3500 PARK AVENUE APARTMENTS

3500 PARK AVENUE
BRONX, NEW YORK

Supplemental Remedial Investigation Work Plan

BCP Site #Number: C203096
CEQR Number: 08DCP022X
AKRF Project Number: 12477

Prepared for:

3500 Park Apts. HDFC, Inc.
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212-696-0670

DECEMBER 2017

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APPENDICES

1.0 INTRODUCTION

This Supplemental Remedial Investigation Work Plan (SRIWP) has been prepared by AKRF, Inc. (AKRF) on behalf of 3500 Park Apts. HDFC, Inc. and 3500 Park Apts. L.P. (the Volunteers) for the property located at 3500 Park Avenue in the Bronx, New York (“the Site”). The legal definition of the Site is Bronx Borough Tax Block 2389, Lot 20. Currently, the Site is an approximately 15,210-square foot, asphalt-paved parking lot with a small attendant shed on the southwestern portion. The Site is bordered by: 168th Street to the north, followed by Public School P.S. 132; an industrial yard, a vacant lot, and residential and commercial buildings to the east; Webster Beverage Wholesale Restaurant Supply to the south; and Park Avenue, followed by Metro North Railroad tracks at approximately 20 feet below grade to the west. A Site Location Plan is provided as Figure 1.

The Volunteers have applied to enter the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP). A Remedial Investigation (RI) Report (RIR) was submitted to the NYSDEC in May 2017 as part of the BCP Application. The RIR concluded that on-site soil is contaminated with semivolatile organic compounds (SVOCs) and metals, which appear to be related to historic filling and/or industrial operations. This SRIWP describes the procedures to be used to further define the nature and extent of the contamination in on-site soil and evaluate groundwater quality on-site. The data compiled from the RI and the SRI will be used to complete a Remedial Action Work Plan (RAWP). All proposed work will be completed in accordance with this SRIWP, which includes a Quality Assurance Project Plan (QAPP) (Appendix A) and a Health and Safety Plan (HASP) (Appendix B). The Community Air Monitoring Plan (CAMP) detailed in the HASP will be implemented during all subsurface disturbance activities at the Site, including, but not limited to, soil boring advancement, soil sampling, and backfilling of boreholes.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description and Surrounding Land Use

The 3500 Park Avenue Apartments Site (BCP Site #C203096) consists of an approximately 15,207-square foot tax lot consisting of an asphalt-paved parking lot with a small mobile storage container, which served as an attendant shed on the southwestern portion. The Metro North Railroad tracks are located approximately 20 feet below ground surface to the west. The surrounding area is developed with residential, commercial, and institutional uses. A Site Plan is provided as Figure 2.

2.2 Site Geology, Hydrogeology, and Subsurface Characteristics

Surface topography at the Site slopes slightly to the west. Based on reports compiled by the U.S. Geological Survey Yonkers Quadrangle map, the Property lies at an elevation of approximately 30 to 40 feet above the National Geodetic Vertical Datum of 1988 (an approximation of mean sea level). The surrounding area slopes down to the south.

Site lithology, based on the soil borings advanced during the RI, consists of historic fill materials (including sand, gravel, silt, concrete, brick, ash, and asphalt) from just below the surface to depths up to approximately 11 feet below grade. Presumed bedrock was encountered between 12 and 19 feet below grade. Groundwater was not encountered above bedrock. Based upon regional groundwater information, groundwater is expected to flow in a south or southeasterly direction in the Site vicinity; however, the presence of subsurface utilities in the vicinity of the Site may influence groundwater flow direction.

Groundwater in the Bronx is not used as a potable source. There are no surface water bodies or streams on or immediately adjacent to the Site.

2.3 Site History

According to a Conditional Negative Declaration issued in September 2010 (CEQR No. 08DCP022X), a Restrictive Declaration (RD) for hazardous materials was recorded on January 22, 2010 and an (E) Designation for noise (E-259) was mapped on the Site. In 2010, the Site was rezoned by 3500 Park Avenue LLC to R7-1 with a C2-4 overlay and extended the C2-4 overlay onto six adjacent lots (Block 2389, Lots 26, 27, 28, 31, 32 and p/o 33).

Historic records indicated that the Site was occupied by an advertising display and wood working facility with a spray booth and paint vault from 1951 to 1993. The Site has been vacant or utilized as a parking lot since 1994. The manufacturing processes, including the use of a spray booth, may have contributed to the contamination found at the Site during the RI.

3.0 PREVIOUS INVESTIGATIONS

3.1 Phase I Environmental Site Assessment (ESA) – June 2006

A Phase I ESA was conducted at the Site in June 2006 by Land America Corporation (LAC). Review of historical information indicated that the Site was previously occupied by a single story industrial facility used for manufacturing of advertising displays and woodworking from at least the mid 1940's to the mid 1990's. The former Site building was demolished in the mid 1990's and the Property was converted to a commercial licensed parking lot in 1995. No other information pertaining to the historic manufacturing activities was available.

3.2 Phase I ESA – May 2016

AKRF conducted a Phase I ESA of the Site in May 2016. The Phase I ESA identified the following:

- Historic uses of the Site included: an advertising display and woodworking manufacturer with a spray booth and paint vault, East Coast Aeronautics Inc., Progressive Tool Works, Weskup Manufacturing Jewelry Co., Kingston Manufacturing Corp. Biltrite/Biltbite Fixture Company, and Servrite Refrigeration Inc. from 1949 to 1993, and an automobile garage from 1927 and 1940. Undocumented releases from these historic industrial uses may have affected affected subsurface conditions at the Site.
- According to a Conditional Negative Declaration issued in September 2010 (CEQR No. 08DCP022X), a Restrictive Declaration (RD) for hazardous materials was recorded on January 22, 2010 and an (E) Designation for noise (E-259) was mapped on the Site.
- Historic Sanborn maps identified The New York Department of Water Supply garage abutting the Site to the south from 1951 to 1986, and a gasoline station with buried tanks and an automotive repair shop north of the Site across East 168th Street in 1951. Additionally, historic automotive repair shops, garages, filling stations, dry cleaning and laundry facilities, metal works facilities, and various manufacturing facilities were noted in the surrounding area from 1896 to 2007. Such uses may have affected area soil and/or groundwater quality at the Site.
- Although no painted surfaces or suspect asbestos-containing materials (ACM) were observed during the time of AKRF's Site visit, the potential exists for building materials from former on-site structures and debris to be within the historical fill. Based on the age of the former structures, these materials could contain lead-based paint (LBP) and/or ACM.

AKRF recommended a Subsurface Investigation be conducted to characterize subsurface conditions of soil, groundwater, and soil vapor at the Site prior to redevelopment.

3.3 Remedial Investigation Work Plan (RIWP) – May 2016

AKRF prepared an RIWP for the Site in May 2016. The scope of the investigation included a geophysical survey across accessible portions of the Site; the advancement of at least five soil borings with the collection and laboratory analysis of at least 10 soil samples; the installation of three temporary groundwater monitoring wells with the collection and laboratory analysis of three groundwater samples; and the installation of four temporary soil vapor points with the collection and laboratory analysis of four soil vapor samples.

3.4 Remedial Investigation (RI) – May 2016

AKRF conducted an RI at the Site in May 2016. The RI was conducted in accordance with the May 2016 RIWP.

The RI included a geophysical survey across accessible portions of the Site, the advancement of five soil borings with the collection and laboratory analysis of 14 soil samples and the installation of four temporary soil vapor points with the collection and laboratory analysis of four soil vapor samples. An ambient air sample was collected for comparison and quality assurance/quality control (QA/QC) purposes.

Soil beneath the Site consisted of historic fill material (sand, gravel, silt, concrete, brick, wood, and asphalt) to depths up to approximately 18 feet below grade. Presumed bedrock was encountered between approximately 12 and 19 feet below grade. Groundwater was not encountered above bedrock.

The soil analytical results indicated up to seven SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene] were detected in soil samples SB-1(4-6), SB-1(10-12), SB-2(0-2), SB-3(0-2), SB-4(0-2), SB-4(6-8), and SB-5(0-2) at concentrations exceeding their respective NYSDEC Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Soil Cleanup Objectives (RRSCOs). Benzo(a)anthracene was detected in seven samples at concentrations ranging from 0.14 parts per million (ppm) to 28 ppm, above the UUSCO and RRSCO of 1 ppm. Benzo(a)pyrene was detected in six samples at an estimated concentration of 0.6 ppm to 30 ppm, above the UUSCO and RRSCO of 1 ppm. Benzo(b)fluoranthene was detected in six samples at concentrations ranging from 2.1 ppm to 33 ppm, above the UUSCO and RRSCO of 1 ppm. Benzo(k)fluoranthene was detected in six samples at concentrations ranging from 0.85 ppm to 13 ppm, above the UUSCO of 0.8 ppm and RRSCO of 3.9 ppm. Chrysene was detected in six samples at concentrations ranging from 1.7 ppm to 29 ppm, above the UUSCO of 1 ppm and RRSCO of 3.9 ppm. Dibenzo(a)anthracene was detected in five samples at concentrations ranging from 0.35 ppm to 4.5 ppm, above the UUSCO and RRSCO of 0.33 ppm. Indeno(1,2,3-cd)pyrene was detected in seven samples at an estimated concentration of 0.6 ppm to 21 ppm, above the UUSCO and RRSCO of 0.5 ppm. Metals were detected in each of the 14 soil samples analyzed. The metals mercury (maximum concentration of 2.2 ppm), zinc (maximum concentration of 480 ppm), lead (maximum concentration of 400 ppm), and copper (maximum concentration of 410 ppm) were detected in soil samples SB-1(0-2), SB-1(4-6), SB-2(0-2), SB-3(0-2), SB-4(0-2), SB-4(6-8), SB-4(10-12), SB-5(0-2), and SB-5(4-6) at concentrations exceeding their respective NYSDEC UUSCOS. The metals copper (maximum concentration of 410 ppm) and mercury (maximum concentration of 2.2 ppm) were detected in soil samples SB-1(0-2) and SB-1(4-6) at concentrations exceeding their respective RRSCOs. No other metals were detected above applicable standards in the soil samples. One polychlorinated biphenyl (PCB), Aroclor 1248, was detected in shallow soil sample SB-3 (0-2) and its associated blind duplicate sample SB-X (0-2), at concentrations of 0.111 ppm and 0.403 ppm, respectively, slightly above the total PCB UUSCO of 0.1 ppm, but below the RRSCO. Four pesticides, P,P'-DDE, P,P'-DDT, P,P'-DDD, and dieldrin, were detected in 8 of the 14 soil samples analyzed. P,P'-DDE was detected in soil samples SB-2(0-2), SB-2(4-6), SB-3(0-2), SB-4(0-4), SB-4(6-8), and SB-5(0-2) ranging from 0.00637 ppm to 0.09 ppm, above its UUSCO of 0.0033 ppm but below its RRSCO of 8.9 ppm. P,P'-DDT was detected in soil samples SB-1(4-6), SB-1(10-12), SB-2(0-2), SB-2(4-6), SB-3(0-2), and SB-5(0-2) ranging from 0.012 ppm to 0.057 ppm, above its UUSCO of 0.0033 ppm, but below its RRSCO of 7.9 ppm. P,P'-DDD was detected in soil samples SB-2(0-2) and SB-3(0-2) at concentrations of 0.198 ppm and 0.0163 ppm, respectively, above its UUSCO of

0.0033 ppm but below its RRSCO of 13 ppm. Dieldrin was detected in soil samples SB-1(4-6), SB-1(10-12), and SB-3(0-2) at concentrations ranging from 0.00167 ppm to 0.015 ppm, above its UUSCO of 0.005 ppm but below its RRSCO of 0.2 ppm.

VOCs associated with petroleum/gasoline (n-hexane, 1,3-butadiene, 2-butanone, toluene, 2-hexanone) were detected at concentrations up to 60.6 micrograms per cubic meter (µg/m^3) in the soil vapor samples. Solvent-related VOCs were detected at individual concentrations up to 136 µg/m^3. Tetrachloroethylene (PCE) was detected in all four soil vapor samples at concentrations ranging from 5.28 µg/m^3 to 136 µg/m^3. PCE was detected in soil vapor sample SV-3 at a concentration of 136 µg/m^3, greater than the NYSDOH AGV of 60 µg/m^3. VOCs detected in the ambient air sample (AA-1) were all below the established AGVs.

Soil concentrations above NYSDEC UUSCOS and/or RRSCOS are illustrated on Figure 3. Soil vapor and ambient air concentrations are illustrated on Figure 4.

4.0 SRI FIELD PROGRAM

The SRI field program will focus on collecting soil and groundwater data to further determine the nature and extent of Site contamination and to assist with determining the appropriate remedial action.

4.1 Field Program Summary

The field sampling scope of work consists of: the advancement of four soil borings with the collection and analysis of two to three soil samples per boring and the installation of one groundwater well with the collection and analysis of one groundwater sample. The proposed sample locations are shown on Figure 5. The following sections describe the methods that will be used to complete the scope of work.

The rationale for the proposed sample locations is as follows:

Sampling Locations	Location	Rationale
RI-SB-6	Northeast of soil boring SB-1	To delineate horizontal and vertical extent of soil contamination in the northwestern portion of the Site found during the RI
RI-SB-7	South of soil boring SB-1	To delineate horizontal and vertical extent of soil contamination in the northwestern portion of the Site found during the RI
RI-SB-8	Southeast of soil boring SB-1	To delineate horizontal and vertical extent of soil contamination in the northwestern portion of the Site found during the RI
RI-SB-9	East of soil boring SB-1	To delineate horizontal and vertical extent of soil contamination in the northwestern portion of the Site found during the RI
GW-1	Adjacent to soil boring SB-1	To assess groundwater quality

4.2 Soil Sampling

A Rotosonic or Geoprobe drill rig will be used to advance soil borings RI-SB-6 through RI-SB-9 to approximately 15 feet below grade at the approximate locations shown on Figure 5 to assess soil quality throughout the Site. During soil boring advancement, air monitoring will be conducted in accordance with the Health & Safety Plan enclosed as Appendix B. Soil samples will be collected continuously at each boring until 15 feet below grade or bedrock refusal, whichever is shallower. Soil cores will be collected in five-foot long, four-inch diameter dedicated plastic bags or four-foot long macrocores. Soil samples will be inspected by AKRF field personnel for evidence of contamination (e.g., odors, staining), screened for the presence of volatile organics with a photoionization detector (PID) equipped with a 10.6 electron volt (eV) lamp, and logged using the modified Burmister soil classification system. The PID will be calibrated in accordance with manufacturer's recommendations prior to sampling.

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lamp, and logged using the modified Burmister soil classification system. The PID will be calibrated in accordance with manufacturer's recommendations prior to sampling.

It is anticipated that up to three soil samples will be collected from each soil boring. One soil sample will be collected from immediately below the surface to two feet below grade and a second soil sample will be collected from 12 to 13 feet below grade. An additional soil sample will be collected at each soil boring from the 13 to 15 foot interval, and placed "on hold" at the laboratory. If the soil sample collected from the 12 to 13 foot interval exceeds applicable soil cleanup objectives, the 13 to 15 foot soil sample(s) would be taken "off hold" and analyzed by the laboratory. A fourth sample may be submitted for laboratory analysis if indications of contamination are observed based on olfactory observations and PID readings. All sampling equipment (e.g., drilling rods and casing, macrocore samplers and probe rods) will be either dedicated or decontaminated between sampling locations.

Soil samples slated for laboratory analysis will be labeled and placed in laboratory-supplied containers and shipped to the laboratory via courier with appropriate chain of custody documentation in accordance with appropriate United States Environmental Protection Agency (EPA) protocols to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory. The samples will be analyzed for target compound list (TCL) VOCs by EPA Method 8260, TCL SVOCs by EPA Method 8270, hexavalent chromium by EPA Method 7196A, and the total analyte list (TAL) metals by EPA Method 6000/7000 series using Category B deliverables. A standard turnaround time will be requested from the laboratory.

One blind duplicate, field blank, trip blank, and matrix spike/matrix spike duplicate (MS/MSD) will be collected for QA/QC purposes for every 20 field samples collected or sample group. It is anticipated that one field blank, one blind duplicate, one MS/MSDs and one trip blank will be required during the soil portion of the field investigation. The QA/QC samples, with the exception of the trip blank, will be analyzed for all of the testing parameters as the accompanying soil samples. The trip blank will be analyzed for VOCs only. The data will be reviewed by a third-party validator and a Data Usability Summary Report (DUSR) will be prepared to document the usability and validity of the data. The soil boring locations will be surveyed using a Global Positioning System (GPS).

After each boring is completed, the bore holes will be filled with on-site materials (if not noticeably contaminated) and patched with asphalt to match existing surface conditions. Soil cuttings to be managed (if any) will be containerized in properly labeled Department of Transportation (DOT)-approved 55-gallon drums for future off-site disposal at a permitted facility. All boreholes that require drill cutting disposal would be filled with bentonite chips (hydrated). Disposable sampling equipment, including spoons, gloves, bags, paper towels, etc., that come in contact with environmental media will be double bagged and disposed of as municipal trash as non-hazardous refuse.

4.3 Groundwater Well Installation, Development and Sampling

One permanent groundwater well will be installed at the Site using a Geoprobe® (fitted with Hollow Stem Augers) at the location shown on Figure 5. The well will be installed 10 feet into the groundwater, if possible, and constructed of 10 feet of screen straddling the water table. Groundwater is expected to be encountered at approximately 20 feet below grade. A No. 2 morie sandpack will be installed to 2 feet above the well screen. The annular space around the solid well riser will be sealed with approximately two feet of bentonite and the well will be completed with a non-shrinking cement mixture to approximately one foot below grade. The well will be finished with a locking j-plug and a flush-mounted protective locking well cover. A well construction logs will be prepared and included as an appendix to the RIR.

Following installation, the groundwater monitoring well will be developed via pumping and surging to remove any accumulated fines and establish a hydraulic connection with the surrounding aquifer. Development will continue until turbidity within the well is less than 50 nephelometric turbidity units (NTUs) for three successive readings and until water quality indicators have stabilized to within 10% for pH, temperature and specific conductivity for three successive readings, or until at least three well volumes have been purged from the well. Well development details will be noted on a groundwater development log.

Approximately one to two weeks after well development, the well will be sampled using EPA low-flow sampling protocols. Prior to sampling, an electronic interface meter will be used to measure water levels and thickness of separate phase product, if any. The purge water will be monitored for turbidity and water quality indicators [i.e., pH, dissolved oxygen, oxidation-reduction potential (ORP), temperature, and specific conductivity] with measurements collected approximately every five minutes. The criteria for stabilization will be three successive readings within ±10% for pH, temperature, and specific conductivity. Purge water needing to be managed on-site will be containerized in properly labeled, DOT-approved 55-gallon drums for off-site disposal at a permitted facility.

