Regulated Management Plan (Ch...	43%
	Remediation Sites	57%
	Scrap Metal Processing	0%

Potential Climate Change Risk	Agricultural Land Use	14%
	Coastal Flooding and Storm Risk	0%
	Driving Time to Urgent/Critical Care	82%
	Extreme Heat Projections (>90° d...	80%
	Inland Flooding Risk Areas	0%
	Low Vegetative Land Cover	36%
Potential Pollution Exposure	Benzene Concentration (Modeled)	27%
	Particulate Matter (PM2.5)	46%
	Traffic: Diesel Trucks	100%
	Traffic: Number of Vehicles	89%
	Wastewater Discharge	63%

☐ Yes ☒ No

No because of the limited scope duration in fact we are aiming to potentially reduce chemical sites with “Regulated Management Plans”

Should thresholds of concern be lowered to account for magnification of impacts? If yes, indicate how lower thresholds will be used in the screening.

☐ Yes ☒ No

Climate Screening Table*

Potential Climate Hazards	Relevant to the Site Location (Y/N/NA) ¹	Projected Change (Reference data source/Model) ³	Potential to Impact Remedy (Y/N)	Is remedy/site already resilient? (Y/N) ⁴
Precipitation	No	CREAT Climate Change Scenarios Projection Map CREAT Climate Change Scenarios Projection Map (arcgis.com)	N/A	N/A
Temperature ² (Extreme Heat or Cold Weather Impacts)	No	CREAT Climate Change Scenarios Projection Map CREAT Climate Change Scenarios Projection Map (arcgis.com)	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Flooding	potentially	N (FEMA National Flood Hazard Mapping - FEMA-National Flood Hazard Layer FEMA.gov)	N/A	N/A
Storm Surge	N/A	N/A	N/A	N/A
Wildfire	No	N/A ((Resilience Analysis and Planning Tool(RAPT) (arcgis.com)))	N/A	N/A
Drought	No	N/A- If not N/A (Home Drought.gov)- this was based upon regional information	N/A	N/A
Storm Severity	No	CREAT Climate Change Scenarios Projection Map CREAT Climate Change Scenarios Projection Map (arcgis.com)	N/A	N/A
Landslides	No	CREAT Climate Change Scenarios Projection Map CREAT Climate Change Scenarios Projection Map (arcgis.com)	N/A	N/A
Other Hazards:	No	N/A	N/A	N/A

* Links to potential data sources can be found on the following page

¹ If the first column is N --> The rest of the columns will be N/A, the hazard is not applicable to the site.

² Extreme Heat: periods of three or more days above 90°F- Extreme Cold: Individual days with minimum temperatures at or below 0 degrees F (NYSERDA ClimAID report)

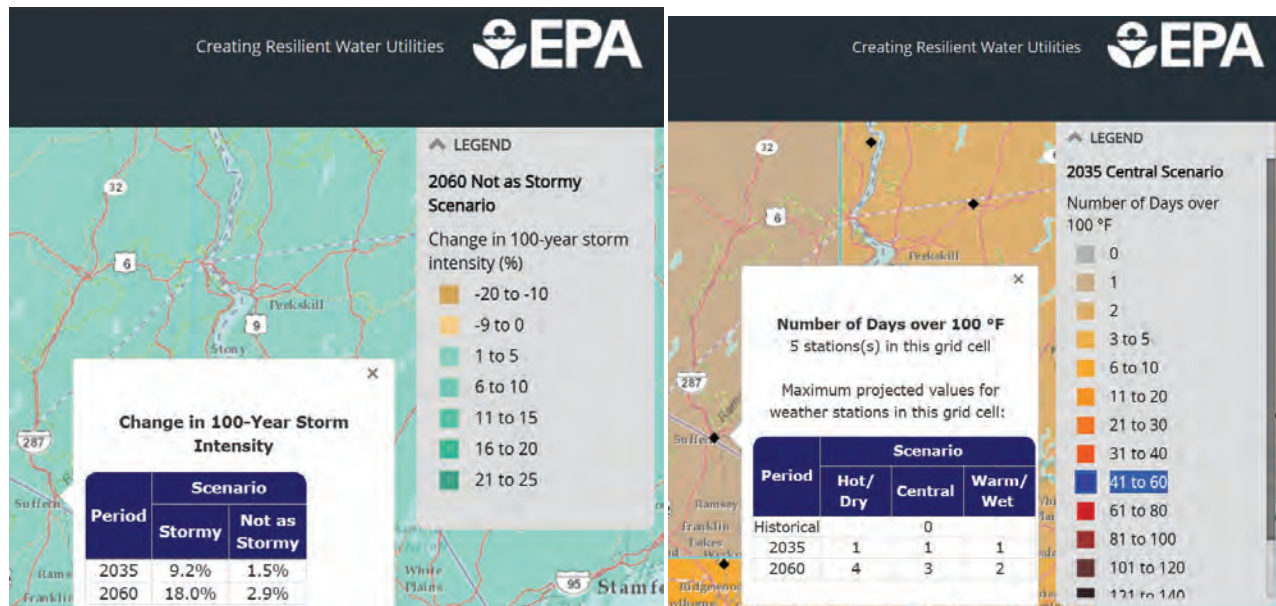
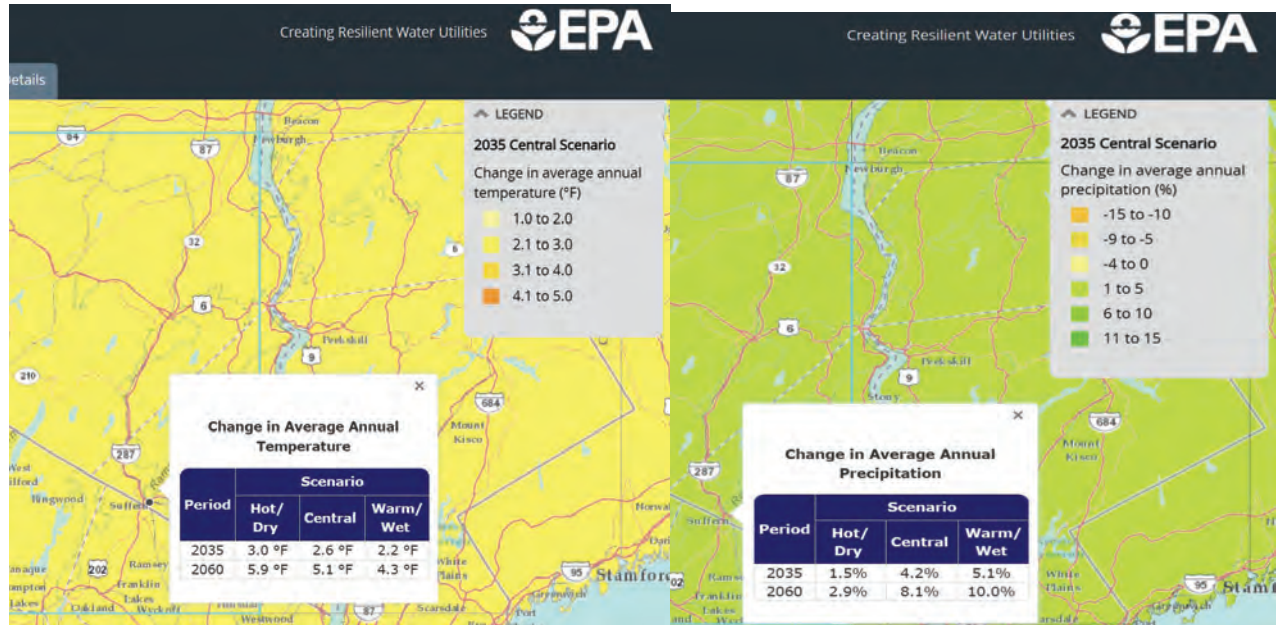
³ List the projected change in specific terms or units e.g. inches of rain fall, feet of sea level rise, etc.

