1770 JEROME AVENUE

BRONX, NEW YORK

INTERIM REMEDIAL MEASURE WORK PLAN

AKRF Project Number: 241375
BCP Site Number: C203185

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LIST OF ACRONYMS

Acronym	Definition
AGVs	NYSDOH Air Guideline Values
AWQSGVs	Ambient Water Quality Standards and Guidance Values
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CAMP	Community Air Monitoring Plan
CCR	Construction Completion Report
CPP	Citizen Participation Plan
CoC	Chain of Custody
C of O	Certificate of Occupancy
CVOCs	Chlorinated Volatile Organic Compounds
DD	Decision Document
DER-10	Division of Environmental Remediation Technical Guide 10
DOT	Department of Transportation
EPA	United States Environmental Protection Agency
EAS	Environmental Assessment Statement
ESA	Environmental Site Assessment
FER	Final Engineering Report
GAC	Granular Activated Carbon
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
HPD	Housing Preservation and Development
HVAC	Heating, Ventilation, and Air-conditioning
IA	Indoor Air
IDW	Investigation Derived Waste
IRM	Interim Remedial Measures
IRMWP	Interim Remedial Measure Work Plan
mg/kg	milligrams per kilogram
NAVD	North American Vertical Datum
NY	New York
NYC	New York City
NYCRR	New York Codes, Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OER	NYC Mayor’s Office of Environmental Remediation
OM&M	Operation, Maintenance, and Monitoring
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethylene
PFAS	Per- and polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PID	Photoionization detector
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QHHEA	Qualitative Human Health Exposure Assessment

Acronym	**Definition**
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
ROI	Radius of Influence
RRGV	Residential Use Guidance Value
RRSCOs	Restricted Residential Soil Cleanup Objectives
SB	Soil Boring
SF	Square foot
SMP	Site Management Plan
SSD	Sub-slab Depressurization
SSDS	Sub-Slab Depressurization System
SV	Soil Vapor
SVOCs	Semivolatile Organic Compounds
TAL	Target Analyte List
TCE	Trichloroethylene
TW	Temporary Well
USGS	United States Geological Survey
UUGV	Unrestricted Use Guidance Value
UUSCOs	Unrestricted Use Soil Cleanup Objectives
VEC	Vapor Encroachment Condition
VOCs	Volatile Organic Compound
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter

1.0 INTRODUCTION

This Interim Remedial Measure (IRM) Work Plan (IRMWP) has been prepared by AKRF, Inc. (AKRF) on behalf of Jerome 1770 MM LLC (the "Applicant") for the 1770 Jerome Avenue Site, located in the Bronx, New York, hereafter referred to as the "Site." The approximately 15,831-square foot Site is located in the Morris Heights section of the Bronx, New York, and is identified on the New York City (NYC) tax map as Block 2580, Lot 9. The Applicant applied for acceptance into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) as a Volunteer concurrently with submission of this IRMWP, and anticipates implementing this IRMWP upon acceptance into the BCP. A Site location map is provided on Figure 1. The proposed BCP Site boundaries are shown on the Site Plan, Figure 2.

The Site contains an E-Designation for hazardous materials and is listed in the NYC Department of City Planning E-Designation database as E-442. E-442 was established following the review of an Environmental Assessment Statement (EAS) prepared to satisfy the requirements of the City Environmental Quality Review for the Jerome Avenue rezoning.

A Remedial Investigation Report (RIR) to satisfy the BCP has not be prepared for the Site yet; however a Remedial Investigation (RI) was conducted by AKRF in July 2024 in accordance with the predevelopment requirements of the NYC Mayor's Office of Environmental Remediation (OER). Based on an evaluation of the data and information from the August 2024 RI report, there is solvent-related volatile organic compound (VOC) contamination present in soil vapor and indoor air at the Site. The previous Site environmental investigations, summarized further in Section 3.0, are sufficient to delineate the nature and extent of the soil vapor contamination at the Site for the purposes of the proposed IRM. A full RI will be scoped [with submission of a RI Work Plan (RIWP)] and implemented after the Applicant's acceptance into the BCP.

This IRMWP has been prepared to address the soil vapor concentrations that warrant mitigation until a Site-wide remedy can be developed and implemented pursuant to a NYSDEC-approved Remedial Action Work Plan (RAWP). This IRMWP includes a preliminary design to retrofit the existing Site building with a sub-slab depressurization system (SSDS), sub-slab vapor communication testing to determine design criteria for a final IRM SSDS design, and final design and installation of an IRM SSDS. An SSDS Design Document will be submitted to NYSDEC with the full details of the proposed IRM SSDS after completion of the sub-slab vapor communications/diagnostic evaluation. The purpose of the IRM SSDS is to create negative pressure (vacuum) beneath the existing Site building to mitigate the potential for soil vapor intrusion.

The Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP), provided as Appendix A and B, respectively, will be implemented during activities outlined in this IRMWP. The quality assurance/quality control (QA/QC) protocol detailed in the Quality Assurance Project Plan (QAPP), provided as Appendix B, will be adhered to for the fieldwork and sampling described in the following sections.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description and Surrounding Land Use

The Site is located in the Morris Heights section of the Bronx, New York, and is identified as Block 2580, Lot 9 on the NYC Tax Map. Currently, the Site is improved with a one-story 'L'-shaped retail building with a full cellar (approximately 8 feet below sidewalk grade) and rear courtyard (approximately 4 feet above sidewalk grade). The cellar beneath the existing building is separated into individual storage spaces under each corresponding retail tenant space. The building is occupied by nine commercial tenants, each with a separate cellar space. The six units located along Jerome Avenue contain the following tenants: Africa Unity Meat V. Corp Supermarket, Jerome Family Health Center, China Star Chinese Food Restaurant, Neighborhood Pharmacy, a retail space under renovation for a new juice bar, and a check cashing store. Three additional retail spaces located along East 176th Street include a plants and religious goods store known as Botanica Santa Ana, the Iglesia De Dios church, and the Altagracia Grocery Corp. (currently vacant). The Site location is shown on Figure 1 and the Site boundary and existing Site features are shown on Figure 2.

The Site is generally bounded by Jerome Avenue and the elevated NYC Metropolitan Transportation Authority #4 subway line to the west, by East 176th Street to the north, by residential properties to the east and by commercial properties to the south. The greater surrounding area is primarily residential with some commercial and institutional uses.

2.2 Site Geology, Hydrogeology, and Subsurface Characteristics

Based on the United States Geological Survey (USGS), Central Park, New York 2019 Quadrangle map, the Subject Property is approximately 44 feet above the North American Vertical Datum (NAVD) of 1988 (an approximation of mean sea level), with the general topographic gradient sloping east-northeast. During the OER RI field activities, groundwater was measured in the temporary monitoring wells at depths ranging from 7 to 11 feet below sidewalk grade or about 2.5 to 3 feet below the cellar slab. Groundwater in the Bronx is not used as a potable source and there are no surface water bodies on or immediately adjacent to the Site. The nearest body of water is the Harlem River located 0.68 miles west of the Site.

The stratigraphy beneath the Site consists of historic fill material (including sand, silt, gravel, brick, concrete, wood, glass, roots, and ash) to the terminus of prior borings advanced up to a depth of 15 feet. Bedrock was not encountered during the RI investigation.

2.3 Site History and Previous Owners

Based on AKRF's June 2024 Phase I ESA, the Site was formerly used as laundry and cleaners, custom printing establishments, T.V., radio and phonograph repair, appliance repair shop, and an auto parts corporation.

City directory listings for the Site identified in the Phase I ESA included: Concourse Self Service Laundry in 1961 and 1965 and Arrow Vacuum Cleaner Co. at 8 East 176th Street; Carmel Cleaners in 1949 at 10 East 176th Street; United Nation Hand Laundry in 1949 and Fordham Typesetters in 1961 and 1965 at 12 East 176th Street; Geronimo Auto Parts Corp. between 1976 and 1993 at 1772 Jerome Avenue; Rothnagel H Clng & Dyeing in 1927, Wasserman Simon Printer, Artype Press, Printrite Shop The Printing, Artype Press and Z R J & E Printing Corp. between 1965 and 1993 at 1778 Jerome Avenue; Alpert A & Son Hardware Paints in 1927 at 1788 Jerome Avenue and SU-EL Cleaners Corp. between 1961 and 1976 at 1794 Jerome Avenue.

2.4 Proposed Development

The Applicant has applied to enter into the BCP as a Volunteer. Entry into the BCP would facilitate the remediation and redevelopment of the Site into a new affordable senior housing residential building. The Applicant acquired the Site in October 2024 and intends to install the IRM SSDS beneath the current building while redevelopment plans for the Site are advanced and the Site is further investigated under the BCP. The proposed redevelopment plans include demolition of the existing building, followed by removal and filling in the existing cellar and excavation in the rear courtyard between approximately 5 to 8 feet below existing grade to facilitate construction of a new affordable senior housing residential building with slab-on grade construction. The rear courtyard is approximately 4 feet above sidewalk grade.

2.5 Proposed Project Schedule

Based on the proposed project schedule detailed in Section 7.0, an IRM is required to mitigate the soil vapor concentrations and the potential for vapor intrusion into the existing on-site building. Subject to the Applicant's acceptance into the BCP in the first quarter of 2025, the conceptual IRM SSDS design, described in this IRMWP, will undergo an engineering evaluation in April 2025, the design will be finalized in May 2025, and the system will be subsequently installed and operational as soon thereafter as is practicable. The IRM SSDS will run 24 hours a day, 7 days a week, 365 days a year until a NYSDEC-approved RAWP can be implemented. Alternatively, if the building is vacated the NYSDEC would be contacted and the IRM SSDS would be turned off.

3.0 PREVIOUS ENVIRONMENTAL REPORTS

Phase I Environmental Site Assessment, 1770 Jerome Avenue, Bronx, NY, AKRF, Inc., June 2024

AKRF prepared a Phase I Environmental Site Assessment (ESA) of 1770 Jerome Avenue, Bronx, New York. The findings are presented below:

Recognized Environmental Condition (RECs)/ Vapor Encroachment Condition (VECs)

- City directory listings for the Site included: Concourse Self Service Laundry in 1961 and 1965 and Arrow Vacuum Cleaner Co. at 8 East 176th Street; Carmel Cleaners in 1949 at 10 East 176th Street; United Nation Hand Laundry in 1949 and Fordham Typsetters in 1961 and 1965 at 12 East 176th Street; Geronimo Auto Parts Corp. between 1976 and 1993 at 1772 Jerome Avenue; Rothnagel H Clng & Dyeing in 1927, Wasserman Simon Printer, Artype Press, Printrite Shop The Printing, Artype Press and Z R J & E Printing Corp. between 1965 and 1993 at 1778 Jerome Avenue; Alpert A & Son Hardware Paints in 1927 at 1788 Jerome Avenue and SU-EL Cleaners Corp. between 1961 and 1976 at 1794 Jerome Avenue. These operations may have affected the subsurface.
- Certificates of Occupancy (C of O) from 1948, 1965, 1998 and 1999 indicated the Site building was utilized as a factory (laundry), custom printing establishments, T.V., radio and phonograph repair, and an appliance repair shop. These operations may have affected the subsurface.
- The surrounding area was developed with primarily residential and commercial uses, as well as some auto-related uses (auto repair, garages, filling stations, and used auto sales), dry cleaning, manufacturing, oil and boiler companies, a grinding shop and transportation-related uses (an elevated subway line west-adjacent to the Site). The regulatory database search identified proximal facilities that have some potential to have affected the Site subsurface, including spill listings, Resource Conservation and Recovery Act (RCRA) facilities, historical auto repair facilities, and/or historical dry cleaners.
- Per- and polyfluoroalkyl substances (PFAS) may have been used in historical on-site manufacturing processes (e.g., printing establishments identified on the February 1965 C of O and the 1778 Jerome Avenue City Directory listing).
- An area of petroleum-like staining was observed on the wall and areas of patched concrete, potentially former drain areas, were observed on the floor in the cellar of the Check Cashing tenant space during the site reconnaissance. Of note, during the Phase I ESA, this was identified as a Business Environmental Risk however, upon further professional review, it was decided that it is best categorized as a REC instead.

Remedial Investigation Report, 1770 Jerome Avenue, Bronx, New York, AKRF, Inc., August 2024

AKRF completed an RI of the Site in August 2024 according to the OER-approved July 2024 RIWP with the exception of the number of soil borings and soil samples.

The RIWP included:

- A ground-penetrating radar (GPR) geophysical survey across all accessible areas of the Site to investigate for the presence of potential UST that were not identified during the Phase I ESA and for potential utilities in proposed drilling areas.
- Advancement of nine test borings at the Site with the collection and chemical analysis of 13 soil samples.
- Installation and sampling of three soil vapor points in the courtyard and four sub-slab soil vapor points beneath the cellar floor with collection of seven soil vapor samples, four co-located indoor air samples, and one ambient (outdoor) sample. Prior to sample collection within the building, a product

inventory/building questionnaire was completed to document existing conditions and equipment/material storage.

- Four temporary groundwater monitoring wells were advanced at the Site with the collection of four groundwater samples.

The RIWP proposed that AKRF would advance one soil boring (SB-05) inside the Church tenant space located to the east of the Botanica Santa Ana space on East 176th Street. However, this location was relocated to the Botanica Santa Ana space due to the presence of a ceramic tile floor in the Church cellar. Soil boring SB-09 was already proposed within the Botanica Santa Ana space and due to the proximity of the relocated SB-05 and the proposed SB-09, SB-09 was not advanced.

The results of the investigation were:

1. Depth to groundwater at the Site ranges from approximately 7 to 11 feet below sidewalk grade or roughly 2.5 to 3 feet below the cellar slab.
2. Stratigraphy at the Site consists of historic fill material (including sand, silt, gravel, brick, concrete, wood, glass, roots, and ash) to the terminus of each boring up to a depth of 15 feet.
3. The geophysical survey did not identify any anomalies consistent with USTs at the Site.
4. Twelve soil samples were collected for laboratory analysis from soil borings SB-01 through SB-08.
   a. One VOC, acetone, was detected at a concentration exceeding its respective Unrestricted Use Soil Cleanup Objectives (UUSCO) in one sample [maximum 0.08 milligrams per kilogram (mg/kg)]. No VOCs were detected above their respective Restricted Residential Soil Cleanup Objectives (RRSCOs).
   b. Six semi-volatile organic compounds (SVOCs) were detected at concentrations exceeding their UUSCOs and/or RRSCOs in up to two samples: benzo(a)anthracene (max. 1.2 mg/kg), benzo(a)pyrene (max. 1.3 mg/kg), benzo(b)fluoranthene (max. 1.9 mg/kg), benzo(k)fluoranthene (max. 0.84 mg/kg), chrysene (max. 1.4 mg/kg), and indeno(1,2,3-c,d)pyrene (max. 0.76 mg/kg). These SVOC exceedances were limited to polycyclic aromatic hydrocarbons, a class of SVOCs commonly found in urban fill material, and are consistent with the material observed in the subsurface at the Site.
   c. Five metals were detected at concentrations exceeding their UUSCOs and/or RRSCOs in up to seven samples: barium (max. 747 mg/kg), lead (max. 396 mg/kg), mercury (max. 0.39 mg/kg), nickel (30.2 mg/kg), and zinc (max. 893 mg/kg).
   d. Polychlorinated bipheyls (PCBs) were not detected above laboratory detection limits in any of the samples analyzed.
   e. Three pesticides were detected above UUSCOs, but below RRSCOs in two samples: P,P’-DDD (max. 0.023 mg/kg), P,P’-DDE (max. 0.011 mg/kg), and P,P’-DDT (max. 0.045 mg/kg).
   f. One PFAS compound, perfluorooctanesulfonic acid (PFOS), was detected in the one sample collected at a concentration of 1.18 micrograms per kilogram (µg/kg), above its Unrestricted Use Guidance Value (UUGV) of 0.88 µg/kg but below the respective Residential Use Guidance Value (RRGV).

   The SVOCs, metals, and pesticides detected in soil, above the UUSCOs and/or RRSCOs appear to be attributable to urban fill. The presence of the VOC acetone is likely attributable to laboratory contamination and not associated with a source of on-site contamination. The presence of PFOS could be attributable to former historic business that operated at the Site; however, based on the soil data obtained during this investigation, there is insufficient data to determine if there is a source of contamination which may be contributing to the elevated PFAS levels identified in groundwater.

5. Four groundwater samples were collected for laboratory analysis from temporary monitoring wells, TW-01 through TW-04, as part of the RI.

   a. Two VOCs, methyl ethyl ketone (2-butanone) and tetrachloroethylene (PCE), were detected above their Class GA Ambient Water Quality Soil Guidance Value (AWQSGVs). Methyl ethyl ketone (2-butanone) was detected in one sample (TW-01_20240723) at a concentration of 80 micrograms per liter (µg/L), above its AWQSGV of 50 µg/L. PCE was detected in one sample (TW-02_20240724) at a concentration of 5.1 µg/L, above its AWQSGV of 5.0 µg/L.

   b. One SVOC, dimethyl phthalate, was detected at a concentration of 61 µg/L, above its AWQSGV of 50 µg/L in one sample (TW-04_20240723).

   c. Three metals (iron, manganese, and sodium) were detected in both the unfiltered (total) and filtered (dissolved) samples. In the unfiltered (total) samples, iron ranged from 1,370 to 10,500 µg/L, above its AWQSGV of 300 µg/L in three samples but did not exceed its AWQSGV in the filtered (dissolved) samples. Manganese was detected at concentrations ranging from 319 to 842 µg/L in two unfiltered (total) samples, and at a concentration of 791 µg/L in the one filtered (dissolved) sample, above its AWQSGV of 300 µg/L. Sodium was detected at concentrations ranging from 47,500 to 515,000 µg/L in four unfiltered (total) samples, and between 45,100 and 546,000 µg/L in the filtered (dissolved) samples, above its AWQSGV of 20,000 µg/L.

   d. No PCBs or pesticides were detected above their respective AWQSGVs.

   e. Two PFAS compounds were detected at concentrations above its guidance values. PFOS was detected ranging from 35 to 733 ng/L, above its PFAS Screening Level of 2.7 ng/L, and perfluorooctanoic acid (PFOA) was detected ranging from 34.3 to 39.6 ng/L, above its PFAS Screening Level of 6.7 ng/L.

   VOCs, SVOCs, and metals were detected in groundwater above Technical & Operational Series (TOGS) Ambient Water Quality Standards and Guidance Values (AWQSGVs) and PFOS and PFOA were detected above the PFAS guidance values. The detections of SVOCs and metals in groundwater above the AWQSGVs, may be attributed to urban fill or soil entrained in the sample; however, the presence of the VOC PCE and PFAS may be attributable to an unidentified on-site or off-site source(s).

6. Seven soil vapor and four co-located indoor air samples were collected for laboratory analysis as part of this RI.

   a) Over 40 VOCs were detected in one or more of the soil vapor or indoor air samples including: 1,1,1,-trichloroethane, 1,2,4-trichlorobenzene, 1,2,4-trimethylbenzene, 1,2-dichloropropane, 1,2-dichlorotetrafluorethane, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,3-dichlorobenzene, 1,3-butadiene, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,4-dichlorobenzene, 2,2,4-trimehtylpentane, 2-hexanone, 4-ethyltoluene, acetone, benzene, butane, carbon disulfide, carbon tetrachloride, chlorodifluoromethane, chloroform, chloromethane, chlorobenzene, benzyl chloride, cis-1,2-dichloroethylene, cis-1,3-dichloropropene, cyclohexane, cymene, dibromohloromethane, dichlorodifluoromethane, ethylbenzene, hexachlorobutadiene, isopropanol, isopropylbenzene, m,p-xylenes, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, n-butylbenzene, n-heptane, n-hexane, n-propylbenzene, o-xylene, styrene, tert-butyl methyl ether, sec-butylbenzene, methyl methacrylate, tert-butyl alcohol, PCE, toluene, trichloroethylene (TCE), trichlorofluoromethylene, trans-1,2-dichloroethene, trichlorofluoromethane, ranging from 0.11 to 10,000 micrograms per cubic meter (µg/m^3) from a diluted analysis.

b) A comparison of the soil vapor and indoor air results to the NYSDOH Soil Vapor/Indoor Air Matrix values indicates that mitigation is warranted due to the presence of PCE, TCE, and cis-1,2-dichloroethylene in soil vapor sample SV-07 at 10,000 µg/m^3, 530 µg/m^3, and 210 µg/m^3, respectively.

The chlorinated VOCs (CVOCs) and petroleum-related compounds detected in the soil vapor samples were not detected in soil samples; however, when combined with Site/area history, may be attributable to an unidentified on-site or off-site source(s). A summary of the soil vapor and indoor air detections for VOCs is provided on Figure 3.

4.0 NATURE AND EXTENT OF CONTAMINATION

4.1 Soil, Soil Vapor and Groundwater Quality

Elevated levels of PCE are present in soil vapor, with the highest concentrations reported beneath the current Check Cashing (SV-06) and Botanica Santa Ana (SV-07) tenant spaces in the northern portion of the building, along East 176th Street. TCE and cis-1,2-DCE, breakdown products of PCE, were also present in the soil vapor sample collected beneath the Botanica Santa Ana tenant space (SV-07). PCE was also detected in the indoor air samples IA-03 (co-located with SV-06) and IA-04 (co-located with SV-07), in the Check Cashing and Botanica Santa Ana tenant spaces, respectively, however, concentrations were below the NYSDOH Air Guideline Values (AGVs). When compared to the NYSDOH Soil Vapor/Indoor Air Matrices, the recommendations are monitor for the Check Cashing space and mitigate for the Botanica Santa Ana space. In addition, carbon tetrachloride was detected in the soil vapor and indoor air samples collected from the supermarket (SV-04/IA-01) and the pharmacy (SV-05/IA-02) tenant spaces with the NYSDOH Soil Vapor/Indoor Air Matrices recommending either the source be identified and resampled or mitigated. Naphthalene was also detected in the soil vapor and indoor air in the supermarket spaces with the NYSDOH Soil Vapor/Indoor Air Matrices recommending either the source be identified and resampled or mitigated. Based on a comparison of PCE and TCE concentrations in soil vapor and indoor air to the NYSDOH Soil Vapor/Indoor Air Matrix Values, mitigation is warranted because the existing Site building will continue to be occupied. Soil vapor and indoor air sample concentrations for VOCs are shown on Figure 3 and in Table 1 below.

Table 1
Soil Vapor and Indoor Air Detections Compared to NYSDOH Decision Matrices

Sample Identification	Matrix	Analyte	Soil Vapor Concentration (µg/m^3)	Indoor Air Concentration (µg/m^3)	NYSDOH Soil Vapor/Indoor Air Matrix Recommendation
SV- 04_20240724/ IA-01_20240724	Matrix A	Carbon Tetrachloride	0.45	1.9	IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
	Matrix D	Naphthalene	25	47	IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
SV-05_20240724/ IA-02_20240724	Matrix A	Carbon Tetrachloride	0.22 U	1.1	IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
SV-06_20240724/ IA-03_20240724	Matrix B	Tetrachloroethylene (PCE)	990 D	3.8	MONITOR
SV-07_20240724/ IA-04_20240724	Matrix A	Cis-1,2-Dichloroethylene	210	0.2 U	MITIGATE
		Trichloroethylene (TCE)	530	0.2 U	MITIGATE
	Matrix B	Tetrachloroethylene (PCE)	10,000 D	3.4	MITIGATE

Notes:
D = Indicates an identified compound in an analysis that has been diluted.
U = The analyte was not detected at the indicated concentration.
µg/m^3 = micrograms per cubic meter

SVOCs, specifically polycyclic aromatic hydrocarbons, metals (barium, lead, mercury, nickel and zinc), and pesticides were detected in soil above the UUSCOs and/or RRSCOs in at least one sample and appear to be attributable to urban fill. The presence of the VOC acetone is a common laboratory contaminant and likely attributable to laboratory contamination and not associated with a source of on-site contamination. The presence of PFOS could be attributable to former historic businesses that operated at the Site, but may also be associated with region-wide PFAS impacts found in NYC. No VOCs were detected in soil above UUSCOs except for acetone.

PCE was also detected in one groundwater sample (TW-02) in the Botanica Santa Ana tenant space at concentration of 5.1 µg/L, above the AWQSGV of 5 µg/L. In addition to PCE in the groundwater, the VOC methyl ethyl ketone, the SVOC dimethyl phthalate, and metals (iron, manganese and sodium) were detected in groundwater above AWQSGVs, and PFAS compounds were detected above the NYSDEC PFAS Screening Levels. The PCE and PFAS detections in groundwater above the AWQSGVs and Screening Levels, may be attributed to a historic on-site or unknown off-site use. The dimethyl phthalate exceedance may be due to sediment entrained in the sample during collection.

4.2 Contaminated Media

The previous investigations conducted at the Site concluded that CVOC-contaminated soil vapor and indoor air are present at the Site and require mitigation. Although PCE was not detected in any soil samples above its UUSCO or RRSCO, PCE was detected in groundwater above its AWQSGV in one sample.

4.3 Qualitative Human Health Exposure Assessment

A Qualitative Human Health Exposure Assessment (QHHEA) will be completed as part of the IRM Report and during the BCP RI. Based on the results of the 2024 RIR prepared for OER, there is a potential exposure pathway from soil vapor emanating from the subsurface to enter into Site’s building as a result of any floor or lower wall openings/cracks. This IRM is intended to mitigate the exposure pathway and protect human health.

5.0 INTERIM REMEDIAL MEASURE: SUB SLAB DEPRESSURIZATION SYSTEM AND INDOOR AIR ASSESSMENT

This section of the report describes the proposed IRM for the Site, which includes chemical inventory assessment, indoor air sampling, and communication testing needed for the design of the SSDS.

The proposed conceptual design for the IRM SSDS targets the entire Site and includes two separate subsystems: one along the southwest portion of the Site, along Jerome Avenue, consisting of four suction points (Subsystem A); and one along East 176th Street on the northern portion of the Site, consisting of three suction points (Subsystem B). The suction points for each subsystem would be manifolded using aboveground piping to a dedicated suction fan. Vapors from the Subsystem B would be treated with granular-activated carbon (GAC) prior to discharge through an exhaust stack. As the CVOC levels in soil vapor are lower in the southern portion of the Site, Subsystem A will not include GAC treatment of discharged vapors. However, the need for GAC on this Subsystem A will be reevaluated through vapor sampling as part of the vapor communication testing. The IRM SSDS is expected to be operational by July 2025. A preliminary layout of the proposed IRM SSDS is provided on Figure 4.

A vapor communication testing study will be conducted prior to final design and installation of the IRM SSDS to evaluate subsurface conditions and confirm the actual quantity and locations of the suction points needed to create a negative pressure beneath all occupied areas, as well as the need for GAC treatment. Therefore, the location and quantity of suction points are preliminary and may be adjusted and presented in a IRM SSDS Design Document to NYSDEC and NYSDOH for review and approval prior to installation.

AKRF will re-evaluate the chemical inventory and current tenant operations prior to or after the IRM SSDS has been installed, to identify any potential indoor air sources of PCE, carbon tetrachloride, and naphthalene, in accordance with the NYSDOH decision matrix recommendations described in Section 4.1. Indoor air sampling will also be conducted at five locations following IRM SSDS startup to reassess indoor air conditions. Additionally, carbon tetrachloride and naphthalene contamination will be further assessed (and investigated, as necessary) in the forthcoming RI performed for the Site under the BCP.

5.1 IRM SSDS Treatment Area

Soil vapor sampling conducted during the OER RI identified individual CVOC concentrations up to 10,000 $\mu g/m^3$ (for PCE) and petroleum-related compounds at concentrations up to 25 $\mu g/m^3$ (for naphthalene), as shown on Figure 3. The elevated concentrations were detected throughout the Site; however, the highest PCE concentrations were detected along in the northern portion of the building along East 176th Street. The target area for the IRM SSDS is immediately beneath the existing building slab. The proposed target area for the IRM is shown on Figure 4.

5.2 Communications Testing

A geophysical contractor will be mobilized to the Site prior to the start of invasive activities to review the vapor communication testing area, and will use a ground penetrating radar (GPR) to locate underground utilities. If utility lines or other anomalies are identified, any proposed applied suction or monitoring points will be adjusted to avoid conflicts.

The vapor communication testing will be conducted by a subcontractor by installing approximately seven (7) 2.5-inch diameter suction points using an electric core drill to advance through the lowest level slab, and removing the underlying fill layer using a shop vacuum and hand tools. This void space will be replaced with a homogeneous gravel layer to optimize vacuum application. A specialized sub-slab diagnostic vacuum blower equipped with a GAC filter will then be connected to the suction points, and will be capable of applying a vacuum of up to 100 inches of water column to the suction point, with flow rates up to 300 cubic feet per minute. The vacuum from the blower will create a negative pressure beneath the concrete slab applied at the suction point. Vacuum induced by this activity will then be measured at several $^{5}/_{16}$-inch diameter monitoring points installed throughout the testing area at strategic locations relative to each applied vacuum point and will provide information about the effective radius of influence (ROI) for each suction point. AKRF personnel will conduct air monitoring using a PID and particulate meter throughout the testing process. The PID will be used to monitor relative levels of VOCs in the extracted soil gas as well as ambient air concentrations in the buildings.

At each suction point, the applied vacuum and the airflow rate will be measured using a magnehelic differential pressure gauge, and a vane anemometer and/or pitot tube flow meter assembly, respectively. The induced vacuum will be measured at the smaller monitoring points using a micro manometer to assess induced vacuum at varying distances and directions from the suction point. A minimum target induced vacuum reading of 0.01 inches of water column at the monitoring points will be used to establish the vacuum ROI for the respective suction point. An additional suction point will be installed along the outer limits of this ROI, and a new test will be conducted to assess vacuum communication beneath the slab. This process will then be repeated iteratively throughout the building footprint to ensure that a sufficient vacuum can be induced throughout the building.

All temporary suction and monitoring points will be patched using concrete grout and/or caulk after completion of the communication testing. During testing, urethane caulk will be used to seal any obvious cracks or other openings in the building slab that may cause short-circuiting of indoor air to the sub-slab.