The groundwater sample slated for laboratory analysis will be placed in laboratory-supplied containers and shipped in accordance with appropriate EPA protocols to a NYSDOH ELAP-certified laboratory. The sample will be analyzed for 1,4-Dioxane by EPA Method modified 8260C Selective Ion Monitoring (SIM), and Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) by EPA Method 537, TCL VOCs by EPA Method 8260, TCL SVOCs by EPA Method 8270, polychlorinated biphenyls (PCBs) by EPA Method 8082A, pesticides by EPA Method 8081B, and total and dissolved target analyte list (TAL) metals by EPA Method 6000/7000 series using Category B deliverables. Filtering will occur in the field. A standard turnaround time will be requested from the laboratory.

One blind duplicate, field blank, trip blank, and MS/MSD sample will be collected for QA/QC purposes. The QA/QC samples, with the exception of the trip blank, will be analyzed for the same analytes as the accompanying groundwater samples. The trip blank will be analyzed for VOCs only. The data will be reviewed by a third-party validator and a DUSR will be prepared to document the usability and validity of the data.

4.4 Quality Assurance/Quality Control (QA/QC) Sampling

Additional analysis will be included for quality control measures, as required by the Category B sampling techniques. The QA/QC samples for soil and groundwater will include one field blank, one trip blank, one MS/MSD, and one blind duplicate sample at a frequency of one sample per 20 field samples per media. The field blank, blind duplicate, and MS/MSD samples will be analyzed for 1,4-Dioxane by EPA Method modified 8260C Selective Ion Monitoring (SIM), and Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) by EPA Method 537, TCL VOCs by EPA Method 8260, TCL SVOCs by EPA Method 8270, pesticides by EPA Method 8081B, PCBs by EPA Method 8082A, hexavalent chromium by EPA Method 7196A (for soil) and TAL metals (for soil), and total and dissolved TAL metals by EPA Method 6000/7000s series (for groundwater) using Category B deliverables. One laboratory-prepared trip blank will be submitted for analysis of VOCs to determine the potential for cross-contamination. The QAPP describes the QA/QC protocols and procedures that will be followed during implementation of the RIWP. The QAPP is included as Appendix A.

4.5 Decontamination Procedures

All non-dedicated sampling equipment (e.g., submersible pumps and oil/water interface probe) will be decontaminated between sampling locations using the following procedure:

1. Scrub equipment with a bristle brush using a tap water/Simple Green® solution.
2. Rinse with tap water.
3. Scrub again with a bristle brush using a tap water/Simple Green® solution.
4. Rinse with tap water.
5. Rinse with distilled water.
6. Air-dry the equipment.

4.6 Management of Investigation-Derived Waste (IDW)

IDW that does not exhibit of evidence of contamination (e.g., staining, presence of ash, oily sheens, odors, etc.) will be used to fill in the corresponding soil boring hole. Any soil and groundwater IDW exhibiting evidence of contamination will be containerized in DOT-approved 55-gallon drums. The drums will be sealed at the end of each work day and labeled with the date, the well or boring number(s), the type of waste (i.e., drill cuttings, decontamination fluids, or purge water) and the name of an AKRF point-of-contact. All drums will be labeled "pending analysis" until laboratory data is available. All IDW will be disposed of or treated according to applicable local, state, and federal regulations.

5.0 REPORTING REQUIREMENTS

5.1 Supplemental Remedial Investigation Report (SRIR)

Upon completion of all field work and receipt of laboratory analytical results, a RIR will be prepared that will: document field activities; present field and laboratory data; evaluate exposure pathways in an exposure assessment; and discuss conclusions and recommendations drawn from the results of the investigation. The report will also include Site photographs of field activities.

5.1.1 Description of Field Activities

This section of the SRIR will describe the field methods used to characterize the Site conditions, including: sampling techniques; field screening equipment; drilling and excavation equipment; geotechnical well installation procedures; and management of IDW.

5.1.2 Soil Boring Assessment

The SRIR will include a section that presents field and laboratory data for soil results. The section will include a description of soil characteristics and figures will be provided that illustrate soil boring locations. Field and laboratory analytical results will be presented in the body of the report, summarized in tables and figures, and the detected concentrations will be compared to regulatory standards and/or guidance values. Soil boring logs and laboratory analytical reports will be provided as attachments. Category B deliverables will be provided by the laboratory and a third-party DUSR will be prepared.

5.1.3 Groundwater Assessment

The SRIR will include a section that presents field and laboratory data from the groundwater sampling. The section will include a description of groundwater characteristics and figures will be provided that illustrate the geotechnical well location. In addition, a well construction log will be included. Field and laboratory analytical results will be presented and compared with regulatory standards and/or guidance values. Low-flow groundwater sampling logs and laboratory analytical reports will be provided as attachments. Category B deliverables will be provided by the laboratory and a third-party DUSR will be prepared.

5.1.4 Qualitative Human Health Exposure Assessment (QHHEA)

A QHHEA will be performed in accordance with DER-10 Section 3.3. The assessment will be included in the SRIR.

5.1.5 Fish and Wildlife Resource Impact Analysis

The SRIR will include a section that documents the steps taken to assess the resources on, adjacent to, and downgradient for the Site.

6.0 SCHEDULE OF WORK

The following tentative schedule has been developed for the project. This schedule is subject to change.

Activity	Time To Complete
Submittal of BCP Application and Draft Remedial Investigation Work Plan (RIWP)	June 2017
Completeness Review	June - August 2017
30-day Public Notice/Public Comment Period is Initiated	August 2017
BCA Execution	October 2017
Submittal and Approval of Citizen Participation Plan and Final RIWP	October/November 2017
Supplemental Remedial Investigation	December 2017
Draft Supplemental Remedial Investigation Report (RIR) and Draft Remedial Action Work Plan (RAWP) Submitted to NYSDEC	January 2018
45-day Public Comment Period for Supplemental RIR and RAWP is Initiated	February 2018
Public Comment Period for Supplemental RIR and RAWP Ends	March 2018
Final Supplemental RIR and RAWP Submitted/DEC Approves and Issues Decision Document	March/April 2018
Issue Remedial/Construction Notice Fact Sheet	March/April 2018
Begin Redevelopment (Construction) with Implementation of RAWP	April/May 2018
Execution of Environmental Easement (if required)	July 2019
Draft Site Management Plan (SMP) Submitted to NYSDEC	October 1, 2019
Draft Final Engineering Report and Fact Sheet	October 2019
Certificate of Completion and Fact Sheet	December 2019
Completion of Building	December 2020

7.0 CERTIFICATION

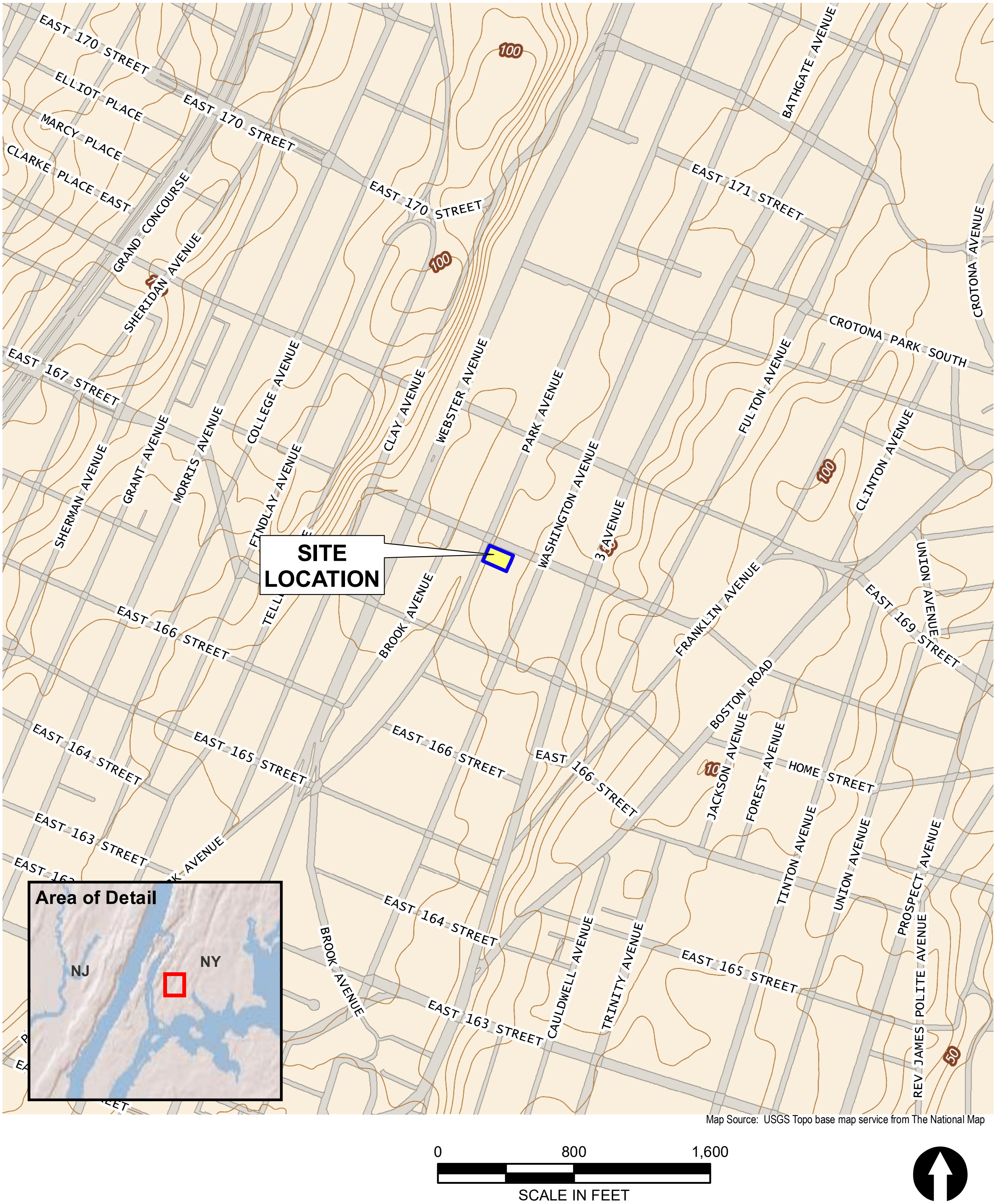
I, Deborah Shapiro, QEP, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Deborah Shapiro, QEP	D. Shapiro	12-12-17
Name	***Signature***	***Date***

8.0 REFERENCES

- Phase I Environmental Site Assessment (ESA) – 3500 Park Avenue, Bronx, New York, LandAmerica Assessment Corporation, June 2006.
- Phase I Environmental Site Assessment (ESA) – 3500 Park Avenue, Bronx, New York, AKRF, Inc., May 2016.
- Remedial Investigation Work Plan (RIWP) – 3500 Park Avenue, Bronx, New York, AKRF, Inc., May 2016.
- Remedial Investigation Report (RIR) – 3500 Park Avenue, Bronx, New York, AKRF, Inc., May 2016.
- U.S. Geological Survey, *Central Park, NY Quadrangle*, 7.5 minute Series (Topographic), Scale 1:2,500, 1995.
- 6 NYCRR Section 375-6: Remedial Program Soil Cleanup Objectives (SCOs), December 2006.
- NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, March 1998.
- U.S. Geological Survey, Open Files Report 89-462, Bedrock and Engineering Geologic Maps of New York County and Parts of Kings and Queens Counties, New York, and Parts of Bergen and Hudson Counties, New Jersey, Sheet 3 - Bedrock Contours and Outcrops, 1990.

FIGURES



Map Source: USGS Topo base map service from The National Map

©2017 AKRF W:\Projects\12477 - 3500 PARK AVENUE\Technical\GIS and Graphics\hazmat\12477 Fig 1 Site Location BCP.mxd5/17/2017 3:51:39 PM jszalus

AKRF

440 Park Avenue South, New York, NY 10016

3500 Park Avenue

Bronx, New York

SITE LOCATION

DATE

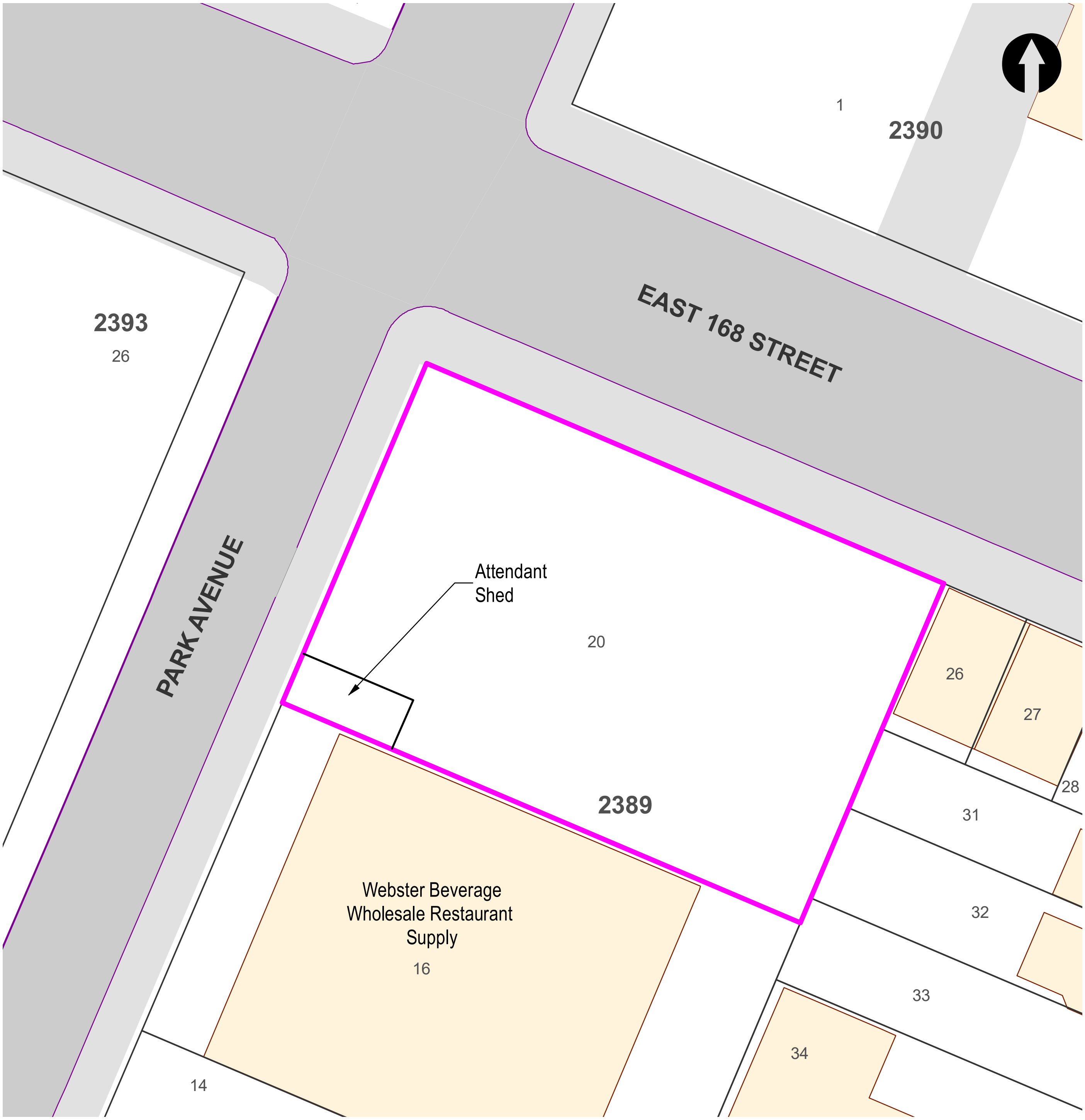
5/17/2017

PROJECT NO.

12477

FIGURE

1



LEGEND

🟪	PROJECT SITE BOUNDARY
20	LOT BOUNDARY AND TAX LOT NUMBER
2389	TAX BLOCK NUMBER
🟧	BUILDING

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

0 40 80
SCALE IN FEET

AKRF
440 Park Avenue South, New York, NY 10016

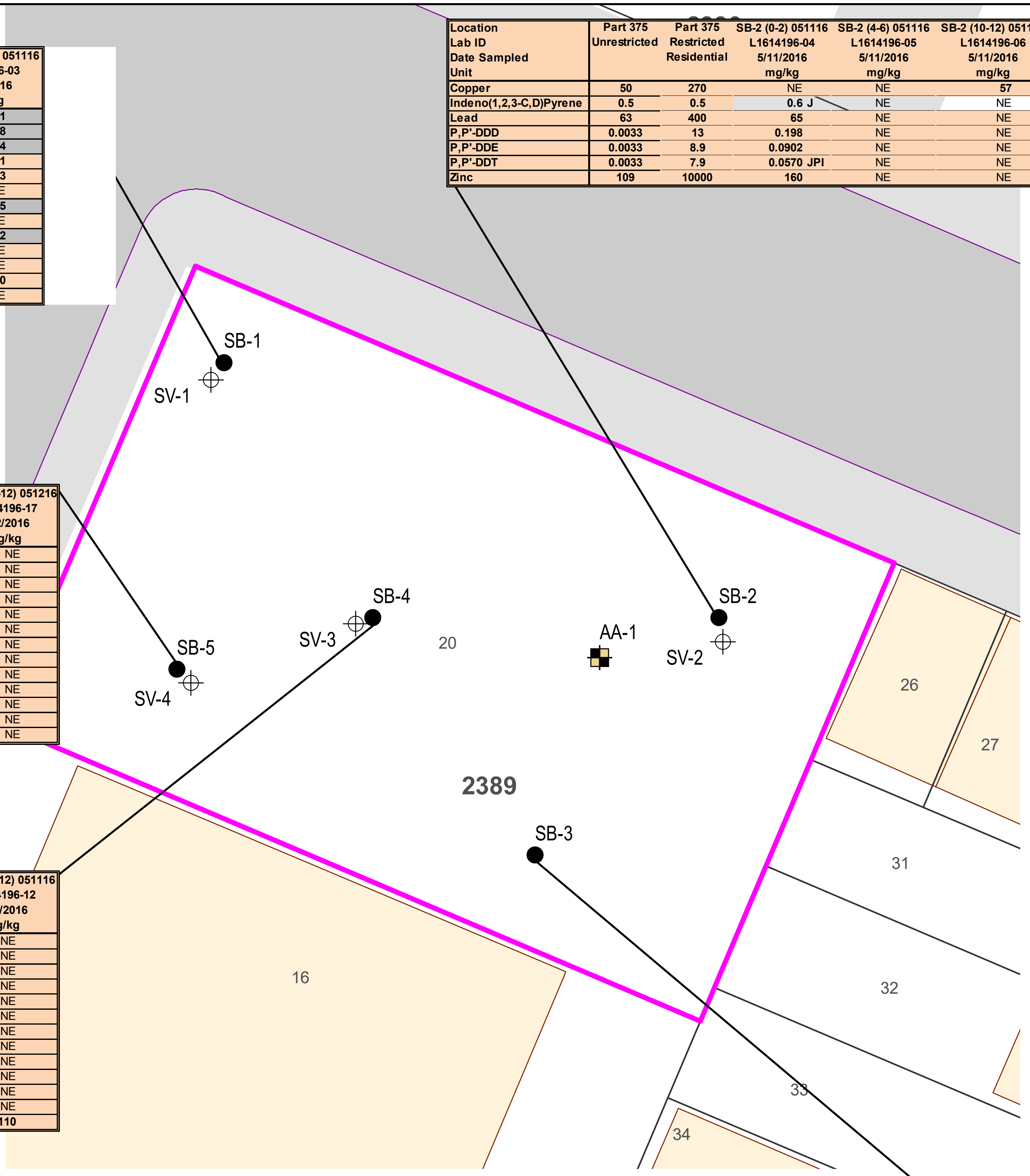
3500 Park Avenue
Bronx, New York

SITE PLAN

DATE
6/21/2017

PROJECT NO.
12477

FIGURE
2



Location Lab ID Date Sampled Unit	Part 375 Unrestricted	Part 375 Restricted Residential	SB-1 (0-2) 051116 L1614196-01 5/11/2016 mg/kg	SB-1 (4-6) 051116 L1614196-02 5/11/2016 mg/kg	SB-1 (10-12) 051116 L1614196-03 5/11/2016 mg/kg
Benzo(A)Anthracene	1	1	NE	28	2.1
Benzo(A)Pyrene	1	1	NE	30	1.8
Benzo(B)Fluoranthene	1	1	NE	33	2.4
Benzo(K)Fluoranthene	0.8	3.9	NE	13	1
Chrysene	1	3.9	NE	29	2.3
Copper	50	270	410	65	NE
Dibenz(A,H)Anthracene	0.33	0.33	NE	4.5	0.35
Dieldrin	0.005	0.2	NE	0.0150 P	NE
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	NE	21	1.2
Lead	63	400	67	400	NE
Mercury	0.18	0.81	0.50	2.2	NE
P,P'-DDT	0.0033	7.9	NE	0.0240 PI	0.0120
Zinc	109	10000	480	260	NE