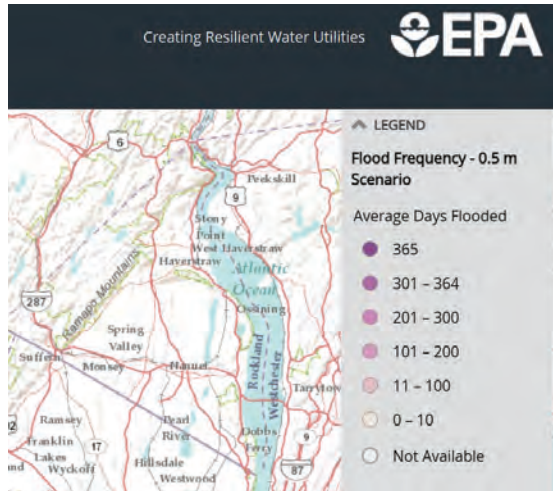
⁴ If final column is Y, provide reasoning, if the final column is N --> Climate Vulnerability Assessment (CVA) required.

Required Next Steps (If no further action is required, provide justification):

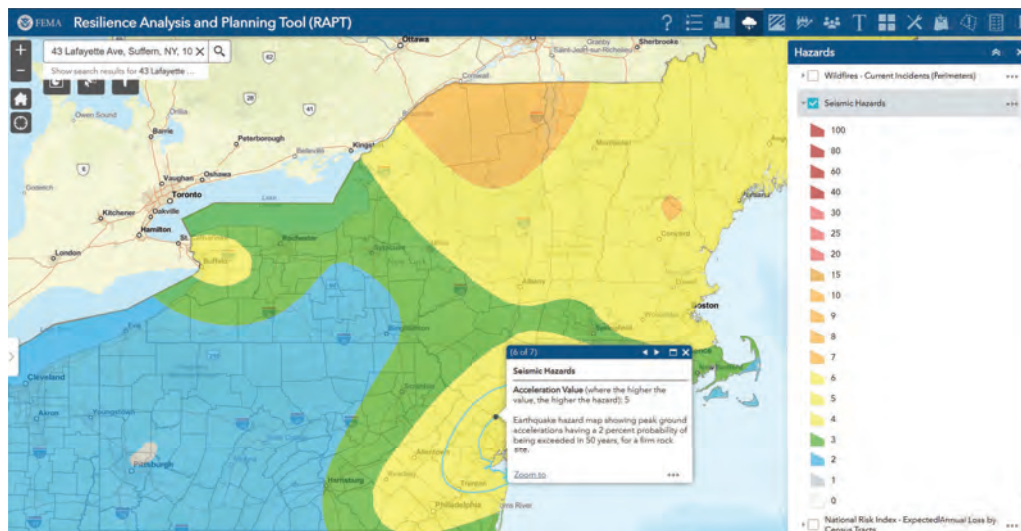
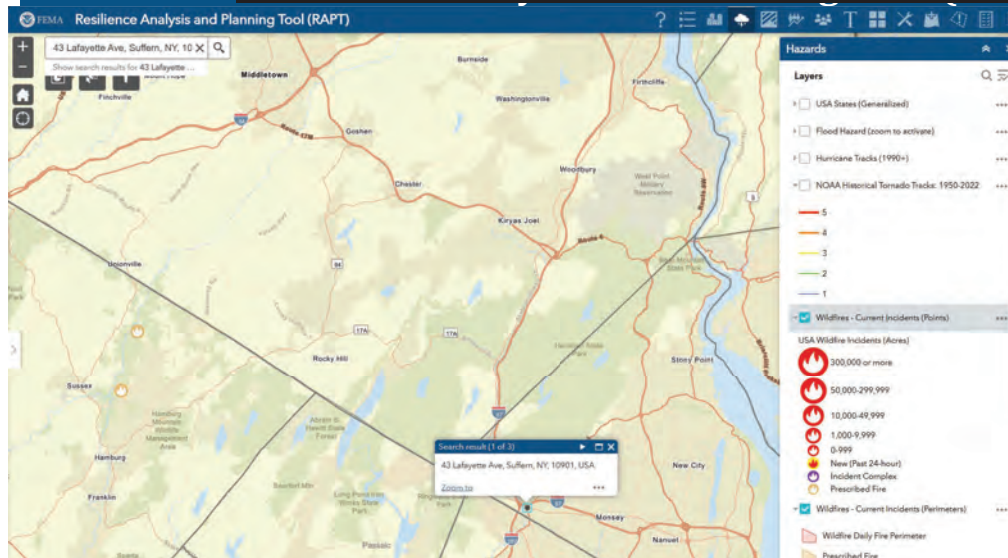
No further Action is required because the excavations are taking place in a building and they are limited in scope the following screenings will have very limited impact to the proposed remediation. Precipitation, Temperature, wildfire, drought, storm severity, landslides, and other hazards (seismic) are not applicable to this site's remedy. Flooding can always impact a property but due to municipal storm sewers it is not expected to affect the remedy. This property is not in a FEMA flood zone or in a coastal area so the likely hood of climate affecting the site is minimal. Wildfires are unlikely due to urban nature. But the nearest wildfires have been mapped according to the RAPT tool. Due to the hard bedrock underlaying the site there is a 2% chance in 50 years that the site will have peak acceleration which may affect the site according to RAPT tool.