This iterative testing approach will result in the identification of key locations for permanent suction points and induced vacuum monitoring points for a final IRM SSDS design, with a final decision on the number of suction points to be made after the Communications Test. The testing approach will also ensure a design with reliable IRM SSDS coverage within the building, and an appropriate applied vacuum that will provide capacity for balancing and long-term coverage of the Site.

5.3 IRM SSDS Effluent Vapor Sampling

During the vapor communication testing, vapor will be screened with a PID from each suction point. The suction point displaying the highest PID reading from the northern and southern halves of the Site would be sampled for laboratory analysis of VOCs by EPA Method TO-15 to determine the projected emission rates, VOC mass loading, and any associated treatment requirements as part of the final IRM SSDS design. QA/QC samples, consisting of a blind duplicate, and trip blank samples, will also be collected in accordance with the QAPP, included as Appendix C. The laboratory samples collected during the vapor communication testing will be collected using either Summa canisters or Tedlar® bags and analyzed by a NYSDOH-certified laboratory with Category B deliverables.

5.4 IRM SSDS Location and Components

The preliminary layout of the IRM SSDS is shown on Figure 4. The layout of the proposed subsystems will be adjusted based on the results of the vapor communication testing. Each suction point will be installed and constructed using the same methodology as the pilot test and connected to the subsystem via a vertical riser and a horizontal leg of aboveground piping, which will then be manifolded to the other points (one manifold for each system). Any horizontal piping will be sloped at least 1% toward the suction points.

The proposed preliminary IRM SSDS design is comprised of the following:

- Seven suction points and risers, spaced throughout the Site building connecting to two manifolds (one for each subsystem).

- Ancillary equipment, including pitot tubes, sample ports, throttling valves, etc.
- Two appropriately-sized exterior suction fans. Both suction fans will be sized based on the results of the vapor communication testing program.
- A control panel equipped with a telemetry system to notify select personnel of alarm conditions.
- A GAC vapor treatment system for the Subsystem B consisting of two 200-pound GAC units in series with influent, intermediate, and effluent sample ports for the IRM SSDS installed.
- An effluent stack extending from each suction fan and terminating a minimum of 7 feet above the roof and at least 25 feet from any building intakes or operable windows.
- Four vacuum monitoring points to measure vacuum beneath the building slabs.

The currently proposed suction fans (to be confirmed in the IRM SSDS Design Document) and GAC unit cut sheets are included in Appendix C.

5.5 Post-Installation Chemical Inventory Assessment and Indoor Air Sampling

Following complete installation of the IRM SSDS, AKRF will conduct a chemical inventory assessment of the Site, review inlets and outlets to existing HVAC systems, and collect five indoor air samples (denoted as IRM-IA-01 through IRM-IA-05) at the approximate locations shown on Figure 5. The indoor air samples will be collected no sooner than 30 days after the IRM SSDS has been in operation. Indoor air samples IRM-IA-01 through IRM-IA-05 will be collected over an 8-hour time period using 6-liter, batch-certified SUMMA® canisters equipped with a vacuum gauge and flow regulator set at a maximum rate of 0.0125 liter per minute. The canisters will be placed at typical breathing zone heights (approximately 4 to 5 feet above the floor). Immediately after opening the flow control valve equipped with an 8-hour regulator, the initial SUMMA® canister vacuum (inches of mercury) will be noted. After eight hours, the flow controller valve will be closed, the final vacuum noted, and the canister placed in a shipping carton for delivery to the laboratory.

The indoor air samples will be analyzed for VOCs by EPA Method TO-15 by a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory with Category B deliverables. Samples will be shipped to the laboratory with appropriate Chain of Custody (CoC) documentation.

Results from the sampling event will be discussed in the IRM Closure Report, discussed further in Section 6.2.

5.6 Decontamination Procedures

Decontamination procedures will be conducted in accordance the QAPP included as Appendix C.

5.7 Management of Investigation-Derived Waste

Management of Investigation-derived waste (IDW) will be conducted in accordance with the procedures outlined in the QAPP included as Appendix C.

6.0 REPORTING REQUIREMENTS

6.1 IRM SSDS Design Document

Upon completion of all fieldwork and receipt of laboratory analytical results for samples obtained during the vapor communication testing, an IRM SSDS Design Document will be prepared that will document field activities and include a final design for the IRM SSDS proposed for the Site. The report will include a summary of the vapor communication testing, vapor sampling results, emissions modeling, and finalized design details for the proposed IRM SSDS, including any vapor treatment.

6.2 Interim Remedial Measure Construction Completion Report

Upon approval of the IRM SSDS Design Report, the SSDS will be installed and operation will commence. An IRM Construction Completion Report (CCR) will be prepared that will document the field activities and start-up testing (including vacuum field extension measurements), all IRM laboratory analytical results and discussions, and include as-built design details for the installed systems. In addition, the report will include the results of the post-installation indoor air sampling program.

6.3 System Operation, Maintenance, and Monitoring Plan

The IRM CCR will include an Operation, Maintenance, and Monitoring (OM&M) Plan that will describe the measures necessary to operate, monitor, and maintain the mechanical components of the proposed IRM SSDS. The OM&M Plan will also include a contingency plan that will be updated periodically to reflect any Site or system changes.

7.0 SCHEDULE

Table 2
Estimated Project Schedule*

Activity	Estimated Date
BCP Application and IRM Work Plan (IRMWP) submitted to NYSDEC.	December 2024
NYSDEC review BCP Application and complete/incomplete determination	January/February 2025
NYSDEC Issues BCP Application Letter of Incompleteness	February 2025
30-day Public Comment Period Initiated for BCP Application and IRMWP	March 2025
Execute BCP Agreement (BCA)	March 2025
Citizen Participation Plan (CPP) Submitted to NYSDEC	March 2025
Conduct Sub-slab Depressurization System (SSDS) Communication Testing and Vapor Sampling	April 2025
Preparation and Submittal of IRM SSDS Design Document to NYSDEC	May 2025
NYSDEC review and approval of IRM SSDS Design Document	June 2025
Implement IRMWP/Install and Start-up of IRM SSDS	July-August 2025
Preparation and Submittal of IRM Construction Completion Report (CCR) to NYSDEC	October 2025
Draft RI Work Plan (RIWP) submitted to NYSDEC/NYSDEC review and approval of CCR	January 2026
Receive NYSDEC comments to draft RIWP.	February 2026
Submit revised RIWP and NYSDEC approves the document.	March 2026
30-day Public Comment Period Initiated for RIWP	April 2026
Conduct RI	May 2026
Prepare and submit draft RIR	June 2026
Receive comments on draft RIR.	July 2026
Submit revised RIR, and NYSDEC approves	August 2026
Prepare and submit draft RAWP	September 2026
Initiate 45-day Public Comment Period	November 2026
Receive comments on draft RAWP	January 2027
Submit revised RAWP, NYSDEC approves, and issues Decision Document (DD)	February 2027
Issue Remedial/Construction Notice Fact Sheet	March 2027
Submittal of Environmental Easement Package	By May 1, 2027
Construction Closing with Housing Preservation and Development (HPD)	June 2027
Begin Redevelopment (Construction) with Implementation of RAWP	June 2027
Draft Site Management Plan (SMP) submitted to NYSDEC	By August 1, 2027
Complete Foundation Excavation and Site Cap	By September 30, 2027
Draft Final Engineering Report (FER) and Fact Sheet	By October 1, 2027
NYSDEC and NYSDOH Approval of FER and SMP	By November 30, 2027
NYSDEC Issues COC	December 2027
SSDS Startup (under Site Management)	4th Quarter 2028
Building Occupancy	1st Quarter 2029

*Subject to Change

8.0 CERTIFICATION

I, Rebecca Kinal, P.E., certify that I am currently a NYS registered Professional Engineer as defined in 6 NYCRR Part 375 and that this IRMWP 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).

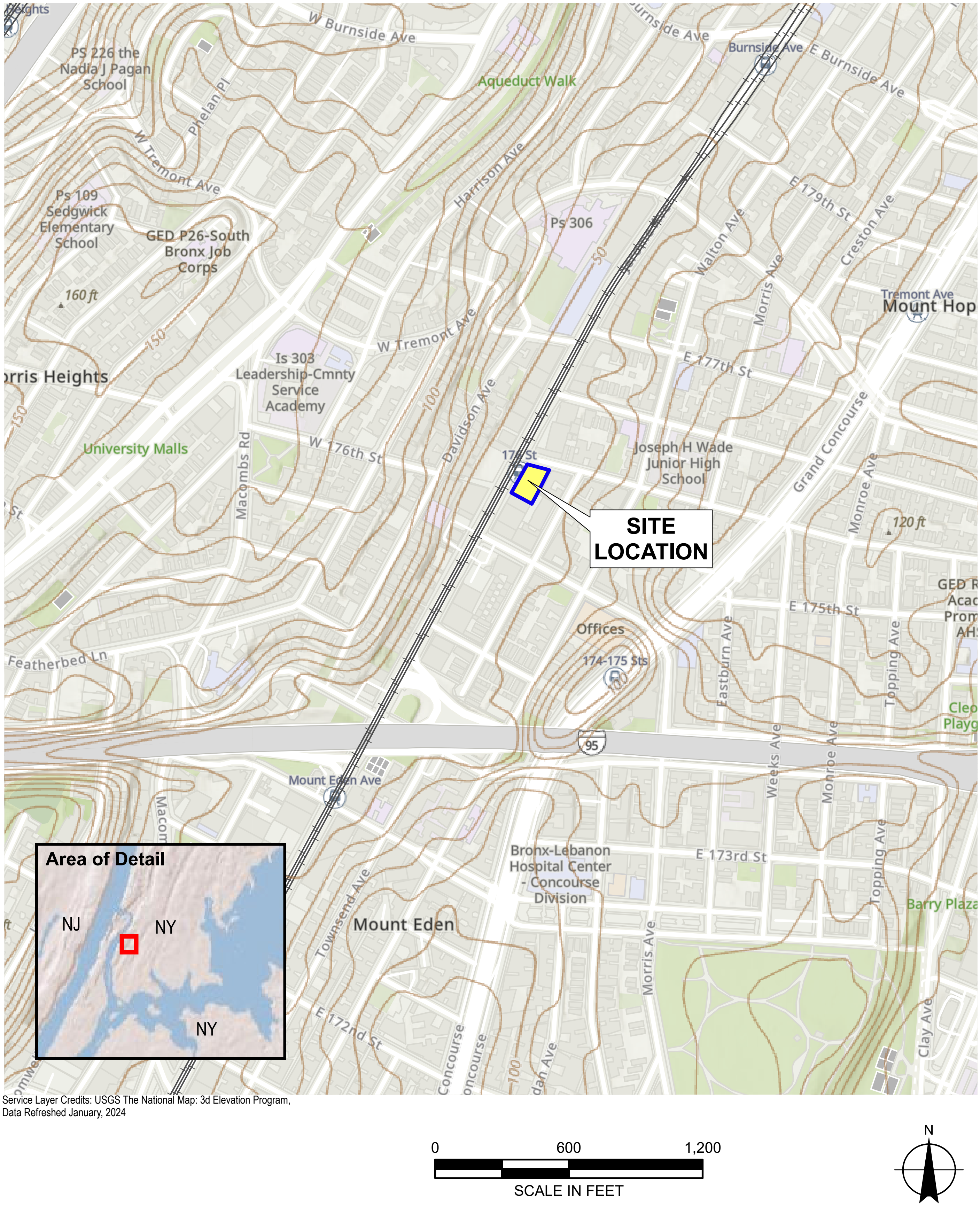
I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

REBECCA A. KINAL
082046-1

Rebecca Kinal, P.E. 9/19/2025

Name ***Signature*** ***Date***

FIGURES



Service Layer Credits: USGS The National Map: 3d Elevation Program, Data Refreshed January, 2024

AKRF O:\Projects\241375 - BRONX PRO 1770 JEROME NYSDEC BCP\SAR\241375 IRMWP Figures.aprx7/3/2024 10:56 AM241375 Fig 1 Site Locationjszalus

akrf
440 Park Avenue South, New York, NY 10016

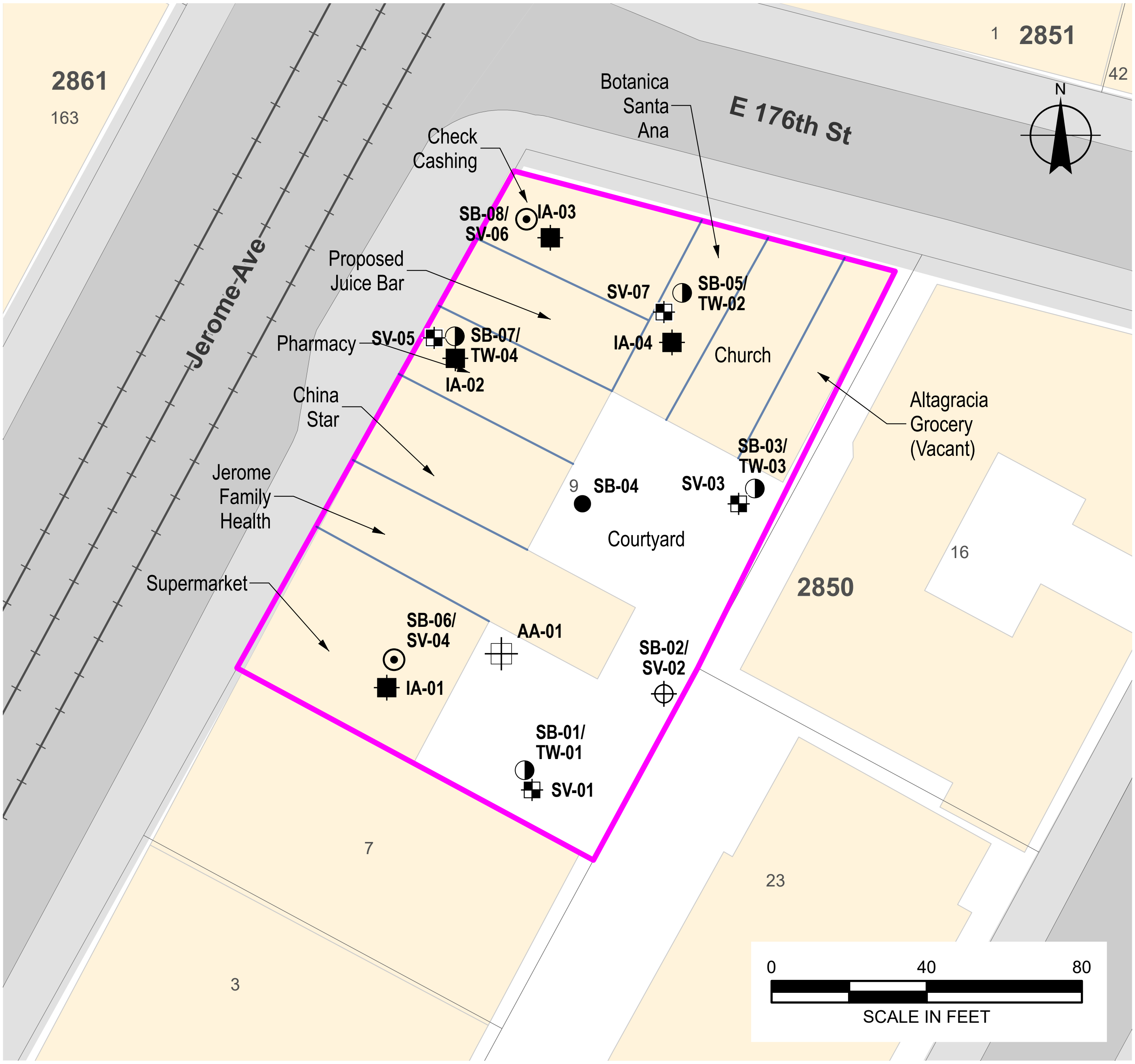
1770 Jerome Avenue
Bronx, NY

SITE LOCATION

DATE
12/4/2024

PROJECT NO.
241375

FIGURE
1



LEGEND

▭	PROJECT SITE BOUNDARY
9	LOT BOUNDARY AND TAX LOT NUMBER
2850	BLOCK NUMBER
▨	BUILDING
—+—	ELEVATED MTA TRACKS
—	APPROXIMATE INTERIOR BUILDING WALLS
●	SOIL BORING
⊙	SOIL BORING/SUBSLAB
◐	SOIL BORING/TEMPORARY WELL
⊕	SOIL BORING/SOIL VAPOR POINT
▚	SOIL VAPOR POINT
■	INDOOR AIR SAMPLE LOCATION

Map Source:
NYCDCP (NYC Dept. of City Planning) GIS database

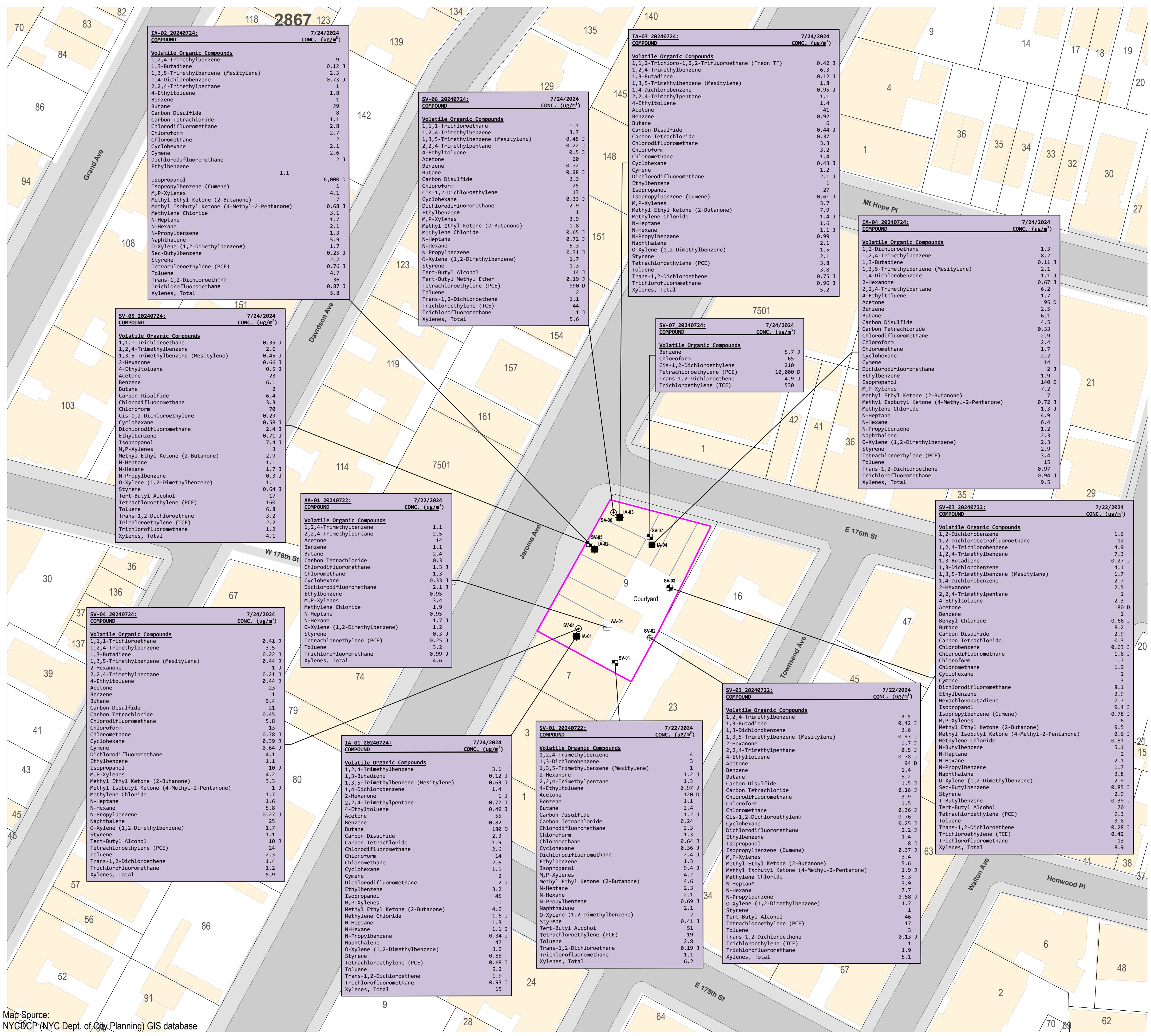
akrf
440 Park Avenue South, New York, NY 10016

1770 Jerome Avenue
Bronx, NY

SITE PLAN WITH SAMPLE LOCATIONS

DATE
12/4/2024
PROJECT NO.
241375
FIGURE
2

AKRF O:\Projects\241375 - BRONX PRO 1770 JEROME NYSDEC BCP\SAR\241375 IRMWP Figures.aprx8/7/2024 2:47 PM241375 Fig 2 Site Plan and Sample Locations|jszalus



IA-02_20240724: COMPOUND	7/24/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
1,2,4-Trimethylbenzene	9
1,3-Butadiene	0.12 J
1,3,5-Trimethylbenzene (Mesitylene)	2.3
1,4-Dichlorobenzene	0.73 J
2,2,4-Trimethylpentane	1
4-Ethyltoluene	1.8
Benzene	1
Butane	29
Carbon Disulfide	8
Carbon Tetrachloride	1.1
Chlorodifluoromethane	2.8
Chloroform	2.7
Chloromethane	2
Cyclohexane	2.1
Cymene	2.6
Dichlorodifluoromethane	2 J
Ethylbenzene	1.1
Isopropanol	6,000 D
Isopropylbenzene (Cumene)	1
M,P-Xylenes	4.1
Methyl Ethyl Ketone (2-Butanone)	7
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	0.68 J
Methylene Chloride	3.1
N-Heptane	1.7
N-Hexane	2.1
N-Propylbenzene	1.3
Naphthalene	5.9
O-Xylene (1,2-Dimethylbenzene)	1.7
Sec-Butylbenzene	0.25 J
Styrene	2.7
Tetrachloroethylene (PCE)	0.76 J
Toluene	4.7
Trans-1,2-Dichloroethene	36
Trichlorofluoromethane	0.87 J
Xylenes, Total	5.8

SV-06_20240724: COMPOUND	7/24/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
1,1,1-Trichloroethane	1.1
1,2,4-Trimethylbenzene	3.7
1,3,5-Trimethylbenzene (Mesitylene)	0.45 J
2,2,4-Trimethylpentane	0.22 J
4-Ethyltoluene	0.5 J
Acetone	20
Benzene	0.72
Butane	0.98 J
Carbon Disulfide	3.3
Chloroform	25
Cis-1,2-Dichloroethylene	13
Cyclohexane	0.33 J
Dichlorodifluoromethane	2.9
Ethylbenzene	1
M,P-Xylenes	3.9
Methyl Ethyl Ketone (2-Butanone)	1.8
Methylene Chloride	0.65 J
N-Heptane	0.72 J
N-Hexane	5.3
N-Propylbenzene	0.31 J
O-Xylene (1,2-Dimethylbenzene)	1.7
Styrene	1.3
Tert-Butyl Alcohol	14 J
Tert-Butyl Methyl Ether	0.19 J
Tetrachloroethylene (PCE)	990 D
Toluene	2
Trans-1,2-Dichloroethene	1.1
Trichloroethylene (TCE)	44
Trichlorofluoromethane	1 J
Xylenes, Total	5.6

IA-03_20240724: COMPOUND	7/24/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon TF)	0.42 J
1,2,4-Trimethylbenzene	6.3
1,3-Butadiene	0.12 J
1,3,5-Trimethylbenzene (Mesitylene)	1.8
1,4-Dichlorobenzene	0.95 J
2,2,4-Trimethylpentane	1.1
4-Ethyltoluene	1.4
Acetone	41
Benzene	0.92
Butane	6
Carbon Disulfide	0.44 J
Carbon Tetrachloride	0.37
Chlorodifluoromethane	3.3
Chloroform	3.2
Chloromethane	1.4
Cyclohexane	0.43 J
Cymene	1.2
Dichlorodifluoromethane	2.1 J
Ethylbenzene	1
Isopropanol	27
Isopropylbenzene (Cumene)	0.61 J
M,P-Xylenes	3.7
Methyl Ethyl Ketone (2-Butanone)	7.9
Methylene Chloride	1.4 J
N-Heptane	1.6
N-Hexane	1.1 J
N-Propylbenzene	0.99
Naphthalene	2.1
O-Xylene (1,2-Dimethylbenzene)	1.5
Styrene	2.1
Tetrachloroethylene (PCE)	3.8
Toluene	3.8
Trans-1,2-Dichloroethene	0.75 J
Trichlorofluoromethane	0.96 J
Xylenes, Total	5.2

IA-04_20240724: COMPOUND	7/24/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
1,2-Dichloroethane	1.3
1,2,4-Trimethylbenzene	8.2
1,3-Butadiene	0.11 J
1,3,5-Trimethylbenzene (Mesitylene)	2.1
1,4-Dichlorobenzene	1.1 J
2-Hexanone	0.67 J
2,2,4-Trimethylpentane	6.2
4-Ethyltoluene	1.7
Acetone	95 D
Benzene	2.5
Butane	6.1
Carbon Disulfide	4.5
Carbon Tetrachloride	0.33
Chlorodifluoromethane	2.9
Chloroform	2.4
Chloromethane	1.7
Cyclohexane	2.2
Cymene	14
Dichlorodifluoromethane	2 J
Ethylbenzene	1.9
Isopropanol	140 D
M,P-Xylenes	7.2
Methyl Ethyl Ketone (2-Butanone)	7
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	0.72 J
Methylene Chloride	1.3 J
N-Heptane	4.9
N-Hexane	6.4
N-Propylbenzene	1.2
Naphthalene	2.3
O-Xylene (1,2-Dimethylbenzene)	2.3
Styrene	2.9
Tetrachloroethylene (PCE)	3.4
Toluene	15
Trans-1,2-Dichloroethene	0.97
Trichlorofluoromethane	0.94 J
Xylenes, Total	9.5

SV-05_20240724: COMPOUND	7/24/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
1,1,1-Trichloroethane	0.35 J
1,2,4-Trimethylbenzene	2.6
1,3,5-Trimethylbenzene (Mesitylene)	0.45 J
2-Hexanone	0.66 J
4-Ethyltoluene	0.5 J
Acetone	23
Benzene	6.1
Butane	2
Carbon Disulfide	6.4
Chlorodifluoromethane	3.3
Chloroform	70
Cis-1,2-Dichloroethylene	0.29
Cyclohexane	0.58 J
Dichlorodifluoromethane	2.4 J
Ethylbenzene	0.71 J
Isopropanol	7.4 J
M,P-Xylenes	3
Methyl Ethyl Ketone (2-Butanone)	2.9
N-Heptane	1.1
N-Hexane	1.7 J
N-Propylbenzene	0.3 J
O-Xylene (1,2-Dimethylbenzene)	1.1
Styrene	0.64 J
Tert-Butyl Alcohol	17
Tetrachloroethylene (PCE)	160
Toluene	6.8
Trans-1,2-Dichloroethene	3.2
Trichloroethylene (TCE)	2.2
Trichlorofluoromethane	1.2
Xylenes, Total	4.1

SV-07_20240724: COMPOUND	7/24/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
Benzene	5.7 J
Chloroform	65
Cis-1,2-Dichloroethylene	210
Tetrachloroethylene (PCE)	10,000 D
Trans-1,2-Dichloroethene	4.9 J
Trichloroethylene (TCE)	530

AA-01_20240722: COMPOUND	7/22/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
1,2,4-Trimethylbenzene	1.1
2,2,4-Trimethylpentane	2.5
Acetone	14
Benzene	1.1
Butane	2.4
Carbon Tetrachloride	0.3
Chlorodifluoromethane	1.3 J
Chloromethane	1.3
Cyclohexane	0.33 J
Dichlorodifluoromethane	2.1 J
Ethylbenzene	0.95
M,P-Xylenes	3.4
Methylene Chloride	1.9
N-Heptane	0.95
N-Hexane	1.7 J
O-Xylene (1,2-Dimethylbenzene)	1.2
Styrene	0.3 J
Tetrachloroethylene (PCE)	0.25 J
Toluene	3.2
Trichlorofluoromethane	0.99 J
Xylenes, Total	4.6

SV-03_20240722: COMPOUND	7/22/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
1,2-Dichlorobenzene	1.6
1,2-Dichlorotetrafluoroethane	12
1,2,4-Trichlorobenzene	4.9
1,2,4-Trimethylbenzene	7.3
1,3-Butadiene	0.27 J
1,3-Dichlorobenzene	4.1
1,3,5-Trimethylbenzene (Mesitylene)	1.7
1,4-Dichlorobenzene	2.7
2-Hexanone	2.5
2,2,4-Trimethylpentane	1
4-Ethyltoluene	2.3
Acetone	180 D
Benzene	1
Benzyl Chloride	0.66 J
Butane	8.2
Carbon Disulfide	2.9
Carbon Tetrachloride	0.3
Chlorobenzene	0.63 J
Chlorodifluoromethane	1.6 J
Chloroform	1.7
Chloromethane	1.9
Cyclohexane	1
Cymene	3
Dichlorodifluoromethane	8.1
Ethylbenzene	3.9
Hexachlorobutadiene	7.7
Isopropanol	9.4 J
Isopropylbenzene (Cumene)	0.78 J
M,P-Xylenes	6
Methyl Ethyl Ketone (2-Butanone)	9.5
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	0.6 J
Methylene Chloride	0.81 J
N-Butylbenzene	5.1
N-Heptane	2
N-Hexane	2.1
N-Propylbenzene	1.7
Naphthalene	3.8
O-Xylene (1,2-Dimethylbenzene)	2.9
Sec-Butylbenzene	0.85 J
Styrene	2.9
T-Butylbenzene	0.39 J
Tert-Butyl Alcohol	70
Tetrachloroethylene (PCE)	9.3
Toluene	3.8
Trans-1,2-Dichloroethene	0.28 J
Trichloroethylene (TCE)	0.42
Trichlorofluoromethane	13
Xylenes, Total	8.9