Location Lab ID Date Sampled Unit	Part 375 Unrestricted	Part 375 Restricted Residential	SB-2 (0-2) 051116 L1614196-04 5/11/2016 mg/kg	SB-2 (4-6) 051116 L1614196-05 5/11/2016 mg/kg	SB-2 (10-12) 051116 L1614196-06 5/11/2016 mg/kg
Copper	50	270	NE	NE	57
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	0.6 J	NE	NE
Lead	63	400	65	NE	NE
P,P'-DDD	0.0033	13	0.198	NE	NE
P,P'-DDE	0.0033	8.9	0.0902	NE	NE
P,P'-DDT	0.0033	7.9	0.0570 JPI	NE	NE
Zinc	109	10000	160	NE	NE

Location Lab ID Date Sampled Unit	Part 375 Unrestricted	Part 375 Restricted Residential	SB-5 (0-2) 051216 L1614196-15 5/12/2016 mg/kg	SB-5 (4-6) 051216 L1614196-16 5/12/2016 mg/kg	SB-5 (10-12) 051216 L1614196-17 5/12/2016 mg/kg
Acetone	0.05	100	0.14	NE	NE
Benzo(A)Anthracene	1	1	2.7	NE	NE
Benzo(A)Pyrene	1	1	2.7	NE	NE
Benzo(B)Fluoranthene	1	1	3.5	NE	NE
Benzo(K)Fluoranthene	0.8	3.9	1.4	NE	NE
Chrysene	1	3.9	2.7	NE	NE
Dibenz(A,H)Anthracene	0.33	0.33	0.49	NE	NE
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	2	NE	NE
Lead	63	400	89	82	NE
Mercury	0.18	0.81	0.41	0.50	NE
P,P'-DDD	0.0033	13	0.00634	NE	NE
P,P'-DDE	0.0033	8.9	0.00702	NE	NE
Zinc	109	10000	230	NE	NE

Location Lab ID Date Sampled Unit	Part 375 Unrestricted	Part 375 Restricted Residential	SB-4 (0-2) 051116 L1614196-10 5/11/2016 mg/kg	SB-4 (6-8) 051116 L1614196-11 5/11/2016 mg/kg	SB-4 (10-12) 051116 L1614196-12 5/11/2016 mg/kg
Benzo(A)Anthracene	1	1	3.7	1.6	NE
Benzo(A)Pyrene	1	1	3.1	1.7	NE
Benzo(B)Fluoranthene	1	1	4.2	2.1	NE
Benzo(K)Fluoranthene	0.8	3.9	1.5	0.85	NE
Chrysene	1	3.9	3.6	1.7	NE
Copper	50	270	NE	54	NE
Dibenz(A,H)Anthracene	0.33	0.33	0.48 J	NE	NE
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	2.1	1.2	NE
Lead	63	400	200	86	NE
Mercury	0.18	0.81	0.55	0.33	NE
P,P'-DDD	0.0033	13	0.0357	0.0108	NE
P,P'-DDE	0.0033	8.9	0.0189	0.00653 P	NE
Zinc	109	10000	150	150	110

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

Location Lab ID Date Sampled Unit	Part 375 Unrestricted	Part 375 Restricted Residential	SB-3 (0-2) 051116 L1614196-07 5/11/2016 mg/kg	SB-X 051116 L1614196-08 5/11/2016 mg/kg	SB-3 (10-12) 051116 L1614196-09 5/11/2016 mg/kg
Benzo(A)Anthracene	1	1	3.1	19	NE
Benzo(A)Pyrene	1	1	3.4	20	NE
Benzo(B)Fluoranthene	1	1	4.4	32	NE
Benzo(K)Fluoranthene	0.8	3.9	1.5	9.6	NE
Chrysene	1	3.9	3.4	22	NE
Copper	50	270	270	1400	NE
Dibenz(A,H)Anthracene	0.33	0.33	0.62	4.3	NE
Dieldrin	0.005	0.2	0.0116	0.00785 PI	NE
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	2.6	17	NE
Lead	63	400	78	180	NE
Mercury	0.18	0.81	0.24	0.54	NE
P,P'-DDD	0.0033	13	0.0163	0.0900	NE
P,P'-DDE	0.0033	8.9	0.0103 P	0.0284	NE
P,P'-DDT	0.0033	7.9	0.0201	0.0172	NE
Polychlorinated Biphenyl (PCBs)	0.1	1	0.126 J	0.443 J	NE

LEGEND

▭	PROJECT SITE BOUNDARY
SB-1 ●	SOIL BORING LOCATION
SV-1 ⌖	SOIL VAPOR POINT LOCATION
AA-1 ▣	AMBIENT AIR SAMPLE LOCATION
20	LOT BOUNDARY AND TAX LOT NUMBER
2389	TAX BLOCK NUMBER
▭	BUILDING

Sample ID

Sample Date

Location Lab ID Date Sampled Unit	Part 375 Unrestricted	Part 375 Restricted Residential	SB-2 (0-2) 051116 L1614196-04 5/11/2016 µg/kg	SB-2 (10-12) 051116 L1614196-06 5/11/2016 mg/kg	SB-2 (4-6) 051116 L1614196-05 5/11/2016 mg/kg
Copper	50	270	NE	57	NE
Indeno(1,2,3-C,D)Pyrene	500	500	600 J	NE	NE
Lead	63	400	65	NE	NE
P,P'-DDD	3.3	13,000	198	NE	NE
P,P'-DDE	3.3	8,900	90.2	NE	NE
P,P'-DDT	3.3	7,900	57 JPI	NE	NE
Zinc	109	10,000	160	NE	NE

Compound in Soil

Concentration in Soil

GENERAL

NS : No soil cleanup objective listed.

NA : Not applicable

NE : No exceedance.

U : The analyte was not detected at the indicated concentration.

J : The concentration given is an estimated value.

I : The lower value of the two columns has been reported due to obvious interference.

P : The RPD between the results for the two columns exceeds the method-specific criteria.

TS : Value represents a sum total standard.

SOIL

Part 375 Soil Cleanup Objectives : Soil Clean-up Objectives listed in NYSDEC (New York State Department of Environmental Conservation) "Part 375" Regulations (6 NYCRR Part 375).

mg/kg : milligrams per kilogram = parts per million (ppm)

µg/L : micrograms per Liter = parts per billion (ppb)

Metals

***** :** Standard listed is for Trivalent, not total, Chromium.

Parent sample of blind duplicate soil sample "SB-X" is "SB-3(0-2)".
Exceedances of Part 375 Unrestricted Soil Cleanup Objectives are highlighted in bold font.
Exceedances of Part 375 Restricted Residential Soil Cleanup Objectives are highlighted in gray.

0 15 30 60

SCALE IN FEET

AKRF
440 Park Avenue South, New York, NY 10016

3500 Park Avenue
Bronx, New York

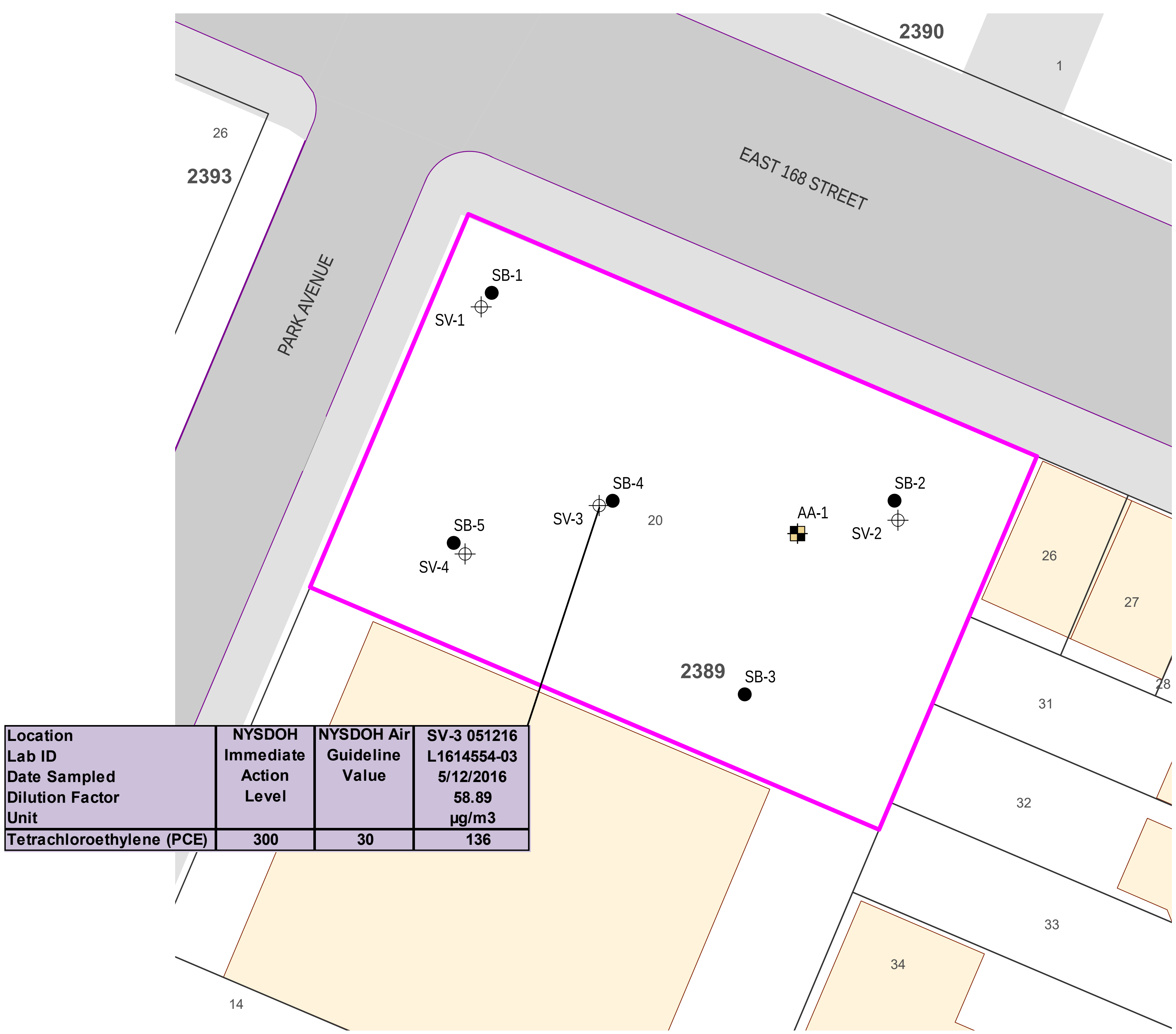
SOIL SAMPLE CONCENTRATIONS ABOVE NYSDEC UUSCOs AND RRSCOs

DATE
5/19/2017

PROJECT NO.
12477

FIGURE
3

©2017 AKRF W:\Projects\12477 - 3500 PARK AVENUE\Technical\GIS and Graphics\hazmat\RIWP\12477 Fig 3 Soil Sample Concentrations Above NYSDEC UUSCOs and RRSCOs BCP.mxd5/19/2017 5:04:02 PM iszalus



Location Lab ID Date Sampled Dilution Factor Unit	NYSDOH Immediate Action Level	NYSDOH Air Guideline Value	SV-3 051216 L1614554-03 5/12/2016 58.89 µg/m3
Tetrachloroethylene (PCE)	300	30	136

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

LEGEND

	▭	PROJECT SITE BOUNDARY
SB-1	●	SOIL BORING LOCATION
SV-1	⊕	SOIL VAPOR POINT LOCATION
AA-1	▨	AMBIENT AIR SAMPLE LOCATION
	20	LOT BOUNDARY AND TAX LOT NUMBER
	2389	TAX BLOCK NUMBER
	▭	BUILDING

Location Lab ID Date Sampled Dilution Factor Unit	NYSDOH Immediate Action Level	NYSDOH Air Guideline Value	SV-3 051216 L1614554-03 5/12/2016 58.89 µg/m3
Tetrachloroethylene (PCE)	300	30	136

Sample ID

Sample Date

Compound in Soil Vapor

Concentration in Soil Vapor

GENERAL

NS : No soil cleanup objective listed.
NA : Not applicable
NE : No exceedance.
U : The analyte was not detected at the indicated concentration.
J : The concentration given is an estimated value.
I : The lower value of the two columns has been reported due to obvious interference.
P : The RPD between the results for the two columns exceeds the method-specific criteria.
TS : Value represents a sum total standard.

SOIL VAPOR

NYSDOH Soil Vapor Intrusion Air Guidance Value : NYSDOH Air Guideline Values (AGVs) and Table 3.3 Matrix 1 and 2 Chemicals presented in the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006 ("NYSDOH Vapor Intrusion Guidance Document"), updated September 2013 for change of AGV for PCE and August 2015 for TCE.

µg/m^3 : micrograms per cubic meter of air

Exceedances of NYSDOH Soil Vapor Intrusion Air Guidance Values are highlighted in bold font.
Exceedances of NYSDOH Soil Vapor Intrusion Air Guidance Matrix Values are highlighted in gray.

0 15 30 60
SCALE IN FEET

AKRF
440 Park Avenue South, New York, NY 10016

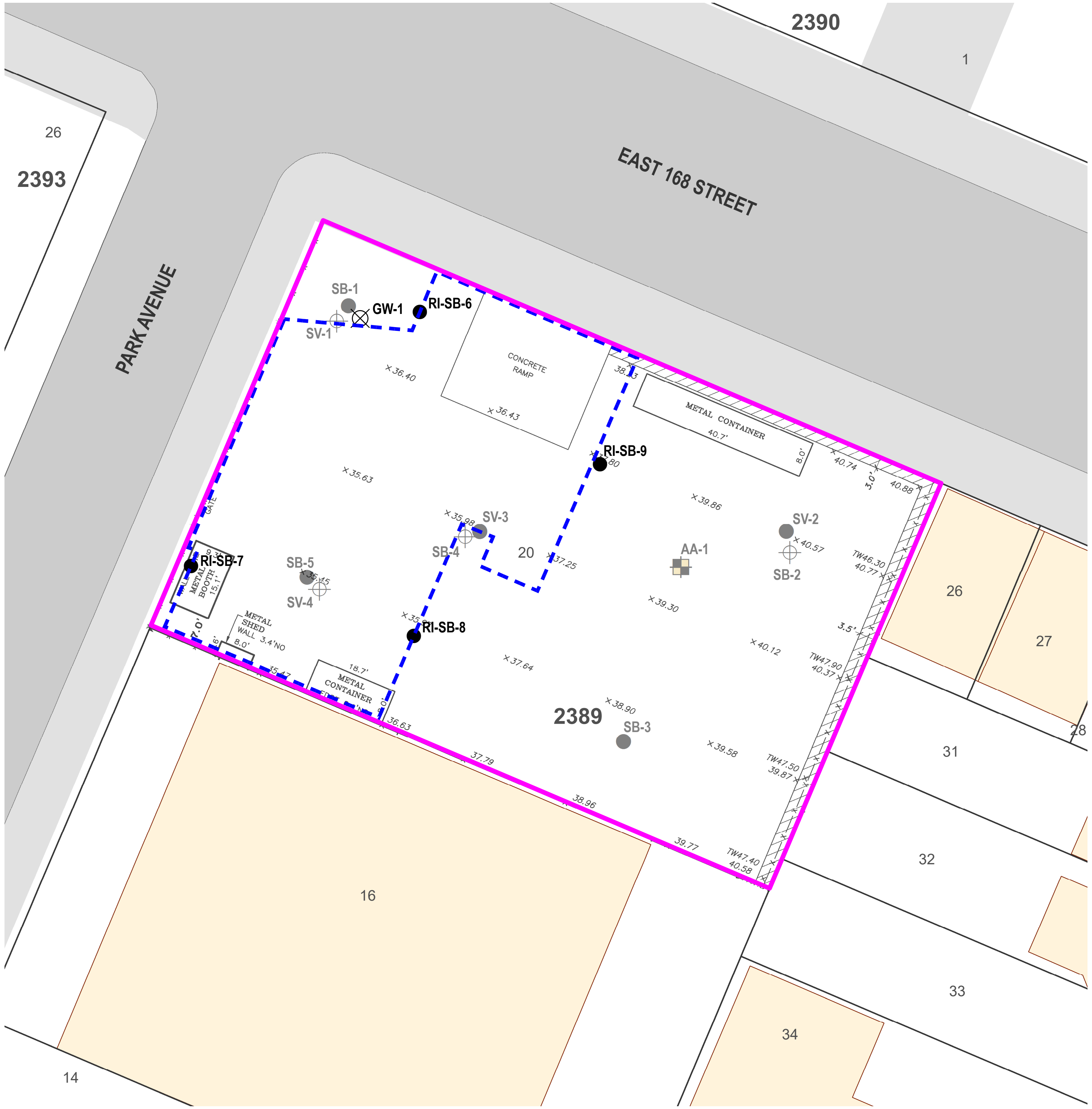
3500 Park Avenue
Bronx, New York

SOIL VAPOR SAMPLE CONCENTRATIONS ABOVE AGVS

DATE
5/19/2017

PROJECT NO.
12477

FIGURE
4



LEGEND

- ▭ PROJECT SITE BOUNDARY
- ⬚ PROPOSED CELLAR FOOTPRINT
- ● PROPOSED SOIL BORING
- ⊠ PROPOSED GROUNDWATER MONITORING WELL
- ● PREVIOUS INVESTIGATION SOIL BORING LOCATION
- ⌖ PREVIOUS INVESTIGATION SOIL VAPOR POINT LOCATION
- ▨ PREVIOUS INVESTIGATION AMBIENT AIR SAMPLE LOCATION
- 20 LOT BOUNDARY AND TAX LOT NUMBER
- **2389** TAX BLOCK NUMBER
- ▭ BUILDING
- × 39.58 EXISITING GRADE ELEVATIONS

0 15 30 60

SCALE IN FEET

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

Survey Source:
1. Elevations Are Based Upon North American Vertical Datum (NAVD) of 1988.
2. Elevations and Locations surveyed by: Leonard J Strandberg and Assoc, P.C. Block 2389, Lot 20, Feb 2017.