CREAT Climate Change Scenarios Projection Maps





Resilience Analysis and Planning Tool (RAPT)



Potential Data Sources (not an exhaustive list)- from Superfund Climate Resilience: Vulnerability Assessment | US EPA

NYSERDA ClimAID report- Responding Climate Change in New York State (ClimAID) - NYSERDA
FEMA- National Flood Hazard Layer | FEMA.gov

NOAA- National Storm Surge Risk Maps - Version 3 (noaa.gov)

Department of Agriculture Forest Service Wildfire Risk to Communities

EPA Climate Change Indicators in the United States

EPA Climate Resilience Evaluation & Awareness Tool (CREAT) | U.S. Climate Resilience Toolkit

EPA National Stormwater Calculator

National Integrated Drought Information System U.S. Drought Portal

National Interagency Coordination Center National Interagency Fire Center

National Oceanic and Atmospheric Administration Coastal Services Digital Coast

- Resources to help communities assess coastal hazards, such as the Sea Level Rise Viewer for visualizing community-level impacts of flooding or sea level rise and downloadable LIDAR data

National Oceanic and Atmospheric Administration National Centers for Environmental Information website

National Oceanic and Atmospheric Administration Sea Level Trends

National Weather Service Climate Prediction Center

National Weather Service National Hurricane Center

National Weather Service Sea, Lake, and Overland Surges from Hurricanes (SLOSH)

National Weather Service Storm Surge Hazard Maps

U.S. Federal Government Climate Resilience Toolkit: The Climate Explorer

U.S. Army Corps of Engineers Climate Preparedness and Resilience

U.S. Geological Survey Coastal Change Hazards Portal

U.S. Geological Survey Landslide Hazards Program

U.S. Geological Survey National Ground-water Monitoring Network Data Portal

U.S. Geological Survey National Climate Change Viewer

U.S. Geological Survey National Water Dashboard

U.S. Geological Survey [StreamStats](#)

NYS Department of State- [Assess | Department of State \(ny.gov\)](#)

NYSERDA NY Coastal Floodplain Mapper- [Home Page \(ny.gov\)](#)

NYSDEC Coastal Erosion Hazards- [Coastal Areas Regulated By The CEHA Permit Program - NYDEC](#)

NYSDOH Heat Index- [health.ny.gov/environmental/weather/vulnerability_index/county_maps.htm](#)

Environmental Footprint Summary

Core Element	Metric	Unit of Measure	Footprint				Total
			Site Preparation	Excavation, Offsite Disposal, and Backfill	Post-Remediation Soil Vapor Intrusion Evaluation	Post-Remediation Groundwater Monitoring	
Materials & Waste	M&W-1	Refined materials used on-site	0.0	1.9	0.0	0.0	1.9
	M&W-2	% of refined materials from recycled or reused material		100.0%			100.0%
	M&W-3	Unrefined materials used on-site	0.000	45.000	0.000	0.000	45.0
	M&W-4	% of unrefined materials from recycled or reused material		0.0%			0.0%
	M&W-5	On-site hazardous waste disposed of off-site	0.0	45.0	0.0	0.0	45.0
	M&W-6	On-site non-hazardous waste disposed of off-site	0.0	0.0	0.0	0.0	0.0
	M&W-7	Recycled or reused waste	0.0	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused		0.0%			0.0%
Water (used on-site)	W-1	Public water use	0.0	0.0	0.0	0.0	0.0
	W-2	Groundwater use	0.0	0.0	0.0	0.0	0.0
	W-3	Surface water use	0.0	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	0.0	0.0	0.0	0.0	0.0
	W-5	Storm water use	0.0	0.0	0.0	0.0	0.0
	W-6	User-defined water resource #1	0.0	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	0.0	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	0.0	0.0	0.0	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	5.0	236.9	1.1	1.1	244.0
	E-2	Energy voluntarily derived from renewable resources					
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	0.000	0.149	0.006	0.015	0.2
	A-1	On-site NOx, SOx, and PM emissions	0.0	82.0	0.0	0.0	82.0
	A-2	On-site HAP emissions	0.0	0.0	0.0	0.0	0.0
Air	A-3	Total NOx, SOx, and PM emissions	5.3	276.5	5.0	2.9	289.7
	A-3A	Total NOx emissions	4.9	211.1	1.4	0.9	218.3
	A-3B	Total SOx emissions	0.3	30.5	3.1	1.7	35.7
	A-3C	Total PM emissions	0.2	34.8	0.5	0.3	35.7
	A-4	Total HAP emissions	0.1	3.1	0.4	0.2	3.7
	A-5	Total greenhouse gas emissions	0.4	18.6	0.1	0.1	19.1
Land & Ecosystems			Qualitative Description				

* Total greenhouse gases emissions (in CO₂e) include consideration of CO₂, CH₄, and N₂O (Nitrous oxide) emissions.