SV-04_20240724: COMPOUND	7/24/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
1,1,1-Trichloroethane	0.41 J
1,2,4-Trimethylbenzene	3.5
1,3-Butadiene	0.22 J
1,3,5-Trimethylbenzene (Mesitylene)	0.44 J
2-Hexanone	1 J
2,2,4-Trimethylpentane	0.21 J
4-Ethyltoluene	0.44 J
Acetone	23
Benzene	1
Butane	9.4
Carbon Disulfide	21
Carbon Tetrachloride	0.45
Chlorodifluoromethane	5.8
Chloroform	13
Chloromethane	0.78 J
Cyclohexane	0.39 J
Cymene	0.64 J
Dichlorodifluoromethane	4.1
Ethylbenzene	1.1
Isopropanol	10 J
M,P-Xylenes	4.2
Methyl Ethyl Ketone (2-Butanone)	3.3
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	1 J
Methylene Chloride	1.7
N-Heptane	1.6
N-Hexane	5.8
N-Propylbenzene	0.27 J
Naphthalene	25
O-Xylene (1,2-Dimethylbenzene)	1.7
Styrene	1.1
Tert-Butyl Alcohol	10 J
Tetrachloroethylene (PCE)	24
Toluene	2.3
Trans-1,2-Dichloroethene	1.4
Trichlorofluoromethane	1.2
Xylenes, Total	5.9

IA-01_20240724: COMPOUND	7/24/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
1,2,4-Trimethylbenzene	3.1
1,3-Butadiene	0.12 J
1,3,5-Trimethylbenzene (Mesitylene)	0.63 J
1,4-Dichlorobenzene	1.4
2-Hexanone	1 J
2,2,4-Trimethylpentane	0.77 J
4-Ethyltoluene	0.49 J
Acetone	55
Benzene	0.82
Butane	180 D
Carbon Disulfide	2.3
Carbon Tetrachloride	1.9
Chlorodifluoromethane	2.6
Chloroform	14
Chloromethane	2.6
Cyclohexane	1.1
Cymene	2
Dichlorodifluoromethane	2 J
Ethylbenzene	3.2
Isopropanol	45
M,P-Xylenes	11
Methyl Ethyl Ketone (2-Butanone)	4.9
Methylene Chloride	1.6 J
N-Heptane	1.3
N-Hexane	1.1 J
N-Propylbenzene	0.34 J
Naphthalene	47
O-Xylene (1,2-Dimethylbenzene)	3.9
Styrene	0.88
Tetrachloroethylene (PCE)	0.68 J
Toluene	5.2
Trans-1,2-Dichloroethene	1.9
Trichlorofluoromethane	0.93 J
Xylenes, Total	15

SV-01_20240722: COMPOUND	7/22/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
1,2,4-Trimethylbenzene	4
1,3-Dichlorobenzene	3
1,3,5-Trimethylbenzene (Mesitylene)	1
2-Hexanone	1.2 J
2,2,4-Trimethylpentane	1.3
4-Ethyltoluene	0.97 J
Acetone	120 D
Benzene	1.1
Butane	2.4
Carbon Disulfide	1.2 J
Carbon Tetrachloride	0.24
Chlorodifluoromethane	2.3
Chloroform	1.3
Chloromethane	0.64 J
Cyclohexane	0.36 J
Dichlorodifluoromethane	2.4 J
Ethylbenzene	1.3
Isopropanol	9.4 J
M,P-Xylenes	4.2
Methyl Ethyl Ketone (2-Butanone)	4.6
N-Heptane	2.3
N-Hexane	2.1
N-Propylbenzene	0.69 J
Naphthalene	2.1
O-Xylene (1,2-Dimethylbenzene)	2
Styrene	0.41 J
Tert-Butyl Alcohol	51
Tetrachloroethylene (PCE)	19
Toluene	2.8
Trans-1,2-Dichloroethene	0.19 J
Trichlorofluoromethane	1.1
Xylenes, Total	6.2

SV-02_20240722: COMPOUND	7/22/2024 CONC. (ug/m^3)
Volatile Organic Compounds	
1,2,4-Trimethylbenzene	3.5
1,3-Butadiene	0.42 J
1,3-Dichlorobenzene	3.6
1,3,5-Trimethylbenzene (Mesitylene)	0.97 J
2-Hexanone	1.7 J
2,2,4-Trimethylpentane	0.5 J
4-Ethyltoluene	0.78 J
Acetone	94 D
Benzene	1.4
Butane	8.2
Carbon Disulfide	1.5 J
Carbon Tetrachloride	0.16 J
Chlorodifluoromethane	3.9
Chloroform	1.5
Chloromethane	0.36 J
Cis-1,2-Dichloroethylene	0.76
Cyclohexane	0.25 J
Dichlorodifluoromethane	2.2 J
Ethylbenzene	1.4
Isopropanol	8 J
Isopropylbenzene (Cumene)	0.37 J
M,P-Xylenes	3.4
Methyl Ethyl Ketone (2-Butanone)	5.6
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	1.9 J
Methylene Chloride	5.3
N-Heptane	3.9
N-Hexane	7.7
N-Propylbenzene	0.58 J
O-Xylene (1,2-Dimethylbenzene)	1.7
Styrene	1
Tert-Butyl Alcohol	46
Tetrachloroethylene (PCE)	17
Toluene	3
Trans-1,2-Dichloroethene	0.13 J
Trichloroethylene (TCE)	1
Trichlorofluoromethane	1.9
Xylenes, Total	5.1

Map Source:
NYCDCP (NYC Dept. of City Planning) GIS database

LEGEND

- PROJECT SITE BOUNDARY
- 20 LOT BOUNDARY AND TAX LOT NUMBER
- **2850** BLOCK NUMBER
- BUILDING
- ⊕ SOIL BORING/SOIL VAPOR POINT
- ◘ SOIL VAPOR POINT
- ⊙ SOIL BORING/SUBSLAB
- ■ INDOOR AIR SAMPLE LOCATION
- ⊕ AMBIENT AIR LOCATION
- APPROXIMATE INTERIOR BUILDING WALLS

SOIL VAPOR INDOOR AIR

µg/m^3- micrograms per cubic meter

J: The reported value is estimated.
D: Analyte concentration obtained from dilution.

All Detections are Shown

Note:
The presented data has not been validated.

Sample ID

Sample Date

SV-07_20240724: COMPOUND	7/24/2024 CONC. (ug/m3)
Volatile Organic Compounds	
Benzene	5.7 J
Chloroform	65
Cis-1,2-Dichloroethylene	210
Tetrachloroethylene (PCE)	10,000 D
Trans-1,2-Dichloroethene	4.9 J
Trichloroethylene (TCE)	530

Analyte/Compound

Concentration

0 50 100 200
SCALE IN FEET

AKRF O:\Projects\241375 - BRONX PRO 1770 JEROME NYSDEC BCP\SAR\241375 IRMWP Figures.aprx 11/25/2024 9:54 PM241375 Fig 3 Soil Vapor and Indoor Air Concentrations jszalus

akrf
440 Park Avenue South, New York, NY 10016

1770 Jerome Avenue
Bronx, NY

Soil Vapor and Indoor Air Concentrations

DATE
12/4/2024

PROJECT NO.
241375

FIGURE
3

LEGEND

▭ PROJECT SITE BOUNDARY

9 LOT BOUNDARY AND TAX LOT NUMBER

2850 BLOCK NUMBER

— APPROXIMATE INTERIOR BUILDING WALLS

▭ BUILDING

○ RADIUS OF INFLUENCE (ASSUMED 30 FEET)

— SSDS PIPING

SSDS-02 ● SUCTION POINT

✳ SUCTION FAN

Map Source:
NYCDCP (NYC Dept. of City Planning) GIS database

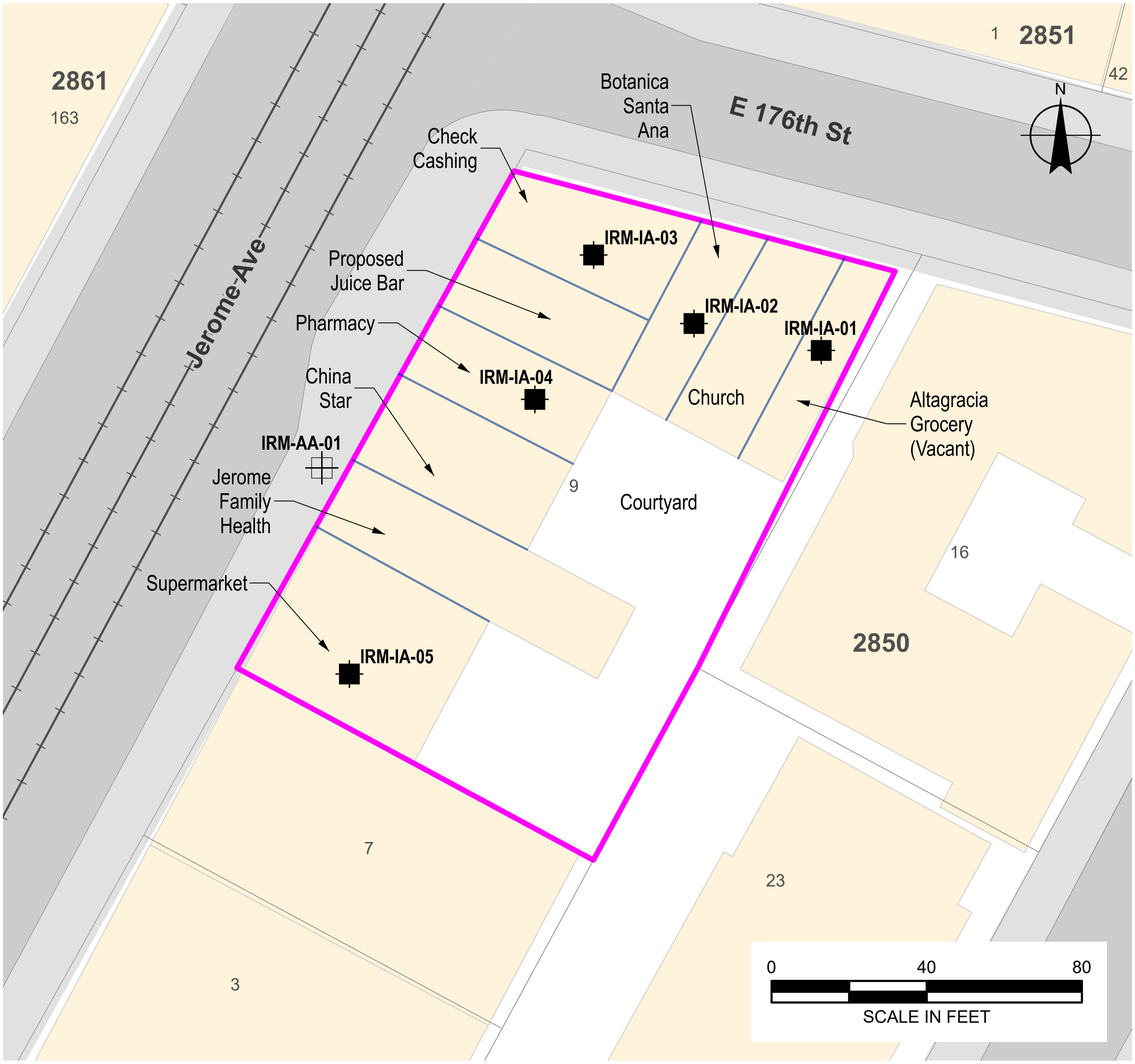
440 Park Avenue South, New York, NY 10016

1770 Jerome Avenue
Bronx, NY

Preliminary Layout of Proposed Sub Slab Depressurization System

DATE
12/4/2024
PROJECT NO.
241375
FIGURE
4

AKRF O:\Projects\241375 - BRONX PRO 1770 JEROME NYSDEC BCP\SAR\241375 IRMWP Figures.aprx12/4/2024 3:22 PM241375 Fig 4 Preliminary Layout of Proposed Sub Slab Depressurization Systemjszalus



LEGEND

▭	PROJECT SITE BOUNDARY
9	LOT BOUNDARY AND TAX LOT NUMBER
2850	BLOCK NUMBER
—+—	ELEVATED MTA TRACKS
—	APPROXIMATE INTERIOR BUILDING WALLS
▨	BUILDING
■	PROPOSED INDOOR AIR SAMPLE LOCATION
⌖	PROPOSED AMBIENT AIR SAMPLE LOCATION

Map Source:
NYCDCP (NYC Dept. of City Planning) GIS database

akrf
440 Park Avenue South, New York, NY 10016

1770 Jerome Avenue
Bronx, NY

Proposed IRM Indoor Air Sample Locations

DATE
12/4/2024
PROJECT NO.
241375
FIGURE
5

AKRF O:\Projects\241375 - BRONX PRO 1770 JEROME NYSDEC BCP\SAR\241375 IRMWP Figures.aprx11/26/2024 12:16 AM241375 Fig 5 Proposed IRM Indoor Air Sample Locationsjszalus

APPENDIX A
HEALTH AND SAFETY PLAN

1770 JEROME AVENUE
BRONX, NEW YORK

Health and Safety Plan
for Interim Remedial Measure Work Plan

AKRF Project Number: 241375
BCP Site Number: To be Assigned

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau B
625 Broadway, 12th Floor
Albany, New York 12233

On Behalf Of:

Jerome 1770 MM LLC
1605 Dr. Martin Luther King Jr. Blvd
Bronx, NY 10453

Prepared by:

akrf

AKRF, Inc.
440 Park Avenue South
New York, New York 10016
(212) 696-0670

DECEMBER 2024

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Figure 1 – Site Location
Figure 2 – Hospital Route Map

ATTACHMENTS

Attachment A – Potential Health Effects from On-Site Contaminants
Attachment B – Report Forms
Attachment C – Emergency Hand Signals

1.0 INTRODUCTION

This environmental Health and Safety Plan (HASP) was prepared by AKRF, Inc. (AKRF) on behalf of Jerome 1770 MM LLC (the "Applicant") for the property located at 1770 Jerome Avenue in the Bronx, New York, hereafter referred to as the "Site". This HASP was developed for the Interim Remedial Measure (IRM) Work Plan (IRMWP) dated November 2024 for the Site for implementation by AKRF personnel and other personnel working under AKRF's direction to implement the IRMWP. The Site is identified on the New York City (NYC) Tax Map as Tax Block 2850 Lot 9. A map showing the Site location is provided as Figure 1.

Jerome 1770 MM LLC is submitting a New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) application as a Volunteer, concurrently with the IRMWP.

The Site is composed of a one-story 'L'-shaped retail building with a full cellar, approximately 8 feet below sidewalk surface and rear courtyard (approximately 4 feet above sidewalk grade). The Site is comprised of nine retail units.

The Site is located in a residential and commercial area of the Morris Heights neighborhood in the Bronx, New York. The Site is generally bounded by Jerome Avenue to the west, by East 176th Street to the north, by residential properties to the east, and by commercial properties to the south. Elevated subway tracks (the NYC Metropolitan Transit Authority's 4 line) are west-adjacent to the Site, above Jerome Avenue. The Major Deegan and Cross Bronx Expressways are located west and south of the Site block.

AKRF conducted a Remedial Investigation at the Site in July 2024. The investigation included the collection of soil, groundwater, and soil vapor samples. The chlorinated volatile organic compounds (CVOCs) tetrachloroethylene (PCE), trichloroethylene (TCE), and cis-1,2-dichloroethylene in soil vapor sample SV-07 were detected at 10,000 $\mu g/m^3$, 530 $\mu g/m^3$, and 210 $\mu g/m^3$, respectively, and were compared to the New York State Department of Health (NYSDOH) Decision Matrices. The CVOCs detected in the soil vapor samples were not detected in soil samples; however, PCE was detected in the groundwater at 5.1 µg/L, above its Ambient Water Quality Standards and Guidance Value (AWQSGV) at TW-02, nearby SV-07. Based on the findings of the investigation and the Site/area history, the potential source of the CVOC contamination may be attributed to an unidentified on-site or off-site source(s), particularly near soil vapor sample SV-07 and groundwater sample TW-02.

Detections of volatile organic compounds (VOCs) (but no exceedances), semivolatile organic compounds (SVOCs), pesticides and metals in soil typically associated with historic/urban fill were present throughout the Site. The presence of perfluorooctane sulfonic acid was also detected in soil and could be attributable to a former historic business that operated at the Site. VOCs, SVOCs, and metals were detected in groundwater above AWQSGVs, and PFAS compounds were detected above the NYSDEC Per- and Polyfluoroalkyl Substances Screening Levels. The detections in groundwater above the AWQSGVs and Screening Levels, may be attributed to urban fill or to prior site uses. Other chlorinated-VOCs and petroleum-related VOCs were also detected at generally higher levels in soil vapor samples across the Site. The affected media at the Site include soil, groundwater, and soil vapor. To address the elevated soil vapor concentrations, an IRM sub-slab depressurization system (SSDS) is proposed to be installed until implementation of remedial actions concurrently with Site redevelopment.

The purpose of this HASP is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise during field activities at the Site. The HASP is intended to minimize health and safety risks resulting from the known or potential presence of contaminated materials.

This HASP does not discuss routine health and safety issues common to general construction and excavation, including, but not, limited to slips, trips, falls, shoring, and other physical hazards. All AKRF employees are additionally directed that all work must be performed in accordance with the AKRF's

Generic HASP and all Occupation Safety and Health Administration (OSHA)-applicable regulations for the work activities required for the project. All project personnel are furthermore directed that they are not permitted to enter Permit Required Confined Spaces (as defined by OSHA). For issues unrelated to contaminated materials, all non-AKRF employees are to be bound by all applicable OSHA regulations as well as any more stringent requirements specified by their employer in their corporate HASP or otherwise. AKRF is not responsible for providing oversight for issues unrelated to contaminated materials for non-employees. This oversight shall be the responsibility of the employer of that worker or other official designated by that employer.

2.0 HEALTH AND SAFETY GUIDELINES AND PROCEDURES

2.1 Hazard Evaluation

2.1.1 Hazards of Concern

The hazards of concern include organic and inorganic chemicals, heat and cold stress, and explosive/flammable materials.

2.1.2 Physical Characteristics

The physical characteristics of the hazards of concern include liquid, solid and vapor.

2.1.3 Hazardous Materials

The chemicals known and/or expected to be encountered at the Site include: VOCs, SVOCs, pesticides, metals and PFAS; the solids include ash, asbestos (as there is potential for asbestos based on the building's age), and historical fill; the solvents include chlorinated solvents.

2.1.4 Chemicals of Concern

Table 1
Chemicals Of Concern

Chemicals	REL/PEL/STEL	Health Hazards
1,2-Dichloroethylene	REL = 200 ppm PEL = 200 ppm	Irritation eyes, respiratory system; central nervous system depression.
Barium	PEL = 0.5 mg/m³ for soluble barium compounds. For barium sulfate dust = 15 mg/m³ of total dust and 5 mg/m³ for respirable fraction. RELs = of 0.5 mg/m³ for soluble barium compounds. The NIOSH has set RELs of 10 mg/m³ (total dust) for barium sulfate and 5 mg/m³ (respirable fraction).	Barium has been found to potentially cause gastrointestinal disturbances and muscular weakness when people are exposed to it at levels above the EPA drinking water standards for relatively short periods of time. Some people who eat or drink amounts of barium above background levels found in food and water for a short period may experience vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. Eating or drinking very large amounts of barium compounds that easily dissolve can cause changes in heart rhythm or paralysis and possibly death. Animals that drank barium over long periods had damage to the kidneys, decreases in body weight, and some died
Benzene	REL = 0.1 ppm PEL = 1 ppm STEL = 5 ppm	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude, dermatitis; bone marrow depression, potential occupational carcinogen.
Carbon Tetrachloride	STEL: 2 ppm PEL: 10 ppm PEL C: 25 ppm; 5-min max peak 200 ppm	Irritation eyes, skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination; [potential occupational carcinogen].
DDD, DDE, & DDT	REL: 0.5 mg/m³ PEL: 1 mg/m³	Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen].

Table 1
Chemicals Of Concern

Chemicals	REL/PEL/STEL	Health Hazards
Lead	REL = 0.05 mg/m^3 PEL = 0.05 mg/m^3	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.
Manganese	REL: 1 mg/m^3 PEL: 5 mg/m^3 STEL: 3 mg/m^3	Manganism (behavioral changes); slowed movements; nervous system effects; lung irritation; reproductive effects.
Mercury	REL = 0.1 mg/m^3 PEL = 0.05 mg/m^3	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria.
Naphthalene	REL: 10 ppm STEL: 15 ppm PEL: 10 ppm	Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage.
Nickel	REL: 0.015 mg/m^3 PEL: 1 mg/m^3	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen].
Polycyclic Aromatic Hydrocarbons	PEL = 5 mg/m^3	Harmful effects to skin, bodily fluids, and ability to fight disease, reproductive problems; [potential occupational carcinogen].
Trichloroethylene	PEL = 100 ppm	Lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen].
Tetrachloroethylene	PEL = 100 ppm STEL = 200 ppm	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, poor coordination; headache, drowsiness; skin erythema (skin redness); liver damage; potential occupational carcinogen.
Vinyl Chloride	PEL = 1 ppm PEL = 5 ppm (Ceiling)	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen].
Zinc	REL = 5 mg/m^3 PEL = 5 mg/m^3	Metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function.

Notes:
REL = National Institute for Occupational Safety and Health Recommended Exposure Limit
PEL = OSHA Permissible Exposure Limit
STEL = OSHA Short Term Exposure Limit

The potential health effects from the on-site contaminants listed above are further described in Attachment A.

2.2 Designated Personnel

AKRF will appoint one of its on-site personnel as the Site Safety Officer (SSO). This individual will be responsible for the implementation of this HASP. The SSO will have experience in implementation of air monitoring and hazardous materials sampling programs. Health and safety training required for the SSO and all field personnel is outlined in Section 2.3 of this HASP.

2.3 Training

All personnel who enter the work area while intrusive activities are being performed will have completed a 40-hour training course that meets OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards. In addition, all personnel will have up-to-date 8-hour refresher training. The training will allow personnel to recognize and understand potential hazards to health and safety. All field personnel must attend a training program, whose purpose is to:

- Make them aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;
- Make them aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the field crew will be instructed in these objectives before he/she goes onto the Site. A Site safety meeting will be conducted at the start of the project. Additional meetings shall be conducted, as necessary, for new personnel working at the Site.

2.4 Medical Surveillance Program

All AKRF and subcontractor personnel performing field work involving subsurface disturbance at the Site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f). A physician's medical release for work will be confirmed by the SSO before an employee can begin Site activities. The medical release shall consider the type of work to be performed and the required personal protective equipment (PPE). The medical examination will, at a minimum, be provided annually and upon termination of hazardous waste Site work.

2.5 Site Work Zones

During any activities involving subsurface disturbance, the work area must be divided into various zones to prevent the spread of contamination, ensure that proper protective equipment is donned, and provide an area for decontamination.

The Exclusion Zone is defined as the area where exposure to contaminated media could be encountered. The Contamination Reduction Zone (CRZ) is the area where decontamination procedures take place and is located next to the Exclusion Zone. The Support Zone is the area where support facilities such as vehicles, fire extinguisher, and first aid supplies are located. The emergency staging area (part of the Support Zone) is the area where all workers on-site would assemble in the event of an emergency. A summary of these areas is provided below. These zones may be changed by the SSO, depending on that day's activities. All field personnel will be informed of the location of these zones before work begins.

Table 2
Site Work Zones

Task	Exclusion Zone	CRZ	Support Zone
Suction Point and Vapor Monitoring Point Installation	15 feet from hand-held coring equipment	Exterior of Building (currently unoccupied)	As Needed

2.6 Personal Protection Equipment

The PPE required for various kinds of Site investigation tasks are based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Appendix B, "General Description and Discussion of the Levels of Protection and Protective Gear."

AKRF field personnel and other Site personnel shall wear, at a minimum, Level D PPE. The protection will be based on the air monitoring described in this section.

Table 4
Personal Protection Equipment Requirements

LEVEL OF PROTECTION & PPE		All Tasks
Level D (**X**) Steel Toe Shoes (**X**) Hard Hat (within 25 ft. of excavator) (**X**) Work Gloves	(**X**) Safety Glasses ( ) Face Shield (**X**) Ear Plugs (within 25 ft. of excavator) (**X**) Nitrile Gloves (**X**) Tyvek for tank contractor if NAPL present	Yes
Level C ***(in addition to Level D)*** (**X**) Half-Face Respirator (**X**) Full Face Respirator ( ) Full-Face PAPR	( ) Particulate Cartridge ( ) Organic Cartridge (**X**) Dual Organic/Particulate Cartridge	If PID > 5 ppm or particulates > 0.125 mg/m^3 in breathing zone
Comments: Cartridges to be changed out at least once per shift unless warranted beforehand (e.g., more difficult to breath or any odors detected). PAPR = powered air purifying respirator		

2.7 General Work Practices

To protect health and safety, all field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited except in designated areas on the Site. These areas will be designated by the SSO.
- Workers must wash their hands thoroughly on leaving the work area and before eating, drinking, or any other such activity.
- The workers should shower as soon as possible after leaving the Site. Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat/cold stress.

3.0 EMERGENCY PROCEDURES AND EMERGENCY RESPONSE PLAN

The field crew will be equipped with emergency equipment, such as a first aid kit and disposable eyewashes. In the case of a medical emergency, the SSO will determine the nature of the emergency and he/she will have someone call for an ambulance, if needed. If the nature of the injury is not serious, i.e., the person can be moved without expert emergency medical personnel, he/she should be driven to the Bronx Lebanon Hospital Center by on-site personnel. Directions to the hospital are provided below, and a hospital route map is provided as Figure 2. Report forms are provided in Attachment B. Emergency hand signals are provided in Attachment C.

Table 5
Hospital Directions

Hospital Name	Bronx Lebanon Hospital Center
Phone Number	(718) 590-1800
Address/Location	1650 Grand Concourse, Bronx, NY 10457
Directions	1. Starting at Jerome Avenue, head SOUTH, making a LEFT turn at East 175th Street. 2. Head EAST and make a RIGHT turn onto Walton Avenue. 3. Head SOUTH and turn LEFT onto East Mt Eden Avenue. 4. Turn LEFT at Sheridan Avenue. The Destination will be on the RIGHT.

3.1 Emergency Contacts

Table 6
Emergency Contacts

Company	Individual Name	Title	Contact Number
AKRF	Rebecca Kinal, P.E.	Remedial Engineer	914-922-2362 (office)
	Stephen Malinowski, QEP	QA/QC Officer	631-574-3724 (office)
	Jessica Holm	Project Manager	646-388-9784 (office)
	Madelyn Fleming	Site Safety Officer (SSO)	781-258-7107 (mobile)
	Brian Quinn	Alternate SSO	201-314-8032 (mobile)
Jerome 1770 MM LLC	Daniel Land Parcerisas	Owner Representative	646-481-9143 (office)
Ambulance, Fire Department, & Police Department	-	-	911
NYSDEC Spill Hotline		-	800-457-7362

4.0 APPROVAL & ACKNOWLEDGMENTS OF HASP

Signed: ________________________________ Date: _________________________________
AKRF Project Manager

Signed: ________________________________ Date: _________________________________
AKRF Health and Safety Officer

Below is an affidavit that must be signed by all workers who enter the site. A copy of the HASP must be on-site at all times and will be kept by the SSO.

AFFIDAVIT

I,_______________________(name), of_____________________________(company name), have read the HASP for the 1770 Jerome Avenue Site located at 1770 Jerome Avenue in Bronx, New York. I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from the Site.