AKRF
440 Park Avenue South, New York, NY 10016

3500 Park Avenue
Bronx, New York

PROPOSED SAMPLE LOCATION PLAN

DATE
11/17/2017

PROJECT NO.
12477

FIGURE
5

APPENDIX A

QUALITY ASSURANCE PROJECT PLAN

3500 PARK AVENUE APARTMENTS

3500 PARK AVENUE
BRONX, NEW YORK

Quality Assurance Project Plan

BCP Site Number: C203096
CEQR Number: 08DCP022X
AKRF Project Number: 12477

Prepared for:
3500 Park Apts. HDFC, Inc.
3500 Park Apts. L.P.
290 Lenox Avenue
New York, NY 10027

Prepared by:

AKRF, Inc.
440 Park Avenue South, 7th Floor
New York, New York 10016
212-696-0670

DECEMBER 2017

TABLE OF CONTENTS

FIGURES

APPENDIX

TITLE AND APPROVAL PAGE

Title: Supplemental Remedial Investigation – 3500 Park Avenue Apartments Quality Assurance Project Plan (QAPP)
Project Name/Property Name: Supplemental Remedial Investigation/ 3500 Park Avenue Apartments
Property/Site Location: 3500 Park Avenue Apartments, 3500 Park Avenue, Bronx, NY 10456

Date: December 12, 2017
Agreement Number: TBD

3500 Park Apts. HDFC, Inc. and 3500 Park Apts. L.P.
Brownfield Cleanup Program Volunteer

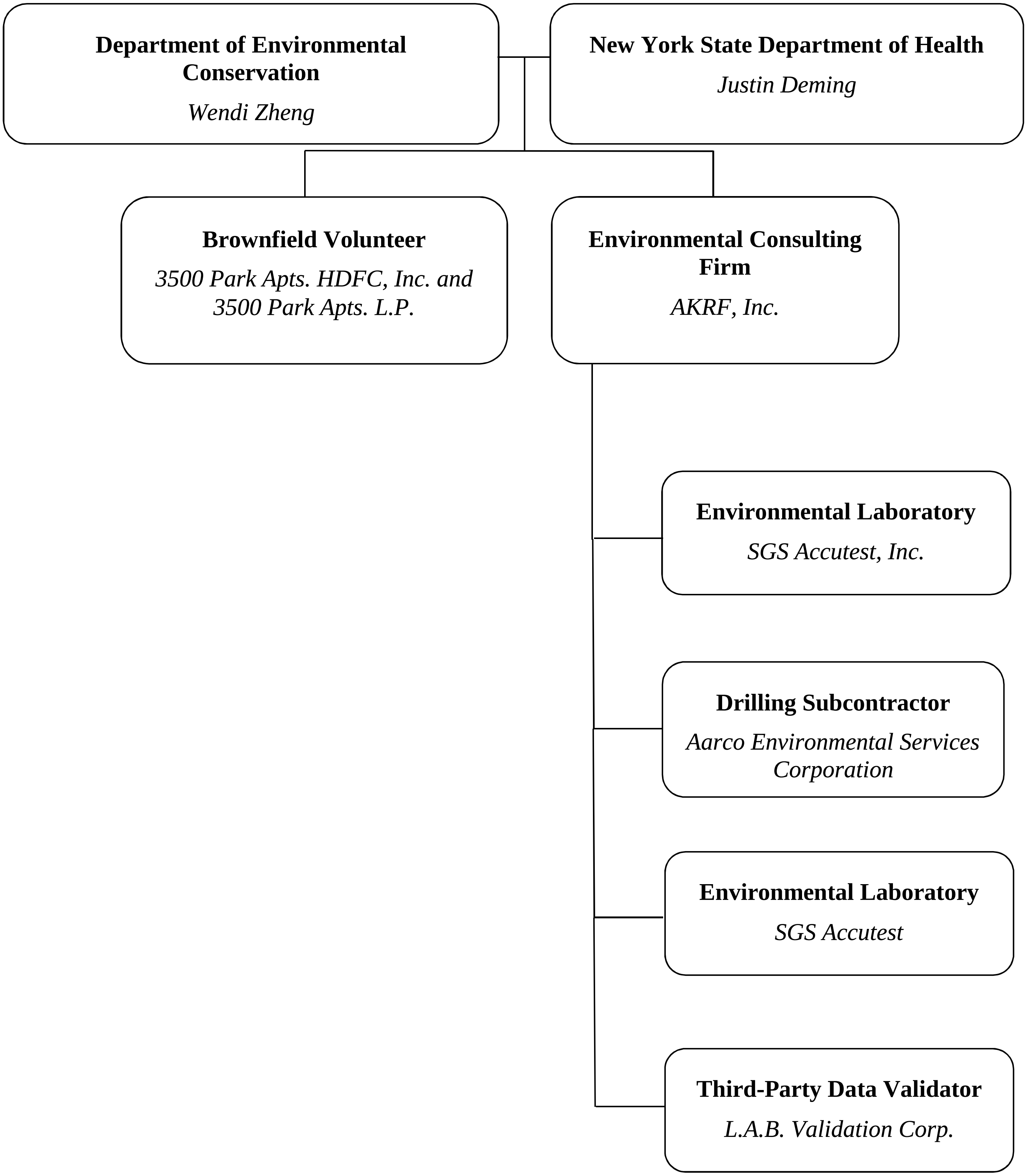
Michelle Lapin, P.E.
AKRF, Inc.
440 Park Avenue South, 7th Floor, New York, NY 10016
646-388-9520, mlapin@akrf.com
Preparer's Name and Organizational Affiliation
Preparer's Address, Telephone Number, and E-mail Address

December 12, 2017
Preparation Date (Day/Month/Year)

Environmental Consultant Quality Assurance Officer (QAO) D. Shapiro

Deborah Shapiro, QEP/AKRF, Inc./ December 12, 2017
Printed Name/Organization/Date

1.0 PROJECT ORGANIZATION CHART



Department of Environmental Conservation
Wendi Zheng

New York State Department of Health
Justin Deming

Brownfield Volunteer
3500 Park Apts. HDFC, Inc. and 3500 Park Apts. L.P.

Environmental Consulting Firm
AKRF, Inc.

Environmental Laboratory
SGS Accutest, Inc.

Drilling Subcontractor
Aarco Environmental Services Corporation

Environmental Laboratory
SGS Accutest

Third-Party Data Validator
L.A.B. Validation Corp.

2.0 PERSONNEL RESPONSIBILITIES

Name	**Title**	**Organization**	**Telephone Number**	**Responsibilities**
Wendi Zheng	BCP Project Manager	NYSDEC	718-482-7541	Review all technical and schedule aspects of the project. Communicate regularly with AKRF and NYSDOH to ensure project in compliance with project work plans.
Michelle Lapin, P.E.	Quality Assurance Officer	AKRF, Inc.	646-388-9520	General oversight of all aspects of the project. Communicate regularly with all members of the AKRF project team to ensure quality assurance and a smooth flow of information between involved parties.
Deborah Shapiro, QEP	Project Manager and	AKRF, Inc.	646-388-9544	Coordinate the implementation of all aspects of the technical scope, and communicate with NYSDEC. Interpretation of laboratory results and preparation of report.
Nick Straccione	Laboratory QA/QC Officer	SGS Accutest	732-329-0200 ext. 1202	Responsible for quality control procedures and checks in the laboratory and ensuring adherence to laboratory protocols. Conduct a final check on the analytical calculations and sign off on the laboratory reports.
Lori Beyer	DUSR Preparer	L.A.B. Validation Corp.	631-454-6100	Responsible for third-party data validation and DUSR preparation.
Mark Jepsen	Field Team Leader	AKRF, Inc.	646-388-9567	Oversee installation of soil borings, Collect soil and groundwater samples.

Resumes of key personnel are provided as Appendix A.

3.0 PROBLEM DEFINITION/PROJECT DESCRIPTION

3.1 Problem Definition

Historic records indicated that the Site was developed with an advertising display and woodworking manufacturer with a spray booth and paint vault, East Coast Aeronautics Inc., Progressive Tool Works, Weskup Manufacturing Jewelry Co., Kingston Manufacturing Corp. Biltrite/Biltbite Fixture Company, and Servrite Refrigeration Inc. from 1949 to 1993, and an automobile garage from 1927 and 1940. Prior uses that appear to have led to Site contamination include manufacturing and historic filling. The Site has been vacant or utilized as a parking lot since 1994.

Based on an evaluation of the available data and information from AKRF's May 2016 Remedial Investigation (RI), on-site soil has been contaminated with the semivolatile organic compounds (SVOCs) and metals, including lead, mercury, and zinc.

The environmental question being asked is: Are there contaminants in the soil and/or groundwater at the Site that exceed New York State Department of Environmental Conservation (NYSDEC) criteria and may impact human health and the environment?

3.2 Project Description

3.2.1 Site Location and Description

The approximately 15,210-square foot Site is located at 3500 Park Avenue in the Bronx, New York. The Site consists of lot consisting of an asphalt-paved parking lot with a small mobile storage container on the southwestern portion, which served as an attendant shed. The Metro North Railroad tracks are located approximately 20 feet below grade to the west. The surrounding area is developed with residential, commercial, and institutional uses. The Site Location is provided as Figure 1 and a Site Plan is provided as Figure 2.

Surface topography at the Site slopes slightly to the west. Based on reports compiled by the U.S. Geological Survey Yonkers Quadrangle map, the Site lies at an elevation of approximately 30 to 40 feet above the National Geodetic Vertical Datum of 1988 (an approximation of mean sea level). The surrounding area slopes down to the south.

Site lithology, based on the soil borings advanced during previous investigations, consists of historic fill materials (including sand, gravel, silt, concrete, brick, ash, and asphalt) from just below the surface to depths up to approximately 11 feet below grade. Presumed bedrock was encountered between 12 and 19 feet below grade. Groundwater was not encountered above bedrock. Based upon regional groundwater information, groundwater is expected to flow in a south or southeasterly direction in the Site vicinity; however, the presence of subsurface utilities in the vicinity of the Site may influence groundwater flow direction. Groundwater in Bronx is not used as a potable source. There are no surface water bodies or streams on or immediately adjacent to the Site.

3.2.2 Site History

According to a Conditional Negative Declaration issued in September 2010 (CEQR No. 08DCP022X), a Restrictive Declaration (RD) for hazardous materials was recorded on January 22, 2010 and an (E) Designation for noise (E-259) was mapped on the Site. In 2010, the Site was rezoned by 3500 Park Avenue LLC to R7-1 with a C2-4 overlay and extended the C2-4 overlay onto six adjacent lots (Block 2389, Lots 26, 27, 28, 31, 32 and p/o 33).

Historic records indicated that the Site was occupied by an advertising display and wood working facility with a spray booth and paint vault from 1951 to 1993. The Site has been vacant or utilized as a parking lot since 1994. The manufacturing processes, including the use of a spray booth, may have contributed to the contamination found at the Site during the RI.

3.3 Project Decision Statements

To assess the contaminant pathway for potential contaminants of concern, it is necessary to acquire soil and groundwater samples for analysis of volatile organic compounds (VOCs), SVOCs, and TAL metals (including hexavalent chromium for soil). The groundwater samples will also be analyzed for 1,4-dioxane, Perfluorooctanoic Acid (PFOA), and Perfluorooctane Sulfonate (PFOS). The primary concern is to identify potential impacts to the environment that may affect human health. Soil sample analytical results will be compared to the 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted-Residential Soil Cleanup Objectives (RRSCOs), the applicable Soil Cleanup Objectives (SCOs) for the proposed future use of the Site. Groundwater analytical results will be compared to the New York State 6NYCRR Part 703.5 Class GA Ambient Water Quality Standards (AWQS), which are drinking water standards, although groundwater in the Bronx is not used as a source of potable water. Soil vapor analytical results were compared to the New York State Department of Health (NYSDOH) 2006 Guidance for Evaluation Soil Vapor Intrusion Air Guidance Values (AGVs) and Matrices, updated in May 2017.

Based on previous environmental assessments conducted at the Site, it may be necessary to develop a remedial action that includes a construction health and safety plan (CHASP) for mitigating potential exposure for any activities that may encounter contaminated media.

4.0 PROJECT QUALITY OBJECTIVES

The overall project objectives for the SRI include:

- Determine whether soil and/or groundwater at the Site poses a risk to human health and safety by exposure to hazardous substances; and
- Investigate groundwater quality at the Site.

Who will use the data?

The collected data will be used by NYSDEC, NYSDOH, 3500 Park Apts. HDFC., Inc., 3500 Park Apts. L.P., and AKRF to be implemented to determine what remedial location will be necessary to redevelop the Site.

What types of data are needed?

- Soil samples will be collected from soil borings and analyzed at an off-site laboratory for Target Compound List (TCL) VOCs by Environmental Protection Agency (EPA) Method 8260C, TCL SVOCs by EPA Method 8270D, TAL metals by EPA Method 6000/7000 series and hexavalent chromium by EPA Method 7196A using Category B deliverables.
- One groundwater sample will be collected from a groundwater monitoring well using low-flow groundwater sampling techniques and analyzed at an off-site laboratory for VOCs using EPA Method 8260C, SVOCs by EPA Method 8270D, pesticides by EPA Method 8081B, polychlorinated biphenyls (PCBs) by EPA Method 8082A, total and dissolved Target Analyte List (TAL) metals by EPA Method 6000/7000 series, 1,4-dioxane by EPA Method modified 8260C Selective Ion Monitoring (SIM), and Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) by EPA Method Modified 537 using Category B deliverables.

How much data are needed?

- Three soil samples from four soil borings will be collected; two to three samples from each boring will be analyzed.
- One groundwater sample will be collected and analyzed.
- For soil and groundwater samples - one field blank, one blind duplicate, one matrix spike/matrix spike duplicate (MS/MSD), and one trip blank at a sample frequency of one sample per 20 field samples per media.

Figure 3 shows the proposed soil and groundwater sampling locations.

Where, when, and how should the data be collected/generated?

- Soil will be continuously logged and collected from four soil borings. Soil samples will be recovered from the soil borings, which will be advanced to 15 feet below grade. Three soil samples will be collected from each soil boring. One soil sample will be collected from immediately below the surface to two feet below grade and a second soil sample will be collected from 12 to 13 feet below grade. An additional soil sample will be collected from the 13 to 15 foot interval, and placed "on hold" at the laboratory. If the soil sample collected from approximately 12 to 13 feet below grade exceeds applicable soil cleanup objectives, the additional soil sample(s) from 13 to 15 feet would be taken "off hold" and analyzed by the laboratory. All sampling equipment (e.g., drilling rods and casing, macrocore samplers and probe rods) will be either dedicated or decontaminated between sampling locations.
- A groundwater sample will be collected from a permanent groundwater well. Groundwater sampling will occur at least one to two weeks after well installation.

Who will collect and generate the data?

AKRF will be responsible for: advancing the soil borings and sampling the soil, and sampling groundwater from the groundwater monitoring well. All samples will be analyzed by SGS Accutest (subcontracted to AKRF), a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory. AKRF will be responsible for collecting, reviewing, assessing, and disseminating validated data. Third-party data validation and the preparation of a Data Summary Usability Report (DUSR) will be prepared by Ms. Lori Beyer of L.A.B. Validation Corp. The DUSR will be prepared in accordance with DER-10. Ms. Beyer's professional certification and resume are attached in Appendix A.

How will the data be reported?

The data will be reported in a Supplemental Remedial Investigation Report (SRIR) and as Environmental Quality Information System (EQuIS)™-compatible electronic data deliverables (EDDs).

How will the data be archived?

The electronic data will be maintained at AKRF offices for a minimum of one year. Field logbooks and forms will be scanned and all electronic data will be archived on the AKRF corporate server.

5.0 PROJECT SCHEDULE/TIMELINE

Activities	**Organization**	**Dates (MM/DD/YY)**		**Deliverable**	**Deliverable Due Date**
		Anticipated Date(s) of Initiation	**Anticipated Date of Completion**		
Preparation of SRIWP and QAPP	AKRF, Inc.	05/15/17	06/21/17	SRIWP	06/21/17
Preparation of HASP	AKRF, Inc.	05/15/17	06/21/17	HASP	06/21/17
Procurement of Equipment	AKRF, Inc.	12/01/17	12/05/17	N/A	N/A
Laboratory Request	AKRF, Inc.	12/01/17	12/05/17	N/A	N/A
Field Reconnaissance/ Access	AKRF, Inc.	12/05/17	12/08/17	N/A	N/A
Collection of Field Samples	AKRF, Inc.	12/18/17	12/26/17	N/A	N/A
Laboratory Package Received	AKRF, Inc.	12/27/17	01/04/18	Unvalidated data package	01/04/18
Validation of Laboratory Results	L.A.B Validation Corp.	12/28/17	01/18/18	Validated data Package	01/18/18
Data Evaluation/ Preparation of Final Report	AKRF, Inc.	12/29/17	01/30/18	Final Report	01/30/18

6.0 SAMPLING METHODS AND LOCATIONS

Samples will be collected from soil borings and the monitoring well at the Site to further delineate the horizontal and vertical extent of contamination previously identified in soil and to determine groundwater quality at the Site. A Rotosonic drill rig will be used to advance soil borings RI-SB-6 through RI-SB-9 to approximately 15 feet below grade. Soil samples will be collected continuously at each boring until 15 feet below grade or bedrock refusal, whichever is shallower. Soil cores will be collected in five-foot long, four-inch diameter dedicated plastic bags. Soil samples will be inspected by AKRF field personnel for evidence of contamination (e.g., odors, staining), screened for the presence of volatile organics with a photoionization detector (PID) equipped with a 10.6 electron volt (eV) lamp, and logged using the modified Burmister soil classification system. The PID will be calibrated in accordance with manufacturer's recommendations prior to sampling.

It is anticipated that up to three soil samples will be collected from each soil boring. One soil sample will be collected from immediately below the surface to two feet below grade and a second soil sample will be collected from 12 to 13 feet below grade. An additional soil sample will be collected at each soil boring from the 13 to 15 foot interval, and placed "on hold" at the laboratory. If the soil sample collected from the 12 to 13 foot interval exceeds applicable soil cleanup objectives, the 13 to 15 foot soil sample(s) would be taken "off hold" and analyzed by the laboratory. A fourth sample may be submitted for laboratory analysis if indications of contamination are observed based on olfactory observations and PID readings. All sampling equipment (e.g., drilling rods and casing, macrocore samplers and probe rods) will be either dedicated or decontaminated between sampling locations.