"MMBtu" = millions of Btus

"MG" = millions of gallons

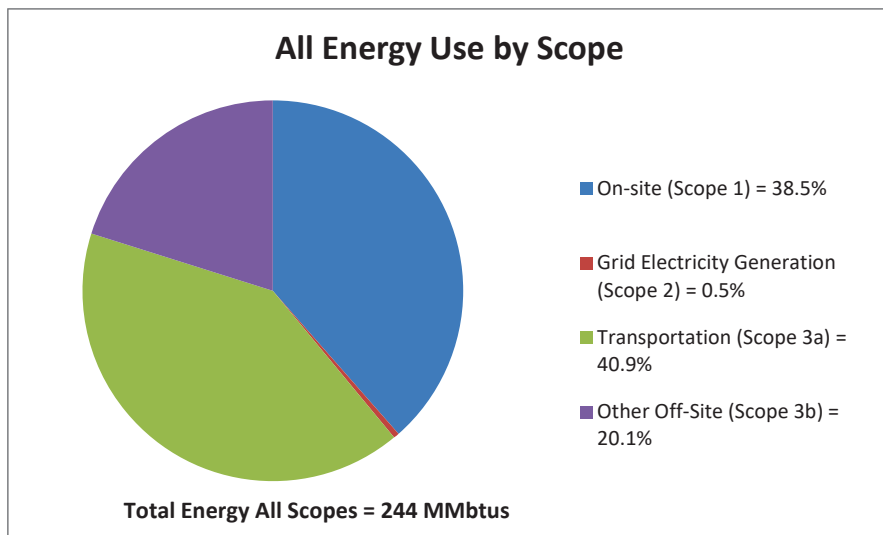
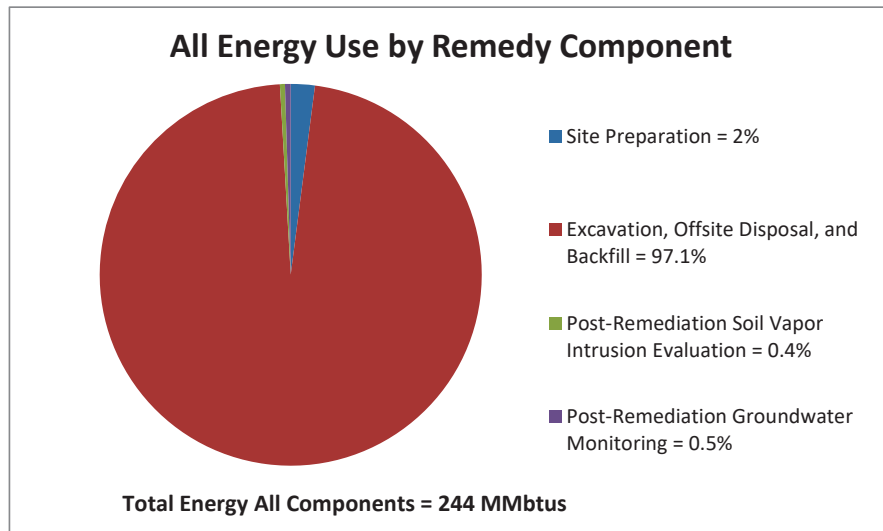
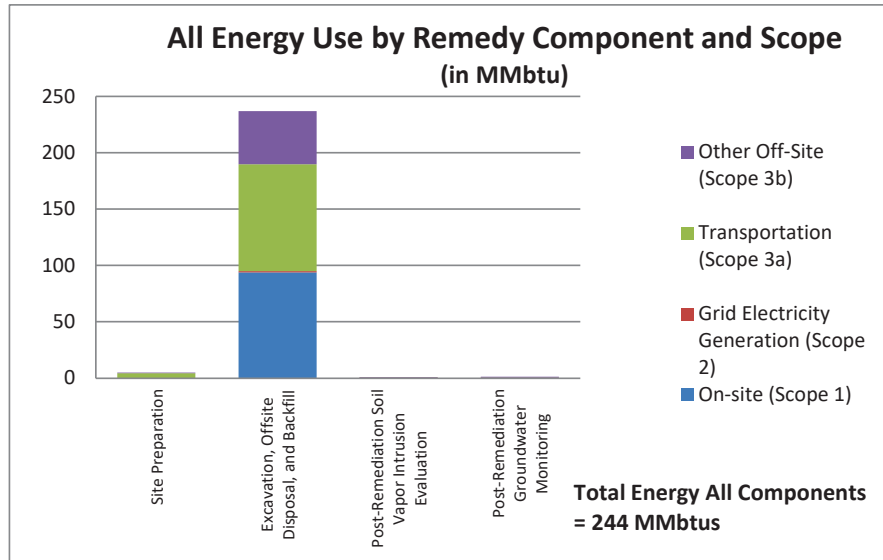
"CO₂e" = carbon dioxide equivalents of global warming potential

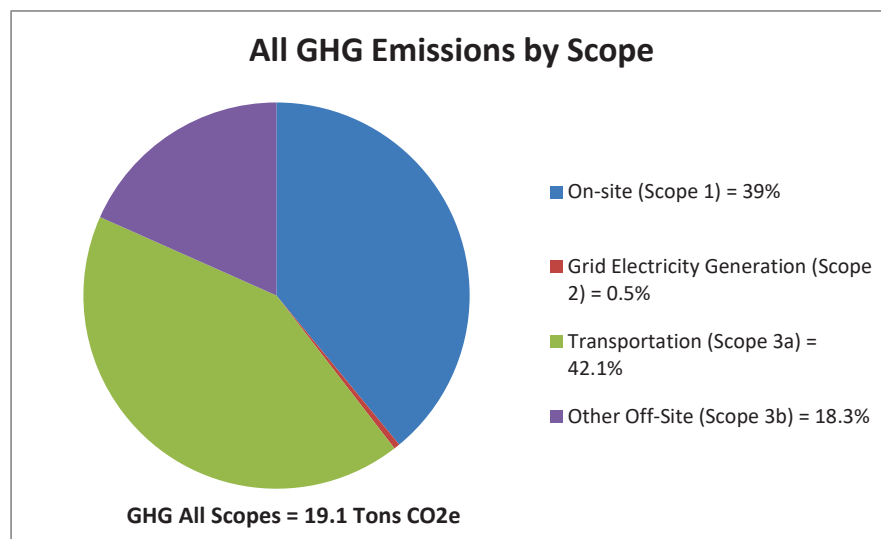
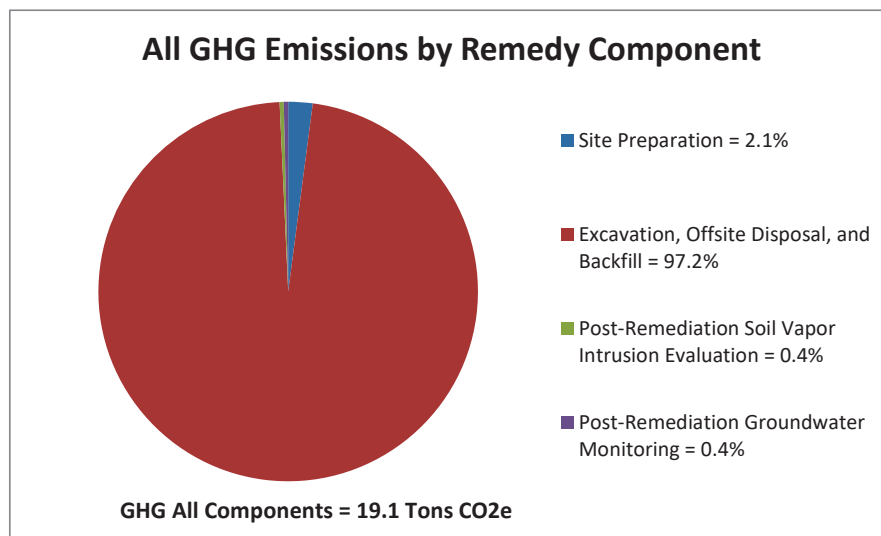
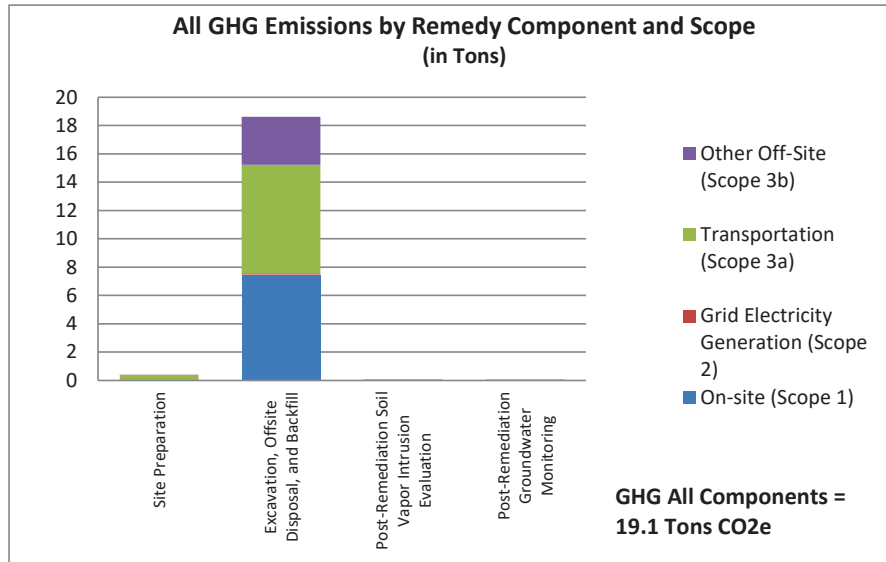
"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)