Signed: ________________________ Company: ______________________ Date: ________
Signed: ________________________ Company: ______________________ Date: ________
Signed: ________________________ Company: ______________________ Date: ________
Signed: ________________________ Company: ______________________ Date: ________
Signed: ________________________ Company: ______________________ Date: ________
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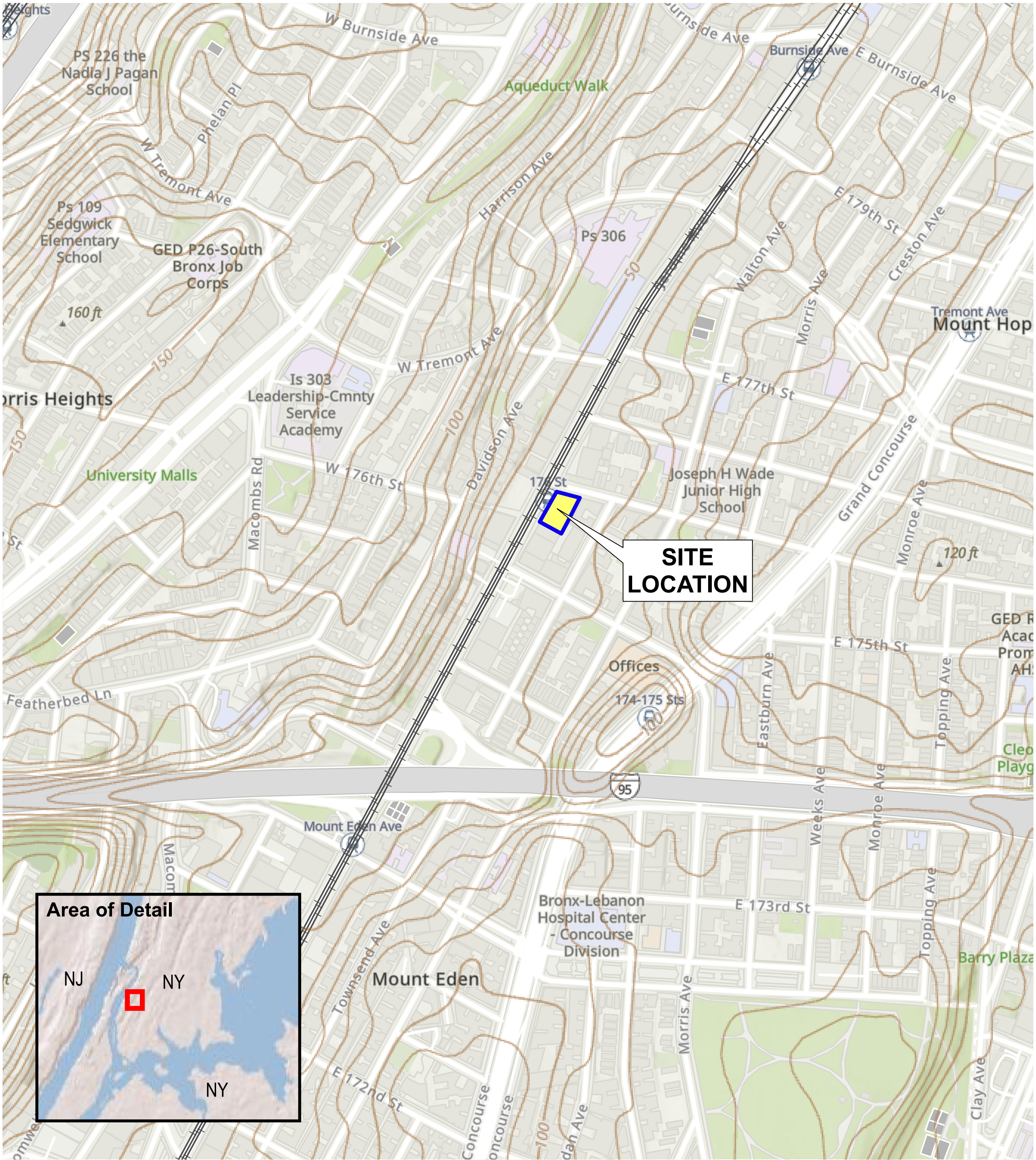
Signed: ________________________ Company: ______________________ Date: ________
Signed: ________________________ Company: ______________________ Date: ________
Signed: ________________________ Company: ______________________ Date: ________

FIGURES



Service Layer Credits: USGS The National Map: 3d Elevation Program,
Data Refreshed January, 2024

440 Park Avenue South, New York, NY 10016

1770 Jerome Avenue
Bronx, NY

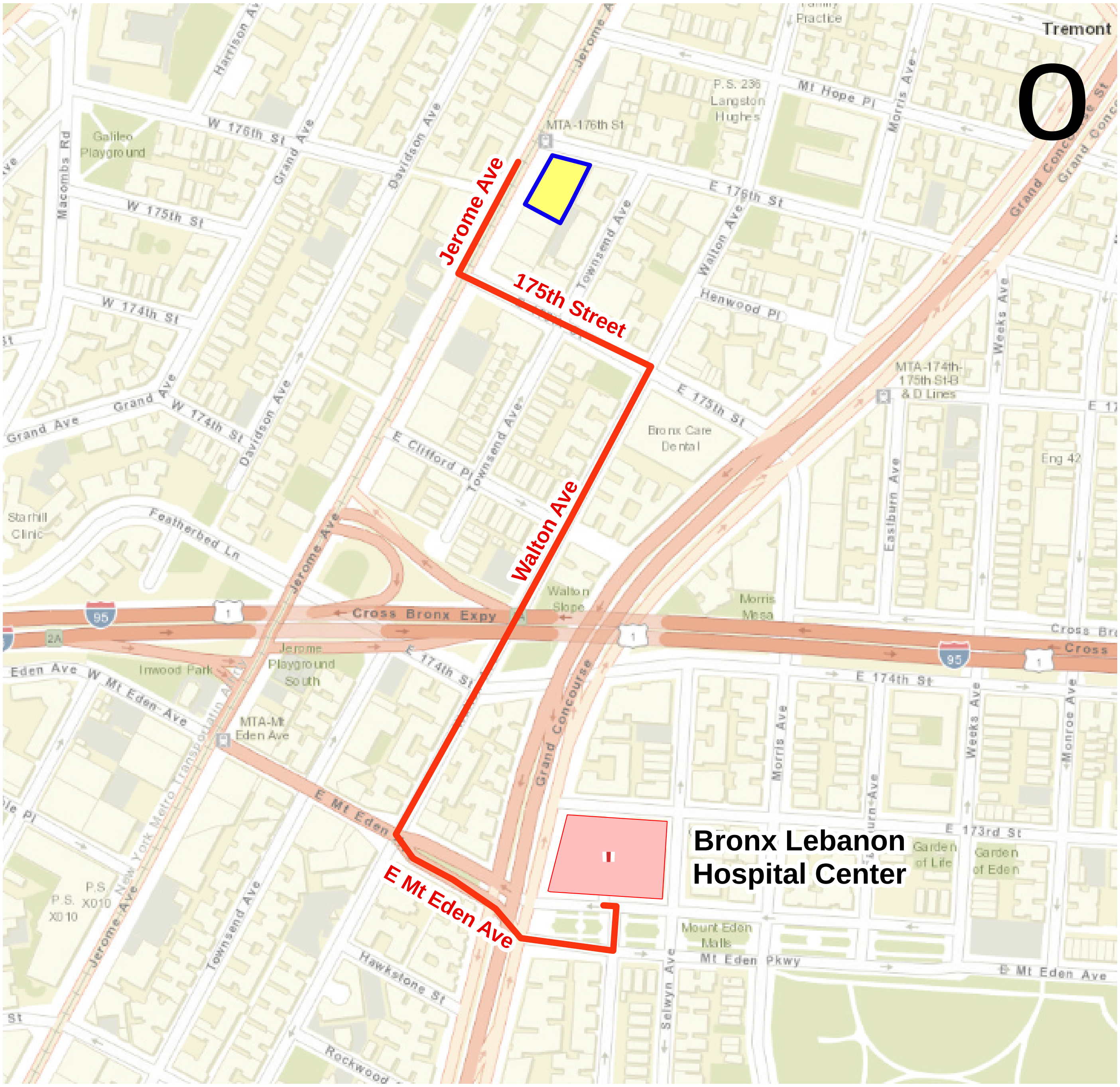
SITE LOCATION

DATE
11/4/2024

PROJECT NO.
241375

FIGURE
1

AKRF O:\Projects\240285 - BP 1770 JEROME\SAR\240285 BCP App Figures.aprx7/3/2024 10:56 AM240285 Fig 1 Site Location\jszalus



Service Layer Credits: ESRI World Street Map 2024

Bronx Lebanon Hospital Center
1650 Grand Concourse
Bronx, NY 10457
(718) 590-1800

LEGEND

🟨 PROJECT SITE BOUNDARY

— ROUTE TO HOSPITAL

▮ HOSPITAL LOCATION

0 400 800
SCALE IN FEET

AKRF
440 Park Avenue South, New York, NY 10016

1770 Jerome Avenue
Bronx, NY

HOSPITAL ROUTE MAP

DATE
11/27/2024

PROJECT NO.
241375

FIGURE
2

ATTACHMENT A
POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS

ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

BARIUM AND COMPOUNDS

CAS # 7440-39-3

Division of Toxicology and Environmental Medicine ToxFAQs™ **August 2007**

This fact sheet answers the most frequently asked health questions (FAQs) about barium and barium compounds. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to barium occurs mostly in the workplace or from drinking contaminated water. Ingesting drinking water containing levels of barium above the EPA drinking water guidelines for relatively short periods of time can cause gastrointestinal disturbances and muscle weakness. Ingesting high levels for a long time can damage the kidneys. Barium and barium compounds have been found in at least 798 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is barium?

Barium is a silvery-white metal which exists in nature only in ores containing mixtures of elements. It combines with other chemicals such as sulfur or carbon and oxygen to form barium compounds.

Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, ceramics, glass, and rubber.

Barium sulfate is sometimes used by doctors to perform medical tests and to take x-rays of the gastrointestinal tract.

What happens to barium when it enters the environment?

❏ Barium gets into the air during the mining, refining, and production of barium compounds, and from the burning of coal and oil.
❏ The length of time that barium will last in air, land, water, or sediments depends on the form of barium released.
❏ Barium compounds, such as barium sulfate and barium carbonate, which do not dissolve well in water, can last a long time in the environment.
❏ Barium compounds, such as barium chloride, barium nitrate, or barium hydroxide, that dissolve easily in water usually do not last in these forms for a long time in the environment. The barium in these compounds that is dissolved in water quickly combines with sulfate or carbonate that are naturally found in water and become the longer lasting forms (barium sulfate and barium carbonate).
❏ Fish and aquatic organisms can accumulate barium.

How might I be exposed to barium?

❏ Ingesting small amounts present in your food and water or breathing air containing very low levels of barium.
❏ Living in areas with unusually high natural levels of barium in the drinking water.
❏ Working in a job that involves barium production or use.
❏ Living or working near waste sites where barium has been disposed of.

How can barium affect my health?

The health effects of the different barium compounds depend on how well the compound dissolves in water or in the stomach contents. Barium compounds that do not dissolve well, such as barium sulfate, are not generally harmful.

Barium has been found to potentially cause gastrointestinal disturbances and muscular weakness when people are exposed to it at levels above the EPA drinking water standards for relatively short periods of time. Some people who eat or drink amounts of barium above background levels found in food and water for a short period may experience vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. Eating or drinking very large amounts of barium compounds that easily dissolve can cause changes in heart rhythm or paralysis and possibly death. Animals that drank barium over long periods had damage to the kidneys, decreases in body weight, and some died.

How likely is barium to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified barium as to its carcinogenicity. The EPA has determined that barium is not likely to be carcinogenic to humans following ingestion and that there is insufficient information to determine whether it will be carcinogenic to humans following inhalation exposure.

How can barium affect children?

We do not know whether children will be more or less sensitive than adults to barium toxicity. A study in rats that swallowed barium found a decrease in newborn body weight; we do not know if a similar effect would be seen in humans.

How can families reduce the risks of exposure to barium?

The greatest potential source of barium exposure is through food and drinking water. However, the amount of barium in foods and drinking water are typically too low to be of concern.

Is there a medical test to determine whether I've been exposed to barium?

There is no routine medical test to determine whether you have been exposed to barium. Doctors can measure barium in body tissues and fluids, such as bones, blood, urine, and feces, using very complex instruments. These tests cannot be used to predict the extent of the exposure or potential health effects.

The geometric mean barium level measured in the U.S. general population aged 6 and older is reported by the Centers for Disease Control and Prevention (CDC) as 1.44 µg/g creatinine (measured in urine).

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2.0 milligrams of barium per liter of drinking water (2.0 mg/L), which is the same as 2 ppm.

The Occupational Safety and Health Administration (OSHA) has set Permissible Exposure Limits (PELs) of 0.5 milligrams of soluble barium compounds per cubic meter of workplace air (0.5 mg/m^3) for 8 hour shifts and 40 hour work weeks. The OSHA limits for barium sulfate dust are 15 mg/m^3 of total dust and 5 mg/m^3 for respirable fraction.

The National Institute for Occupational Safety and Health (NIOSH) has set Recommended Exposure Limits (RELs) of 0.5 mg/m^3 for soluble barium compounds. The NIOSH has set RELs of 10 mg/m^3 (total dust) for barium sulfate and 5 mg/m^3 (respirable fraction).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Barium and Compounds (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

CARBON TETRACHLORIDE

CAS # 56-23-5

Division of Toxicology ToxFAQs™ August 2005

This fact sheet answers the most frequently asked health questions (FAQs) about carbon tetrachloride. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Carbon tetrachloride does not occur naturally. Exposure to this substance results mostly from breathing air, drinking water, or coming in contact with soil that is contaminated with it. Exposure to very high amounts of carbon tetrachloride can damage the liver, kidneys, and nervous system. Carbon tetrachloride can cause cancer in animals. Carbon tetrachloride has been found in at least 425 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is carbon tetrachloride?

Carbon tetrachloride is a manufactured chemical that does not occur naturally. It is a clear liquid with a sweet smell that can be detected at low levels. It is also called carbon chloride, methane tetrachloride, perchloromethane, tetrachloroethane, or benziform.

Carbon tetrachloride is most often found in the air as a colorless gas. It is not flammable and does not dissolve in water very easily. It was used in the production of refrigeration fluid and propellants for aerosol cans, as a pesticide, as a cleaning fluid and degreasing agent, in fire extinguishers, and in spot removers. Because of its harmful effects, these uses are now banned and it is only used in some industrial applications.

What happens to carbon tetrachloride when it enters the environment?

❑ It moves very quickly into the air upon release, so most of it is in the air.
❑ It evaporates quickly surface water.
❑ Only a small amount sticks to soil particles; the rest evaporates or moves into the groundwater.
❑ It is very stable in air (lifetime 30-100 years).
❑ It can be broken down or transformed in soil and water within several days.
❑ When it does break down, it forms chemicals that can destroy ozone in the upper atmosphere.
❑ It does not build up in animals. We do not know if it build up in plants.

How might I be exposed to carbon tetrachloride?

❑ Breathing contaminated air near manufacturing plants or waste sites.
❑ Breathing workplace air when it is used.
❑ Drinking contaminated water near manufacturing plants and waste sites.
❑ Breathing contaminated air and skin contact with water while showering or cooking with contaminated water.
❑ Swimming or bathing in contaminated water.
❑ Contact with or eating contaminated soil (pica child) at waste sites.

How can carbon tetrachloride affect my health?

High exposure to carbon tetrachloride can cause liver, kidney, and central nervous system damage. These effects can occur after ingestion or breathing carbon tetrachloride, and possibly from exposure to the skin. The liver is especially sensitive to carbon tetrachloride because it enlarges and cells are damaged or destroyed. Kidneys also are damaged, causing a build up of wastes in the blood. If exposure is low and brief, the liver and kidneys can repair the damaged cells and function normally again. Effects of carbon tetrachloride are more severe in persons who drink large amounts of alcohol.

If exposure is very high, the nervous system, including the brain, is affected. People may feel intoxicated and experience headaches, dizziness, sleepiness, and nausea and vomiting. These effects may subside if exposure is stopped, but in severe cases, coma and even death may occur.

There have been no studies of the effects of carbon tetrachloride on reproduction in humans, but studies in rats showed that long-term inhalation may cause decreased fertility.

How likely is carbon tetrachloride to cause cancer?

Studies in humans have not been able to determine whether or not carbon tetrachloride can cause cancer because usually there has been exposure to other chemicals at the same time. Swallowing or breathing carbon tetrachloride for years caused liver tumors in animals. Mice that breathed carbon tetrachloride also developed tumors of the adrenal gland.

The Department of Health and Human Services (DHHS) has determined that carbon tetrachloride may reasonably be anticipated to be a carcinogen. The International Agency for Research on Cancer (IARC) has determined that carbon tetrachloride is possibly carcinogenic to humans, whereas the EPA determined that carbon tetrachloride is a probable human carcinogen.

How can carbon tetrachloride affect children?

The health effects of carbon tetrachloride have not been studied in children, but they are likely to be similar to those seen in adults exposed to the chemical. We do not know whether children differ from adults in their susceptibility to carbon tetrachloride.

A few survey-type studies suggest that maternal drinking water exposure to carbon tetrachloride might possibly be related to certain birth defects. Studies in animals showed that carbon tetrachloride can cause early fetal deaths, but did not cause birth defects. A study with human breast milk in a test tube suggested that it would be possible for carbon tetrachloride to pass from the maternal circulation to breast milk, but there is no direct demonstration of this occurring.

How can families reduce the risks of exposure to carbon tetrachloride?

❏ Discard any product that contains carbon tetrachloride that you may have at home and may have used in the past.

❏ Household chemicals should be stored out of the reach of children in their original containers.

❏ Sometimes older children sniff household chemical products to get high. Talk to your children about the dangers of sniffing chemicals.

Is there a medical test to determine whether I've been exposed to carbon tetrachloride?

Several sensitive and specific tests are available to measure carbon tetrachloride in exposed persons. The most convenient way is simply to measure carbon tetrachloride in the exhaled air. Carbon tetrachloride also can be measured in blood, fat, or other tissues. These tests are not usually done in the doctor's office because they require special equipment. Although these tests can show that a person has been exposed to carbon tetrachloride, the results cannot be used to reliably predict whether any adverse health effect might result. Because carbon tetrachloride leaves the body fairly quickly, these methods are best suited to detecting exposures that have occurred within the last several days.

Has the federal government made recommendations to protect human health?

The EPA has set a limit for carbon tetrachloride in drinking water of 5 parts of carbon tetrachloride per billion parts of water (5 ppb). The EPA has also set limits on how much carbon tetrachloride can be released from an industrial plant into waste water and is preparing to set limits on how much carbon tetrachloride can escape from an industrial plant into outside air.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 ppm for carbon tetrachloride in workplace air for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Carbon Tetrachloride (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

DDT, DDE, and DDD - ToxFAQs™

What are DDT, DDE, and DDD?

DDT (dichlorodiphenyltrichloroethane) is a man-made chemical that does not occur naturally in the environment. It is a white, crystalline solid with no odor or taste. DDE (dichlorodiphenyldichloroethylene) and DDD (dichlorodiphenyldichloroethane) are chemicals similar to DDT that can form when DDT breaks down.

DDT is a pesticide that was once widely used to control insects in agriculture and insects that carry diseases such as malaria. Its use was banned in 1972 because of damage to wildlife but is still used in a limited number of countries where diseases such as malaria are a major health problem. DDE has no commercial use. DDD was also used to kill pests, but its use has also been banned. One form of DDD has been used to treat cancer of the adrenal gland.

What happens to DDT, DDE, and DDD in the environment?

DDT can get into the environment when it is used as a pesticide. DDE and DDD form when DDT breaks down. These chemicals can evaporate into the air from water and moist soil and may then be carried to locations very far from the original source. They can be removed from the air by rain and snow or be broken down by sunlight. DDT, DDE, and DDD stick strongly to the soil and are not likely to move into the groundwater. Microorganisms in the soil slowly break down DDT (it can take anywhere from 2 to 15 years to break down half of the DDT). DDT does not dissolve easily in water and is mostly found in the sediment on the bottom of bodies of water. DDT, DDE, and DDD can build up in plants and animals.

How can I be exposed to DDT, DDE, and DDD?

Most people are not likely to be exposed to DDT, DDE, or DDD. The most common way to be exposed to small amounts of these chemicals is from eating contaminated food such as meat, fish, poultry, and dairy products. If you live near a hazardous waste site, you might be exposed to DDT, DDE, and DDD from contaminated air, dirt, or water.

Since DDT was banned in 1972, exposure to DDT, DDE, and DDD has decreased dramatically. Small amounts may still be found in some food.

How can DDT, DDE, and DDD affect my health?

People who accidentally swallowed large amounts of DDT had tremors, headaches, nausea, and seizures. These effects went away after the exposure stopped. No effects were seen in volunteers who took a small daily dose of DDT by capsule for 18 months. Studies have shown that women with high amounts of DDE in their blood were more likely to have a premature baby or a baby with a wheeze. Exposure to DDT may also increase chances of developing Type II diabetes mellitus in some groups of people.

Animal studies generally used higher amounts of DDT, DDE, and DDD than you would likely be exposed to in the United States. In studies where animals were fed DDT, DDE, or DDD, harmful effects were seen on their nervous system, liver, and reproductive system (including decreased fertility).

DDT, DDE, and DDD

Can DDT, DDE, and DDD cause cancer?

Studies have shown that people with higher levels of DDT in their blood have an increased risk of developing liver cancer. Liver cancer was also seen in animals that were fed DDT over a long period of time.

The U.S. Department of Health and Human Services (DHHS) has determined that DDT may reasonably be anticipated to be a human carcinogen (causing cancer in people).

The U.S. Environmental Protection Agency (EPA) has classified DDT, DDE, and DDD as probable human carcinogens.

The International Agency for Research on Cancer (IARC) determined DDT may possibly cause cancer in humans.

Can I get a medical test to check for DDT, DDE, and DDD?

Tests are available to measure levels of DDT, DDE, and DDD in the blood, hair, and breast milk.

These tests cannot predict whether you will have health problems from the exposure to DDT, DDE, and DDD. Doctor's offices do not routinely offer these tests.

How can I protect myself and my family from DDT, DDE, and DDD?

Most people don't need to take any special steps to avoid DDT, DDE, and DDD in their daily lives. Washing fruits and vegetable that come from foreign countries will remove most DDT if any is present. Children should avoid playing in dirt or water near hazardous waste sites to avoid coming in contact with these chemicals.

Follow health advisories that tell you about consumption of fish and wildlife caught in contaminated areas.

For more information:

Call **CDC-INFO** at 1-800-232-4636, or submit your question online at https://wwwn.cdc.gov/dcs/ContactUs/Form

Go to ATSDR's Toxicological Profile for DDT, DDE, and DDD: https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=81&tid=20

Go to ATSDR's Toxic Substances Portal: https://wwwn.cdc.gov/TSP/index.aspx

Find & contact your ATSDR Regional Representative at http://www.atsdr.cdc.gov/DRO/dro_org.html

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MANGANESE

CAS # 7439-96-5

Division of Toxicology and Environmental Medicine ToxFAQs™ **September 2008**

This fact sheet answers the most frequently asked health questions (FAQs) about manganese. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Manganese is a trace element and eating a small amount from food or water is needed to stay healthy. Exposure to excess levels of manganese may occur from breathing air, particularly where manganese is used in manufacturing, and from drinking water and eating food. At high levels, it can cause damage to the brain. Manganese has been found in at least 869 of the 1,669 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is manganese?

Manganese is a naturally occurring metal that is found in many types of rocks. Pure manganese is silver-colored, but does not occur naturally. It combines with other substances such as oxygen, sulfur, or chlorine. Manganese occurs naturally in most foods and may be added to some foods.

Manganese is used principally in steel production to improve hardness, stiffness, and strength. It may also be used as an additive in gasoline to improve the octane rating of the gas.

What happens to manganese when it enters the environment?

❑ Manganese can be released to the air, soil, and water from the manufacture, use, and disposal of manganese-based products.

❑ Manganese cannot break down in the environment. It can only change its form or become attached to or separated from particles.

❑ In water, manganese tends to attach to particles in the water or settle into the sediment.

❑ The chemical state of manganese and the type of soil determine how fast it moves through the soil and how much is retained in the soil.

❑ The manganese-containing gasoline additive may degrade in the environment quickly when exposed to sunlight, releasing manganese.

How might I be exposed to manganese?

❑ The primary way you can be exposed to manganese is by eating food or manganese-containing nutritional supplements. Vegetarians who consume foods rich in manganese such as grains, beans and nuts, as well as heavy tea drinkers, may have a higher intake of manganese than the average person.

❑ Certain occupations like welding or working in a factory where steel is made may increase your chances of being exposed to high levels of manganese.

❑ Manganese is routinely contained in groundwater, drinking water, and soil at low levels. Drinking water containing manganese or swimming or bathing in water containing manganese may expose you to low levels of this chemical.

How can manganese affect my health?

Manganese is an essential nutrient, and eating a small amount of it each day is important to stay healthy.

The most common health problems in workers exposed to high levels of manganese involve the nervous system. These health effects include behavioral changes and other nervous system effects, which include movements that may become slow and clumsy. This combination of symptoms when sufficiently severe is referred to as "manganism". Other less severe nervous system effects such as slowed hand movements have been observed in some workers exposed to lower concentrations in the work place.

Nervous system and reproductive effects have been observed in animals after high oral doses of manganese.

How likely is manganese to cause cancer?

The EPA concluded that existing scientific information cannot determine whether or not excess manganese can cause cancer.

How can manganese affect children?

Studies in children have suggested that extremely high levels of manganese exposure may produce undesirable effects on brain development, including changes in behavior and decreases in the ability to learn and remember. We do not know for certain that these changes were caused by manganese alone. We do not know if these changes are temporary or permanent. We do not know whether children are more sensitive than adults to the effects of manganese, but there is some indication from experiments in laboratory animals that they may be.

Studies of manganese workers have not found increases in birth defects or low birth weight in their offspring. No birth defects were observed in animals exposed to manganese.

How can families reduce the risks of exposure to manganese?

❏ Children are not likely to be exposed to harmful amounts of manganese in the diet. However, higher-than-usual amounts of manganese may be absorbed if their diet is low in iron. It is important to provide your child with a well-balanced diet.

❏ Workers exposed to high levels of airborne manganese in certain occupational settings may accumulate manganese dust on their work clothes. Manganese-contaminated work clothing should be removed before getting into your car or entering your home to help reduce the exposure hazard for yourself and your family.

Is there a medical test to determine whether I've been exposed to manganese?

Several tests are available to measure manganese in blood, urine, hair, or feces. Because manganese is normally present in our body, some is always found in tissues or fluids.

Because excess manganese is usually removed from the body within a few days, past exposures are difficult to measure with common laboratory tests.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to manganese in drinking water at concentrations of 1 mg/L for up to 10 days is not expected to cause any adverse effects in a child.

The EPA has established that lifetime exposure to 0.3 mg/L manganese is not expected to cause any adverse effects.

The FDA has determined that the manganese concentration in bottled drinking water should not exceed 0.05 mg/L.

The Occupational Health and Safety Administration (OSHA) has established a ceiling limit (concentration that should not be exceeded at any time during exposure) of 5 mg/m^3 for manganese in workplace air.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for Manganese (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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NAPHTHALENE
CAS # 91-20-3

1-METHYLNAPHTHALENE
CAS # 90-12-0

2-METHYLNAPHTHALENE
CAS # 91-57-6

Division of Toxicology ToxFAQs™ **August 2005**

This fact sheet answers the most frequently asked health questions (FAQs) about naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene happens mostly from breathing air contaminated from the burning of wood, tobacco, or fossil fuels, industrial discharges, or moth repellents. Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. Naphthalene has caused cancer in animals. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene have been found in at least 687, 36, and 412, respectively, of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What are naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Naphthalene is a white solid that evaporates easily. Fuels such as petroleum and coal contain naphthalene. It is also called white tar, and tar camphor, and has been used in mothballs and moth flakes. Burning tobacco or wood produces naphthalene. It has a strong, but not unpleasant smell. The major commercial use of naphthalene is in the manufacture of polyvinyl chloride (PVC) plastics. Its major consumer use is in moth repellents and toilet deodorant blocks.

1-Methylnaphthalene and 2-methylnaphthalene are naphthalene-related compounds. 1-Methylnaphthalene is a clear liquid and 2-methylnaphthalene is a solid; both can be smelled in air and in water at very low concentrations.

1-Methylnaphthalene and 2-methylnaphthalene are used to make other chemicals such as dyes and resins. 2-Methylnaphthalene is also used to make vitamin K.

What happens to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene when they enter the environment?

- Naphthalene enters the environment from industrial and domestic sources, and from accidental spills.
- Naphthalene can dissolve in water to a limited degree and may be present in drinking water from wells close to hazardous waste sites and landfills.
- Naphthalene can become weakly attached to soil or pass through soil into underground water.
- In air, moisture and sunlight break it down within 1 day. In water, bacteria break it down or it evaporates into the air.
- Naphthalene does not accumulate in the flesh of animals or fish that you might eat.
- 1-Methylnaphthalene and 2-methylnaphthalene are expected to act like naphthalene in air, water, or soil because they have similar chemical and physical properties.

How might I be exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

- Breathing low levels in outdoor air.
- Breathing air contaminated from industrial discharges or smoke from burning wood, tobacco, or fossil fuels.
- Using or making moth repellents, coal tar products, dyes or inks could expose you to these chemicals in the air.
- Drinking water from contaminated wells.
- Touching fabrics that are treated with moth repellents containing naphthalene.
- Exposure to naphthalene, 1-methylnaphthalene and 2-methylnaphthalene from eating foods or drinking beverages is unlikely.

How can naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene affect my health?

Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. This could cause you to have too few red blood cells until your body replaces the destroyed cells. This condition is called hemolytic anemia. Some symptoms of hemolytic anemia are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin. Animals sometimes develop cloudiness in their eyes after swallowing high amounts of naphthalene. It is not clear whether this also develops in people. Rats and mice that breathed naphthalene vapors daily for a lifetime developed irritation and inflammation of their nose and lungs. It is unclear if naphthalene causes reproductive effects in animals; most evidence says it does not.

There are no studies of humans exposed to 1-methylnaphthalene or 2-methylnaphthalene.

Mice fed food containing 1-methylnaphthalene and 2-methylnaphthalene for most of their lives had part of their lungs filled with an abnormal material.

How likely are naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene to cause cancer?

There is no direct evidence in humans that naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene cause cancer. However, cancer from naphthalene exposure has been seen in animal studies. Some female mice that breathed naphthalene vapors daily for a lifetime developed lung tumors. Some male and female rats exposed to naphthalene in a similar manner also developed nose tumors.

Based on the results from animal studies, the Department of Health and Humans Services (DHHS) concluded that naphthalene is reasonably anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) concluded that naphthalene is possibly carcinogenic to humans. The EPA determined that naphthalene is a possible human carcinogen (Group C) and that the data are inadequate to assess the human carcinogenic potential of 2-methylnaphthalene.

How can naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene affect children?

Hospitals have reported many cases of hemolytic anemia in children, including newborns and infants, who either ate naphthalene mothballs or deodorants cakes or who were in close contact with clothing or blankets stored in naphthalene mothballs.

Naphthalene can move from a pregnant woman's blood to the unborn baby's blood. Naphthalene has been detected in some samples of breast milk from the general U.S. population, but not at levels that are expected to be of concern.

There is no information on whether naphthalene has affected development in humans. No developmental abnormalities were observed in the offspring from rats, mice, and rabbits fed naphthalene during pregnancy.

We do not have any information on possible health effects of 1-methylnaphthalene or 2-methylnaphthalene on children.

How can families reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

❑ Families can reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene by avoiding smoking tobacco, generating smoke during cooking, or using fireplaces or heating appliances in the their homes.

❑ If families use naphthalene-containing moth repellents, the material should be enclosed in containers that prevent vapors from escaping, and kept out of the reach from children.

❑ Blankets and clothing stored with naphthalene moth repellents should be aired outdoors to remove naphthalene odors and washed before they are used.

❑ Families should inform themselves of the contents of air deodorizers that are used in their homes and refrain from using deodorizers with naphthalene.