Soil samples slated for laboratory analysis will be labeled and placed in laboratory-supplied containers and shipped to the laboratory via courier with appropriate chain of custody documentation in accordance with appropriate United States Environmental Protection Agency (EPA) protocols to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory. The samples will be analyzed for target compound list (TCL) VOCs by EPA Method 8260, TCL SVOCs by EPA Method 8270, hexavalent chromium by EPA Method 7196A, and total analyte list (TAL) metals by EPA Method 6000/7000 series using Category B deliverables. A standard turnaround time will be requested from the laboratory. In addition, one trip blank, one field blank, one blind duplicate, and one matrix spike/matrix spike duplicate (MS/MSD) will be collected at a frequency of one sample per 20 samples or sample group.

Samples slated for laboratory analysis will be placed in laboratory-supplied containers and shipped in accordance with appropriate EPA protocols to a NYSDOH ELAP-certified laboratory. All non-dedicated drilling and sampling equipment will be decontaminated between sampling locations. Immediately after collection, soil and groundwater samples will be placed on ice and stored in a cooler at temperatures below 4 ºC.

The following table summarizes the sampling locations, analytical groups, number of samples, section reference for sampling Standard Operating Procedure (SOP), and rationale for the proposed sampling locations.

Matrix	Sampling Location	Depth (feet below grade)	Analytical Group	Rationale for Sampling Location
Soil	RI-SB-6	All borings have 3 samples; (0-2') and (12-13'), additional sample (13-15') to be determined based on initial laboratory results.	VOCs, SVOCs, and TAL Metals (including hexavalent chromium)	To delineate horizontal and vertical extent of soil contamination in the northwestern portion of the Site found during the remedial investigation
Soil	RI-SB-7	All borings have 3 samples; (0-2') and (12-13'), additional sample (13-15') to be determined based on initial laboratory results.	VOCs, SVOCs, and TAL Metals (including hexavalent chromium)	To delineate horizontal and vertical extent of soil contamination in the northwestern portion of the Site found during the remedial investigation
Soil	RI-SB-8	All borings have 3 samples; (0-2') and (12-13'), additional sample (13-15') to be determined based on initial	VOCs, SVOCs, and TAL Metals (including hexavalent chromium)	To delineate horizontal and vertical extent of soil contamination in the northwestern portion of

Matrix	Sampling Location	Depth (feet below grade)	Analytical Group	Rationale for Sampling Location
		laboratory results.		the Site found during the remedial investigation
Soil	RI-SB-9	All borings have 3 samples; (0-2') and (12-13'), additional sample (13-15') to be determined based on initial laboratory results.	VOCs, SVOCs, and TAL Metals (including hexavalent chromium)	To delineate horizontal and vertical extent of soil contamination in the northwestern portion of the Site found during the remedial investigation
Groundwater	GW-1	TBD	VOCs, SVOCs, pesticides, PCBs, TAL Metals (total and dissolved), 1,4-dioxane, PFOA, PFOS	To assess groundwater quality

6.1 Soil Boring Installation

The proposed soil boring locations are depicted on Figure 3. Utility mark-outs are required by law and the drilling contractor is required to call Dig Safely New York at least two days prior to intrusive work. If there are any questions regarding locations of utilities in the sidewalk, the respective utility(s) will be contacted to clarify any concerns and/or the sampling location would be adjusted following consultation with NYSDEC.

Borings RI-SB-6 to RI-SB-9 will be advanced using a Rotosonic drill rig to approximately 15 feet below grade at the approximate locations shown on Figure 3. Soil will be inspected for evidence of contamination (e.g., odors, staining), screened for the presence of volatile organics with a PID equipped with a 10.6 electron volt (eV) lamp, and logged using the modified Burmister soil classification system. The PID will be calibrated prior to sampling in accordance with the manufacturer's recommendations. Each soil boring location will be surveyed using a Global Positioning System (GPS) handheld device to determine its accurate location. At each boring location, AKRF field personnel will record and document subsurface conditions.

6.2 Soil Sampling

Soil is being sampled as part of this SRI to: (1) further determine the horizontal and vertical nature and extent of contamination identified in soil during the initial RI; and (2) determine whether potentially contaminated soil may require special handling requirements relating to construction worker health and safety. Two to three soil samples from each boring will be submitted for laboratory analysis. Samples from soil borings will be analyzed for the following:

- VOCs by EPA Method 8260C;
- SVOCs by EPA Method 8270D;
- TAL Metals by EPA Method 6000/7000 series; and
- Hexavalent Chromium by EPA Method 7196A.

The proposed locations of the soil borings are shown on Figure 3. Three soil samples will be collected from each soil boring. One soil sample will be collected from immediately below the surface to two feet below grade and a second soil sample will be collected from 12 to 13 feet below grade. One additional soil sample will be collected at each soil boring, from the 13 to 15 foot interval, and placed "on hold" at the laboratory. If the soil sample collected from the 12 to 13 foot interval exceeds applicable soil cleanup objectives, the additional soil sample(s) from the preceding depth intervals would be taken "off hold" and analyzed by the laboratory. All sampling equipment (e.g., drilling rods and casing, macrocore samplers and probe rods) will be either dedicated or decontaminated between sampling locations.

One field blank, one blind duplicate, and one MS/MSD will be collected for quality control/quality assurance (QA/QC) purposes for analysis of all of the parameters previously noted and one laboratory-prepared trip blank will be submitted for analysis of VOCs to determine the potential for cross-contamination at a frequency of one sample per 20 samples per media. All samples will be analyzed by a NYSDOH ELAP-certified laboratory with Category B deliverables.

6.3 Groundwater Sampling

At least one to two weeks after the groundwater monitoring well is installed, one groundwater sample will be collected from the well in accordance with United States Environmental Proection Agency (USEPA) low flow sampling techniques. The expected targeted purge rate will be around 500 mililiters per minute (ml/min) and water quality parameters will be monitored during purging. Prior to collecting the sample, the well headspace will be screened for the presence of VOCs using a PID after removing the well cap. The depth to groundwater and depth to product, if any, will then be measured in the well using an electronic oil/water interface probe attached to a measuring tape accurate to 0.01 foot.

The groundwater sample will be analyzed for the following:

- VOCs by EPA Method 8260C;
- SVOCs by EPA Method 8270D;
- Pesticides by EPA Method 8081B;
- PCBs by EPA Method 8082A;
- TAL Metals by EPA Method 6000/7000 series (total and dissolved);
- 1,4-dioxane by EPA Method modified 8260C SIM; and
- PFOA and PFOS by EPA Method Modified 537.

One field blank, one blind duplicate, and one MS/MSD will be collected for QA/QC purposes for analysis of all of the above parameters and one laboratory-prepared trip blank will be submitted for analysis of VOCs to determine the potential for cross-contamination. The sample will be analyzed by a NYSDOH ELAP-certified laboratory with Category B deliverables.

6.4 Decontamination of Sampling Equipment

All sampling equipment (augers, drilling rods, macrocore samplers, probe rods and pumps, etc.) will be either dedicated or decontaminated between sampling locations. The decontamination procedure will be as follows:

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

6.5 Management of Investigation-Derived Waste (IDW)

IDW that does not exhibit of evidence of contamination (e.g., staining, presence of ash, oily sheens, odors, etc.) will be used to fill in the corresponding soil boring hole. Soil and groundwater IDW exhibiting evidence of contamination (if any) will be containerized in DOT-approved 55-gallon drums. The drums will be sealed at the end of each work day and labeled with the date, the well or boring number(s), the type of waste (i.e., drill cuttings, decontamination fluids, development water, or purge water) and the name of an AKRF point-of-contact. All drums will be labeled "pending analysis" until laboratory data is available. All IDW will be disposed of or treated according to applicable local, state, and federal regulations.

7.0 ANALYTICAL METHODS AND REQUIREMENTS

SGS Accutest of Dayton, New Jersey will perform analyses on soil and groundwater samples.

Matrix	Analytical Group	Conc. Level	Analytical and Preparation Method	Sample Volume *	Containers	Preservation Requirement	Max. Hold Time
Soil	VOCs	Low	SW5035A 8260C	17 oz.	3 encores and % Solid	4 °C	2 days
Soil	SVOCs	Low	SW846 8270D	8 oz.	1, 8-oz Clear Glass	4 °C	14 days
Soil	TAL Metals	Low	SW846 6010C	8 oz.	1, 8-oz Clear Glass	4°C	6 months/28 days for mercury
Soil	Hexavalent Chromium	Low	SW7196A	4 oz.	1, 4-oz Amber Glass	4°C	30 days
Groundwater	VOCs	Low	SW846 8260C	120 mL	3, 40-ml VOAs	HCl, pH<2, 4 °C	14 days

Matrix	Analytical Group	Conc. Level	Analytical and Preparation Method	Sample Volume *	Containers	Preservation Requirement	Max. Hold Time
Groundwater	SVOCs	Low	SW846 8270D	2 L	2, 1L Amber Glass	4°C	7 days
Groundwater	PCBs	Low	SW846 8082A	1 L	1L Amber Glass	4°C	7 days
Groundwater	Pesticides	Low	SW846 8081B	1 L	1L Amber Glass	4°C	7 days
Groundwater	TAL Metals (total and dissolved)	Low	SW846 6000/7000 series	250 mL	250 mL, Plastic	4°C	6 months/28 Days for mercury
Groundwater	1,4-Dioxane	Low	8260C plus Selective Ion Monitoring (SIM) 5 40 mL Glass Vials	200 mL	40 mL Glass Vials	HCl to pH < 2 and ≤ 6 ^{o}C	48 hours to extract; 14 days to analyze
Groundwater	PFOA and PFOS	Low	Modified 537	750 mL	250 mL Polypropylene Bottles	≤ 6 ^{o}C, Trizma	14 days to analyze

* Sample volumes recommended by the laboratory per sample. Additional volume may be requested as a contingency for dilutions, breakage, etc.

8.0 ANALYTICAL LABORATORY SENSITIVITY AND PROJECT CRITERIA

Laboratory performance criteria are provided in this Section.

Matrix: Aqueous and Soil
Analytical Group: VOC and 1,4-Dioxane
Concentration Level Low

Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
8260C and 8260C plus SIM	Precision – Lab	RPD < 30%	MS/MSD	A
	Precision – Overall Representativeness	RPD < 40% for compounds w/ concentrations > QL	Field Duplicates	S&A
	Accuracy	Recovery within lab statistical QC limits provided in Table 1	LCS	A
	Accuracy	Recovery within lab statistical QC limits provided in Table 1	MS/MSD	A
	Accuracy	Per lab limits provided in Table 1	Surrogate spike	A
	Sensitivity	< QL	Low point calibration standard	A

Matrix Aqueous and Soil
Analytical Group SVOC
Concentration Level Low

Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
8270D	Precision – Lab	RPD < 40%	MS/MSD	A
	Precision – Overall Representativeness	RPD < 40% for compounds w/ concentrations > QL	Field Duplicates	S&A
	Accuracy	Recovery within lab statistical QC limits provided in Table 1	LCS	A
	Accuracy	Recovery within lab statistical QC limits provided in Table 1; 40% RPD	MS/MSD	A
	Accuracy	Per lab limits provided in Table 1; one AE and one BN can be out if >10%	Surrogate spike	A
	Sensitivity	< QL	Low point calibration standard	A

Matrix Aqueous and Soil
Analytical Group Metals
Concentration Level Low

Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
6000/7000 series	Precision – Lab	RPD < 20% if conc > 5*QL	Laboratory Duplicates	A
	Precision – Overall Representativeness	RPD < 30% for compounds w/ concentrations >5*QL	Field Duplicates	S&A
	Accuracy	% Recovery 80-120%	LCS	A
	Accuracy	80-120% or as per lab limits provided in Table 1	MS/MSD	A
	Accuracy	80-120% or as per lab limits provided in Table 1	PDS	A
	Sensitivity	< QL	Low point calibration standard	A

Matrix Soil
Analytical Group Hexavalent Chromium
Concentration Level Low

Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
7196A	Precision – Lab	RPD < 40%	MS/MSD	A
	Precision – Overall Representativeness	RPD < 40% for compounds w/ concentrations > OL	Field Duplicates	S&A
	Accuracy	Recovery within lab statistical QC limits provided in Table 1	LCS	A
	Accuracy	Recovery within lab statistical QC limits provided in Table 1; 40 % RPD	MS/MSD	A
	Accuracy	Per lab limits provided in Table 1	Surrogate spike	A
	Sensitivity	< QL	Low point calibration standard	A

Matrix Aqueous
Analytical Group Pesticides
Concentration Level Low

Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
8081B	Precision – Lab	RPD < 40%	MS/MSD	A
	Precision – Overall Representativeness	RPD < 40% for compounds w/ concentrations > OL	Field Duplicates	S&A
	Accuracy	Recovery within lab statistical QC limits provided in Table 1	LCS	A
	Accuracy	Recovery within lab statistical QC limits provided in Table 1; 40 % RPD	MS/MSD	A
	Accuracy	Per lab limits provided in Table 1;	Surrogate spike	A
	Sensitivity	< QL	Low point calibration standard	A

Matrix Aqueous
Analytical Group PCBs
Concentration Level Low

Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
8082A	Precision – Lab	RPD < 40%	MS/MSD	A
	Precision – Overall Representativeness	RPD < 40% for compounds w/ concentrations > OL	Field Duplicates	S&A
	Accuracy	Recovery within lab statistical QC limits provided in Table 1	LCS	A
	Accuracy	Recovery within lab statistical QC limits provided in Table 1; 40 % RPD	MS/MSD	A
	Accuracy	Per lab limits provided in Table 1	Surrogate spike	A
	Sensitivity	< QL	Low point calibration standard	A

9.0 SECONDARY DATA CRITERIA AND LIMITATIONS

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
Phase I Environmental Site Assessment	Phase I Environmental Site Assessment of the Site, prepared by Land America Corporation in June 2006, and by AKRF in June 2016	General information on Recognized Environmental Conditions	Indicated possible locations of contaminant sources; may be used to position sampling locations	Qualitative data
Subsurface Investigation	Subsurface Investigation of the Site, conducted by AKRF, Inc., in June 2016	Soil and soil vapor data	Preliminary delineation of contaminants	Quantitative data

10.0 FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING, AND INSPECTION

Field Equipment (Parameter)	Calibration Activity	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	SOP
Mini Rae 2000 or 3000 PID (Organic vapor)	Instrument calibration with isobutylene	Charge battery Replace or clean sensor	Clean air reading Inspect for visual damage	Calibration – daily; Maintenance as needed	As per operator's manual	Recalibrate or perform maintenance	Operation manual
Oil/water interface probe (Depth to GW and LNAPL or DNAPL)	Calibrated by Manufacturer	Check battery and decontaminate between wells	Lower into well water to check alarm Inspect for visual damage	Between wells	Proper tone produced	Replace battery and/or decontaminate	Operation manual
Horiba U-52 water quality meter (conductivity, turbidity, pH, ORP, DO, temperature)	Verify calibration with auto-calibration solution for pH, DO, conductivity, turbidity, ORP	Charge battery	N/A Inspect for visual damage	Calibration – daily; Maintenance as needed	Calibration does not drift	Recalibrate or replace	Operation model

Note: Equivalent equipment may also be used as available.

11.0 ANALYTICAL LABORATORY INSTRUMENTS AND EQUIPMENT

11.1 Analytical Laboratory Instruments and Equipment Maintenance, Testing and Inspection

Instrument/ Method/ SOP	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person
GC/MS 8260C 8270D 1A 2A 16A	Check for leaks, replace gas line filters, recondition or replace trap, replace column, clean injection port/liner, replace Electron Multiplier	Tune (BFB or DFTPP), Calibration	Monitor instrument performance via tuning mass criteria, and Calibration criteria	See following table	See following table	Replace connections, replace gas line filters, replace trap, replace GC column, clip column, replace injection port liner, clean injection port, replace Electron Multiplier; repeat calibration or CCV	Lab chemist
GC/ECD 8081B 8082A 10A 11A	Check for leaks, replace gas line filters, recondition or replace column, clean injection port/liner	Calibration	Monitor instrument performance via Calibration criteria	See following table	See following table	Replace connections, replace gas line filters, replace GC column, clip column, replace injection port liner, clean injection port; repeat calibration or CCV	Lab chemist
ICP –MS 6000/7000 series 5A	Perform leak test, change pump tubing, change torch and window, clean filters	Initial Calibration Verification and IC Blank	Monitor instrument performance via Initial Calibration Verification and IC Blank	See following table	See following table	Replace pump tubing, replace torch and window, clean all filters; repeat calibration or CCV	Lab chemist
CVAA 7470 6A	Perform leak test, change tubing, clean window, clean filters	Initial Calibration Verification and IC Blank	Monitor instrument performance via Initial Calibration Verification and IC Blank	See following table	See following table	Replace connections, replace pump tubing, clean all filters; repeat calibration or CCV	Lab chemist

11.2 Analytical Laboratory Instrument Calibration

Instrument/ Method/SOP	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA
GC/MS 8260C 8270D 1A, 2A	Initial 5-point Calibration	Prior to sample analysis	Response Factor (RF)>0.05 and %RSD<15%	Service instrument	Lab chemist
	Continuing calibration – mid-level standard	Once every 12 hours prior to sample analysis	RF%D<30% from initial calibration	Reanalyze continuing calibration standard. If still outside limits, recalibrate and reanalyze all samples since last complaint calibration standard.	Lab chemist
GC/ECD 8081B 8082A 10A, 11A	Initial calibration – 5 levels-one <= quantitation limit	Prior to sample analysis	80-20% of true value or r>0.99	Reanalyze continuing calibration standard. If still outside limits, recalibrate and reanalyze all samples since last complaint calibration standard.	Lab chemist
	Continuing calibration – mid-level standard	1 standard per 20 samples or every 12 hours, whichever is more frequent	%Difference < 15% from initial calibration	If the daily calibration technical acceptance criteria are not met, inspect the system for problems. It will be necessary to rerun daily calibration sample.	Lab chemist
ICP-MS 6000/7000 series 5A	Initial calibration	Daily	r>0.995	Recalibrate and reanalyze.	Lab chemist
	Continuing calibration – mid level standard	Every 10 samples and at end of run	Results 90-110% true value	Reanalyze continuing calibration standard. If still outside limits, recalibrate and reanalyze all samples since last complaint calibration standard.	Lab chemist
CVAA 7470 6A	Initial Calibration – 5 levels and a blank (one level must be a quantitation level)	Prior to sample analysis	r>0.995	Reanalyze continuing calibration standard. If still outside limits, recalibrate and reanalyze all samples since last complaint calibration standard.	Lab chemist
	Continuing Calibration – mid level standards	Every 10 samples and at end of run	80-120 % recovery	Reanalyze continuing calibration standard. If still outside limits, recalibrate and reanalyze all samples since last complaint calibration standard.	Lab chemist

12.0 SAMPLE HANDLING SYSTEM

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): Mark Jepsen, AKRF
Sample Packaging (Personnel/Organization): Mark Jepsen, AKRF
Coordination of Shipment (Personnel/Organization): Mark Jepsen, AKRF
Type of Shipment/Carrier: Courier or overnight delivery services
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): SGS Accutest Personnel
Sample Custody and Storage (Personnel/Organization): SGS Accutest Personnel
Sample Preparation (Personnel/Organization): SGS Accutest Personnel
Sample Determinative Analysis (Personnel/Organization): SGS Accutest Personnel
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples to be sent to SGS Accutest Laboratories either by an SGS Accutest Personnel courier the same day as the sampling or by overnight delivery services to laboratory for delivery the following morning. 1 day
Sample Extract/Digestate Storage (No. of days from extraction/digestion): As per analytical methodology; 30 days
SAMPLE DISPOSAL
Personnel/Organization: SGS Accutest Personnel
Number of Days from Analysis: Until analysis and QA/QC checks are completed; as per analytical methodology; 30 days

13.0 SAMPLE CUSTODY REQUIREMENTS

13.1 Sample Identification

All samples will be consistently identified in all field documentation, chain-of-custody (COC) documents and laboratory reports using an alpha-numeric code. The samples will be identified by a prefix of "SRI-" to designate the type of investigation (SRI) followed by the soil boring or monitoring well number with sample depth interval in parenthesis (for soil samples only).