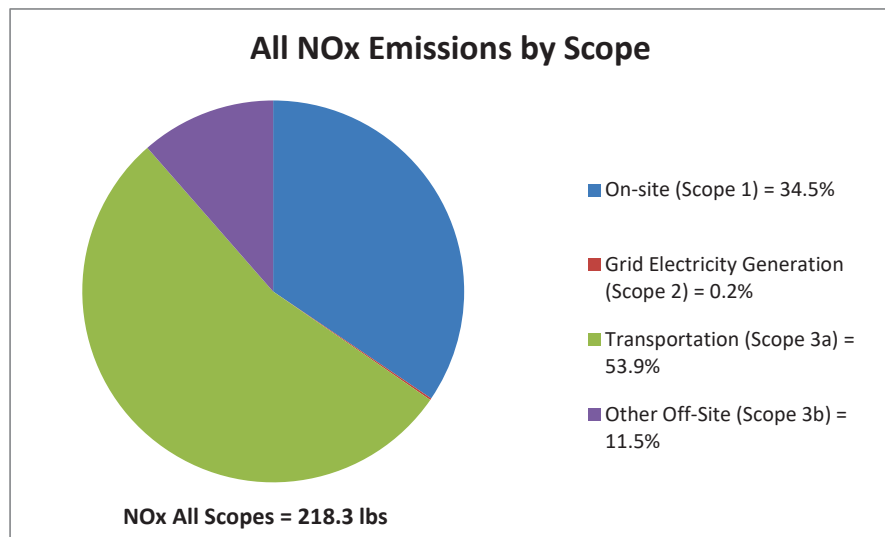
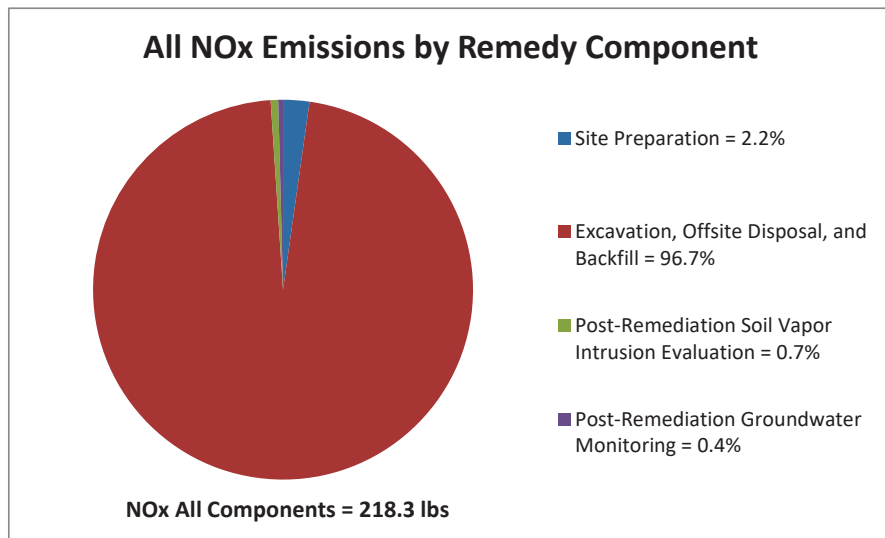
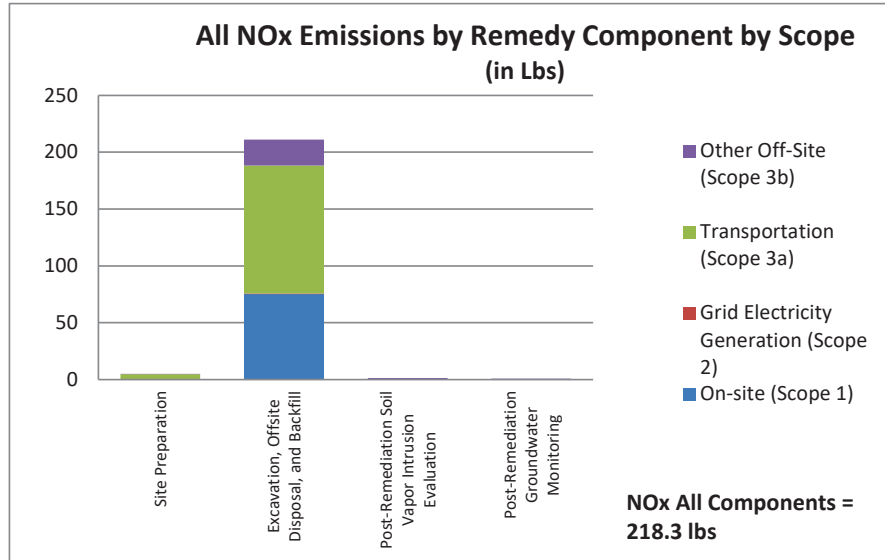
"Tons" = short tons (2,000 pounds)