Is there a medical test to determine whether I've been exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Tests are available that measure levels of these chemicals and their breakdown products in samples of urine, feces, blood, maternal milk, or body fat. These tests are not routinely available in a doctor's office because they require special equipment, but samples can be sent to special testing laboratories. These tests cannot determine exactly how much naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene you were exposed to or predict whether harmful effects will occur. If the samples are collected within a day or two of exposure, then the tests can show if you were exposed to a large or small amount of naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene.

Has the federal government made recommendations to protect human health?

The EPA recommends that children not drink water with over 0.5 parts per million (0.5 ppm) naphthalene for more than 10 days or over 0.4 ppm for any longer than 7 years. Adults should not drink water with more than 1 ppm for more than 7 years. For water consumed over a lifetime (70 years), the EPA suggests that it contain no more than 0.1 ppm naphthalene.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 ppm for the level of naphthalene in workplace air during an 8-hour workday, 40-hour workweek. The National Institute for Occupational Safety and Health (NIOSH) considers more than 500 ppm of naphthalene in air to be immediately dangerous to life or health. This is the exposure level of a chemical that is likely to impair a worker's ability to leave a contaminate area and therefore, results in permanent health problems or death.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Nickel - ToxFAQs™

What is nickel?

Nickel (Ni) is an element and a metal found naturally in the environment. It is found in water, soils, and air. Nickel is obtained through mining and recycling. Nickel is mainly used to make stainless steel and is used by many other industries in the United States and worldwide. Combining nickel with other metals, such as iron and copper, forms alloys with numerous uses including in medical devices, jewelry, and coins. Nickel is also used to produce batteries for electrical cars. Nickel compounds are formed when combining nickel with elements like sulfur, hydrogen, and oxygen, and are used in nickel plating and batteries. Nickel is also present in foods, drinking water, tobacco products, and electronic cigarette liquid.

What happens to nickel in the environment?

- Nickel occurs in air, water, sediments, and soil coming from various natural sources and human activities like trash incineration, coal-burning, and oil-burning.
- In air, nickel usually attaches to particles (particulate matter) that may fall to the ground or be brought down by rain or snow.
- Nickel can be transported into streams and waterways through natural weathering or from disturbed soil.
- Nickel can be found naturally in all plants. Certain plants can accumulate more nickel than others.
- Nickel is not expected to accumulate in large amounts in fish or other organisms found in water.

How can I be exposed to nickel?

- You are mainly exposed to nickel by eating foods or drinking water that contain it, but usually in small amounts.
- You may be exposed when you come in direct and prolonged skin contact, including body piercings, with high nickel-releasing items, such as jewelry.
- You may breathe in air that contains small amounts of nickel. You can also breathe in small amounts of nickel by smoking tobacco or tobacco-containing products, or by using electronic cigarettes.
- If you work in an industry that processes or uses nickel, you may have exposure to nickel in the workplace.
- Soils near mines, processing facilities, or waste dumps may be contaminated with nickel but these levels are expected to be low due to regulations and risk management measures.

Nickel allergy is estimated to affect 4–16% of the global population.

How can nickel affect my health?

The most common health effect is an allergic reaction in the form of itchy rash (contact dermatitis). This can happen where your skin comes in direct and prolonged contact with high nickel-releasing items. Globally, an estimated 4% of men and 16% of women in the population may have allergic skin reactions to nickel. You can develop a sensitivity if you have direct and prolonged skin contact with high nickel-releasing items, such as wearing jewelry that releases high amounts of nickel. You may also experience allergic reactions from eating food or drinking water containing nickel. Only a small portion of the nickel-allergic population is susceptible to reactions from oral exposure.

Respiratory effects have been reported in workers exposed to nickel or nickel compounds. In laboratory animals, lung damage and nasal effects have been observed at relatively low concentrations of nickel and nickel compounds.

In studies on laboratory animals, eating or drinking large amounts of nickel caused lung effects and effects on the stomach, blood, liver, kidneys, immune system, reproduction, and development.

The U.S. Department of Health and Human Services (HHS) has classified metallic nickel as reasonably anticipated to be a human carcinogen (cancer causing) based on evidence from animal studies. HHS has also classified nickel compounds as known to be a human carcinogen based on evidence in human studies.

The U.S. Environmental Protection Agency (EPA) has classified nickel subsulfide and nickel refinery dust as human carcinogens. The EPA has not evaluated whether other nickel compounds are cancer causing.

The International Agency for Research on Cancer (IARC) has determined that metallic nickel is possibly carcinogenic to humans and nickel compounds are carcinogenic to humans.

Can I get a medical test to check for nickel?

You can take a blood, urine, or feces test that will measure the amount of nickel in your body. However, these tests will not predict if you will have health problems or if your health problems are due to nickel. These tests are not part of tests routinely done at a doctor's office, but at a special lab. If you think you may have been exposed to high levels of nickel, talk to your doctor, nurse, or health clinic, or call poison control.

How can I protect my family from nickel exposure?

You may eliminate or reduce the risk of an allergic skin reaction by avoiding direct and prolonged skin contact with high nickel-releasing items such as jewelry and instead purchasing items that are made with surgical stainless steel or are labelled hypoallergenic.

Most people may eat food or drink water that contain low amounts of nickel, which are not usually a cause of concern for health.

If you work with nickel, be sure to wear the necessary protective clothing and equipment and always follow safety procedures, including showering and changing your clothes before you go home each day.

For more information:

Call **CDC-INFO** at 1-800-232-4636, or submit your question online at https://wwwn.cdc.gov/dcs/ContactUs/Form

Go to ATSDR's Toxicological Profile for Nickel: https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=245&tid=44

Go to ATSDR's Toxic Substances Portal: http://www.atsdr.cdc.gov/substances/index.asp

Find & contact your ATSDR Regional Representative at http://www.atsdr.cdc.gov/DRO/dro_org.html

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AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

1,2-DICHLOROETHENE

CAS # 540-59-0, 156-59-2, and 156-60-5

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1997**

This fact sheet answers the most frequently asked health questions (FAQs) about 1,2-dichloroethene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to 1,2-dichloroethene occurs mainly in workplaces where it is made or used. Breathing high levels of 1,2-dichloroethene can make you feel nauseous, drowsy, and tired. *cis*-1,2-Dichloroethene has been found in at least 146 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA). *trans*-1,2-Dichloroethene was found in at least 563 NPL sites. 1,2-Dichloroethene was found at 336 sites, but the isomer (*cis*- or *trans*-) was not specified.

What is 1,2-dichloroethene?

(Pronounced 1,2-dī-klôr′ ō-ĕth′ēn)

1,2-Dichloroethene, also called 1,2-dichloroethylene, is a highly flammable, colorless liquid with a sharp, harsh odor. It is used to produce solvents and in chemical mixtures. You can smell very small amounts of 1,2-dichloroethene in air (about 17 parts of 1,2-dichloroethene per million parts of air [17 ppm]).

There are two forms of 1,2-dichloroethene; one is called *cis*-1,2-dichloroethene and the other is called *trans*-1,2-dichloroethene. Sometimes both forms are present as a mixture.

What happens to 1,2-dichloroethene when it enters the environment?

- 1,2-Dichloroethene evaporates rapidly into air.
- In the air, it takes about 5-12 days for half of it to break down.
- Most 1,2-dichloroethene in the soil surface or bodies of water will evaporate into air.
- 1,2-Dichloroethene can travel through soil or dissolve in water in the soil. It is possible that it can contaminate groundwater.
- In groundwater, it takes about 13-48 weeks to break down.
- There is a slight chance that 1,2-dichloroethene will break down into vinyl chloride, a different chemical which is believed to be more toxic than 1,2-dichloroethene.

How might I be exposed to 1,2-dichloroethene?

- Breathing 1,2-dichloroethene that has leaked from hazardous waste sites and landfills.
- Drinking contaminated tap water or breathing vapors from contaminated water while cooking, bathing, or washing dishes.
- Breathing 1,2-dichloroethene, touching it, or touching contaminated materials in the workplace.

How can 1,2-dichloroethene affect my health?

Breathing high levels of 1,2-dichloroethene can make you feel nauseous, drowsy, and tired; breathing very high levels can kill you.

When animals breathed high levels of *trans*-1,2-dichloroethene for short or longer periods of time, their livers and lungs were damaged and the effects were more severe with longer exposure times. Animals that breathed very high levels of *trans*-1,2-dichloroethene had damaged hearts.

Animals that ingested extremely high doses of *cis*- or *trans*-1,2-dichloroethene died.

Lower doses of *cis*-1,2-dichloroethene caused effects on the blood, such as decreased numbers of red blood cells, and also effects on the liver.

The long-term (365 days or longer) human health effects after exposure to low concentrations of 1,2-dichloroethene aren't known. One animal study suggested that an exposed fetus may not grow as quickly as one that hasn't been exposed.

Exposure to 1,2-dichloroethene hasn't been shown to affect fertility in people or animals.

How likely is 1,2-dichloroethene to cause cancer?

The EPA has determined that *cis*-1,2-dichloroethene is not classifiable as to its human carcinogenicity.

No EPA cancer classification is available for *trans*-1,2-dichloroethene.

Is there a medical test to show whether I've been exposed to 1,2-dichloroethene?

Tests are available to measure concentrations of the breakdown products of 1,2-dichloroethene in blood, urine, and tissues. However, these tests aren't used routinely to determine whether a person has been exposed to this compound. This is because after you are exposed to 1,2-dichloroethene, the breakdown products in your body that are detected with these tests may be the same as those that come from exposure to other chemicals. These tests aren't available in most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum allowable level of *cis*-1,2-dichloroethene in drinking water at 0.07 milligrams per liter of water (0.07 mg/L) and *trans*-1,2-dichloroethene at 0.1 mg/L.

The EPA requires that any spills or accidental release of 1,000 pounds or more of 1,2-dichloroethene must be reported to the EPA.

The Occupational Health Safety and Health Administration (OSHA) has set the maximum allowable amount of 1,2-dichloroethene in workroom air during an 8-hour workday in a 40-hour workweek at 200 parts of 1,2-dichloroethene per million parts of air (200 ppm).

Glossary

Carcinogenicity: Ability of a substance to cause cancer.

CAS: Chemical Abstracts Service.

Fertility: Ability to reproduce.

Ingest: To eat or drink something.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Solvent: A chemical that can dissolve other substances.

References

This ToxFAQs information is taken from the 1996 Toxicological Profile for 1,2-Dichloroethene produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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BENZENE
CAS # 71-43-2

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1997**

This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 813 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is benzene?
(Pronounced bĕn′zēn′)

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What happens to benzene when it enters the environment?

- ☐ Industrial processes are the main source of benzene in the environment.
- ☐ Benzene can pass into the air from water and soil.
- ☐ It reacts with other chemicals in the air and breaks down within a few days.
- ☐ Benzene in the air can attach to rain or snow and be carried back down to the ground.
- ☐ It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- ☐ Benzene does not build up in plants or animals.

How might I be exposed to benzene?

- ☐ Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- ☐ Indoor air generally contains higher levels of benzene from products that contain it such as glues, paints, furniture wax, and detergents.
- ☐ Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- ☐ Leakage from underground storage tanks or from hazardous waste sites containing benzene can result in benzene contamination of well water.
- ☐ People working in industries that make or use benzene may be exposed to the highest levels of it.
- ☐ A major source of benzene exposures is tobacco smoke.

How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, Public Health Service
Agency for Toxic Substances and Disease Registry

The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

How likely is benzene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

Is there a medical test to show whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood, however, since benzene disappears rapidly from the blood, measurements are accurate only for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 0.005 milligrams per liter (0.005 mgL). The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 1 part of benzene per million parts of air (1 ppm) in the workplace during an 8-hour workday, 40-hour workweek.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Chromosomes: Parts of the cells responsible for the development of hereditary characteristics.

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Benzene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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AGENCY FOR TOXIC SUBSTANCES
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LEAD

CAS # 7439-92-1

Division of Toxicology and Environmental Medicine ToxFAQs™ **August 2007**

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

What happens to lead when it enters the environment?

❑ Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.

❑ When lead is released to the air, it may travel long distances before settling to the ground.

❑ Once lead falls onto soil, it usually sticks to soil particles.

❑ Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

❑ Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.

❑ Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.

❑ Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.

❑ Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

- ☐ Avoid exposure to sources of lead.
- ☐ Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.
- ☐ If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.
- ☐ Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children
- ☐ If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter (μg/dL). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10 μg/dL to be a level of concern for children.

EPA limits lead in drinking water to 15 μg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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MERCURY

CAS # 7439-97-6

Agency for Toxic Substances and Disease Registry ToxFAQs **April 1999**

This fact sheet answers the most frequently asked health questions (FAQs) about mercury. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, may damage the brain, kidneys, and developing fetus. This chemical has been found in at least 714 of 1,467 National Priorities List sites identified by the Environmental Protection Agency.

What is mercury?

(Pronounced mū̃r′kyə-rē)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

- ☐ Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.
- ☐ It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.
- ☐ Methylmercury may be formed in water and soil by small organisms called bacteria.
- ☐ Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

- ☐ Eating fish or shellfish contaminated with methylmercury.
- ☐ Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- ☐ Release of mercury from dental work and medical treatments.
- ☐ Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- ☐ Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

There are inadequate human cancer data available for all forms of mercury. Mercuric chloride has caused increases in several types of tumors in rats and mice, and methylmercury has caused kidney tumors in male mice. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.

How can mercury affect children?

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also can pass to a nursing infant through breast milk. However, the benefits of breast feeding may be greater than the possible adverse effects of mercury in breast milk.

Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage.

How can families reduce the risk of exposure to mercury?

Carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids.

Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children.

Pregnant women and children should keep away from rooms where liquid mercury has been used.

Learn about wildlife and fish advisories in your area from your public health or natural resources department.

Is there a medical test to show whether I've been exposed to mercury?

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2 parts of mercury per billion parts of drinking water (2 ppb).

The Food and Drug Administration (FDA) has set a maximum permissible level of 1 part of methylmercury in a million parts of seafood (1 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 0.1 milligram of organic mercury per cubic meter of workplace air (0.1 mg/m^3) and 0.05 mg/m^3 of metallic mercury vapor for 8-hour shifts and 40-hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES
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POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1996**

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl′ĭ-sī′klĭk ăr′ə-măt′ĭk hī′drə-kar′bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- ☐ PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- ☐ PAHs can occur in air attached to dust particles.
- ☐ Some PAH particles can readily evaporate into the air from soil or surface waters.
- ☐ PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- ☐ PAHs enter water through discharges from industrial and wastewater treatment plants.
- ☐ Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- ☐ Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- ☐ In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- ☐ PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- ☐ Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- ☐ Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- ☐ Coming in contact with air, water, or soil near hazardous waste sites.
- ☐ Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- ☐ Drinking contaminated water or cow's milk.

- ☐ Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
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TRICHLOROETHYLENE

CAS # 79-01-6

Division of Toxicology ToxFAQs™ July 2003

This fact sheet answers the most frequently asked health questions (FAQs) about trichloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Trichloroethylene is a colorless liquid which is used as a solvent for cleaning metal parts. Drinking or breathing high levels of trichloroethylene may cause nervous system effects, liver and lung damage, abnormal heartbeat, coma, and possibly death. Trichloroethylene has been found in at least 852 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is trichloroethylene?

Trichloroethylene (TCE) is a nonflammable, colorless liquid with a somewhat sweet odor and a sweet, burning taste. It is used mainly as a solvent to remove grease from metal parts, but it is also an ingredient in adhesives, paint removers, typewriter correction fluids, and spot removers.

Trichloroethylene is not thought to occur naturally in the environment. However, it has been found in underground water sources and many surface waters as a result of the manufacture, use, and disposal of the chemical.

What happens to trichloroethylene when it enters the environment?

❑ Trichloroethylene dissolves a little in water, but it can remain in ground water for a long time.

❑ Trichloroethylene quickly evaporates from surface water, so it is commonly found as a vapor in the air.

❑ Trichloroethylene evaporates less easily from the soil than from surface water. It may stick to particles and remain for a long time.

❑ Trichloroethylene may stick to particles in water, which will cause it to eventually settle to the bottom sediment.

❑ Trichloroethylene does not build up significantly in plants and animals.

How might I be exposed to trichloroethylene?

❑ Breathing air in and around the home which has been contaminated with trichloroethylene vapors from shower water or household products such as spot removers and typewriter correction fluid.

❑ Drinking, swimming, or showering in water that has been contaminated with trichloroethylene.

❑ Contact with soil contaminated with trichloroethylene, such as near a hazardous waste site.

❑ Contact with the skin or breathing contaminated air while manufacturing trichloroethylene or using it at work to wash paint or grease from skin or equipment.

How can trichloroethylene affect my health?

Breathing small amounts may cause headaches, lung irritation, dizziness, poor coordination, and difficulty concentrating.

Breathing large amounts of trichloroethylene may cause impaired heart function, unconsciousness, and death. Breathing it for long periods may cause nerve, kidney, and liver damage.

Drinking large amounts of trichloroethylene may cause nausea, liver damage, unconsciousness, impaired heart function, or death.

Drinking small amounts of trichloroethylene for long periods may cause liver and kidney damage, impaired immune system function, and impaired fetal development in pregnant women, although the extent of some of these effects is not yet clear.

Skin contact with trichloroethylene for short periods may cause skin rashes.

How likely is trichloroethylene to cause cancer?

Some studies with mice and rats have suggested that high levels of trichloroethylene may cause liver, kidney, or lung cancer. Some studies of people exposed over long periods to high levels of trichloroethylene in drinking water or in workplace air have found evidence of increased cancer. Although, there are some concerns about the studies of people who were exposed to trichloroethylene, some of the effects found in people were similar to effects in animals.

In its 9th Report on Carcinogens, the National Toxicology Program (NTP) determined that trichloroethylene is "reasonably anticipated to be a human carcinogen." The International Agency for Research on Cancer (IARC) has determined that trichloroethylene is "probably carcinogenic to humans."

Is there a medical test to show whether I've been exposed to trichloroethylene?

If you have recently been exposed to trichloroethylene, it can be detected in your breath, blood, or urine. The breath test, if it is performed soon after exposure, can tell if you have been exposed to even a small amount of trichloroethylene.

Exposure to larger amounts is assessed by blood and urine tests, which can detect trichloroethylene and many of its breakdown products for up to a week after exposure. However, exposure to other similar chemicals can produce the same breakdown products, so their detection is not absolute proof of exposure to trichloroethylene. This test isn't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level for trichloroethylene in drinking water at 0.005 milligrams per liter (0.005 mg/L) or 5 parts of TCE per billion parts water.

The EPA has also developed regulations for the handling and disposal of trichloroethylene.

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 100 parts of trichloroethylene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

Glossary

Carcinogenicity: The ability of a substance to cause cancer.
CAS: Chemical Abstracts Service.
Evaporate: To change into a vapor or gas.
Milligram (mg): One thousandth of a gram.
Nonflammable: Will not burn.
ppm: Parts per million.
Sediment: Mud and debris that have settled to the bottom of a body of water.
Solvent: A chemical that dissolves other substances.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Trichloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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TETRACHLOROETHYLENE
CAS # 127-18-4

Agency for Toxic Substances and Disease Registry ToxFAQs September 1997

This fact sheet answers the most frequently asked health questions (FAQs) about tetrachloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Tetrachloroethylene is a manufactured chemical used for dry cleaning and metal degreasing. Exposure to very high concentrations of tetrachloroethylene can cause dizziness, headaches, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Tetrachloroethylene has been found in at least 771 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is tetrachloroethylene?
(Pronounced tĕt′rə-klôr′ ō-ĕth′ə-lēn′)

Tetrachloroethylene is a manufactured chemical that is widely used for dry cleaning of fabrics and for metal-degreasing. It is also used to make other chemicals and is used in some consumer products.

Other names for tetrachloroethylene include perchloroethylene, PCE, and tetrachloroethene. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor. Most people can smell tetrachloroethylene when it is present in the air at a level of 1 part tetrachloroethylene per million parts of air (1 ppm) or more, although some can smell it at even lower levels.

What happens to tetrachloroethylene when it enters the environment?

☐ Much of the tetrachloroethylene that gets into water or soil evaporates into the air.

☐ Microorganisms can break down some of the tetrachloroethylene in soil or underground water.

☐ In the air, it is broken down by sunlight into other chemicals or brought back to the soil and water by rain.

☐ It does not appear to collect in fish or other animals that live in water.

How might I be exposed to tetrachloroethylene?

☐ When you bring clothes from the dry cleaners, they will release small amounts of tetrachloroethylene into the air.

☐ When you drink water containing tetrachloroethylene, you are exposed to it.

How can tetrachloroethylene affect my health?

High concentrations of tetrachloroethylene (particularly in closed, poorly ventilated areas) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death.

Irritation may result from repeated or extended skin contact with it. These symptoms occur almost entirely in work (or hobby) environments when people have been accidentally exposed to high concentrations or have intentionally used tetrachloroethylene to get a "high."

In industry, most workers are exposed to levels lower than those causing obvious nervous system effects. The health effects of breathing in air or drinking water with low levels of tetrachloroethylene are not known.

Results from some studies suggest that women who work in dry cleaning industries where exposures to tetrachloroethylene can be quite high may have more menstrual problems and spontaneous abortions than women who are not exposed. However, it is not known if tetrachloroethylene was responsible for these problems because other possible causes were not considered.

Results of animal studies, conducted with amounts much higher than those that most people are exposed to, show that tetrachloroethylene can cause liver and kidney damage. Exposure to very high levels of tetrachloroethylene can be toxic to the unborn pups of pregnant rats and mice. Changes in behavior were observed in the offspring of rats that breathed high levels of the chemical while they were pregnant.

How likely is tetrachloroethylene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. Tetrachloroethylene has been shown to cause liver tumors in mice and kidney tumors in male rats.

Is there a medical test to show whether I've been exposed to tetrachloroethylene?

One way of testing for tetrachloroethylene exposure is to measure the amount of the chemical in the breath, much the same way breath-alcohol measurements are used to determine the amount of alcohol in the blood.

Because it is stored in the body's fat and slowly released into the bloodstream, tetrachloroethylene can be detected in the breath for weeks following a heavy exposure.

Tetrachloroethylene and trichloroacetic acid (TCA), a breakdown product of tetrachloroethylene, can be detected in the blood. These tests are relatively simple to perform. These tests aren't available at most doctors' offices, but can be performed at special laboratories that have the right equipment.

Because exposure to other chemicals can produce the same breakdown products in the urine and blood, the tests for breakdown products cannot determine if you have been exposed to tetrachloroethylene or the other chemicals.

Has the federal government made recommendations to protect human health?

The EPA maximum contaminant level for the amount of tetrachloroethylene that can be in drinking water is 0.005 milligrams tetrachloroethylene per liter of water (0.005 mg/L).

The Occupational Safety and Health Administration (OSHA) has set a limit of 100 ppm for an 8-hour workday over a 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that tetrachloroethylene be handled as a potential carcinogen and recommends that levels in workplace air should be as low as possible.

Glossary

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Milligram (mg): One thousandth of a gram.

Nonflammable: Will not burn.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Tetrachloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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VINYL CHLORIDE

CAS # 75-01-4

Division of Toxicology and Environmental Medicine ToxFAQs™ July 2006

This fact sheet answers the most frequently asked health questions (FAQs) about vinyl chloride. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to vinyl chloride occurs mainly in the workplace. Breathing high levels of vinyl chloride for short periods of time can cause dizziness, sleepiness, unconsciousness, and at extremely high levels can cause death. Breathing vinyl chloride for long periods of time can result in permanent liver damage, immune reactions, nerve damage, and liver cancer. This substance has been found in at least 616 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is vinyl chloride?

Vinyl chloride is a colorless gas. It burns easily and it is not stable at high temperatures. It has a mild, sweet odor. It is a manufactured substance that does not occur naturally. It can be formed when other substances such as trichloroethane, trichloroethylene, and tetrachloroethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC). PVC is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

Vinyl chloride is also known as chloroethene, chloroethylene, and ethylene monochloride.

What happens to vinyl chloride when it enters the environment?

❑ Liquid vinyl chloride evaporates easily. Vinyl chloride in water or soil evaporates rapidly if it is near the surface.
❑ Vinyl chloride in the air breaks down in a few days to other substances, some of which can be harmful.
❑ Small amounts of vinyl chloride can dissolve in water.
❑ Vinyl chloride is unlikely to build up in plants or animals that you might eat.

How might I be exposed to vinyl chloride?

❑ Breathing vinyl chloride that has been released from plastics industries, hazardous waste sites, and landfills.
❑ Breathing vinyl chloride in air or during contact with your skin or eyes in the workplace.
❑ Drinking water from contaminated wells.

How can vinyl chloride affect my health?

Breathing high levels of vinyl chloride can cause you to feel dizzy or sleepy. Breathing very high levels can cause you to pass out, and breathing extremely high levels can cause death.

Some people who have breathed vinyl chloride for several years have changes in the structure of their livers. People are more likely to develop these changes if they breathe high levels of vinyl chloride. Some people who work with vinyl chloride have nerve damage and develop immune reactions. The lowest levels that produce liver changes, nerve damage, and immune reaction in people are not known. Some workers exposed to very high levels of vinyl chloride have problems with the blood flow in their hands. Their fingers turn white and hurt when they go into the cold.

The effects of drinking high levels of vinyl chloride are unknown. If you spill vinyl chloride on your skin, it will cause numbness, redness, and blisters.

Animal studies have shown that long-term exposure to vinyl chloride can damage the sperm and testes.

How likely is vinyl chloride to cause cancer?

The U.S. Department of Health and Human Services has determined that vinyl chloride is a known carcinogen. Studies in workers who have breathed vinyl chloride over many years showed an increased risk of liver, brain, lung cancer, and some cancers of the blood have also been observed in workers.

How can vinyl chloride affect children?

It has not been proven that vinyl chloride causes birth defects in humans, but studies in animals suggest that vinyl chloride might affect growth and development. Animal studies also suggest that infants and young children might be more susceptible than adults to vinyl chloride-induced cancer.

How can families reduce the risk of exposure to vinyl chloride?

Tobacco smoke contains low levels of vinyl chloride, so limiting your family's exposure to cigarette or cigar smoke may help reduce their exposure to vinyl chloride.

Is there a medical test to show whether I've been exposed to vinyl chloride?

The results of several tests can sometimes show if you have been exposed to vinyl chloride. Vinyl chloride can be measured in your breath, but the test must be done shortly after exposure. This is not helpful for measuring very low levels of vinyl chloride. The amount of the major breakdown product of vinyl chloride, thiodiglycolic acid, in the urine may give some information about exposure. However, this test must be done shortly after exposure and does not reliably indicate the level of exposure.

Has the federal government made recommendations to protect human health?

Vinyl chloride is regulated in drinking water, food, and air. The EPA requires that the amount of vinyl chloride in drinking water not exceed 0.002 milligrams per liter (mg/L) of water.

The Occupational Safety and Health Administration (OSHA) has set a limit of 1 part vinyl chloride per 1 million parts of air (1 ppm) in the workplace.

The Food and Drug Administration (FDA) regulates the vinyl chloride content of various plastics. These include plastics that carry liquids and plastics that contact food. The limits for vinyl chloride content vary depending on the nature of the plastic and its use.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2006. Toxicological Profile for Vinyl Chloride (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
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ZINC

CAS # 7440-66-6

Division of Toxicology ToxFAQs™ **August 2005**

This fact sheet answers the most frequently asked health questions (FAQs) about zinc. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Zinc is a naturally occurring element. Exposure to high levels of zinc occurs mostly from eating food, drinking water, or breathing workplace air that is contaminated. Low levels of zinc are essential for maintaining good health. Exposure to large amounts of zinc can be harmful. It can cause stomach cramps, anemia, and changes in cholesterol levels. Zinc has been found in at least 985 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is zinc?

Zinc is one of the most common elements in the earth's crust. It is found in air, soil, and water, and is present in all foods. Pure zinc is a bluish-white shiny metal.

Zinc has many commercial uses as coatings to prevent rust, in dry cell batteries, and mixed with other metals to make alloys like brass, and bronze. A zinc and copper alloy is used to make pennies in the United States.

Zinc combines with other elements to form zinc compounds. Common zinc compounds found at hazardous waste sites include zinc chloride, zinc oxide, zinc sulfate, and zinc sulfide. Zinc compounds are widely used in industry to make paint, rubber, dyes, wood preservatives, and ointments.

What happens to zinc when it enters the environment?

❑ Some is released into the environment by natural processes, but most comes from human activities like mining, steel production, coal burning, and burning of waste.
❑ It attaches to soil, sediments, and dust particles in the air.
❑ Rain and snow remove zinc dust particles from the air.
❑ Depending on the type of soil, some zinc compounds can move into the groundwater and into lakes, streams, and rivers.
❑ Most of the zinc in soil stays bound to soil particles and does not dissolve in water.
❑ It builds up in fish and other organisms, but it does not build up in plants.

How might I be exposed to zinc?

❑ Ingesting small amounts present in your food and water.
❑ Drinking contaminated water or a beverage that has been stored in metal containers or flows through pipes that have been coated with zinc to resist rust.
❑ Eating too many dietary supplements that contain zinc.
❑ Working on any of the following jobs: construction, painting, automobile mechanics, mining, smelting, and welding; manufacture of brass, bronze, or other zinc-containing alloys; manufacture of galvanized metals; and manufacture of machine parts, rubber, paint, linoleum, oilcloths, batteries, some kind of glass, ceramics, and dyes.

How can zinc affect my health?

Zinc is an essential element in our diet. Too little zinc can cause problems, but too much zinc is also harmful.

Harmful effects generally begin at levels 10-15 times higher than the amount needed for good health. Large doses taken by mouth even for a short time can cause stomach cramps, nausea, and vomiting. Taken longer, it can cause anemia and decrease the levels of your good cholesterol. We do not know if high levels of zinc affect reproduction in humans. Rats that were fed large amounts of zinc became infertile.

Inhaling large amounts of zinc (as dusts or fumes) can cause a specific short-term disease called metal fume fever. We do not know the long-term effects of breathing high levels of zinc.

Putting low levels of zinc acetate and zinc chloride on the skin of rabbits, guinea pigs, and mice caused skin irritation. Skin irritation will probably occur in people.

How likely is zinc to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified zinc for carcinogenicity. Based on incomplete information from human and animal studies, the EPA has determined that zinc is not classifiable as to its human carcinogenicity.