The blind duplicate samples will be labeled with a dummy sample location to ensure that they are submitted as blind samples to the laboratory. The dummy identification will consist of the sample type followed by a letter. Trip blanks and field blanks will be identified with "TB" and "FB", respectively.

The following table presents the sampling identification scheme.

Sample Description	Sample Designation
Soil sample collected from 0 to 2 feet at boring SRI-SB-6 collected on December 18, 2017	SRI-SB-7 (0-2') 20171218
Groundwater sample collected from monitoring well SRI-GW-1 collected on December 18, 2017	SRI-GW-1 20171218
MS/MSD duplicate groundwater sample from SRI-GW-1 collected on December 18, 2017	SRI-GW-1-MS/MSD 20171218
Blind duplicate soil sample from 0 to 2 feet at SRI-SB-8 collected on December 18, 2017	SRI-SB-X (0-2') 20171218
Trip Blank submitted with samples collected on December 18, 2017	SRI-TB 20171218
Field Blank submitted with samples collected on December 18, 2017	SRI-FB 20171218

Following the labeling of each sample, the appropriate laboratory COC form will be completed and will accompany the samples. Each person having custody of the samples will document receipt and relinquishment of such samples.

13.2 Sample Labeling and Shipping

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

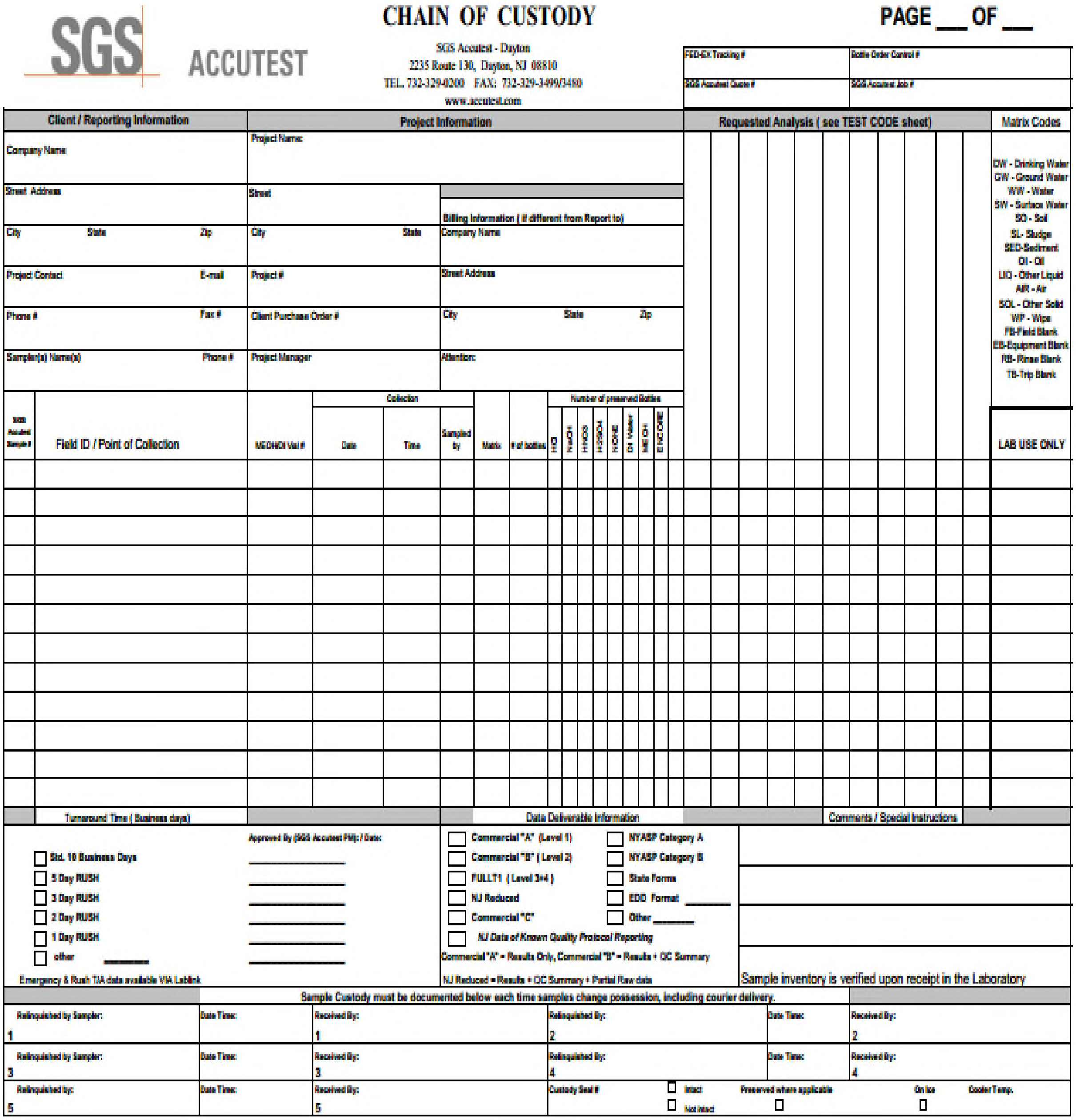
- Project identification
- Sample identification

- 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 a container and maintained in a secure environment until transported to the laboratory. The soil and groundwater samples will be prepared for shipment by placing each sample in a sealable plastic bag, then wrapping each container in bubble wrap to prevent breakage, adding freezer packs and/or fresh ice in sealable plastic bags and the COC form. Samples will be transported by a laboratory courier or, if necessary, shipped via FedEx.

13.3 Sample Custody

Field personnel will be responsible for maintaining the sample containers 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 COC forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; signatures of individuals involved in sample transfer; and the dates and times of transfers. Blanks and example COCs for soil and groundwater are provided on the following page.



SGS ACCUTEST

CHAIN OF CUSTODY

SGS Accutest - Dayton
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www.accutest.com

PAGE ___ OF ___

FED-EX Tracking #	Bottle Order Control #
SGS Accutest Quote #	SGS Accutest Job #

Client / Reporting Information

Company Name
Street Address
City State Zip
Project Contact E-mail
Phone # Fax #
Sampler(s) Name(s) Phone #

Project Information

Project Name:
Street
City State
Project #
Client Purchase Order #
Project Manager

Billing Information (if different from Report to)
Company Name
Street Address
City State Zip
Attention:

Requested Analysis (see TEST CODE sheet)

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB-Field Blank
EB-Equipment Blank
RB- Rinse Blank
TB-Trip Blank

			Collection					Number of preserved Bottles									
SGS Accutest Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE		LAB USE ONLY

Turnaround Time (Business days)

☐ Std. 10 Business Days
☐ 5 Day RUSH
☐ 3 Day RUSH
☐ 2 Day RUSH
☐ 1 Day RUSH
☐ other ______

Approved By (SGS Accutest PM): / Date:

Emergency & Rush T/A data available VIA Lablink

Data Deliverable Information

☐ Commercial "A" (Level 1) ☐ NYASP Category A
☐ Commercial "B" (Level 2) ☐ NYASP Category B
☐ FULLT1 (Level 3+4) ☐ State Forms
☐ NJ Reduced ☐ EDD Format ______
☐ Commercial "C" ☐ Other ______
☐ *NJ Data of Known Quality Protocol Reporting*

Commercial "A" = Results Only, Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

Sample inventory is verified upon receipt in the Laboratory

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler: 1	Date Time:	Received By: 1	Relinquished By: 2	Date Time:	Received By: 2
Relinquished by Sampler: 3	Date Time:	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal #	☐ Intact ☐ Not intact	Preserved where applicable ☐ On Ice ☐ Cooler Temp.

Upon receipt at the laboratory, the condition of each sample will be checked to ensure that the sample integrity has not been compromised. Any discrepancy between the samples and the COC information, any broken or leaking sample bottles, or any other abnormal situations will be reported by the laboratory project manager to the AKRF Project Manager. If required, corrective action options will be discussed and implemented. Notations of the problem and resolution will be made in the laboratory analytical report.

Once samples are in the custody of the laboratory, sample integrity will be maintained. Each sample batch will be assigned a unique project number by the laboratory and each sample will be assigned a unique laboratory identification number. When samples are required for preparation and/or analysis, the sample custodian or designee will distribute the samples to the appropriate analysts. An internal COC form will be signed by the individual to whom the samples are relinquished to track the samples internally.

14.0 DATA MANAGEMENT AND DOCUMENTATION

Field Sample Collection Documents and Records	Analytical Laboratory Documents and Records	Data Assessment Documents and Records	Project File
• Field books • Boring logs • COC forms • Well Development Forms • Well Sampling Forms • Photos	• Sample receipt logs • Internal and external COC forms • Equipment calibration logs • Sample preparation worksheets/logs • Sample analysis worksheets/run logs • Corrective action documentation	• Data validation report • Field inspection forms • Corrective action documentation • Electronic Data Deliverables (EDD) compatible with EQuIS™.	• Project files will be stored for one year in AKRF main office • Project files will be stored for seven years by the City of New York • After minimum of one year, hard copy files archived off-site • EDDs archived on AKRF corporate server

15.0 PROJECT REPORTS

Type of Report	Frequency (Daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Date	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
Remedial Investigation Report	N/A	1/31/2018	Michelle Lapin, P.E. Senior Vice President AKRF, Inc. and Deborah Shapiro, QEP Vice President AKRF, Inc.	Wendi Zheng New York City Department of Environmental Conservation Justin Deming New York City Department of Health

Project delivery date is based on timing of work plan approval and implementation, as outlined in Section 5.0.

16.0 PROJECT DATA VERIFICATION (STEP I)

Step I is a completeness check. The following processes will be followed to verify project data:

Verification Input	**Description**	**Internal/ External**	**Responsible for Verification (Name, Organization)**
Field book	All entries complete, signed, corrections properly initialed, sample list corresponds to COC.	I	Deborah Shapiro, Project Manager, AKRF
Chain of Custody forms	Field COC is completed with legible sample ID, dates, times, all analytical parameters correctly entered, preservatives noted, signatures. Lab COC indicates any errors, signatures signifying acceptance of custody.	I E	Deborah Shapiro, Project Manager, AKRF Lab sample custodian, SGS Accutest
Sample receiving document	Lab verified against COC.	E	Lab sample custodian, SGS Accutest
Draft lab results	All samples have results as requested, IDs match COC, all QC present and reported as per QAPP.	I	Deborah Shapiro, Project Manager, AKRF
Analytical data package	Verify data package for completeness including the presence of Laboratory case narrative, sample receipt form, holding times record, sample results, blank results, MS/MSD summary forms, LCS summary forms, surrogate and internal summary forms (where appropriate), initial and continuing calibration summary and raw data.	E	Third Party Validator
Lab originated NCRs/CARS	When required, properly completed with appropriate corrective action specifies and signatues where required; properly filed.	I	Deborah Shapiro, Project Manager, AKRF
Memo regarding QAPP modifications or deviations	When required, document all QAPP modifications.	I	Deborah Shapiro, Project Manager, AKRF
Analytical EQuIS EDDs	Verify that all SDGs are reported in Excel format.	I	Deborah Shapiro, Project Manager, AKRF

Acronyms: COC – Chain of Custody; MS/MSD – Matrix Spike/Matrix Spike Duplicate; LCS – Laboratory Control Sample; NCRs – Nonconformance Reports; CARs – Corrective Action Reports; EDDs – Electronic Data Deliverables; SDGs –Sample Delivery Groups

17.0 PROJECT DATA VALIDATION PROCESS (STEPS IIA AND IIB)

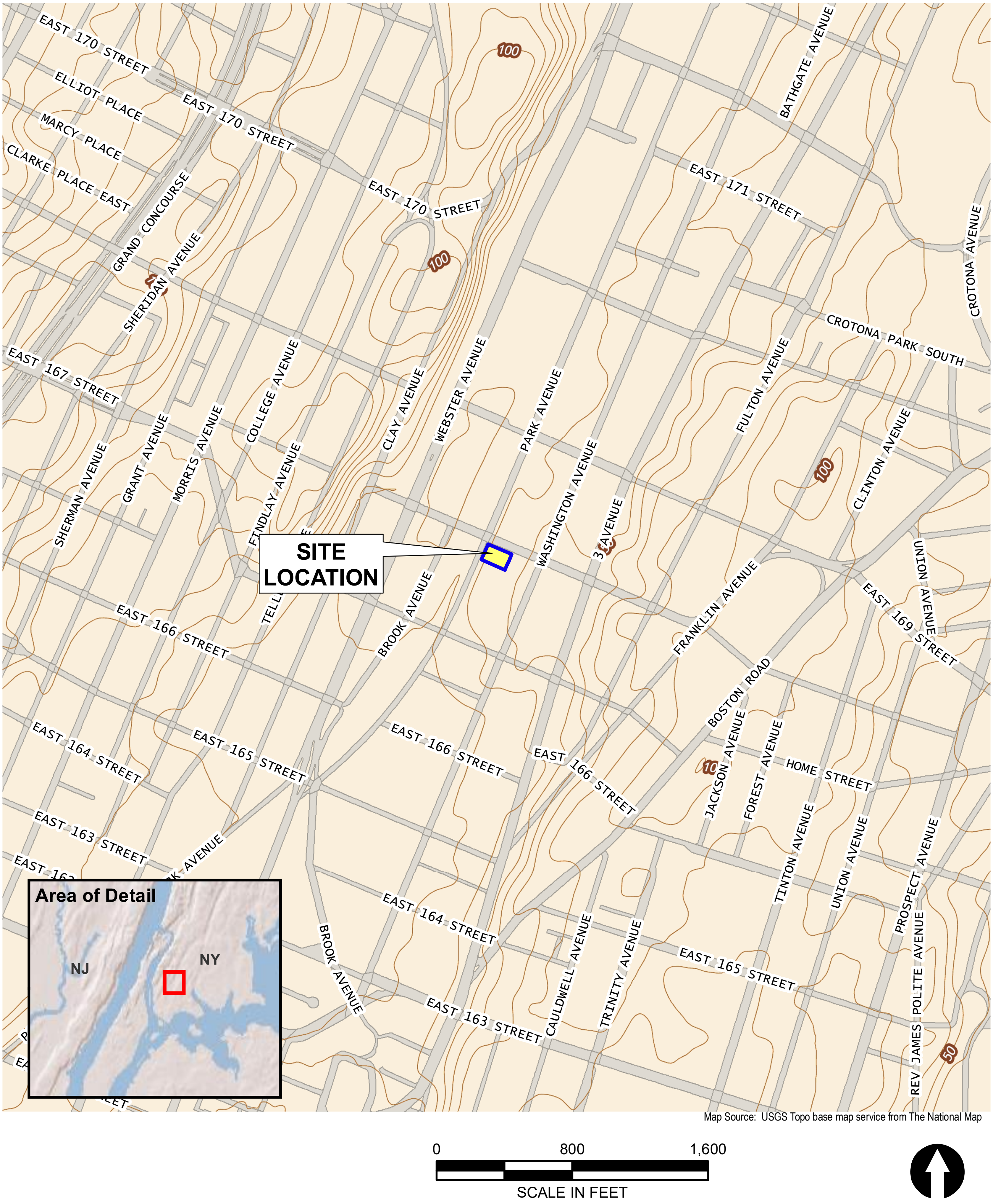
The following processes will be followed to validate project data under Step IIa (Compliance with Methods Procedures and Contracts) and Step IIb (Comparison with Performance Criteria in this QAPP).