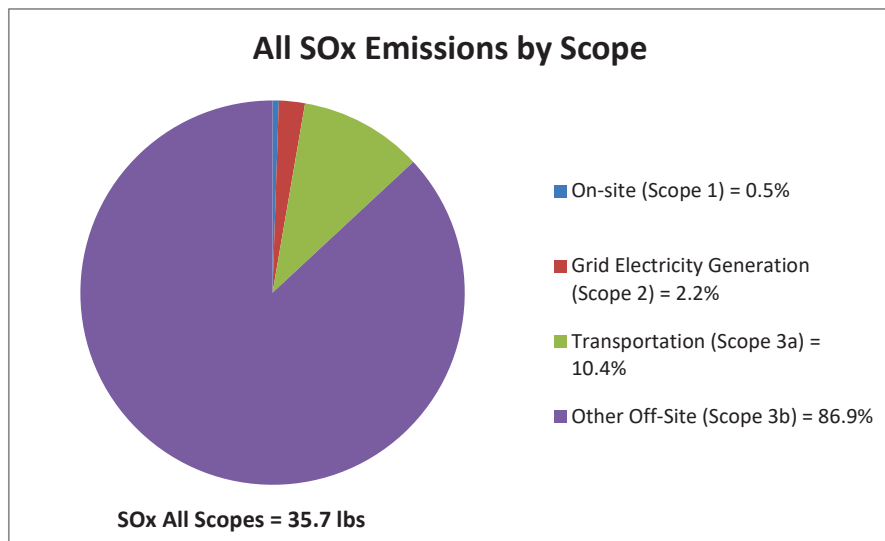
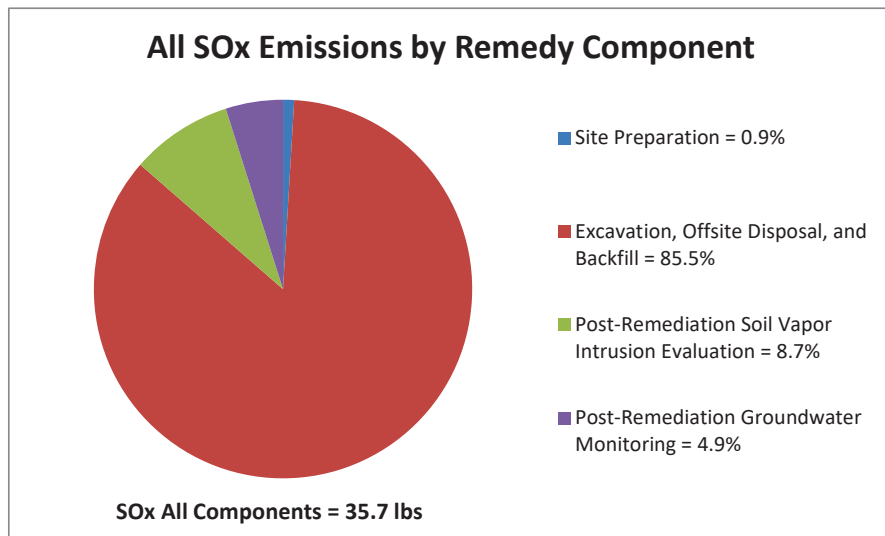
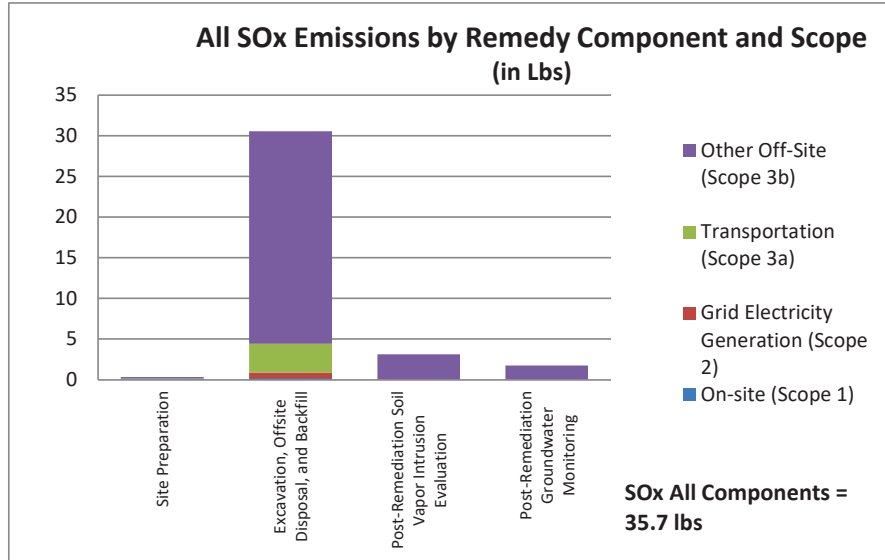
The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