How can zinc affect children?

Zinc is essential for proper growth and development of young children. It is likely that children exposed to very high levels of zinc will have similar effects as adults. We do not know whether children are more susceptible to the effects of excessive intake of zinc than the adults.

We do not know if excess zinc can cause developmental effects in humans. Animal studies have found decreased weight in the offspring of animals that ingested very high amounts of zinc.

How can families reduce the risks of exposure to zinc?

❏ Children living near waste sites that contain zinc may be exposed to higher levels of zinc through breathing contaminated air, drinking contaminated drinking water, touching or eating contaminated soil.
❏ Discourage your children from eating soil or putting their hands in their mouths and teach them to wash their hands frequently and before eating.
❏ If you use medicines or vitamin supplements containing zinc, make sure you use them appropriately and keep them out of the reach of children.

Is there a medical test to determine whether I've been exposed to zinc?

There are tests available to measure zinc in your blood, urine, hair, saliva, and feces. These tests are not usually done in the doctor's office because they require special equipment. High levels of zinc in the feces can mean high recent zinc exposure. High levels of zinc in the blood can mean high zinc consumption and/or high exposure. Tests to measure zinc in hair may provide information on long-term zinc exposure; however, the relationship between levels in your hair and the amount of zinc you were exposed to is not clear.

Has the federal government made recommendations to protect human health?

The EPA recommends that drinking water should contain no more than 5 milligrams per liter of water (5 mg/L) because of taste. The EPA requires that any release of 1,000 pounds (or in some cases 5,000 pounds) into the environment be reported to the agency.

To protect workers, the Occupational Safety and Health Administration (OSHA) has set an average limit of 1 mg/m^3 for zinc chloride fumes and 5 mg/m^3 for zinc oxide (dusts and fumes) in workplace air during an 8-hour workday, 40-hour workweek.

Similarly, the National Institute for Occupational Safety and Health (NIOSH) has set the same standards for up to a 10-hour workday over a 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Zinc (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATTACHMENT B
REPORT FORMS

WEEKLY SAFETY REPORT FORM

Week Ending: ________________ Project Name/Number: 1770 Jerome Avenue

Report Date: ________________ Project Manager Name: ________________

Summary of any violations of procedures occurring that week:

Summary of any job related injuries, illnesses, or near misses that week:

Summary of air monitoring data that week (include and sample analyses, action levels exceeded, and actions taken):

Comments:

Name: ________________ Company: ________________

Signature: ________________ Title: ________________

INCIDENT REPORT FORM

Date of Report: ________________________________

Injured: ________________________________

Employer: ________________________________

Site: 1770 Jerome Avenue Site Location: 1770 Jerome Avenue, Bronx, New York

Report Prepared By: ____________________ ____________________
Signature Title

ACCIDENT/INCIDENT CATEGORY (check all that applies)

___Injury
__ Property Damage
__ On-site Equipment
__ Mechanical
___ Illness
___ Fire
___ Motor Vehicle
___ Spill
___ Near Miss
___ Chemical Exposure
___ Electrical
___ Other

DATE AND TIME OF ACCIDENT/INCIDENT: Narrative report of accident/incident: Identify: 1) actions leading to or contributing to the accident/incident; 2) the accident/incident occurrence; and 3) actions following the accident/incident.

____

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WITNESS TO ACCIDENT/INCIDENT:

Name:	____________________	Company:	____________________
Address:	____________________	Address:	____________________
Phone No.:	____________________	Phone No.:	____________________
Name:	____________________	Company:	____________________
Address:	____________________	Address:	____________________
Phone No.:	____________________	Phone No.:	____________________

INJURED - ILL:

Name: ____________________ SSN: ____

Address: ____________________ Age: ____

Length of Service: ____________________ Time on Present Job: ______________________________

Time/Classification: ____

SEVERITY OF INJURY OR ILLNESS:

____ Disabling ___ Non-disabling ___ Fatality

____ Medical Treatment ___ First Aid Only

ESTIMATED NUMBER OF DAYS AWAY FROM JOB: ________________________________

NATURE OF INJURY OR ILLNESS: ____

____

____

____

CLASSIFICATION OF INJURY:

__ Abrasions
__ Bites
__ Blisters
__ Bruises
__ Chemical Burns
__ Cold Exposure
__ Concussion
__ Lacerations

_____ Dislocations
_____ Faint/Dizziness
_____ Fractures
_____ Frostbite
_____ Heat Burns
_____ Heat Exhaustion
_____ Heat Stroke

____ Punctures
____ Radiation Burns
____ Respiratory Allergy
____ Sprains
____ Toxic Resp. Exposure
____ Toxic Ingestion
____ Dermal Allergy

Part of Body Affected: ____

Degree of Disability: ____

Date Medical Care was Received: ____

Where Medical Care was Received: ____

Address (if off-site): ____

(If two or more injuries, record on separate sheets)

PROPERTY DAMAGE:

Description of Damage: ______________________________

____

Cost of Damage: $ ______________________________

ACCIDENT/INCIDENT LOCATION: ______________________________

ACCIDENT/INCIDENT ANALYSIS: Causative agent most directly related to accident/incident (Object, substance, material, machinery, equipment, conditions)

____

____

____

____

Was weather a factor?: ______________________________

____

Unsafe mechanical/physical/environmental condition at time of accident/incident (Be specific):

____

____

____

Personal factors (Attitude, knowledge or skill, reaction time, fatigue):

____

____

ON-SITE ACCIDENTS/INCIDENTS:

Level of personal protection equipment required in Site Safety Plan:

____

____

Modifications:

____

Was injured using required equipment?:

____

____

If not, how did actual equipment use differ from plan?:

____

____

ACTION TAKEN TO PREVENT RECURRENCE: (Be specific. What has or will be done? When will it be done? Who is the responsible party to insure that the correction is made?

ACCIDENT/INCIDENT REPORT REVIEWED BY:

SSO Name Printed

SSO Signature

OTHERS PARTICIPATING IN INVESTIGATION:

Signature

Title

Signature

Title

Signature

Title

ACCIDENT/INCIDENT FOLLOW-UP: Date:

Outcome of accident/incident:

Physician's recommendations:

Date injured returned to work:

Follow-up performed by:

Signature

Title

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

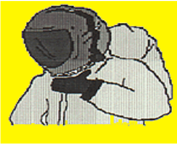
ATTACHMENT C
EMERGENCY HAND SIGNALS

EMERGENCY SIGNALS

In most cases, field personnel will carry mobile cell phones. If this is the case, a call, text message, or other notification that indicates an emergency will take priority over all other calls, texts, or notifications.

Where cell phone communications is not available, the following air-horn and/or hand signals will be used:

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN’T BREATH!	 **Hand gripping throat**
LEAVE AREA IMMEDIATELY, NO DEBATE!	**(No Picture) Grip partner’s wrist or place both hands around waist**
NEED ASSISTANCE!	 **Hands on top of head**
OKAY! – I’M ALL RIGHT! **- I UNDERSTAND!**	 **Thumbs up**
NO! - NEGATIVE!	 **Thumbs down**

APPENDIX B
COMMUNITY AIR MONITORING PLAN

1770 JEROME AVENUE

BRONX, NEW YORK

Community Air Monitoring Plan

for Interim Remedial Measure Work Plan

AKRF Project Number: 241375
BCP Site Number: To be Assigned

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau B
625 Broadway, 12th Floor
Albany, New York 12233

On Behalf Of:

Jerome 1770 MM LLC
1605 Dr. Martin Luther King Jr. Blvd
Bronx, NY 10453

Prepared by:

AKRF, Inc.
440 Park Avenue South
New York, New York 10016
(212) 696-0670

DECEMBER 2024

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IN-TEXT TABLES

Table 1 – Work Zone Action Levels and Required Responses
Table 2 – Project Contacts

FIGURE

Figure 1 – Site Location

ATTACHMENT

Attachment A – NYSDOH Generic CAMP and Special Requirements

1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) was prepared by AKRF, Inc. (AKRF) on behalf of Jerome 1770 MM LLC (the “Applicant”) for the property located at 1770 Jerome Avenue in the Bronx, New York, hereafter referred to as the “Site”. This CAMP was developed for the Interim Remedial Measure (IRM) Work Plan (IRMWP) dated November 2024 for the Site for implementation by AKRF personnel and other personnel working under AKRF’s direction to implement the IRMWP. The Site is identified on the New York City (NYC) Tax Map as Tax Block 2850 Lot 9. A map showing the Site location is provided as Figure 1.

As explained in Section 2.0, work zone air monitoring will be performed for all ground-intrusive activities; however, perimeter community air monitoring would only be performed for ground-intrusive activities performed outside the existing building’s footprint.

Jerome 1770 MM LLC is submitting a New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) application as a Volunteer, concurrently with the IRMWP.

The Site is composed of a one-story ‘L’-shaped retail building with a full cellar, approximately 8 feet below sidewalk grade and rear courtyard (approximately 4 feet above sidewalk grade). The Site is comprised of nine retail units.

The Site is located in a residential and commercial area of the Morris Heights neighborhood in the Bronx, New York. The Site is generally bounded by Jerome Avenue to the west, by East 176th Street to the north, by residential properties to the east, and by commercial properties to the south. Elevated subway tracks (the NYC Metropolitan Transit Authority’s 4 line) are west-adjacent to the Site, above Jerome Avenue. The Major Deegan and Cross Bronx Expressways are located west and south of the Site block.

AKRF conducted a Remedial Investigation at the Site in July 2024. The investigation included the collection of soil, groundwater, and soil vapor samples. The chlorinated volatile organic compounds (CVOCs) tetrachloroethylene (PCE), trichloroethylene (TCE), and cis-1,2-dichloroethylene in soil vapor sample SV-07 were detected at 10,000 $\mu g/m^3$, 530 $\mu g/m^3$, and 210 $\mu g/m^3$, respectively, and were compared to the New York State Department of Health (NYSDOH) Decision Matrices. The CVOCs detected in the soil vapor samples were not detected in soil samples however, PCE was detected in the groundwater at 5.1 µg/L, above its Ambient Water Quality Standards and Guidance Value (AWQSGV) at TW-02, nearby SV-07. Based on the findings of the investigation and the Site/area history, the potential source of the CVOC contamination may be attributed to an unidentified on-site or off-site source(s), particularly near soil vapor sample SV-07 and groundwater sample TW-02.

Detections of volatile organic compounds (VOCs) (but no exceedances), semivolatile organic compounds (SVOCs), pesticides and metals in soil typically associated with historic/urban fill were present throughout the Site. The presence of perfluorooctane sulfonic acid was also detected in soil and could be attributable to a former historic business that operated at the Site. VOCs, SVOCs, and metals were detected in groundwater above AWQSGVs, and PFAS compounds were detected above the NYSDEC Per- and Polyfluoroalkyl Substances Screening Levels. The detections in groundwater above the AWQSGVs and Screening Levels, may be attributed to urban fill or to prior site uses. Other CVOCs and petroleum-related VOCs were also detected at generally higher levels in soil vapor samples across the Site. The affected media at the Site include soil, groundwater, and soil vapor. To address the elevated soil vapor concentrations, an IRM sub-slab depressurization system (SSDS) is proposed to be installed until implementation of remedial actions concurrently with Site redevelopment.

All AKRF employees are directed that all work must be performed in accordance with the AKRF's Generic HASP and all Occupation Safety and Health Administration (OSHA)-applicable regulations for the work activities required for the project. All project personnel are furthermore directed that they are not permitted to enter Permit Required Confined Spaces (as defined by OSHA). For issues unrelated to contaminated materials, all non-AKRF employees are to be bound by all applicable OSHA regulations as well as any more stringent requirements specified by their employer in their corporate HASP or otherwise. AKRF is not responsible for providing oversight for issues unrelated to contaminated materials for non-employees. This oversight shall be the responsibility of the employer of that worker or other official designated by that employer.

2.0 AIR MONITORING PROGRAM

The purpose of the air monitoring program is to identify any exposure of the field personnel and the community to potential environmental hazards in the soil and groundwater. Air Monitoring will be conducted in accordance with the NYSDOH and NYSDEC guidance. Results of the air monitoring will be used to determine the appropriate response action, if needed. Field personnel will be trained in the proper operation of all field instruments at the start of the field program. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork. If an instrument fails calibration, the project manager will be contacted immediately to obtain a replacement instrument and arrange for repairs.

2.1 Work Zone Air Monitoring

2.1.1 Volatile Organic Compound Monitoring

Continuous monitoring for VOCs will be conducted using roving hand-held equipment during all ground-intrusive activities (e.g., installation of suction point). Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations. VOCs will be monitored continuously at the downwind perimeter of the exclusion zone. Monitoring will be conducted with a photoionization detector (PID) equipped with a 11.7 electron Volt (eV) lamp capable of calculating 15-minute running average concentrations. More frequent intervals of monitoring will be conducted if required as determined by the Site Safety Officer (SSO). All PID readings will be recorded and available for NYSDEC and NYSDOH personnel to review. Instantaneous readings will also be recorded.

2.1.2 Airborne Particulate Monitoring

A DustTrak® or equivalent would be used to measure real-time concentrations of total particulates 10 micrometers or less (PM_{10}). Measurements for particulates will be taken prior to commencement of the work and during the work in areas where contaminated soil would be disturbed. The action levels listed in Table 1 are based on 15-minute averages of the monitoring data. The measurements will be made at the breathing height of the workers and as close to their location as practicable. The SSO will set up the equipment and confirm that it is working properly. His/her qualified designee may oversee the air measurements during the day. The initial measurement for the day will be performed before the start of work and will establish background levels. The final measurement for the day will be performed after the end of work. The action levels for particulates and VOCs and required responses are listed in Table 1.

Table 1
Work Zone Action Levels and Required Responses

Monitoring	Action Level[1]	Response Action
Particulate	Less than 0.125 mg/m^3 above background	**Level D or D-Modified** (Requires coveralls and steel toe boots) (As applicable: Chemical resistant gloves, chemical resistant boot covers, hard hat, safety glasses, face shield, or escape mask)
	Between 0.125 mg/m^3 and 0.150 mg/m^3 above background	**Level C** (Requires full face or half face respirator, hooded chemical resistant two-piece Tyvek suit or overalls, chemical resistant inner and outer gloves, chemical resistant boot covers, steel toe and shank boots) (As applicable: hard hat, face shield, or escape mask) Apply dust suppression measures. Resume work or upgrade.
	Greater than 0.150 mg/m^3 above background	**Stop work** Apply additional dust suppression measures. Resume work when less than 0.150 mg/m^3 and maintain Level C.
VOCs	Less than 5 ppm in breathing zone	**Level D or D-Modified**
	Between 5 and 50 ppm	**Level C**
	More than 50 ppm	**Stop work** Resume work when source of vapors is abated and readings are less than 50 ppm above background.

Notes**:**
[1] - 15-minute time-weighted average
parts per million = ppm
milligrams per cubic meter = mg/m^3

2.2 Perimeter Community Air Monitoring

Perimeter community air monitoring would only be performed for ground-intrusive activities performed outside the existing building's footprint.

When perimeter community air monitoring is necessary (when performing ground-intrusive activities outside the building's footprint), fixed air monitoring stations will be set up at the upwind and downwind perimeters of the exclusion zone during all ground intrusive activities and will continuously log VOC and particulate levels. Each fixed monitoring station will be fully enclosed and equipped with the following:

- A PID equipped with a 11.7 eV lamp capable of calculating 15-minute running average VOC concentrations;
- A TSI 8530 DustTrak II or equivalent dust monitor capable of measuring the concentration of airborne respirable particulates at PM_{10} and calculating 15-minute running average particulate concentrations; and
- A Netronix™ Thiamus™ ICU-820 or equivalent Global System for Mobile Communication (GSM)/Global Positioning System (GPS) device capable of recording air monitoring and location data.

Each monitoring station will be capable of sending e-mail alerts to the SSO to indicate an exceedance of action levels. Additionally, the SSO will conduct an inspection of the monitoring stations on at least an hourly basis. Upon completion of Site activities, all air monitoring data will be available to download via the Environet® website. All air monitoring data recorded at the fixed monitoring stations will be available for NYSDOH and NYSDEC review and will be included in the IRM Report.

Site-wide monitoring for particulates and VOCs will be conducted during remedial excavation in conformance with the NYSDOH CAMP and NYSDOH special requirements for work within 20 feet of potentially exposed individuals or structures, and for indoor work with co-located residences or facilities (Attachment A).

2.2.1 Perimeter Community Air Monitoring Action Levels

VOC Action Levels

The following actions will be taken based on organic vapor levels measured:

- If total organic vapor levels exceed 5 parts per million (ppm) above background for the 15-minute average at the exclusion zone perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the exclusion zone persist at levels in excess of 5 ppm above background, but less than 50 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the hot zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet – is below 5 ppm above background for the 15-minute average.
- If the total organic vapor level is above 50 ppm at the perimeter of the exclusion zone, activities will be shutdown.

Particulate Action Levels

The following actions will be taken based on particulate levels measured:

- If the downwind particulate concentrations are greater than 0.125 mg/m^3 above background (upwind concentrations), and no other obvious source is apparent, then it will be assumed that the elevated particulate concentrations are a result of site activities. In such instances, dust suppression measures will be implemented, and monitoring will be continued. Work will be allowed to continue with dust suppression if downwind particulate levels do not exceed 0.150 mg/m^3 above the background (upwind concentration) and provided that no visible dust is migrating from the work area.
- If particulate levels persist at 0.150 mg/m^3 above the background, work must be stopped until dust suppression measures bring particulate levels to below 0.150 mg/m^3 above background.

2.3 Major Vapor Emission Response Plan

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work Site, or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted, or vapor controls must be implemented.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the exclusion zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If either of the following criteria is exceeded in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented:

- Sustained organic vapor levels approaching 1 ppm above background for a period of more than 30 minutes; or
- Organic vapor levels greater than 5 ppm above background for any period.

Upon activation, the following activities shall be undertaken as part of the Major Vapor Emission Response Plan:

- The NYSDEC, NYSDOH, and local police authorities will be immediately contacted by the SSO and advised of the situation;
- Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Site Health and Safety Officer; and
- All Emergency contacts will go into effect as appropriate.

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

2.4 Reporting

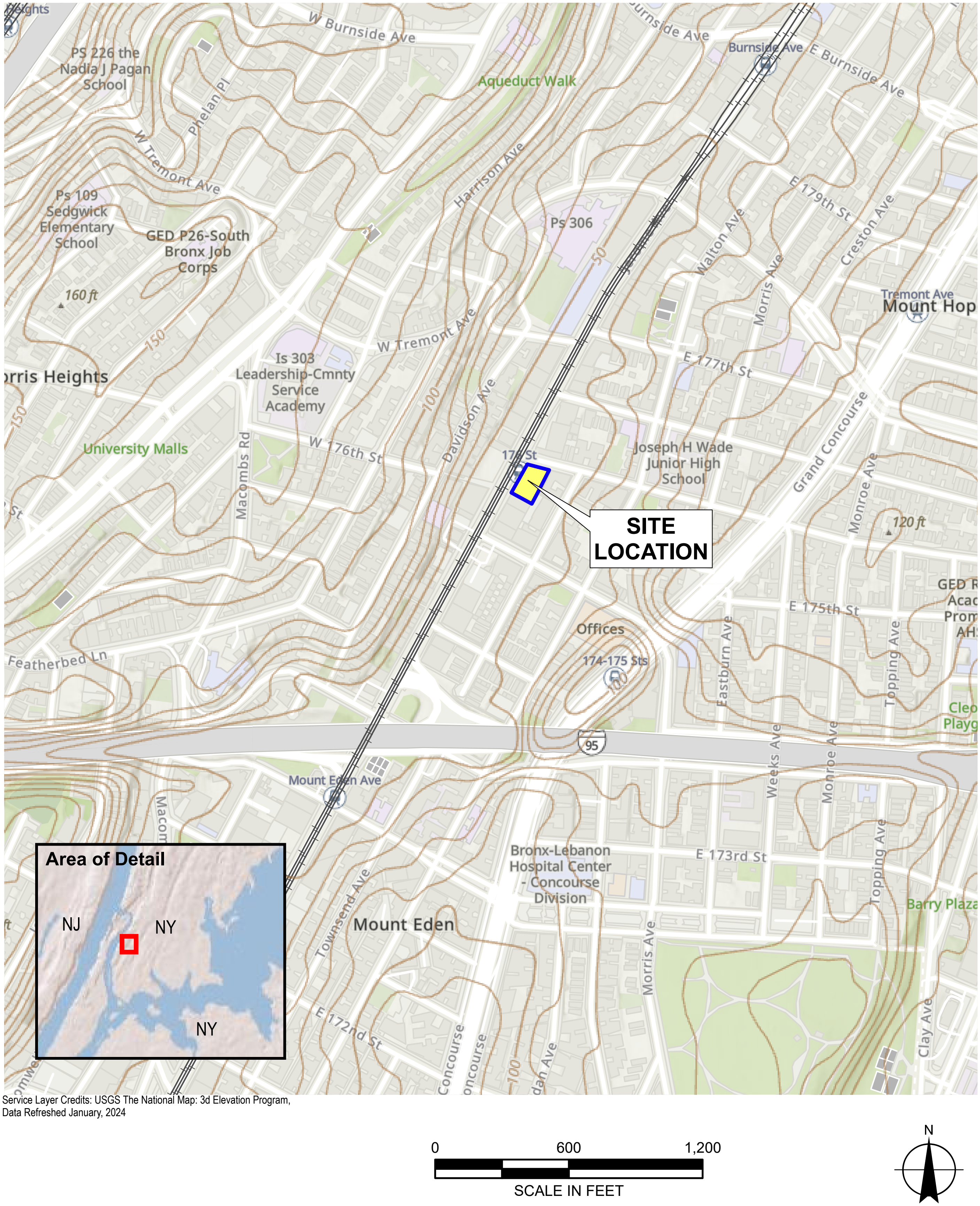
CAMP summary reports will be prepared and submitted to NYSDEC and NYSDOH for review as part of the daily reports, and in supplemental weekly CAMP reports. In the event there is an action level exceedance or complaint, NYSDEC and NYSDOH will be notified within 24 hours (same day to the extent possible) of the exceedance or complaint. The notification will include a description of the exceedance or complaint, the cause of the exceedance, and any corrective actions taken. All recorded CAMP data will be included in the IRM Construction Completion Report.

2.5 Project Contacts

Table 2
Project Contacts

Company	Individual Name	Title	Contact Number
AKRF	Rebecca Kinal, P.E.	Remedial Engineer	914-922-2362 (office)
	Stephen Malinowski, QEP	Quality Assurance/ Quality Control Officer	631-574-3724 (office)
	Jessica Holm	Project Manager	646-388-9784 (office)
	Madelyn Fleming	SSO	781-258-7107 (mobile)
	Brian Quinn	Alternate SSO	201-314-8032 (mobile)
Jerome 1770 MM LLC	Daniel Land Parcerisas	Client Representative	646-481-9143 (office)
NYSDEC	Elliott Jackson	BCP Project Manager	To be Assigned
NYSDOH	To be Assigned	Project Manager	To be Assigned

FIGURE



Service Layer Credits: USGS The National Map: 3d Elevation Program,
Data Refreshed January, 2024

akrf
440 Park Avenue South, New York, NY 10016

1770 Jerome Avenue
Bronx, NY

SITE LOCATION

DATE
11/4/2024

PROJECT NO.
241375

FIGURE
1

AKRF O:\Projects\240285 - BP 1770 JEROME\SAR\240285 BCP App Figures.aprx7/3/2024 10:56 AM240285 Fig 1 Site Location\jszalus

ATTACHMENT A
NYSDOH GENERIC CAMP AND SPECIAL REQUIREMENTS

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for 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. “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 shutdown.

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/m^3) 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/m^3 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/m^3 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/m^3 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.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for volatile organic compounds (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 (ECs) 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 New York State Department of Health 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 ($\mu g/m^3$), work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 $\mu g/m^3$ or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work with Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under “Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures” except that in this instance “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other ECs be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g., weekends or evenings) when building occupancy is at a minimum.

APPENDIX C
QUALITY ASSURANCE PROJECT PLAN

1770 JEROME AVENUE

BRONX, NEW YORK

QUALITY ASSURANCE PROJECT PLAN

for Interim Remedial Measure Work Plan

AKRF Project Number: 241375
BCP Site Number: To Be Assigned

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau B
625 Broadway, 12th Floor
Albany, New York 12233

On Behalf Of:

Jerome 1770 MM LLC
1605 Dr. Martin Luther King Jr. Blvd.
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DECEMBER 2024

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Attachment A – Project Team Resumes

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) describes the protocols and procedures that will be followed during implementation of the Interim Remedial Measure (IRM) under the IRM Work Plan (IRMWP) at the property located at 1770 Jerome Avenue in the Bronx, New York, hereafter referred to as the “Site”. The Site is identified on the New York City Tax Map as Bronx Tax Block 2580, Lot 9.

The objective of this QAPP is to provide for Quality Assurance (QA) and maintain Quality Control (QC) during the IRM under the New York State Department of Environmental Conservation (NYSDEC) oversight upon acceptance into the Brownfield Cleanup Program (BCP). Adherence to this QAPP will ensure that defensible data will be obtained during IRM implementation at the Site.

2.0 PROJECT TEAM

The project team will be drawn from AKRF professional and technical personnel, and AKRF's subcontractors. All field personnel and subcontractors will have completed a 40-hour training course and updated 8-hour refresher course that meet the Occupational Safety and Health Administration (OSHA) requirements of 29 CFR Part 1910. The following sections describe the key project personnel and their responsibilities.

2.1 Quality Assurance/Quality Control Officer

Stephen Malinowski will serve as the QA/QC officer and will be responsible for adherence to this QAPP. The QA/QC officer will review the procedures with all personnel prior to commencing any fieldwork and will conduct periodic Site visits to assess implementation of the procedures. Mr. Malinowski's resume is included in Attachment A.

2.2 Remedial Engineer

Rebecca Kinal, P.E. will serve as the Remedial Engineer. As the Remedial Engineer, Ms. Kinal will oversee the design and installation of the sub-slab depressurization system (SSDS). Ms. Kinal's resume is included in Attachment A.

2.3 Project Manager

Jessica Holm will serve as the AKRF Project Manager. The Project Manager will be responsible for directing and coordinating all elements of the IRMWP. The Project Manager will prepare reports and participate in meetings with the Site owner/Volunteer, and/or the NYSDEC. As Project Manager, Ms. Holm will also be responsible for the general oversight of all aspects of the project, including scheduling, budgeting, data management, and field program decision-making. The Project Manager will communicate regularly with all members of the AKRF and NYSDEC project teams to ensure a smooth flow of information between involved parties. Ms. Holm's resume is included in Attachment A.

2.4 Field Team Leader, Field Technician, and Site Safety Officer

The Field Team Leader will be responsible for supervising the daily sampling and health and safety activities in the field and will ensure adherence to the work plan and Health and Safety Plan (HASP), included as Appendix A of the IRMWP. The Field Team Leader will also act as the Field Technician and Site Safety Officer (SSO) and will report to the AKRF Project Manager or the Project Manager Alternate on a regular basis regarding daily progress and any deviations from the work plan. The Field Team Leader will be a qualified and responsible person able to act professionally and promptly during environmental work at the Site. Madelyn Fleming will be the Field Team Leader and the Field Team Leader alternate will be Brian Quinn. Ms. Fleming and Mr. Quinn's resumes are included in Attachment A.

2.5 Laboratory Quality Assurance/Quality Control Officer

The Laboratory QA/QC Officer will be responsible for quality control procedures and checks in the laboratory and ensuring adherence to laboratory protocols. The QA/QC officer will track the movement of samples from the time they are checked in at the laboratory to the time that analytical results are issued and will conduct a final check on the analytical calculations and sign off on the laboratory reports. The Laboratory QA/QC Officer will be Carl Ambruster of Eurofins Test America (Eurofins). Eurofins, a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-certified laboratory is being contracted to for all environmental sampling at the Site. Mr. Ambruster's resume is included in Attachment A.

2.6 Third-Party Data Validator

The Third-Party Data Validator will be responsible for reviewing the final data packages for analyzed samples and preparing a Data Usability Summary Report (DUSR) that will provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and comparability associated with the laboratory analyses for the investigation. The Third-Party Data Validator will be Lori Beyer of L.A.B. Validation Corporation of East Northrop, New York. Ms. Beyer's resume is included in Attachment A.

3.0 STANDARD OPERATING PROCEDURES

The following sections describe the standard operating procedures (SOPs) for the IRMs included in the IRMWP. During these operations, safety monitoring will be performed as described in the HASP, included as Appendix A of the IRMWP.

The temporary suction points will be installed according to the following procedure:

- Conduct a geophysical survey of each proposed vent and monitoring point location to identify any subsurface utilities in the work area. Mark locations on the ground with spray paint;
- Wet area down with a water mist to reduce dust from concrete;
- An electric core drill or hammer drill will be used to advance approximately seven (7) 2.5-inch diameter temporary suction points through the concrete building slabs.
- After penetrating the slab, remove the underlying fill layer using a shop vacuum equipped with a granular activated carbon (GAC) filter and/or hand tools. Replace with a homogeneous gravel layer to optimize vacuum application.
- A diagnostic vacuum with a GAC filter will then be used to create a negative pressure beneath the concrete slab applied to the suction point.
- An electric hammer drill will be utilized to drill $^{5}/_{16}$-inch holes on each side of the suction point to measure the negative pressure induced by the diagnostic vacuum. Subsequent monitoring points will be installed as needed to determine the radius of influence (ROI) of each temporary suction point.
- Backfill each hole with Site soils when complete and restore the surface with concrete. Decontaminate the hammer drill bit prior to and following installation of each temporary suction point as described in Section 3.1 of this QAPP.
- Repeat the process at each proposed suction point location and add additional temporary suction points as necessary to establish design requirements to achieve a negative pressure under the each of the Site buildings.
- Document all work in the field logbook or on field data sheets.