Step IIa or IIb	**Validation Input**	**Description**	**Responsible for Validation (Name, Organization)**
IIa/IIb	Field book and field data sheets	Ensure that the sampling protocols and SOPs outlined in the QAPP were followed and that any deviations were noted/approved, appropriate QC samples collected, proper sample preservation.	Deborah Shapiro, Project Manager AKRF
IIa/IIb	Field originated NCRs/CARS	All issues properly documented, corrective actions were implemented and effective.	Deborah Shapiro Project Manager AKRF
IIa	Chain of Custody forms; sample receiving document	Examine COC forms against QAPP and laboratory requirements (analytical methods, sample, samples have data reported for requested analysis).	Third Party Validator
IIa	Analytical data package Lab SOPs/ Reference methods QAPP MPC	Holding times met all method criteria.	Third Party Validator
IIa		Review of dilutions and re-analyses results against reported data; when multiple analyses appropriate run was reported, proper units are reported.	Third Party Validator
IIa/IIb		Calibrations were analyzed at required frequency and met criteria.	Third Party Validator
IIa/IIb		Comparison of QC sample results (surrogate, internal standards, spikes, blanks, etc) all match criteria in metod and QAPP (Worksheets 12, 15, 28).	Third Party Validator
IIa/IIb		Blanks are free of contamination; if analytes present > RDL samples properly quallified if sample concentration < 10x Blank concentration.	Third Party Validator
IIb		Detection limits, project action limits were met.	Third Party Validator
IIa/IIb	Lab originated NCRs/CARS	When required, document all issues property and confirm corrective actions were implemented and effective.	Deborah Shapiro Project Manager AKRF
IIb	Memo regarding QAPP modifications	When required, document all QAPP modifications and corrective actions.	Deborah Shapiro Project Manager AKRF
IIb	Analytical EDDs	All data reported in excel format; EDD verified against hard copy lab report.	Deborah Shapiro Project Manager AKRF

Acronyms: MPC – Measurement Performance Criteria; NCRs – Nonconformance Reports; CARs – Corrective Action Reports; EDDs – Electronic Data Deliverables (EQuIS compatible)

18.0 PROJECT MATRIX AND ANALYTICAL VALIDATION (STEPS IIA AND IIB) SUMMARY

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa	Soil	VOCs, SVOCs, TAL Metals, and Hexavalent Chromium	Low	SW846/EPA Method criteria; Laboratory SOPs and control limits	Third Party Data Validator
IIb	Soil	VOCs, SVOCs, TAL Metals, and Hexavalent Chromium	Low	QAPP Templates 5c, 5d, 8 and 10	Third Party Data Validator
IIa	GW	VOCs, SVOCs, Pesticides, PCBs, and TAL Metals (total and dissolved)	Low	SW846/EPA Method criteria; Laboratory SOPs and control limits	Third Party Data Validator
IIb	GW	VOCs, SVOCs, Pesticides, PCBs, and TAL Metals (total and dissolved)	Low	QAPP Templates 5c, 5d, 8 and 10	Third Party Data Validator



Map Source: USGS Topo base map service from The National Map

AKRF
440 Park Avenue South, New York, NY 10016

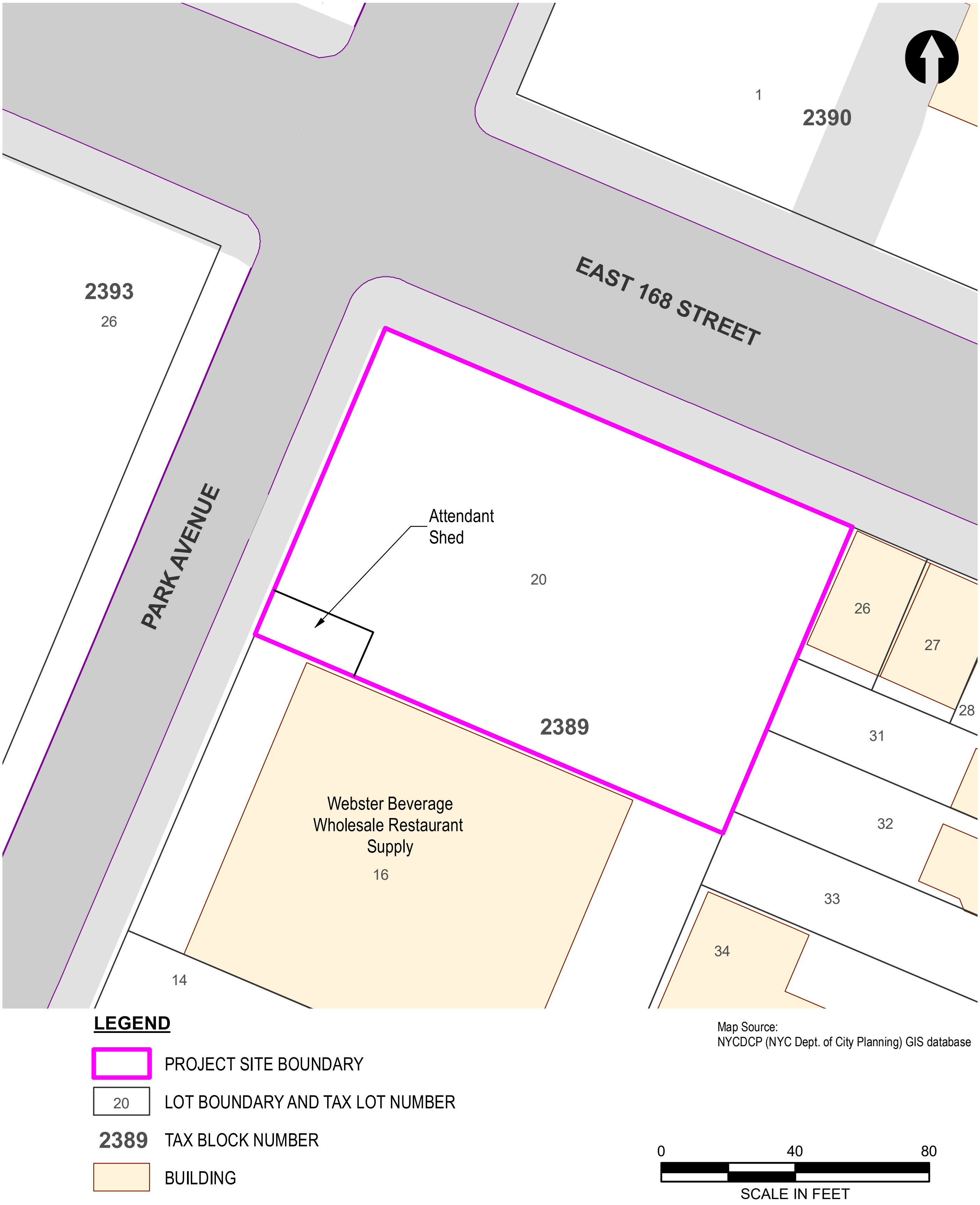
3500 Park Avenue
Bronx, New York

SITE LOCATION

DATE
5/17/2017

PROJECT NO.
12477

FIGURE
1



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

AKRF
440 Park Avenue South, New York, NY 10016

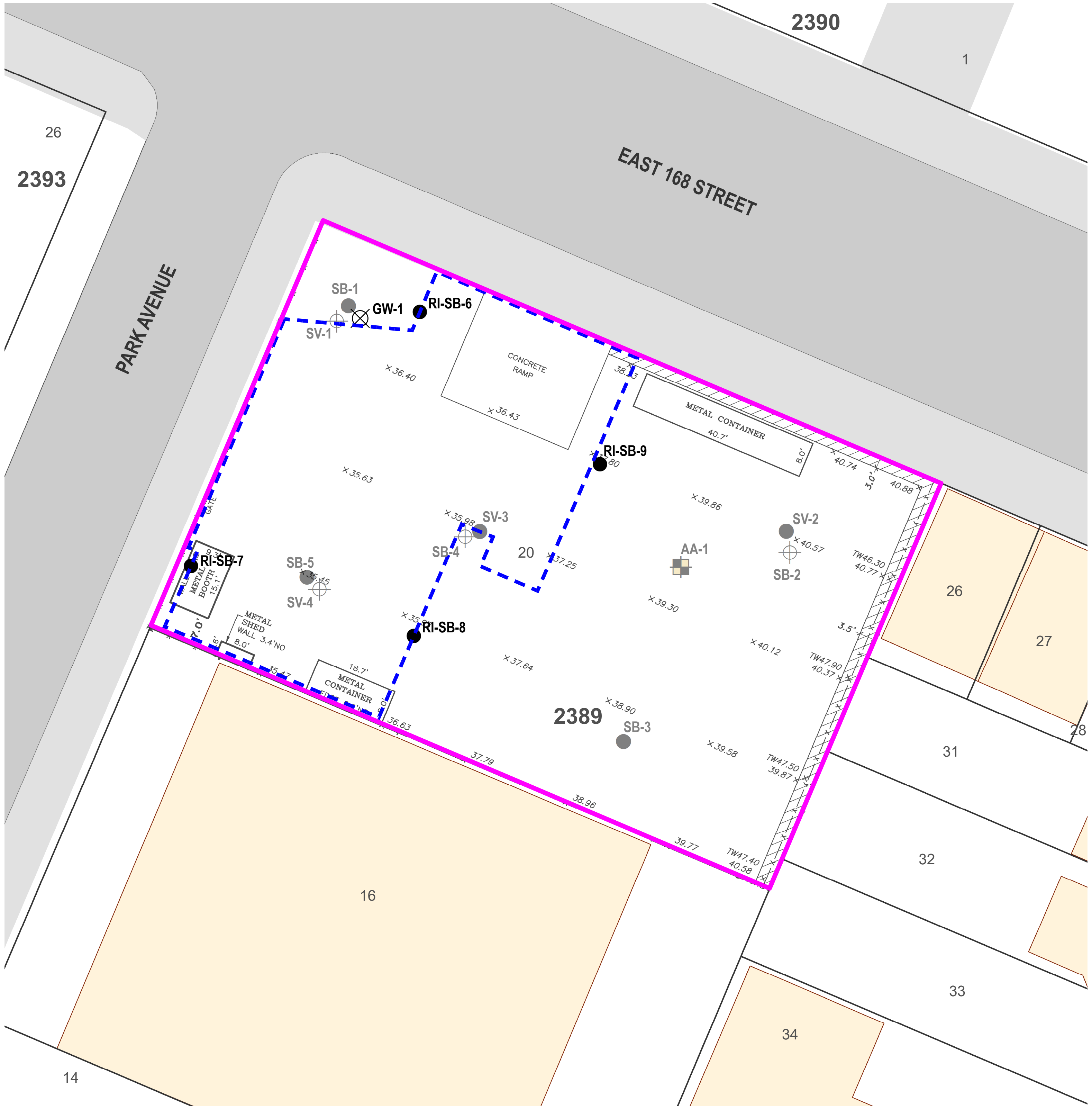
3500 Park Avenue
Bronx, New York

SITE PLAN

DATE
6/21/2017

PROJECT NO.
12477

FIGURE
2



LEGEND

▭ PROJECT SITE BOUNDARY

⬚ PROPOSED CELLAR FOOTPRINT

● PROPOSED SOIL BORING

⊗ PROPOSED GROUNDWATER MONITORING WELL

● PREVIOUS INVESTIGATION SOIL BORING LOCATION

⌖ PREVIOUS INVESTIGATION SOIL VAPOR POINT LOCATION

▨ PREVIOUS INVESTIGATION AMBIENT AIR SAMPLE LOCATION

20 LOT BOUNDARY AND TAX LOT NUMBER

2389 TAX BLOCK NUMBER

▭ BUILDING

× 39.58 EXISITING GRADE ELEVATIONS

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

Survey Source:
1. Elevations Are Based Upon North American Vertical Datum (NAVD) of 1988.
2. Elevations and Locations surveyed by: Leonard J Strandberg and Assoc, P.C. Block 2389, Lot 20, Feb 2017.

0 15 30 60
SCALE IN FEET

AKRF
440 Park Avenue South, New York, NY 10016

3500 Park Avenue
Bronx, New York

PROPOSED SAMPLE LOCATION PLAN

DATE
11/17/2017
PROJECT NO.
12477
FIGURE
5

MARK JEPSEN

ENVIRONMENTAL SCIENTIST

Mark Jepsen is an Environmental Scientist in AKRF's Hazardous Materials group. He has a great deal of experience in both environmental science and natural resources, including environmental remediation and consulting, groundwater quality and soil science, hydrology, and geology.

Since Joining AKRF at the beginning of 2014, Mr. Jepsen has overseen a wide variety of environmental investigations. He has performed oversight at large scale construction sites entailing complex remediation techniques. He has performed various Phase I site visits and reports. Additionally, Mr. Jepsen has followed up these Phase I investigations with performing Phase II remedial investigations including soil, groundwater, and soil vapor sampling. Also, Mr. Jepsen has a great deal of experience creating environmental reports discussing results found during the preliminary and supplemental investigations, Remedial Action Work Plans (RAWPs), Construction Health and Safety Plans (CHASP), Remedial Closure Reports, Environmental Bid Specifications and Design Coordination. Mr. Jepsen has a knowledgeable background in environmental issues and challenges pertaining to the New York metropolitan area and technical guidelines. Mr. Jepsen has a great deal of experience working on projects involved with multiple governmental regulators including NYSDEC, NJDEP, NYCDEP, and NYCOER.

Before joining AKRF, Mr. Jepsen worked for Bluestone Environmental Services in Somerset, New Jersey. He was responsible for performing a wide array of field work activities including groundwater sampling, monitoring well gauging, soil sampling, and more for Bluestone's various clients including: ExxonMobil, International-Matex Tank Terminals (IMTT) and various gas stations. He was responsible for maintaining an understanding of large and active remediation sites and dealing with an extensive groundwater monitoring well network, as well as acting as an on-site safety supervisor for all Bluestone employees and subcontractors.

BACKGROUND

Education

B.S., Environmental Science, The Ohio State University, 2012

New Jersey Regulatory Seminars

Combined Sewer Outfalls (CSO) for LSRPs: Remediation Alternatives to Better Manage Storm Water

Certifications

40 Hour OSHA HAZWOPER – annual refresher every year
10 Hour OSHA Construction Training
Gold Certified Brownfield Professional by New York City Office of Environmental Remediation
Transportation Worker Identification Credential (TWIC)
NYSDEC Erosion and Sediment Control Inspector
Boating license

Years of Experience

Date started at AKRF: March 2014
Prior industry experience: Bluestone Environmental Services (NJ) – January 2013 to March 2014

RELEVANT AKRF EXPERIENCE

432 East 14th Street, Environmental Management Specifications, Design Coordination and Pre-Characterization of Soil for Off-site Disposal, New York, NY

Mr. Jepsen supported AKRF's preparation of Environmental Management Specifications and Design Coordination, and collection and laboratory analysis of soil samples to pre-characterize soil beneath the Site for off-site disposal. Mr. Jepsen also performed the Phase II remedial investigation of this site which included soil, groundwater, and soil vapor sampling. Mr. Jepsen was also responsible for construction oversight during the foundation excavation for the proposed building. Following completion of excavation, Mr. Jepsen was responsible for inspecting the vapor barrier system installed as an engineering control for the proposed building. He has also been involved with creating the Remedial Closure Report.

77 Commercial Street, Environmental Services, Greenpoint, NY

Mr. Jepsen supported AKRF's environmental services, including Preparation of a Remedial Investigation (Phase II) Work Plan; Remedial Investigation (RI) and Report; Preparation of a Remedial Action Work Plan (RAWP) and Construction Health and Safety Plan (CHASP); Pre-Characterization of Soil for Off-site Disposal; Environmental Monitoring; Remedial Closure Report; and Environmental Bid Specifications and Design Coordination.

Bronx Pro 2264-2272 Morris Avenue, Environmental Consulting Services, Bronx, NY

Mr. Jepsen is supporting AKRF's environmental consulting services for this site including, Phase I Environmental Site Assessment (ESA) and update, Phase II remedial site investigations and subsurface sampling, ongoing construction oversight and vapor barrier inspections.

Memorial Sloan Kettering Cancer Center Hospital 74th Street, Environmental Services, New York, NY

Mr. Jepsen supported AKRF's environmental services, including construction oversight and air monitoring, groundwater sampling, and monitoring well decommissioning. Also, Mr. Jepsen has overseen large scale UST closure and removal at this site. Mr. Jepsen was responsible for the on-site implementation of AKRF's Remedial Action Work Plan (RAWP) and Construction Health and Safety Plan (CHASP). He has also been involved with creating the Remedial Closure Report.

School Construction Authority, New York, NY

Under an on-call contract, AKRF provides the New York City School Construction Authority (NYCSCA) with hazardous materials consulting services. Mr. Jepsen is involved with various due diligence and environmental assessment projects including Phase I Environmental Site Assessments (ESAs); Phase II (Subsurface) Environmental Site Investigations (soil, groundwater and soil vapor intrusion investigations); Indoor Air Quality (IAQ) Assessments; Underground Storage Tank (UST) and Aboveground Storage Tank (AST) inspections relating to boiler conversions; and peer review of other consultant's due diligence reports.

Indoor Air Quality Monitoring, New York, NY

Mr. Jepsen has performed a variety of indoor air quality investigations and surveys at sites including educational institutions and various residential buildings. Mr. Jepsen performed interviews pertaining to environmental site conditions and background with property owners and operators.

11 Greene Street, Environmental Consulting Services, New York, NY

Investigation and remediation of the Site is being conducted to satisfy NYC Office of Environmental Remediation (NYCOER) requirements under the Voluntary Clean-Up Program (VCP) and CEQR. Mr. Jepsen is supporting AKRF's environmental consulting services for this site including Waste Classification testing and delineation, preparation of a Remedial Investigation (Phase II) Work Plan; Remedial Investigation (RI) and Report; Preparation of a NYCDEP Dewatering Application and Permit; Preparation of a Remedial Action Work Plan (RAWP) and Construction Health and Safety Plan (CHASP); Pre-Characterization of Soil for Off-site Disposal; Environmental Monitoring; and Environmental Bid Specifications and Design Coordination.

3200 Jerome Avenue, Environmental Consulting Services, Bronx, New York

AKRF conducted a Phase I ESA and an Indoor Air Quality Survey of this property in the Bronx during due diligence investigations for the NYCSCA which identified levels of trichloroethene (TCE) in indoor air that exceeded the New York State Department of Health (NYSDOH) standards. NYCSCA subsequently terminated its lease of the site and discontinued its use as a school. Following the termination of NYCSCA's lease of the site, AKRF was retained by the owner to conduct an investigation and cleanup. Mr. Jepsen helped to conduct groundwater sampling requirements set by the NYSDEC as part of the Brownfield Cleanup Agreement for the project site. Mr. Jepsen is supporting the ongoing operations and maintenance of an active sub-slab depressurization system installed beneath the building. Mr. Jepsen has also overseen in-situ chemical oxidation (ISCO) groundwater treatment injection activities performed on-site.

98-100 Franklin Street, Manhattan, NY

AKRF completed a Phase I Environmental Site Assessment (ESA), Phase II ESI, prepared a Remedial Action Work Plan, a NYCDEP Dewatering Application and Permit, and performed soil waste classification sampling (which required the preparation of a NYC Transit Subsurface Investigation Permit to perform the associated soil borings) for the proposed redevelopment for a 29,564-square foot, eight-story mixed-use building with a cellar. As the assistant project manager, Mr. Jepsen coordinated with the client and contactors and performed oversight of on-site remediation activities.

NYSDOT/NYSTA Tappan Zee Hudson River Crossing, Rockland and Westchester Counties, NY

AKRF completed an EIS for this project on a fast-track schedule. Findings of the study were utilized to develop numerous documents prepared to guide the construction team, including a Remedial Action Plan and a Construction Health and Safety Plan for the five-year bridge replacement project. As part of the findings of the study, additional mitigation was required to ensure safety of endangered species inhabiting the Hudson River. Mr. Jepsen has been responsible for captaining and assisting in vessel-based monitoring of endangered species within and surrounding the marine construction zone of the new Tappan Zee Bridge located in Tarrytown and Nyack, NY on the Hudson River.

Previous Experience

International-Matex Tank Terminals (IMTT) and ExxonMobil, Environmental Consulting Services, Bayonne, NJ

Mr. Jepsen was responsible for conducting operations and maintenance of an extensive groundwater monitoring well network at an active storage tank terminal located in Bayonne, NJ. Mr. Jepsen also conducted site investigation field activities; including soil, groundwater sampling, and monitoring well installation. Mr. Jepsen aided with the operation and maintenance of active remedial systems, including oil recovery skimming systems and water treatment and discharge systems. Mr. Jepsen was responsible for maintaining client relationships and acting as an on-site safety supervisor for all Bluestone employees and subcontractors. Mr. Jepsen assisted with relevant compliance reporting requirements, remedial work plans, and general work permitting

Various Gas Stations, Environmental Consulting Services, Various Locations, NJ

Mr. Jepsen conducted site investigation field activities, including groundwater sampling and monitoring well installation at various gas stations with open petroleum spills reported the NJDEP. Mr. Jepsen acted as an on-site safety supervisor for all Bluestone employees and subcontractors. Mr. Jepsen assisted with relevant compliance reporting requirements.

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.

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

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

MICHELLE LAPIN, P.E.

SENIOR VICE PRESIDENT

Michelle Lapin is a Senior Vice President with more than 25 years of experience in the assessment and remediation of hazardous waste issues. She leads the firm's Hazardous Materials group and offers extensive experience providing strategic planning and management for clients. Ms. Lapin has been responsible for the administration of technical solutions to contaminated soil, groundwater, air and geotechnical problems. Her other 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.