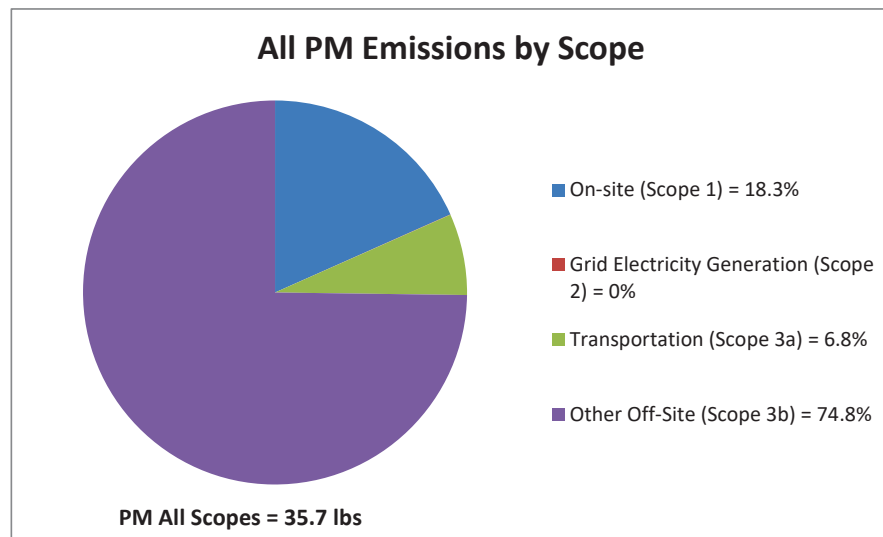
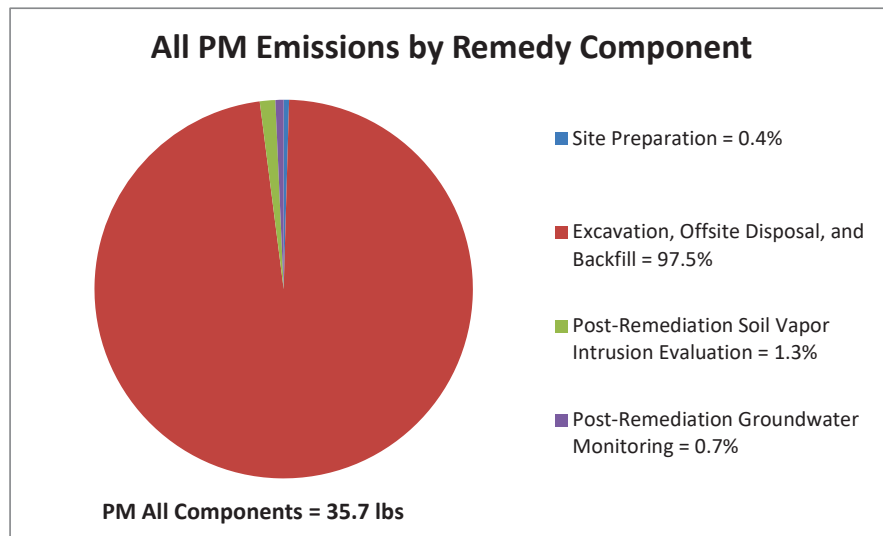
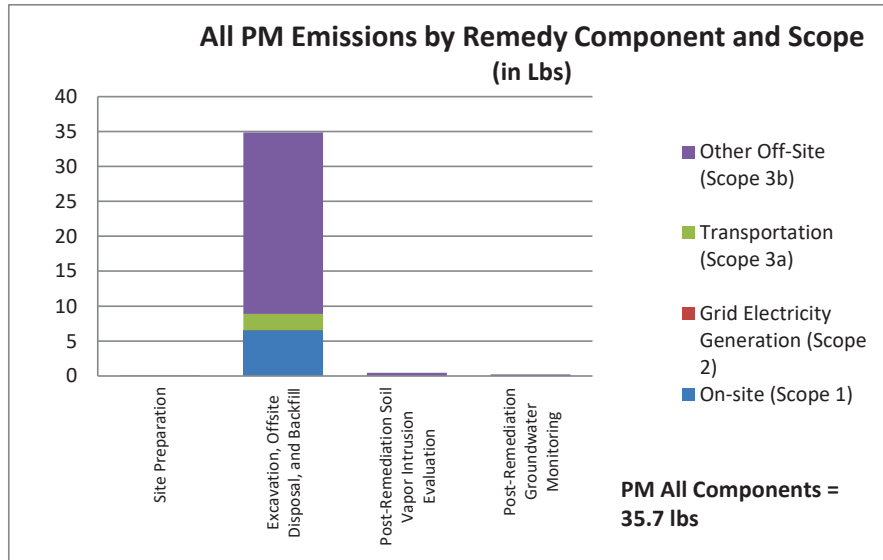
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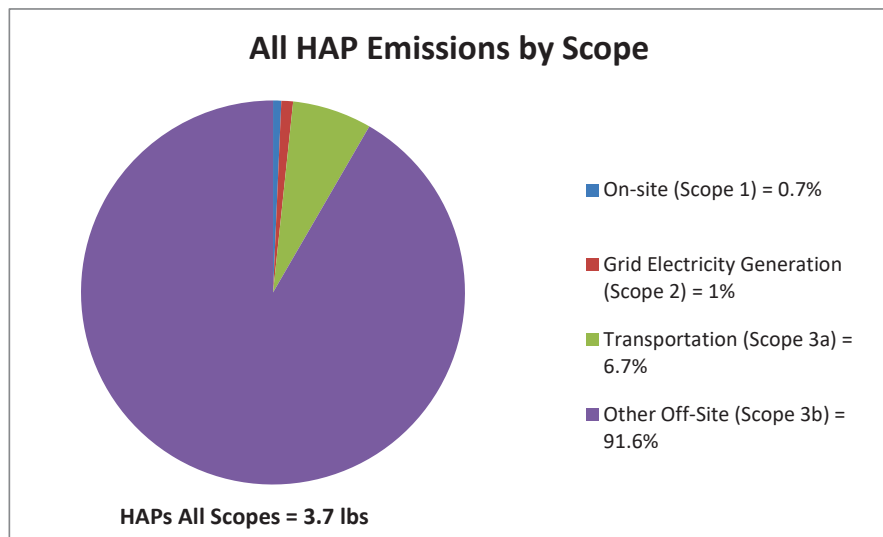
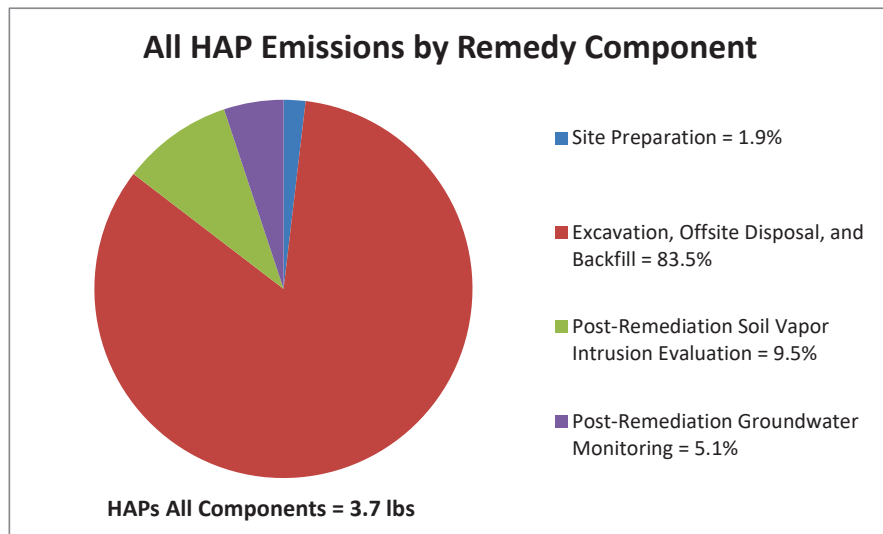
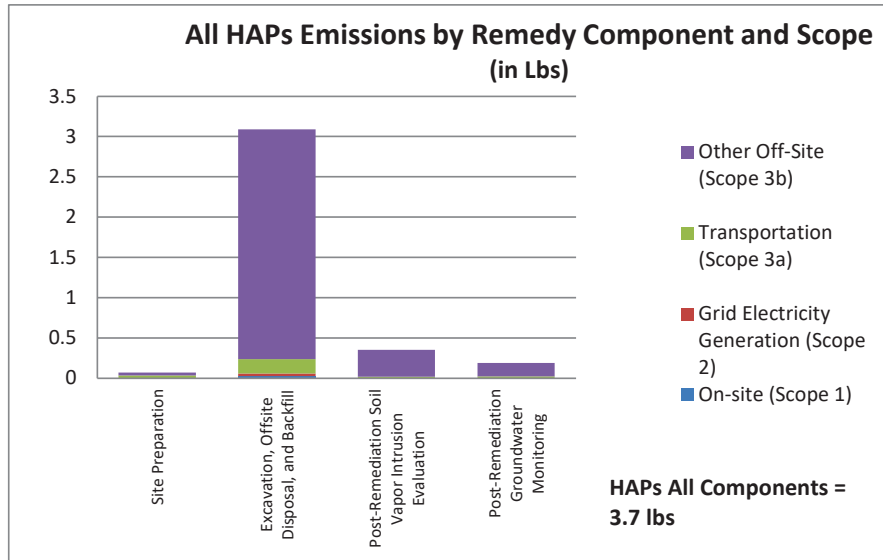