3.1 Decontamination of Sampling Equipment

All equipment will be either dedicated or decontaminated between sampling locations. Decontamination will be conducted to prevent discharge to the ground. The decontamination procedure will be as follows:

1. Scrub using tap water/Alconox® mixture and bristle brush.
2. Rinse with tap water.
3. Scrub again with tap water/Alconox® mixture and bristle brush.
4. Rinse with tap water.
5. Rinse with distilled water.
6. Air-dry the equipment, if possible.

3.2 Management of Investigation-Derived Waste

Investigation-derived waste (IDW) will be containerized in New York State Department of Transportation (NYSDOT)-approved 55-gallon drums. The drums will be sealed at the end of each workday and labeled with the date, location (i.e., suction point ID), the type of waste (i.e., soil cuttings), and the name and phone number of an AKRF point of contact. All IDW will be disposed of or treated according to applicable local, state, and federal regulations.

4.0 FIELD TESTING PROCEDURES

4.1 Communications Testing

A geophysical contractor will be mobilized to the Site prior to the start of invasive activities to review the communications testing area and will use a ground penetrating radar system to locate utilities. If utility lines or other anomalies are identified, any proposed suction or monitoring points will be relocated to avoid conflicts.

The communication testing will be conducted by a subcontractor by installing approximately seven (7) 2.5-inch diameter suction points using an electric core drill to advance through the building slab, and removing the underlying fill layer using a shop vacuum and hand tools. This void space will be replaced with a homogeneous gravel layer to optimize vacuum application. A specialized sub-slab diagnostic vacuum blower equipped with a GAC filter will then be connected to the suction points, and will be capable of applying a vacuum of up to 100 inches of water column to the suction point, with flow rates up to 300 cubic feet per minute. The vacuum will then be used to create a negative pressure beneath the concrete slab applied to the suction point. Vacuum induced by this activity will then be measured at several smaller, $^5/_{16}$-inch diameter monitoring points installed throughout the testing area at strategic locations relative to each suction point to determine the effective ROI for each suction point. AKRF personnel will conduct air monitoring using a photoionization detector (PID) and particulate meter throughout the testing process according to the HASP and CAMP provided as Appendix A and B of the IRMWP, respectively. The PID will also be used to monitor VOCs in the extracted vapors as well as ambient air concentrations in the buildings.

At each suction point, the applied vacuum and the airflow rate will be measured using a magnehelic differential pressure gauge, and a vane anemometer and/or pitot tube flow meter assembly, respectively. The induced vacuum will be measured at the smaller monitoring points using a micro manometer to assess induced vacuum at varying distances and directions from the applied vacuum point. A minimum target induced vacuum reading of 0.01 inches of water column at the monitoring points will be used to establish the vacuum ROI for the respective suction point. An additional suction point will be installed along the outer limits of this ROI, and a new test will be conducted to assess vacuum communication beneath the slab. This process will then be repeated, as necessary, throughout each building footprint.

All temporary suction and monitoring points will be patched using concrete grout and/or caulk after completion of the communication testing. During testing, urethane caulk will be used to seal any obvious cracks or other openings in the building slab that may cause short-circuiting of indoor air to the sub-slab.

This iterative testing approach will result in the identification of key locations for permanent suction points and induced vacuum monitoring points for a final SSDS design to ensure reliable SSDS coverage within each of the buildings and adequate system capacity for balancing and long-term coverage of the Site.

5.0 SAMPLING AND LABORATORY PROCEDURES

5.1 Soil Vapor Sampling

Soil vapor sampling will be conducted according to the following procedures:

- Field screen the sample for evidence of contamination (e.g., odors, staining,) using visual and olfactory methods and screen for VOCs using a PID equipped with an 11.7 electron Volt (eV) lamp.
- Collect a sample of the influent vapor at each suction point with a Tedlar® bag and screen for evidence of contamination with a PID. Collect a vapor sample for laboratory analysis of VOCs from one suction point displaying the highest reading on the PID for each of the two proposed SSDS.
- Collect QA/QC samples, including one blind duplicate, and one trip blank sample per 20 vapor samples collected.
- Collect samples in laboratory-supplied Summa™ canister or Tedlar® bag, label the sample in accordance with Section 5.3.1 of this QAPP, and place in a container for shipment to the laboratory. For Tedlar® bag samples, each submitted sample shall consist of three (3) Tedlar® bags to provide triplicate sample volume to protect against sample bag damage during transit.
- Complete the proper chain of custody (COC) paperwork and seal the container.
- Record observations (evidence of contamination, PID readings, etc.) in field log book and boring log data sheet, if applicable.
- Decontaminate hand-held drill bit between sample locations as described in Section 3.1 of this QAPP.

5.2 Laboratory Methods

Table 1 summarizes the laboratory methods that will be used to analyze field samples and the sample container type, preservation, and applicable holding times. Eurofins of Burlington, Vermont, a NYSDOH ELAP-certified laboratory subcontracted to AKRF, will be used for all chemical analyses in accordance with the Division of Environmental Remediation (DER)-10 2.1(b) and 2.1(f) with Category B Deliverables.

Table 1
Laboratory Analytical Methods

Matrix	Analysis	EPA Method	Bottle Type	Preservative	Hold Time
Soil Vapor	VOCs	TO-15	Summa Canister or Tedlar® bag	None	14 days

5.3 Sample Handling

5.3.1 Sample Identification

All samples will be consistently identified in all field documentation, COC documents, and laboratory reports. All samples will be amended with the collection date at the end of the sample same in a year, month, day (YYYYMMDD) format. Special characters, including primes/apostrophes ('), will not be used for sample nomenclature.

Sample Labeling and Shipping

All sample containers will be provided with labels containing the following information:

- Project identification, including Site name, BCP Site number, Site address
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Sampler's initials

Once the samples are collected and labeled, they will be placed in coolers and stored in an area away from direct sunlight to await shipment to the laboratory. All samples will be shipped to the laboratory at least twice per week.

The samples will be prepared for shipment by placing each sample in laboratory-supplied containers and into cartons for shipment to the laboratory. The COC will be properly completed by the sampler in ink, and all sample shipment transactions will be documented with signatures, and the date and time of custody transfer. Samples will be shipped overnight (e.g., Federal Express) or transported by a laboratory courier. All coolers shipped to the laboratory will be sealed with mailing tape and a COC seal to ensure that the samples remain under strict COC protocol.

Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured location until they are picked up and/or sent to the laboratory. The record of possession of samples from the time they are obtained in the field to the time they are delivered to the laboratory or shipped off-site will be documented on the COC. The COC will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; and signatures of individuals involved in sample transfer, and the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in.

5.4 Field Instrumentation

Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the Site for referencing proper operation, maintenance, and calibration procedures. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork. If an instrument fails calibration, a replacement instrument will be obtained as soon as possible. A calibration log will be maintained to record the date of each calibration, including any failure to calibrate and corrective actions taken. The PID will be equipped with an 11.7 eV lamp and will be calibrated each day using 100 parts per million (ppm) isobutylene standard gas in accordance with the manufacturer's standards.

ATTACHMENT A
RESUMES OF QA/QC OFFICER, REMEDIAL ENGINEER, PROJECT DIRECTOR/PROJECT MANAGER, FIELD TEAM LEADER, LABORATORY QUALITY ASSURANCE/QUALITY CONTROL OFFICER, AND THIRD-PARTY DATA VALIDATOR

STEPHEN T. MALINOWSKI, QEP, NYSPG

SENIOR VICE PRESIDENT- SITE ASSESSMENT AND REMEDIATION

Stephen Malinowski, QEP is a Senior Vice President with experience in assessment, investigation, and remediation of environmental contamination-related issues. Stephen manages all aspects of environmental projects with multi-disciplinary teams, including public agencies, developers, property owners, architects, and construction managers to navigate regulatory programs efficiently and achieve project objectives. His projects fall under the regulatory oversight of the United States Environmental Protection Agency, New York State Department of Environmental Conservation, New York City Department of Environmental Protection and New York City Office of Environmental Remediation including the Federal and New York State Superfund, New York State Brownfield Cleanup Program (BCP) and petroleum spills, RCRA/IUC closures, New York City Voluntary Cleanup Program (VCP) and E-Designation program, and Nassau and Suffolk County regulatory programs.

Stephen's experience includes the design, implementation, and management of environmental assessment, investigation and remediation projects on Long Island and across the New York Metropolitan Area including soil groundwater investigation, monitoring, and sampling programs, Brownfield and hazardous waste site investigations; underground storage tank studies, including soil contamination delineation, classification, waste removal and disposal. He has overseen and conducted hundreds of Phase I Environmental Site Assessments (ESAs) and Phase II investigations in a variety of environmental settings ranging from industrial sites to sites in challenging urban areas, many of them in conjunction with site redevelopment and property transaction related activities. In addition, Stephen has designed and implemented indoor air and soil vapor intrusion surveys at industrial, commercial, municipal, and residential properties in accordance with New York State Department of Health protocols, many requiring sub-slab depressurization or soil vapor extraction systems.

BACKGROUND

Education

BA, State University of New York at Plattsburgh, Environmental Science, 1992

Licenses/Certifications

Professional Geologist, NY - 000422
Qualified Environmental Professional, Institute of Professional Environmental Practice - 04120009
Health and Safety Operations at Hazardous Materials Sites 29 CFR 1910.120
NYSDEC Erosion and Sediment Control Inspector
OSHA 10 Hour Construction Safety & Health Course

Professional Memberships

Member, Long Island Association of Professional Geologists
Member, Institute of Professional Environmental Practice
Member, New York State Council of Professional Geologists

Years of Experience

31 years in the industry
11 years with AKRF

STEPHEN T. MALINOWSKI, QEP, NYSPG

SENIOR VICE PRESIDENT- SITE ASSESSMENT AND REMEDIATION

RELEVANT EXPERIENCE

Gowanus Canal First Street Turn Basin, New York, NY

AKRF performed professional services for the remedial design for restoration of the Filled-in Former First Street Turning Basin adjacent to the Gowanus Canal in Brooklyn, New York. The remediation is being conducted as part of an Order of Consent between the City of New York and USEPA for the Gowanus Canal Superfund Site. The remedial design included removal of fill and sediment within the filled-in turning basin in an approximately 475-foot by 50-foot area and the creation of a wetland shelf. Design considerations include geotechnical concerns related to adjacent buildings and new and existing bulkheads; soil and water management; landscape design; and access/construction logistics.

Stephen Malinowski was responsible for coordination of a multidisciplinary team to evaluate existing structural and environmental conditions associated with the site and the immediate surrounding area. Stephen oversaw the implementation of underwater bulkhead inspections and multi-beam sounding surveys in the Gowanus Canal, as well as environmental and geotechnical investigations, surveys, structural and existing condition evaluations of nearby properties. He was responsible for all reporting and communications for the project, and worked with nearby property owners to initiate access agreements for work on their properties. Stephen also assisted the DDC with presentations at the Gowanus Community Action Group and worked closely with the USEPA to implement an archaeology monitoring plan during subsurface disturbance activities. The project design was completed 2020, however, Stephen continues to be involved as the work is coordinated with remedial activities associated with the rest of the Gowanus Canal.

Front and York and Magnolia DUMBO at 85 Jay Street, Brooklyn, NY

AKRF served as site assessment/remediation consultant for 85 Jay Street in Brooklyn, a 1.1-million-square-foot residential development in Brooklyn with a pair of 21-story buildings that rise from a multi-level retail podium. Stephen Malinowski was responsible for preparation and implementation of a NYSDEC-approved Remedial Action Work Plan for this approximately three-acre former industrial site that encompasses an entire city-block. The remediation was conducted under the NYSDEC Brownfield Cleanup Program, primarily due to high levels of lead associated with former smelting operations. His responsibilities included overseeing an in-situ soil pre-characterization testing program to obtain pre-approval from the disposal of approximately 170,000 cubic yards of soil during the foundation excavation. He assisted with the review and procurement of bids for the off-site transport and disposal of multiple soil waste streams. As part of the approval process, he oversaw extensive testing to delineate the extent of lead and other hot spot areas of contamination.

Stephen was responsible for preparation and implementation of a NYSDEC-approved Remedial Action Work Plan for this approximately three-acre former industrial site that encompasses an entire city-block. The remediation is being conducted under the NYSDEC Brownfield Cleanup Program, primarily due to high levels of lead associated with former smelting operations. His responsibilities included overseeing an in-situ soil pre-characterization testing program to obtain pre-approval from the disposal of approximately 170,000 cubic yards of soil during the foundation excavation. As part of the approval process, he oversaw extensive testing to delineate the extent of lead and other hot spot areas of contamination.

The testing program included the development of a bench-scale study to condition the lead in-situ with a patented product to reduce its leachability from the soil and lower disposal costs. Based on the results of the bench tests, a Soil Stabilization Plan detailing an in-situ pilot study followed by wide-scale implementation was prepared and approved by NYSDEC. Upon receipt of the pilot test results, the soil conditioning program was approved for implementation for 40,000 tons of lead contaminated material. Stephen assisted with the review and procurement of bids for the off-site transport and disposal of multiple soil waste streams and oversaw a soil conditioning program, the excavation monitoring with community and work-zone air monitoring, and the daily and monthly reporting obligation to NYSDEC. He was responsible for preparation of the Final Engineering Report (FER). The FER was approved by NYSDEC and the project received a certificate of completion in December 2019 for a Track I cleanup.

STEPHEN T. MALINOWSKI, QEP, NYSPG

SENIOR VICE PRESIDENT- SITE ASSESSMENT AND REMEDIATION

East Side Coastal Resiliency (ESCR) Preliminary & Final Design, New York, NY

AKRF is leading a multidisciplinary design team that was selected by the New York City agency partnership of NYCDDC, New York City Department of Parks and Recreation (NYC Parks), New York City Department of Transportation, and the Mayor's Office of Recovery and Resiliency (ORR) to provide engineering, planning, landscape architecture, urban design and community engagement services for the Preliminary and Final Design Services for East Side Coastal Resiliency (ESCR).

Stephen Malinowski worked with the design team to identify additional data needs based on advances in the design and developed a Supplemental Subsurface Investigation Work Plan for NYCDEP-approval. He leads all aspects of the management and implementation of the supplemental field investigation including access coordination, utility locating, permitting and reporting. Stephen is responsible for the interpretation of a wide-range of data, and to provide critical cost and health/safety direction to the design team. He is also responsible for preparation of all reports (EIS, cost reports, Soil and Groundwater Management Plan, and presentations to the NYC team.)

Stephen has led extensive geology and hydrogeological studies to evaluate the impacts of the flood protection structure on the groundwater flow and transport of MGP-related wastes. He is currently supporting the City team with the coordination of remedial efforts pertains to MGP contaminants with NYSDEC, Con Ed and the various public and private entities that have a stake in the project. Once the preliminary design is released, he will prepare environmental specifications for the project to be used during the procurement of contractor bids.

J2 at 147-25 94th Avenue, Queens, NY

AKRF provided site assessment/remediation, civil engineering, and E-Designation services related to noise and hazardous materials for J2, a 25-story residential and retail building at 147-25 94th Avenue in Jamaica, Queens. The 550,000-square-foot building will include 543 residential units, including affordable housing, and is located adjacent to the Jamaica Station transit hub. Construction of J2 broke ground in March 2020. A Certificate of Completion for participation in New York State's Brownfield Cleanup Program was issued by NYSDEC in December 2020.

Stephen Malinowski directed all Phases of this NYS Brownfield Cleanup Program (BCP) project located within the Jamaica Brownfield Opportunity Area. He has been responsible for overseeing the implementation of a Phase I Environmental Site Assessment and asbestos survey of this former industrial property adjacent to the Long Island Rail Road tracks. Since the site had an E-Designation for hazardous materials, noise and air quality, Stephen coordinated with the New York City Office of Environmental Remediation (NYCOER) to ensure that all technical deliverables would also satisfy NYCOER's predevelopment requirements in order to obtain a Notice to Proceed from the NYC Department of Buildings. In doing so, he designed a scope of work for the Remedial Investigation that would satisfy both OER and the NYSDEC BCP.

Upon the receipt of results indicating the presence of contaminated soil and soil vapor beneath the site, the client decided to apply for the NYS BCP. Stephen was responsible for preparation and submission of a BCP Application simultaneously with the Remedial Investigation Report and a Remedial Action Work Plan (RAWP) to expedite the approval process and enable implementation of the remediation concurrently with construction. He prepared a remedial estimate for the activities required by the RAWP, allowing the client to obtain financing for construction. Stephen designed a testing program to pre-characterize approximately 15,000 cubic yards of soil underlying the existing building for disposal during the remedial excavation. The disposal testing identified a hotspot containing hazardous levels of lead, which he coordinated with the EPA to remediate at the onset of construction. The remedial excavation was completed during the height of the COVID outbreak with Stephen's team providing environmental oversight, community air monitoring with NYSDEC. Upon completion of the work, he prepared a Final Engineering report and the Client received a Certificate of Completion from NYSDEC in 2020.

Elton Crossing - Melrose Commons North Site C, Bronx, NY

AKRF provided environmental consulting services in connection with the purchase and redevelopment of the Elton Crossing site at 899 Elton Avenue in the Bronx, NY. The work initially involved the preparation of a Phase II Subsurface investigation including soil and soil vapor testing to determine if the site would be eligible for the New York State Brownfield Cleanup Program (NYSBCP). Upon completion of the investigation, AKRF prepared a NYCBCP Application and the site was accepted into the NYSBCP. AKRF managed all aspects of the brownfield cleanup including; development of Investigation Work Plans, performing Remedial Investigations and Reports, preparation of Phase I ESAs, preparation of a Citizen Participation Plan, distribution of public notices, preparation and implementation of a Remedial Action Work Plan (RAWP), design of a sub-slab depressurization system, preparation of the Final Engineering Report and Site Management Plan, and sampling and management of soil disposal. AKRF is in the midst of implementing the Site Management Plan.

Stephen Malinowski was responsible for overseeing the implementation of the NYSDEC-approved Remedial Action Work Plan for this former industrial property. His responsibilities included the in-situ testing of all site soil to obtain pre-approval from facilities for 15,000 tons of soil disposal during the foundation excavation. Stephen secured approval and procured bids for the off-site transport and disposal for six different classifications of soil. During excavation, he coordinated the transport and disposal of excavated material with the foundation contractor, while on-site personnel working under his direction managed the excavation and manifests for each truckload leaving the site. Stephen was the regulatory and technical lead for the remediation, which involved providing guidance for the closure of two petroleum spills; the registration, removal, and closure of five petroleum storage tanks encountered during excavation; and the delineation of soil contaminants, including hazardous lead, petroleum, and pesticides. His efforts prior to construction and his strong communication skills allowed the foundation excavation to advance with minimal delays from environmental matters.

Additionally, Stephen oversaw the implementation of the Community Air Monitoring Program (CAMP) during soil excavation activities and developed a soil-testing program that allowed the client to reuse certain material on-site, avoiding delays and soil import fees. The site was remediated to achieve Track 4 site-specific cleanup criteria and received a Certificate of Completion in 2016.

REBECCA KINAL, P.E.

VICE PRESIDENT

Rebecca Kinal has over 20 years of experience in the assessment and remediation of soil and groundwater contamination and other hazardous/non-hazardous waste problems. Ms. Kinal's experience includes environmental due diligence, soil and groundwater investigations, leaking underground storage tank studies, soil gas/vapor intrusion surveys, and oversight of small- and large-scale remediation programs, including design of groundwater remediation systems and vapor mitigation systems. She has directed numerous Phase I and Phase II investigations and remediation programs, many of them in conjunction with commercial/residential developers, law firms, lending institutions, and public agencies. She is experienced in the cleanup of contaminated properties under New York State Brownfield Cleanup Program (BCP) regulations and the New York City "E-designation" program. As a part of this work, her duties have included technical and report review, proposal writing, scheduling, budgeting, and acting as liaison between clients and regulatory agencies, and project coordination with federal, state, and local authorities.

BACKGROUND

Education

M.S., Hydrogeology, Rensselaer Polytechnic Institute, 1995

B.S., Civil Engineering, Lafayette College, 1992

Licenses/Certifications

State of New York, P.E. Registration No. 082046, 2004

Years of Experience

Year started in company: 2000

Year started in industry: 1996

RELEVANT EXPERIENCE

White Plains Mall/Hamilton Green

Ms. Kinal managed environmental due diligence and remediation planning for the project, which included Phase I and II environmental assessments, a petroleum Spill investigation, preparation of remediation cost estimates, and application to the NYSDEC BCP.

New York City School Construction Authority On-Call Contracts for Environmental Consulting Services, Various Sites, NY

Ms. Kinal serves as the project manager for AKRF's on-call hazardous materials consulting contract with the New York City School Construction Authority for over 8 years. For potential new school sites, assignments include initial due diligence, Phase I environmental site assessments, (ESAs) and subsurface investigation of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school, likely remediation requirements, and associated costs. For sites undergoing design and development, assignments include preparation of remediation plan, contract specifications, and design drawings. The work has also included conducting indoor air quality testing, vapor intrusion assessments, preparation of specifications, supervision of storage tank removals, and investigation and remediation of spills for existing schools. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours.

USTA National Tennis Center, Queens, NY

AKRF prepared an EIS for the New York City Departments of City Planning (DCP) and Environmental Protection (DEP) as co-lead agencies to analyze the expansion of the National Tennis Center, which includes multiple improvements and construction projects at the USTA campus over several years. As part of the EIS requirements, AKRF prepared a Remedial Action Plan for implementation during the proposed project's construction. In accordance with the RAP, vapor mitigation systems were incorporated into the design for several of the proposed structures at the facility, including two new stadiums, a new transportation center, and several practice court facilities. Ms. Kinal prepared the specifications and design drawings for the vapor mitigation and is providing on-going construction support to review contractor submittals and inspect the vapor barrier and sub-slab depressurization system installations.

Montefiore Medical Center, Various Locations, NY

Ms. Kinal provides due diligence assistance to Montefiore Medical Center (MMC) for the ongoing expansion of their facilities, primarily in the Bronx and Westchester County. She conducts and manages environmental due diligence tasks related to their property transactions, including Phase I Environmental Site Assessments (ESAs), Phase II investigations, and geophysical surveys. She also assists MMC in making decisions with respect to environmental risk issues.

Queens West Development Project, Long Island City, NY

For over 20 years, AKRF has played a key role in advancing the Queens West development, which promises to transform an underused industrial waterfront property into one of largest and most vibrant mixed-use communities just across the East River from the United Nations. AKRF has prepared an Environmental Impact Statement that examines issues pertaining to air quality, land use and community character, economic impacts, historic and archaeological resources, and infrastructure. As part of the project, AKRF also undertook the largest remediation ventures completed to date under the NYSDEC Brownfields Cleanup Program (BCP). Ms. Kinal helped prepare the Remedial Work Plan (RWP) and oversaw the remediation of Parcel 9, a 1.8-acre former industrial site. Remediation includes installation of a sheet pile containment wall, excavation of coal tar- and petroleum-contaminated soil under a temporary structure to control odors during remediation, vapor mitigation for the future buildings, and institutional controls. Upon completion of the remediation activities, Ms. Kinal managed the preparation of a Final Engineering Report (FER) to document the clean-up activities. The NYSDEC issued a Certificate of Completion (COC) for the Parcel 9 site in December 2006. Ms. Kinal continues to oversee post-remediation monitoring and site management activities to ensure that the remedy remains in-place and effective.

Roosevelt Union Free School District, Roosevelt, NY

Ms. Kinal managed environmental investigation and remediation activities for the sites of three new elementary schools and a new middle school in Roosevelt, New York. Remediation activities include removal/closure of contaminated dry wells and underground petroleum storage tanks, and excavation and off-site disposal of petroleum- and pesticide-contaminated soil. Remediation of the new middle school site, which also included a sub-slab depressurization system, was conducted through coordination with the NYSDEC, NYSDOH, New York State Education Department (NYSED), and the local school district. Upon completion of the remediation and school construction, Ms. Kinal managed confirmatory indoor air testing and preparation of a Final Engineering Report to document the site clean-up. The NYSDEC issued a Certificate of Completion and the school was open for the Fall 2008 semester as planned.

Proposed NYC Public School Campus, Bronx, NY

Ms. Kinal provided environmental consulting services to the selected environmental remediation contractor for this former manufactured gas plant in the Mott Haven neighborhood of the Bronx, which was remediated under the NYSDEC BCP. These services included: preparation of an in situ sampling plan and excavation plan for waste characterization and disposal; supervision of waste characterization sampling activities; development and implementation of a community air monitoring program during all remediation activities; and daily reporting to the NYC School Construction Authority.

National Grid – Halesite Manufactured Gas Plant Site, Town of Huntington, NY

Ms. Kinal served as the project manager for the remedial design and engineering work associated with remediation of National Grid's former manufactured gas plant (MGP) located in the Town of Huntington. The site is situated in a sensitive location along the waterfront, surround by commercial and residential properties, and half the property where the remediation was conducted is a steep slope. The remedy consisted of soil removal, oxygen injection, and non-aqueous phase liquid recovery. Ms. Kinal developed the remedial work plans, design/construction documents, and managed environmental oversight of the remedial work, including waste characterization and tracking, confirmatory endpoint sampling, air monitoring, and reporting to the NYSDEC. After the remediation work was completed, Ms. Kinal prepared appropriate close-out documentation in accordance with NYSDEC requirements.

Shell Service Station, Millwood, NY

Ms. Kinal planned and oversaw a Phase I Environmental Site Assessment and Phase II Subsurface Investigation of this active gasoline station in northern Westchester County. The Phase I/Phase II investigations were performed for the potential buyer of the property who wished to redevelop it with a more modern service station and convenience store. Ms. Kinal also prepared a conceptual remediation plan to address several areas of petroleum contamination identified during the Phase II. The plan, which was approved by NYSDEC, will be implemented in conjunction with the site redevelopment activities to achieve closure for several spills reported at the site.

Pelham Plaza Shopping Center Site Investigation & Remediation, Pelham Manor, NY

Ms. Kinal managed a Site Investigation at Pelham Plaza, an approximately ten-acre site that formerly contained a manufactured gas plant. The site was investigated under a voluntary clean-up agreement entered into with the NYSDEC by the site owner. The site investigation included advancing over 100 soil borings with continuous soil sampling to bedrock, installing monitoring and recovery wells, and conducting test pitting both indoor and outdoor locations to collect soil and groundwater samples and determine the extent of Non-Aqueous Phase Liquid (NAPL). The investigation also included: soil gas sampling to determine contaminant concentrations in the vapors beneath the foundation of an on-site retail store; sediment sampling in an adjacent creek to identify off-site impacts; and a tidal survey to determine tidal influence on groundwater levels at the site. Ms. Kinal also oversaw interim remedial measures, which include biweekly pumping of recovery wells to remove dense NAPL (DNAPL) from the site subsurface.

Shaws Supermarket Redevelopment Project, New Fairfield, CT

Ms. Kinal managed the Remedial Investigation (RI) for an approximately nine-acre shopping center site that was contaminated by releases from former dry cleaning operations. The site was being redeveloped with a new supermarket and separate retail stores. The investigation included the installation of monitoring wells in the intermediate overburden aquifer and bedrock aquifer, sampling of existing and newly installed wells, geophysical logging in bedrock wells, and pump testing in intermediate and bedrock wells. Ms. Kinal prepared a Remedial Action Work Plan (RAWP) based on results from the RI, which included a groundwater pump and treat system to contain a plume of perchlorethylene (PCE)-contaminated groundwater, and excavation and disposal of contaminated soil in the presumed source area. Following CTDEP approval of the RAWP, Ms. Kinal prepared bid specifications for soil excavation and remediation system installation, and oversaw their implementation. Ms. Kinal also prepared NPDES permit applications for discharges from construction dewatering and the groundwater remediation system, and conducted associated discharge monitoring.

Yankee Stadium, Bronx, NY

Ms. Kinal performed the hazardous materials analysis for the Draft Environmental Impact Statement for the proposed new Yankee Stadium. The analysis included a Phase I Environmental Site Assessment of the entire project area and Subsurface (Phase II) Investigation in areas where environmental conditions were identified. The Phase II investigation included geophysical surveys to search for potential underground storage tanks; and soil, soil gas, and groundwater sampling at over 40 locations to determine potential environmental impacts during and after the proposed construction. Ms. Kinal also developed an extensive community air monitoring plan and oversaw its implementation during deconstruction of the old Yankee Stadium.

Avalon on the Sound, New Rochelle, NY

Ms. Kinal oversaw environmental investigation and soil remediation during the construction of two luxury high-rise apartment buildings and an associated parking garage. Investigation activities included an electromagnetic survey to search for possible underground storage tanks, and subsurface sampling to characterize soil and groundwater. Remediation activities included removing underground storage tanks, excavating and disposing of soil contaminated with volatile and semi-volatile organic compounds, and collecting end-of-excavation confirmation samples.

Davids Island Environmental Audit, New Rochelle, NY

Ms. Kinal managed the hazardous materials portion of the audit of this undeveloped island site, including a Phase I Environmental Site Assessment (ESA) and Subsurface (Phase II) Investigation in areas where environmental conditions were identified. The Phase II investigation included collecting soil samples from more than 100 locations and analyzing them for targeted compounds, including volatile organic compounds, semi-volatile compounds, metals, pesticides, and polychlorinated biphenyls (PCBs). Ms. Kinal also oversaw an electromagnetic (EM) survey conducted to identify the location of suspected underground storage tanks on the island. Based on soil sample results, Ms. Kinal estimated the volume of contaminated soil requiring remediation and prepared cost estimates for soil excavation and for transportation and disposal of contaminated soil and hazardous materials.

Outlet City Site Investigation, Queens, NY

Ms. Kinal prepared a work plan for remedial investigation of the Outlet City site, a property in Long Island City that was formerly occupied by a manufacturer of industrial cleaners and pharmaceuticals. The site is being investigated and remediated under the NYSDEC voluntary clean-up program. In preparing the work plan, Ms. Kinal evaluated results from several previous investigations and conducted a limited groundwater sampling program to determine future data needs for designing remediation of creosote-contaminated soil and groundwater. The work plan included additional soil and groundwater sampling, a tidal survey to determine tidal influence on groundwater levels, and pilot free product recovery testing. Ms. Kinal also helped design a venting system for an on-site basement and performed exposure calculations for the vented vapors.