APPENDIX J
KEY PERSONNEL RESUMES'





Environmental Consulting and Management Services

10 Filmont Drive
New City, NY 10956

Tel: 845-638-0640
Cell: 914-523-1523
info@ecmsny.com

Harry Sudwischer, Curriculum Vitae

Senior Project Manager, Director of Remediation and Spills

Qualified: B.S., Earth Science, State University of New York, in New Paltz, New York (concentrations in Geology, Hydrogeology and Adolescent Education), 2007

Professional Registrations: Qualified Environmental Professional: NY; Applying for Professional Geologist(NY); Asbestos Project Monitor (Expired) – New York State, 40-hour OSHA HAZWOPER

Professional Summary: Mr. Sudwischer has over 16 years of experience primarily in environmental investigation and remediation at sites throughout the Mid-Atlantic Region, specializing in New York and Connecticut. His additional experience includes due diligence investigations and environmental baseline assessments, managing the environmental liability on a grander scale for more than 100 active remediation sites and, water supply projects. He has a history of working as a team with all parties including builders, architects, regulators, owners, responsible parties, and other professionals involved to ensure each project is completed to attain the site goals. Wherever possible, Mr. Sudwischer has employed site conceptual models and innovative technologies to streamline the path to site regulatory closure and permit approval.

Senior Project Manager

NYC Hotel Demolition/Redistricting | Confidential Client | New York City, NY

On behalf of a confidential attorney who represented a group opposed to demolition of historic hotel in Manhattan reviewed documents that assessed with change of use for area, geotechnical suitability, for high rise construction, and hazardous materials aspects of an EA under CEQR. Identified potential economic, and hazardous materials issues that were not identified in the documents reviewed.

Project Manager

Chlorinated Solvents Remediation| Confidential Client | Voluntary Cleanup | Brooklyn, NY

Manager for a Voluntary Cleanup Program (VCP) site in New York. The project involved the investigation of soil, water, groundwater, soil vapor, and indoor air to complete a Remedial Investigation. Conducted installation of Air sparge and Soil Vapor Extraction treatment system to treat and depressurize the sub slab. Directed the Monitoring, Operations, and maintenance for system as part of the NYSDEC VCP program.

Project Monitor

Asbestos Abatement Oversight | Confidential New York State Public School

Managed abatement of asbestos-containing materials from an entire New York State Public School District. Public interface for the District. I dealt with district employees, parents, and general public to establish understanding of the safety procedures involved in asbestos abatement. I conducted other various site inspections at commercial, and municipal properties in New York State.

Field Geologist

Sanitary Sewer Investigations | City of Yonkers

Investigated contamination between sanitary and storm sewers throughout the City of Yonkers. My responsibilities included interface for the NYS Office of Attorneys General. During the project I canvassed neighborhoods to coordinate dye tests and video investigations of private sewer connections. I conducted over 500 tests at individual residences, commercial business, apartment complexes, and outfalls into the Bronx River.



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Harry Sudwischer, Curriculum Vitae

**Environmental Project Manager, Field Geologist
Petroleum Remediation | Getty Realty Portfolio |
NYSDEC Stipulation Agreement(s) / Order on
Consent(s) | New York / Connecticut Metro Area**

Project Manager/Field oversight for remediation at more than 100 sites. Oversaw Directed groundwater, soil, air sampling at petroleum storage facilities to document conditions and comply with regulations. Implemented site assessments, remedial activities, and emergency response activities at commercial and industrial properties across New York/ Connecticut, impacted by petroleum hydrocarbons, and chlorinated solvents. During State/County regulator site inspections & conferences communicate work plans and progress updates to ensure regulatory expectations are met. Collect, evaluate, summarize and interpret laboratory data to: prepare geologic cross-sections, generate well/boring logs and write tank closure reports spill closure, No further Action letters, Monthly, quarterly, semi-annual, annual monitoring reports, subsurface investigation reports, Misc. regulatory reports, generating AutoCad drawings for site assessments, remedial investigations, conclusions and recommendations. During site work supervise and direct technicians, drill crews, excavation crews, subcontractors, and other professionals. Conduct third-party oversight to ensure/confirm the client expectations are being met by other responsible parties. Managed remedial system design, managed remedial permitting associated with installation and system operation. Managed operation and maintenance program for multiple remedial systems; responsible for data evaluation, system optimization, and regulatory compliance. Managed and directed site investigation activities including installation of groundwater monitoring and soil vapor monitoring points within client owned properties, third party owner properties, and public right of ways. Managed underground storage tank removals, excavation of impacted soils, and waste management activities. Directed the Collection of samples at residential and commercial potable water treatment systems for Served as point of Contact for NYSDEC/ NYSDOH compliance. Point of contact with multiple regulatory agencies including NYSDEC, Westchester County Department of Health, and Rockland County Department of Health & NYSDOH.

**Staff Scientist, Sanitarian
Compliance Inspections | NYSDEC,
Region 3 | Petroleum Bulk Storage Inspections |
Lower Hudson Valley, NY**

Conducted Regulatory Compliance inspections as a subcontractor to NYSDEC for Petroleum Bulk Storage (PBS) tanks in Sullivan, Dutchess, Orange and Putnam Counties on behalf of the NYSDEC. Performed inspections, Issued Notices of Violation on behalf of the NYSDEC, Sat in on Notice of violation conferences for inspected facilities.

**Senior Project Manager
Miscellaneous Vapor Intrusion
Investigations | Several Confidential Clients |
New York State and New York City**

Conducted various vapor intrusion studies at more than a dozen properties in the five boroughs and in greater NYS. All investigations have been conducted in accordance with the NYSDOH guidance in an attempt to identify evaluate and mitigate/remediate properties according to site specific circumstances.

Work History

2018-Present	Senior Project Manager, Director of Remediation and Spills, Environmental Consulting & Management Services, Inc. New City, NY
2017 – 2018	Senior Project Manager, Project Professional, Antea Group USA, Inc.
2010 – 2017	Environmental Project Manager, Field Geologist, Environmental Scientist Tyree Environmental, Corp and T-Env, Inc. Brookfield, CT
2009 – 2010	Staff Scientist, YEC, Inc. Valley Cottage, NY
2008 – 2009	High School, Science Teacher, Clarkstown Central School District, Clarkstown, NY
2006 – 2008	Project Monitor, Field Industrial Hygienist, Project Manager Environmental Consulting & Management Services, Inc. New City, NY