Yonkers Waterfront Redevelopment Project, Yonkers, NY

For this redevelopment along Yonkers' Hudson River waterfront, Ms. Kinal supervised the remediation of Parcels H and I that were contaminated with hazardous soil. During the remediation process, she reviewed the subcontractor health and safety plans, delineated the areas of excavation, and oversaw field activities to ensure compliance with the specifications and appropriate regulations. This property was remediated under the NYSDEC Environmental Restoration Program (ERP).

JESSICA HOLM

SENIOR PROFESSIONAL/ENVIRONMENTAL SCIENTIST – SITE ASSESSMENT AND REMEDIATION

Jessica Holm is an Environmental Scientist in AKRF's Site Assessment and Remediation group, with experience conducting environmental sampling and monitoring, subsurface and vapor intrusion investigations, potable drinking water and indoor environmental testing, remediation system operation and maintenance, and technical reporting.

EDUCATION

B.S. Environmental Science, Susquehanna University, 2015

CERTIFICATIONS

OSHA 40-hour HAZWOPER Certified
OSHA 30-hour Construction Safety Training
OSHA 10-hour Construction Industry
USEPA/NJDOH Lead-Based Paint Risk Assessor

YEARS OF EXPERIENCE

9 years in the industry
2 years at AKRF

RELEVANT EXPERIENCE – AKRF

New York City School Construction Authority On-Call Contracts for Environmental Consulting Services, Various Sites, NY

AKRF has undertaken various assignments under five consecutive hazardous materials on-call contracts, including environmental assessment, remedial design, construction support, plumbing disinfection, and potable water (lead) sampling consulting tasks. For potential new school sites, assignments include initial due diligence, Phase I environmental site assessments, and subsurface investigation of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school, likely remediation requirements, and associated costs. For sites undergoing design and development, assignments include preparation of remediation plans, design of sub-slab depressurization systems and contract specifications, and construction oversight. The work also includes conducting indoor air quality testing, vapor intrusion assessments, preparation of specifications and construction management for petroleum storage tank removals, and investigation and remediation of spills for existing schools. Under the most recent contract, Jessica Holm helped to complete a Phase I Environmental Site Assessment for the site of a proposed annex for John Bowne High School in Queens.

Remedial Action – MGD South Portland, Brooklyn, New York

AKRF performed a Remedial Action at the MGD South Portland Site as part of the NYC Voluntary Cleanup Program. Jessica Holm assisted in preparing the Remedial Action Report for submittal to the NYC Office of Environmental Remediation (OER).

Phase I ESA – 2955 West 29th Street, Brooklyn, New York

Jessica Holm completed a Phase I Environmental Site Assessment (ESA) in accordance with the American Society for Testing and Materials (ASTM) Standard E1527-13 and E1527-21, which included documentary research to determine past uses on the Property, a site inspection, interviews, review of regulatory databases and preparing the final report.

Remedial Action – Pyne Residence, Far Hills, New Jersey

AKRF performed a Remedial Action which included the in-situ treatment of contaminated groundwater using bio-stimulation and bio-augmentation to reduce the contaminant mass in the overburden aquifer at the Site. Jessica Holm supervised the system decommissioning, after the groundwater monitoring program was complete, indicating the treatment system was effective in reducing the contaminants to below applicable NJDEP Groundwater Quality Standards. Additionally, Ms. Holm prepared the Remedial Action Report for submittal to the New Jersey Department of Environmental Protection (NJDEP).

Remedial Action – PSEG Target Range, Lower Alloways Creek, New Jersey

AKRF performed a Remedial Action at the PSEG Target Range for the remediation of lead in soils by implementing in-situ soil stabilization at the Site. Jessica Holm performed air monitoring, oversaw remedial activities and collected appropriate end-point and composite samples to document the soil stabilization process was effective in compliance with the NJDEP regulations.

Remedial Investigation – NYSDOT Livingston Avenue Bridge, Albany, New York

Jessica Holm performed oversight and collected sediment samples for selected analytical parameters during the installation of geotechnical borings within the Hudson River for this project.

RELEVANT EXPERIENCE – TECTONIC ENGINEERING, MOUNTAINSIDE, NJ

Jersey City Public Schools Environmental Consulting Services – Jersey City, New Jersey

Jessica Holm conducted a multitude of environmental projects for the district including drinking water testing, performing right-to-know surveys, soil and groundwater sampling related to existing underground storage tanks (USTs), indoor air sampling, assistance with indoor environmental health assessments (IEHA), and technical reporting.

Passaic Board of Education Environmental Consulting Services - Passaic, New Jersey

Jessica Holm conducted drinking water testing at various schools within the district as well as assisted in the asbestos monitoring program inspection and reporting pursuant to the Asbestos Hazardous Emergency Response Act (AHERA).

Preliminary Assessments for Various Child Care Centers in New Jersey

Jessica Holm conducted multiple Phase I ESAs/Preliminary Assessments (PAs) including site review, data research and final reporting for various childcare centers in New Jersey.

RELEVANT EXPERIENCE – BOSWELL ENGINEERING, SOUTH HACKENSACK, NJ

Remedial Investigation/Remedial Action - G.I. Auto Salvage, Montville, New Jersey

Jessica Holm conducted remedial investigation and oversaw remedial actions as part of the development of a Site-Specific Remediation Standard and Classification Exception Area (CEA) for groundwater contamination present at the Site. Her work included: preparation of the Site Implementing Plan (SIP) for submittal to the United States Environmental Protection Agency (USEPA) for polychlorinated biphenyl (PCB) soil contamination; oversight of in-situ chemical oxidation (ISCO) injections for contaminated groundwater; oversight of soil excavation at multiple areas of concern (AOC); collection of post excavation samples pursuant to the SIP or Remedial Action Workplan (RAWP); and oversight of monitoring well installations and decommissioning.

Site Investigation/Remedial Investigation – Woodport Road, Sparta, New Jersey

Jessica Holm worked on the delineation of groundwater contamination in accordance with NJDEP requirements through the installation of monitoring wells and subsequent groundwater sampling as well as related indoor air sampling as part of the monitoring program. She provided an in-depth review and interpretation of laboratory data and previously performed remedial activities as part of the preparation of the Site and Remedial Investigation (SI/RI) technical reports for submittal to the NJDEP.

MADELYN FLEMING

GEOLOGIST/PROFESSIONAL II

Madelyn Fleming is a Geologist/Professional II in the AKRF, Inc. Site Assessment and Remediation department with experience in remedial oversight, community air monitoring (CAMP), soil sampling, groundwater sampling, and technical reporting.

BACKGROUND

Role in Project
Field Technician

Education

B.S., Geology, Clemson University, May 2020

Certifications
OSHA 40-hour HAZWOPER Certified
OSHA 30-hour Construction Safety Training

Years of experience
AKRF: November 2022 - present (1 year and 7 months)
Prior industry experiences: Intern at Vineyard Engineering and Environmental Services (Summer 2019)

RELEVANT EXPERIENCE

Phase I Environmental Site Assessment – Various Projects

Ms. Fleming has drafted Phase I reports for various projects and completed the site research and reconnaissance as part of the assessments.

Phase II Subsurface Investigation and Remedial Investigation – Various Projects

Ms. Fleming conducted subsurface and remedial investigations on various project sites in the Bronx, Manhattan, Brooklyn, and Queens, including the oversight of drilling activities, as well as low-flow groundwater sampling, soil sampling, and soil vapor sampling.

Remediation Oversight and Community Air Monitoring - 380 4th Avenue, Brooklyn, NY

Ms. Fleming performed oversight and conducted community air monitoring during removal of contaminated soil/municipal waste and import of fill materials, to ensure adherence to project specifications for construction projects at 380 4th Avenue in the Gowanus neighborhood of Brooklyn. As part of her duties, Ms. Fleming also prepared daily reports for client and agency review and participated in the NYSDEC-approved endpoint sampling program.

Remediation Oversight and Community Air Monitoring - 57 Alexander Street, Yonkers, NY

AKRF is providing ongoing remedial oversight of this NYSDEC Brownfield Cleanup Site on the Yonkers, New York waterfront. The Site, which was contaminated with PCBs, is being remediated under an NYSDEC-approved Remedial Action Work Plan (RAWP) and a USEPA-approved Self Implementation Plan (SIP). Ms. Fleming performed environmental oversight during site remediation and redevelopment activities, including community air monitoring, and documentation of off-site disposal of excavated soil, import of environmentally clean fill material, and collection of endpoint samples. Ms. Fleming also prepared daily reports for submission to the NYSDEC.

Remediation Oversight and Community Air Monitoring – Fresh Kills Landfill, Staten Island, NY

Ms. Fleming performed oversight and conducted community air monitoring during removal of contaminated soil/municipal waste and import of fill materials, to ensure adherence to project specifications for construction projects at several NYC Department of Sanitation (DSNY) facilities located on/near the Fresh Kills Landfill. As part of her duties, Ms. Fleming also prepared daily reports for client and agency review.

Remediation Oversight and Community Air Monitoring – Harlem Hospital, Manhattan, NY

Through an on-call contract with the New York City Economic Development Corporation, AKRF is providing construction support and environmental monitoring services during construction of a new public health laboratory on the Harlem Hospital campus to ensure compliance with the NYCDEP-approved Remediation Action Work Plan (RAWP). Ms. Fleming served as an on-site environmental monitor during earthwork for the building construction. Her duties included community and work zone air monitoring, overseeing excavation and export of urban fill and petroleum-contaminated soil, documenting the import/placement of environmentally clean backfill, and preparation of daily reports for submission to the client.

PREVIOUS EXPERIENCE

Vineyard Engineering and Environmental Services – Stoneham, MA

As an environmental technician intern, Ms. Fleming conducted monitoring well sampling, soil gas sampling, and oversight of remediation projects. She also helped to review data and prepare environmental reports.

BRIAN QUINN

ENVIRONMENTAL PROFESSIONAL I – SITE ASSESSMENT AND REMEDIATION

Brian Quinn is an Environmental Professional I in AKRF's Site Assessment and Remediation group, with experience in environmental sampling and monitoring during site remediation, subsurface and vapor intrusion investigations, and groundwater remediation system operation and maintenance.

BACKGROUND

Role in Project
Field Technician

EDUCATION

B.A. Environmental Studies, Bucknell University, May 2020

CERTIFICATIONS

OSHA 40-hour Hazardous Waste Operations and Emergency Response Training

OSHA 30-hour Construction Safety Training

YEARS OF EXPERIENCE

Date started at AKRF: March 2022

Prior industry experience: Greenstar Environmental Solutions: February 2021- February 2022 (1 year)

RELEVANT EXPERIENCE - AKRF

Construction Oversight and Community Air Monitoring – American Museum of Natural History, Manhattan, New York

AKRF prepared and is implementing a NYCDEP-approved RAP during construction of the new Gilder Center for Science, Education, and Innovation at the AMNH. Mr. Quinn serves as an on-site environmental monitor during construction to ensure compliance with the RAP. His duties include community and work zone air monitoring, overseeing excavation and export of contaminated soil, and documenting the import of environmentally clean backfill.

RELEVANT EXPERIENCE – GREENSTAR ENVIRONMENTAL SOLUTIONS, SOMERSET, NJ

As an Environmental Scientist at Greenstar, Mr. Quinn conducted Phase II subsurface investigations, low-flow groundwater sampling and soil vapor intrusion assessments, and prepared associated technical reports. He also conducted routine O&M of a large groundwater treatment system, and oversaw installation of new extraction wells for system upgrades

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Personnel Resume

Carl Armbruster
QA Manager

Qualifications Summary

Mr. Armbruster has over 30 years of experience in the environmental laboratory and engineering industry that includes extensive technical, management/leadership experience in all aspects of the laboratory business. He is an action-oriented manager dedicated to ensuring the laboratory maintains a quality program that holds the highest credentials in PT scores, accreditations and customer satisfaction. His unique experience lends itself to working successfully with employees, managers and clients at all levels.

Professional Experience

Quality Assurance Manager – TestAmerica Edison - 2005 to Present

Mr. Armbruster is responsible for establishing and implementing the quality assurance program at the Edison facility; and for interfacing with the corporate Quality Assurance Director to ensure adherence with the overall Quality Management Plan. He is also responsible for monitoring implementation and compliance with NELAC and TestAmerica's QMP, conducting annual management system audits and data audits, as well as providing regulatory updates and technical support to the Laboratory Director, Operations Manager, Client Services and Sales department.

Project Manager/Assistant Technical Director – STL Edison --2000 to 2005

Laboratory Director − STL Whippany − 1998 to 2000

Account Manager − Clean Harbors Environmental Services − 1997 to 1998

Laboratory Manager − Waste Management Inc., and Chemical Waste Management Inc − 1988 to 1997

Environmental Scientist − ICF Technology − 1987 to 1988

Analytical Chemist − IT Corporation – 1985 to 1987

Analytical Chemist − Hess Environmental Laboratories – 1983 to 1985

Education

- MS in Biology – East Stroudsburg University, 1984
- BS in Environmental Studies - East Stroudsburg University, 1980

Lori A. Beyer

SUMMARY: General Manager/Laboratory Director with a solid technical background combined with Management experience in environmental testing industry. Outstanding organizational, leadership, communication and technical skills. Customer focused, quality oriented professional with consistently high marks in customer/employee satisfaction.

EXPERIENCE:

1998-Present L.A.B. Validation Corporation, 14 West Point Drive, East Northport, NY
President

- Perform Data Validation activities relating to laboratory generated Organic and Inorganic Environmental Data.

1998-Present American Analytical Laboratories, LLC. 56 Toledo Street, Farmingdale, NY
Laboratory Director/Technical Director

- Plan, direct and control the operation, development and implementation of programs for the entire laboratory in order to meet AAL's financial and operational performance standards.
- Ensures that all operations are in compliance with AAL's QA manual and other appropriate regulatory requirements.
- Actively maintains a safe and healthy working environmental that is demanded by local laws/regulations.
- Monitors and manages group's performance with respect to data quality, on time delivery, safety, analyst development/goal achievement and any other key performance indices.
- Reviews work for accuracy and completeness prior to release of results to customers.

1996-1998 Nytest Environmental, Inc. (NEI) Port Washington, New York
General Manager

- Responsible for controlling the operation of an 18,000 square foot facility to meet NEI's financial and operational performance standards.
- Management of 65 FTEs including Sales and Operations
- Ensure that all operations are in compliance with NEI's QA procedures
- Ensures that productivity indicators, staffing levels and other cost factors are held within established guidelines
- Maintains a quantified model of laboratory's capacity and uses this model as the basis for controlling the flow of work into and through the lab so as to ensure that customer requirements and lab's revenue and contribution targets are achieved.

1994-1996 Nytest Environmental, Inc. (NEI) Port Washington, New York
Technical Project Manager

- Responsible for the coordination and implementation of environmental testing programs requirements between NEI and their customers
- Supervise Customer Service Department
- Assist in the development of major proposals
- Complete management of all Federal and State Contracts and assigned commercial contracts
- Provide technical assistance to the customer, including data validation and interpretation
- Review and implement Project specific QAPP's.

1995-1996 Nytest Environmental, Inc. (NEI) Port Washington, New York
Corporate QA/QC Officer

- Responsible for the implementation of QA practices as required in the NJDEP and EPA Contracts
- Primary contact for NJDEP QA/QC issues including SOP preparation, review and approval
- Responsible for review, verification and adherence to the Contract requirements and NEI QA Plan

1992-1994 Nytest Environmental, Inc. (NEI) Port Washington, New York
Data Review Manager

- Responsible for the accurate compilation, review and delivery of analytical data to the company's customers. Directly and effectively supervised a department of 22 personnel.
- Managed activities of the data processing software including method development, form creation, and production
- Implement new protocol requirements for report and data management formats
- Maintained control of data storage/archival areas as EPA/CLP document control officer

1987-1991 Nytest Environmental, Inc. (NEI) Port Washington, New York
Data Review Specialist

- Responsible for the review of GC, GC/MS, Metals and Wet Chemistry data in accordance with regulatory requirements
- Proficient with USEPA, NYSDEC, NJDEP and NEESA requirements
- Review data generated in accordance with SW846, NYSDEC ASP, EPA/CLP and 40 CFR Methodologies

1986-1987 Nytest Environmental, Inc (NEI) Port Washington, New York
GC/MS VOA Analyst

EDUCATION:

1982-1985 State University of New York at Stony Brook, New York; BS Biology/Biochemistry
1981-1982 University of Delaware; Biology/Chemistry
5/91 Rutgers University; Mass Spectral Data Interpretation Course, GC/MS Training
8/92 Westchester Community College; Organic Data Validation Course
9/93 Westchester Community College; Inorganic Data Validation Course

Form **W-9**
(Rev. December 2011)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type
See **Specific Instructions** on page 2.

Name (as shown on your income tax return)
L.A.B VALIDATION CORP

Business name/disregarded entity name, if different from above

Check appropriate box for federal tax classification:
☐ Individual/sole proprietor ☐ C Corporation ☒ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶

☐ Other (see instructions) ▶

☐ Exempt payee

Address (number, street, and apt. or suite no.)
14 WEST POINT DRIVE

City, state, and ZIP code
EAST NORTHPORT, New York 11731

Requester's name and address (optional)

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number
- -

Employer identification number
58 - 2381714

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here Signature of U.S. person ▶ Date ▶ 01/18/13

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

Westchester Community College
Professional Development Center

Awards this Certificate of Achievement To

LORI BEYER

for Successfully Completing

ORGANIC DATA VALIDATION COURSE (35 HOURS)

Dr. John Samuelian

Date AUGUST 1992

Assistant Dean
Professional Development Center

President

The Professional
Development Center

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

Westchester Community College
Professional Development Center

Awards this Certificate of Achievement To

LORI BEYER

for Successfully Completing

INORGANIC DATA VALIDATION

Instructor: Dale Boshart

Date MARCH 1993

Assistant Dean
Professional Development Center

President

The Professional
Development Center

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Thomas C. Jorling
Commissioner

July 8, 1992

Ms. Elaine Sall
Program Coordinator
Westchester Community College
Valhalla, NY 10595-1698

Dear Elaine,

Thank you for your letter of June 29, 1992. I have reviewed the course outline for organic data validation, qualifications for teachers and qualifications for students. The course that you propose to offer would be deemed equivalent to that which is offered by EPA. The individuals who successfully complete the course and pass the final written exam would be acceptable to perform the task of organic data validation for the Department of Environmental Conservation, Division of Hazardous Waste Remediation.

As we have discussed in our conversation of July 7, 1992, you will forward to me prior to the August course deadline, the differences between the EPA SOW/90 and the NYSDEC ASP 12/91. You stated these differences will be compiled by Mr. John Samulian.

I strongly encourage you to offer an inorganic data validation course. I anticipate the same list of candidates would be interested in an inorganic validation course as well, since most of the data to be validated consists of both organic and inorganic data.

Thank you for you efforts and please contact me if I can be of any further assistance.

Sincerely,

Maureen P. Serafini

Maureen P. Serafini
Environmental Chemist II
Division of Hazardous Waste
Remediation

The Professional Development Center
AT
WESTCHESTER COMMUNITY COLLEGE

914 285-6619

October 2, 1992

Ms. Lori Beyer
3 sparkill Drive
East Northport, NY 11731

Dear Ms. Beyer:

Congratulations upon successful completion of the Organic Data Validation course held August 17 - 21, 1992, through Westchester Community College, Professional Development Center. This course has been deemed by New York State Department of Environmental Conservation as equivalent to EPA's Organic Data Validation Course.

Enclosed is your Certificate. Holders of this Certificate are deemed competent to perform organic data validation for the New York State DEC Division of Hazardous Waste Remediation.

The Professional Development Center at Westchester Community College plans to continue to offer courses and seminars which will be valuable to environmental engineers, chemists and related personnel. Current plans include a TCLP seminar on November 17th and a conference on Environmental Monitoring Regulations on November 18th.

We look forward to seeing you again soon at another environmental program or event. Again, congratulations.

Very truly yours,

Passing Grade is 70%
Your Grade is 99%

Elaine Sall
Program Coordinator

ES/bf

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

The Professional
Development Center
AT
WESTCHESTER COMMUNITY COLLEGE

914 285-6619

June 21, 1993

Dear Ms. Beyer:

Enclosed is your graded final examination in the Inorganic Data Validation course you completed this past March. A score of 70% was required in order to receive a certificate of satisfactory completion. Persons holding this certificate are deemed acceptable to perform Inorganic Data Validation for the New York State Department of Environmental Conservation, Division of Hazardous Waste Remediation.

I am also enclosing a course evaluation for you to complete if you have not already done so. The information you provide will greatly aid us in structuring further courses. We wish to make these course offerings as relevant, targeted and comprehensive as possible. Your evaluation is vital to that end.

Congratulations on your achievement. I look forward to seeing you again at another professional conference or course. We will be co-sponsoring an environmental monitoring conference on October 21, 1993 with the New York Water Pollution Control Association, Lower Hudson Chapter, at IBM's Yorktown Heights, NY site. Information regarding this event will be going out in August.

Very truly yours,

Elaine Sall

Elaine Sall
Program Coordinator

ES/bf

Enclosures

SUNY
WESTCHESTER COMMUNITY COLLEGE
Valhalla, New York 10595

APPENDIX D

PROPOSED SUB SLAB DEPRESSURIZATION SYSTEM BLOWER & GRANULAR ACTIVATED CARBON CUT SHEETS

Liquid Filters

Vapor Filters

VFD Series

- VFD-30
- VFD-55
- VFD-85
- VFD-110

VFV Series

- VFV-250
- VFV-500
- VFV-1000
- VFV-2000
- VFV-3000
- VFV-5000
- VFV-10000

VF Series

- VF-500
- VF-1000
- VF-2000
- VF-3000
- VF-5000
- VF-10000

VR Series

- VR-140
- VR-170
- VR-225
- VR-400
- VR-700
- VR-1600
- VR-2600

Filtration Media

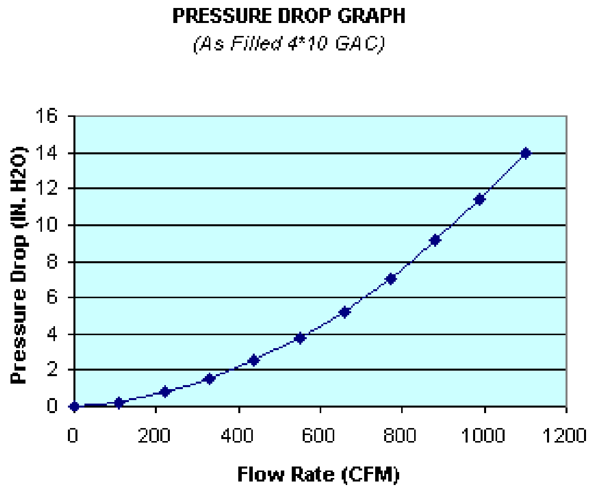
Special Products

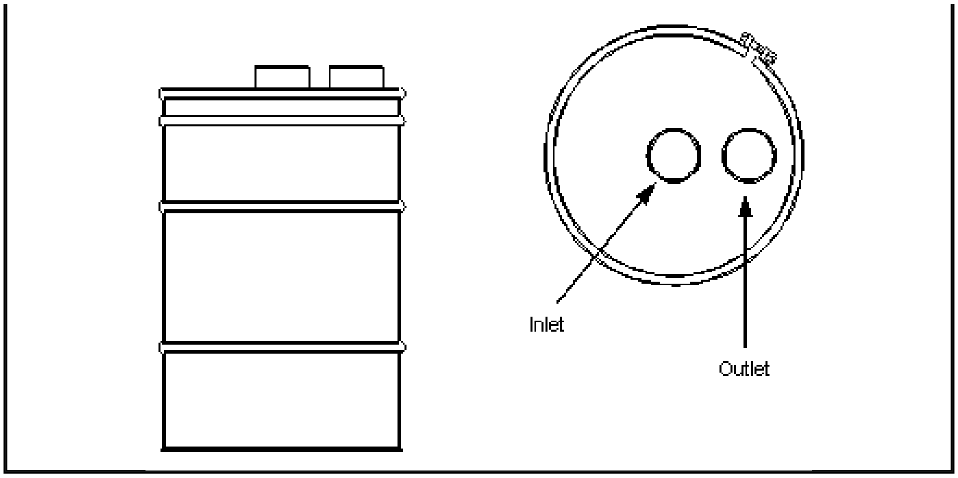
VR SERIES FILTERS
MODEL VR-400

Picture Not Available

The VR-400 filter is a radial flow filter vessel designed to treat vapor streams where pressure drop is a strong concern. With the radial design in certain applications the user can obtain higher flow rates than could be obtained in similar upflow filters. Some applications include:

- Soil Vapor Extraction Treatment
- Air Stripper Off Gas Treatment
- Odor Removal System
- Storage Tank Purge Vapor Treatment
- Industrial Process Treatment



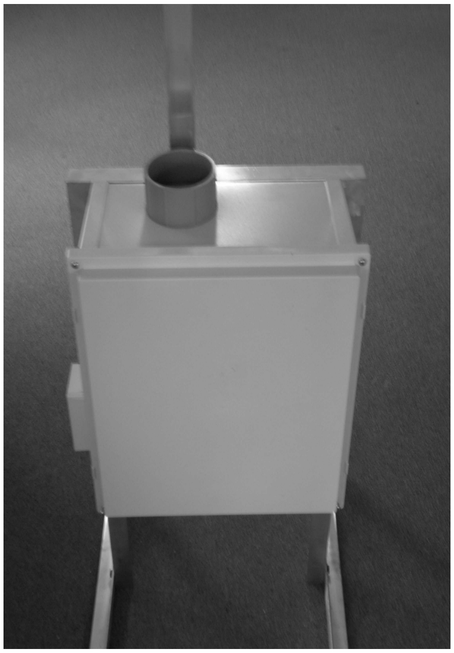


VR-400 SPECIFICATIONS			
Overall Height	3’11”	Vessel/Internal Piping Materials	CS/ SCH 40 PVC
Diameter	30”	Internal Coating	Polyamide Epoxy Resin
Inlet / Outlet (FNPT)	6”	External Coating	Urethane Enamel
Drain / Vent (FNPT)	OPT	Maximum Pressure / Temp	2 PSIG / 150º F
GAC Fill (lbs)	400	Cross Sectional Bed Area	8.8 FT^2
Shipping / Operational Weight (lbs)	500/575	Bed Depth/Volume	11.7 IN / 14.25 FT^3

THE OBAR GBR89

COMPACT RADIAL BLOWER

Based on 25 years of experience and 2 years of research and development, the patent pending GBR series of compact radial blowers provide the perfect combination of performance and design.



GBR89 WITH ROOF MOUNT

PERFORMANCE

- GBR89 HA 14" WC at 100CFM max flow 500 CFM.
- Built in speed control to customize performance.
- Condensate bypass built in.
- 18 month warranty 40,000 hr sealed bearings.

DESIGN

- Our modular design means the blower and manifold assembly can be removed and replaced as a unit. This makes repairs cost effective and easy and allows contractors to upgrade systems simply by swapping assemblies.
- The GBR series is based on a bypass blower designed to handle combustible materials.
- The housing is not required to be air tight so you can add gauges and alarms without compromising the system.
- Built in condensate bypass.
- Built in speed control.
- Quick disconnect electrical harness.
- All UL listed components including UL listed enclosure for outside use.
- Wall fastening lugs included.
- GBR series roof and wall mounts available to quickly configure the blowers for your installation while providing a custom built look.
- Compact design 18"x 16"x 10" weighing only 18 lbs.
- 4" schedule 40 inlet and 6" schedule 40 exhaust.

Enclosure Specifications

Rating:

Ingress Protection (EN 60529): 66/67

Electrical insulation: Totally insulated

Halogen free (DIN/VDE 0472, Part 815): yes

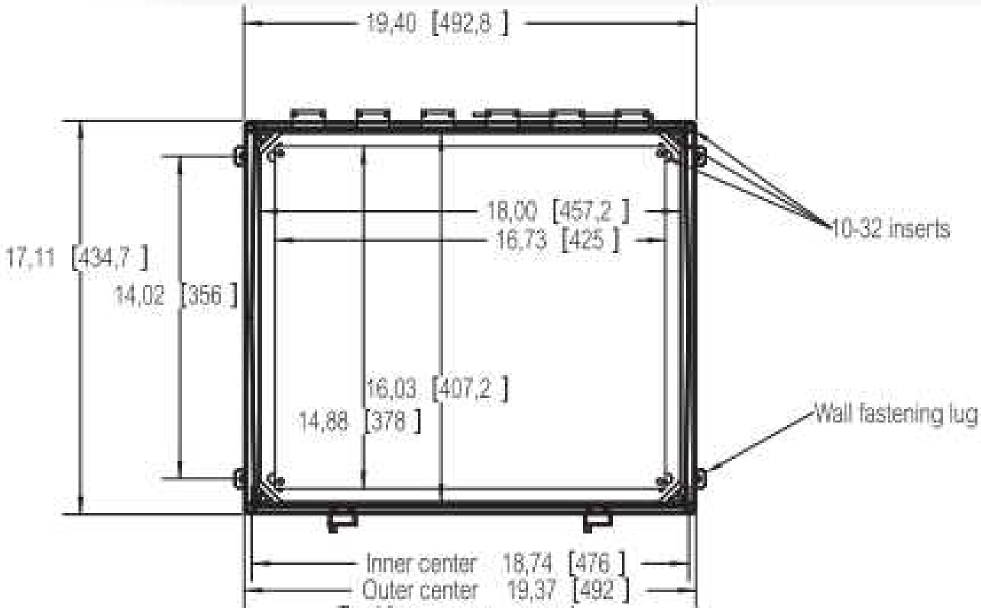
UV resistance: UL 508

Flammability Rating (UL 746 C 5): complies with UL 508

Glow Wire Test (IEC 695-2-1) °C: 960

NEMA Class: UL Type 4, 4X, 6, 6P, 12 and 13

Certificates: Underwriters Laboratories



Top View - cover removed