Ms. Lapin's hydrogeologic experience includes groundwater investigations, formulation and administration of groundwater monitoring programs and remediation throughout the Northeast. Her experience with groundwater contamination includes Level B hazardous waste site investigations; leaking underground storage tank studies, including hazardous soil removal and disposal and associated soil and water issues; soil gas/vapor intrusion surveys; and wetlands issues. Ms. Lapin is experienced in coordinating and monitoring field programs concerning hazardous waste cell closures. She has directed hundreds of Phase I, Phase II, and Phase III investigations and remediations, many of them in conjunction with developers, law firms, lending institutions, and national retail chains. She is also experienced in the cleanup of contaminated properties under Brownfield Cleanup Program (BCP) regulations.

BACKGROUND

Education

M.S., Civil Engineering, Syracuse University, 1985
B.S., Civil Engineering, Clarkson University, 1983

Professional Licenses/Certifications

New York State P.E.
State of Connecticut P.E.

Professional Memberships

Member, National Society of Professional Engineers (NSPE), National and CT Chapters
Member, American Society of Civil Engineers (ASCE), National and CT Chapters
Member, Connecticut Business & Industry Association (CBIA), CBIA Environmental Policies Council (EPC)
Member, Environmental Professionals' Organization of Connecticut (EPOC)
Board Member, New York City Brownfield Partnership
Member, NAIOP, a Commercial Real Estate Development Association

Years of Experience

Year started in company: 1994
Year started in industry: 1986

RELEVANT EXPERIENCE

Memorial Sloan Kettering Cancer Center-CUNY 74th Street EIS, New York, NY

AKRF was engaged by Memorial Sloan-Kettering Cancer Center (MSK) and CUNY-Hunter College (CUNY) to prepare an EIS for a proposed joint facility located on a New York City-owned parcel located between East 73rd Street and East 74th Street adjacent to the FDR Drive in Manhattan. The proposed facility was formerly occupied by the Department of Sanitation, and had included over 41 underground storage tanks, will include an ambulatory medical care center for MSK and educational and medical research facilities for CUNY.

Ms. Lapin is leading the hazardous materials work which includes the preparation of the Phase I and II environmental site assessments, remedial action work plans (RAWPs), and construction health and safety plans (CHASPs) for submission to the New York City Office of Environmental Remediation (OER) for the Voluntary Cleanup Program (VCP) and to the New York State Department of Environmental Conservation (NYSDEC) for remediation of a petroleum spill. The RAWPs and CHASPs included provisions for excavation of contaminated soil and rock, removal of tanks and environmental monitoring during the construction activities. AKRF also performed a pre-demolition asbestos survey of the remaining concrete foundation structures and prepared specifications for asbestos abatement, soil management and underground storage tank removal and disposal.

Brooklyn Bridge Park, Brooklyn, NY

AKRF prepared an Environmental Impact Statement (EIS) and is continuing to provide technical and planning support services for Brooklyn Bridge Park, which revitalizing the 1.3-mile stretch of the East River waterfront between Jay Street on the north and Atlantic Avenue on the south. The new park, allows public access to the water's edge, allowing people to enjoy the spectacular views of the Manhattan skyline and New York Harbor. It also provides an array of passive and active recreational opportunities, including lawns, pavilions, and a marina. As with many waterfront sites around New York City, the lands along the Brooklyn waterfront have a long history of industrial activities. Some of these industries used dangerous chemicals and generated toxic by-products that could have entered the soil and groundwater. In addition, landfilling activities along the shoreline also used ash and other waste materials from industrial processes. Based on site inspections, historical maps, government records, and other sources, AKRF has been investigating the potential for the presence for hazardous materials in the park. This information was compiled into a Phase 1 Environmental Site Assessment report. AKRF has also provided and continues to support to the design team related to designing the project to minimize costs related to remediating hazardous materials where possible. Ms. Lapin is serving as senior manager for the hazardous materials investigations.

Columbia University Manhattanville Academic Mixed-Use Development, New York, NY

Ms. Lapin served as Hazardous Materials Task Leader on this Environmental Impact Statement (EIS) for approximately 4 million square feet of new academic, research and neighborhood uses to be constructed north of Columbia University's existing Morningside campus. The work included Phase I Environmental Site Assessments for the properties within the site boundaries, and estimates for a Subsurface (Phase II) Investigation of the entire development area. The firm's Hazardous Materials group performed over 30 individual Phase I Environmental Site Assessments for properties within the development area. In addition, a Preliminary Environmental Site Assessment (PESA) was completed in conjunction with the Environmental Impact Statement (EIS). Based on the Phase I studies, AKRF conducted a subsurface (Phase II) investigation in accordance with a New York City Department of Environmental Protection (NYCDEP) approved investigative work plan and health and safety plan. Subsurface activities included the advancement of soil borings, groundwater monitor wells, and the collection of soil and groundwater samples for laboratory analysis. This study was used to estimate costs to remediate contaminated soil and groundwater, and underground storage tanks and hazardous building materials, including lead-based paint and asbestos-containing materials.

Albert Einstein College of Medicine Center for Genetic and Translational Medicine, Bronx, NY

Ms. Lapin directed the firm's hazardous materials work in connection with the construction a new Center for Genetics and Translational Medicine (CGTM) building on the Bronx campus of the Albert Einstein College of Medicine of Yeshiva University. AKRF prepared an Environmental Assessment Statement (EAS) that examined such issues as land use, zoning, air quality, urban design and visual resources, hazardous materials, traffic, noise, and air quality. Ms. Lapin's work included analysis of the existing conditions and potential impacts that the construction could cause to the environment and human health.

West 61st Street Rezoning/Residential Development, New York, NY

Ms. Lapin is directing the firm's hazardous materials work for this mixed-use development in Manhattan. The Algin Management Company hired AKRF to prepare an environmental impact statement (EIS) for the proposed rezoning of the western portion of the block between West 60th and 61st Streets, between Amsterdam and West End Avenues. The purpose of the proposed action was to facilitate the development of two 30-story residential towers with accessory parking spaces, and landscaped open space. The EIS examined a "worst case" condition for rezoning the block, which allowed Algin to build a residential building of approximately 375,000 square feet at their site. The building now contains 475 apartments, 200 accessory parking spaces, a health club, and community facility space. This site, with the services of AKRF, entered into New York State's Brownfield Cleanup Program (BCP). On-site issues included underground storage tanks remaining from previous on-site buildings, petroleum contamination from these tanks and possibly from off-site sources, and other soil contaminants (metals, semi-volatile organic compounds, etc.) from fill materials and previous on-site buildings. AKRF oversaw the adherence to the Construction Health and Safety Plan (HASP), which was submitted to and approved by the New York State Department of Environmental Conservation (NYSDEC), and monitored the waste streams, to ensure that the different types of waste were disposed of at the correct receiving facilities. This oversight also included confirmation and characteristic soil sampling for the receiving facilities and NYSDEC. A "Track 1" Clean up of the majority of the property (the portion including the buildings) was completed and the final Engineering Report was approved by the NYSDEC. AKRF has also completed a smaller portion of the property as a "Track 4" cleanup, which includes a tennis court and landscaped areas. Ms. Lapin continues to manage the annual inspections for the property owner in accordance with the Brownfield Cleanup Agreement.

Hudson River Park, New York, NY

Ms. Lapin is directing AKRF's hazardous materials work during construction of Hudson River Park, a five-mile linear park along Manhattan's West Side. As the Hudson River Park Trust's (HRPT's) environmental consultant, AKRF has overseen preparation and implementation of additional soil and groundwater investigations [working with both the New York State Department of Environmental Conservation (NYSDEC) and the New York City Department of Environmental Protection (NYCDEP)], all health and safety activities, and removal of both known underground storage tanks and those encountered during construction. Previously, the firm performed hazardous materials assessments as part of the Environmental Impact Statement (EIS) process, including extensive database and historical research, and soil and groundwater investigations. Ms. Lapin has been the senior consultant for the soil and groundwater investigations and remediation, and the asbestos investigations and abatement oversight.

Roosevelt Union Free School District – District-wide Improvement Program, Roosevelt, NY

Ms. Lapin managed the hazardous materials investigation for the Draft and Final Environmental Impact Statements (EIS) for the improvement program, which included the demolition of three existing elementary schools and portions of the junior-senior high school, and the reconstruction of three replacement elementary schools, a separate replacement middle school, and renovations to the high school. Following the EIS, additional hazardous materials investigations were completed, including comprehensive asbestos and lead surveys; Phase I and Phase II Environmental Site Assessments; the preparation of asbestos, lead, hazardous materials and demolition specifications; and obtaining site-specific variances from the New York State Department of Labor (NYSDOL). The middle school remediation was conducted through coordination with the New York State Department of Environmental Conservation (NYSDEC), the New York State Department of Health (NYSDOH), the New York State Education Department (NYSED) and the local school district. The project was approved, and construction/renovation for the new middle school completed such that the school opened for the Fall 2008 semester as planned.

Fiterman Hall Deconstruction and Decontamination Project, New York, NY

The 15-story Fiterman Hall building, located at 30 West Broadway between Barclay and Murray Streets, originally constructed as an office building in the 1950s, had served as an extension of the City University of New York (CUNY) Borough of Manhattan Community College (BMCC) since 1993. The building was severely damaged during the September 11, 2001, attack on the World Trade Center (WTC) when 7 WTC collapsed and struck the south façade of the building, resulting in the partial collapse of the southwest corner of the structure. The building was subsequently stabilized, with breaches closed and major debris removed, however, extensive mold and WTC dust contaminants remain within the building, which must be taken down. The project required the preparation of two Environmental Assessment Statements (EASs) for the redevelopment of Fiterman Hall—one for the deconstruction and decontamination of the building and one for the construction of a replacement building on the site. AKRF prepared the EAS for the Deconstruction and Decontamination project, which included the decontamination of the interior and exterior of the building, the removal and disposal of all building contents, and the deconstruction of the existing, approximately 377,000-gross-square-foot partially collapsed structure. Ms. Lapin reviewed the deconstruction and decontamination plans for the EAS. The cleanup plan was submitted to the United States Environmental Protection Agency (USEPA).

Yonkers Waterfront Redevelopment Project, Yonkers, NY

For this redevelopment along Yonkers' Hudson River waterfront, Ms. Lapin headed the remedial investigation and remediation work that included Phase I Environmental Site Assessments of 12 parcels, investigations of underground storage tank removals and associated soil remediation, remedial alternatives reports, and remedial work plans for multiple parcels. Several of the city-owned parcels were remediated under a Voluntary Cleanup Agreement; others were administered with state Brownfields grants. Hazardous waste remediation was completed on both brownfield and voluntary clean-up parcels, which enabled construction of mixed-use retail, residential development, and parking.

Davids Island Site Investigations, New Rochelle, NY

Ms. Lapin managed the hazardous materials investigation of Davids Island, the largest undeveloped island on the Long Island Sound in Westchester County. The 80-acre island features pre- and post-Civil War military buildings and parade grounds, and is viewed as a major heritage, tourism, and recreational amenity. The island, formerly known as Fort Slocum, was used by the U.S. military, beginning in the 19th century, as an Army base, hospital, and training center. The island was planned for county park purposes. The investigation included a Phase I Environmental Site Assessment, with historical research going back to the 17th century, a Phase II (Subsurface) Investigation, underground storage tank investigations, asbestos surveys, and conditions surveys of all remaining structures. Cost estimates were submitted to Westchester County for soil remediation, asbestos abatement, and building demolition.

Site Selection and Installation of 11 Turbine Generators, New York and Long Island, NY

AKRF was retained by the New York Power Authority (NYPA) to assist in the State Environmental Quality Review Act (SEQRA) review of the proposed siting, construction, and operation of 11 single-cycle gas turbine generators in the New York metropolitan area. Ms. Lapin managed the hazardous materials investigation of the sites. The work has included Phase I Environmental Site Assessments, subsurface investigations, and construction health and safety plans.

Cross Westchester (I-287) Expressway Phases V and VI, Westchester County, NY

For the New York State Department of Transportation's (NYSDOT) I-287 reconstruction project, Ms. Lapin served as Project Manager and was responsible for directing the contaminated materials aspect of the final design effort for the reconstruction of Westchester County's major east-west artery. As part of her duties, Ms. Lapin managed the asbestos investigations at eight bridges and wetland delineation along the entire corridor and wrote the scope of work and provided general management of the project.

Supermarket Redevelopment, New Fairfield, CT

AKRF provided consulting services to the developer and owner of a nine-acre site, including conducting a remedial investigation and remediation of a site contaminated from former dry cleaning operations and off-site gasoline spills. The investigation included the installation of monitoring wells in three distinct aquifers, geophysical logging, pump tests, and associated data analysis. Ms. Lapin presented the environmental issues and planned remediation to local and state officials during the early stages of the planning process to incorporate their comments into the final remedial design. A remedial action work plan (RAWP) was completed and approved by the Connecticut Department of Environmental Protection (CTDEP) within a year to enable redevelopment work for a new supermarket and shopping center. The RAWP included the remediation of soil within the source area and a multi-well pump and treat system for the recovery of non-aqueous and dissolved phase contamination in groundwater. The design of the recovery well system included extensive groundwater modeling to ensure capture of the contaminant plume and the appropriate quantity and spacing of the wells. Ms. Lapin directed the soil removal remedial activities and monitoring for additional potential contamination during construction. In addition, AKRF performed comprehensive pre-demolition asbestos and lead-based paint surveys of the former site structures, conducted abatement, air monitoring and oversight, and provided environmental consulting support for the development of the site. The groundwater remediation system was installed during site development and began operation once development was complete.

Broad Street, Stamford, CT [former Project name: Target Stamford)

AKRF originally completed a Phase I Environmental Site Assessment (ESA) for a developer of this property, located at southeastern corner of Broad Street and Washington Boulevard in downtown Stamford, Connecticut, for a proposed residential development. Four years later, an update of this Phase I ESA was conducted for a proposed Target retail development. The study area included the current Target site and the west-adjacent site which was subsequently developed as a luxury residential tower. Following the Phase I report, a subsurface (Phase II) investigation was conducted, which included soil borings, groundwater monitor wells, soil and groundwater sample collection and analysis. The results of the Phase II investigation were used to develop a remediation strategy. An additional Phase I/Phase II investigation was conducted of the adjacent former transmission repair facility, which included a site inspection, review of local and state records, an underground storage tank markout survey, advancement of soil borings, and collection of soil samples for laboratory analysis. AKRF also conducted asbestos surveys prior to abatement and demolition of the former Broad Street and Washington Boulevard buildings.

EPA Brownfields Assessment Program, Naugatuck, CT

Ms. Lapin is currently serving as the Principal-in-Charge for a USEPA Brownfields Assessment program project in Naugatuck, Connecticut. She is overseeing the assessment and investigation of key development parcels, including Work Plan and QAPP preparation, and conducting community outreach tasks to communicate site risks and the project process. Mr. Stefaniak plays the lead role in administering the USEPA Cooperative Agreement on behalf of the Borough.

East 75th/East 76th Street Site, New York, NY

Ms. Lapin served as Senior Manager for this project that encompassed coordination and direct remediation efforts of this former dry cleaning facility and parking garage prior to the sale of the property and its ultimate redevelopment for use as a private school. A preliminary site investigation identified 20 current and former petroleum and solvent tanks on the property. A soil and groundwater testing program was designed and implemented to identify the presence and extent of contamination resulting from potential tank spills. This investigation confirmed the presence of subsurface petroleum contamination in the soil and solvent contamination from former dry cleaning activities in the bedrock. AKRF completed oversight of the remediation under the State's Voluntary Cleanup Program. Remediation, consisting of tank removals and excavation of contaminated soil and the removal of solvent-contaminated bedrock down to 30 feet below grade, has been completed. AKRF completed oversight of the pre-treatment of groundwater prior to discharge to the municipal sewer system and an off-site study to determine impacts to groundwater in downgradient locations.

Former Macy's Site, White Plains, NY

While assisting Tishman Speyer with plans to redevelop this site, Ms. Lapin managed the pre-demolition work, which included a Phase I site assessment; subsurface investigation (Phase II), including the analysis of soil and groundwater samples for contamination; a comprehensive asbestos, lead paint, and PCB investigation; radon analysis; and coordination and oversight of the removal of hazardous materials left within the building by previous tenants. Work also included asbestos abatement specifications and specifications for the removal of two 10,000-gallon vaulted fuel-oil underground storage tanks.

Storage Deluxe, Various Locations, NY

Ms. Lapin manages the firm's ongoing work with Storage Deluxe, which includes Phase I Environmental Site Assessments and Phase II Subsurface Investigations, underground storage tank removals and associated remediation, asbestos surveys and abatement oversight, and contaminated soil removal and remediation for sites in Connecticut, the Bronx, Brooklyn, Manhattan, Westchester County, and Long Island.

Home Depot, Various Locations, NY and CT

Ms. Lapin, serving as either Project Manager or Senior Manager, has managed the investigations and remediation at multiple Home Depot sites in the five boroughs, Long Island, and Connecticut. The investigations have included Phase I, II, and III site assessments, asbestos and lead paint surveys, abatement specifications and oversight, and soil and groundwater remediation.

Avalon on the Sound, New Rochelle, NY

For Avalon Bay Communities, Ms. Lapin managed the investigations and remediation of two phases of this residential development, including two luxury residential towers and an associated parking garage. Remediation of the first phase of development (the first residential tower and the parking garage) included gasoline contamination from a former taxi facility, fuel oil contamination from multiple residential underground storage tanks, and chemical contamination from former on-site manufacturing facilities. The remediation and closure of the tank spills was coordinated with the New York State Department of Environmental Conservation (NYSDEC). The initial investigation of the Phase II development—an additional high-rise luxury residential building—detected petroleum contamination. A second investigation was conducted to delineate the extent of the contamination and estimate the costs for remediation. AKRF oversaw the remediation and conducted the Health and Safety monitoring. The remediation was completed with closure and approvals of the NYSDEC.

Mill Basin, Gerritsen Inlet, and Paerdegat Basin Bridges, Final Design, Shore Parkway, Brooklyn, NY

Following the preparation of the Generic Environmental Impact Statement (GEIS) for the Belt Parkway Bridges Project, the firm was retained for supplemental work during the final design phase of the project. This included National Environmental Policy Act (NEPA) and State Environmental Quality Review Act (SEQRA) documentation for three of the bridges—Mill Basin, Gerritsen Inlet, and Paerdegat Basin—which will be federally funded. Ms. Lapin managed the contaminated materials investigation that included a detailed subsurface contaminated materials assessment, both subaqueous and along the upland approaches.

NYSDOT Transportation Management Center (TMC), Hawthorne, NY

AKRF conducted environmental studies for the New York State Department of Transportation (NYSDOT) at the current troopers' headquarters in Hawthorne, NY. The property is the proposed site of a new Transportation

Management Center. AKRF completed a comprehensive asbestos survey of the on-site building and prepared asbestos abatement specifications; performed a Phase I site assessment; conducted an electromagnetic (EM) survey that located two fuel oil underground storage tanks, and developed removal specifications for the two underground storage tanks and an aboveground storage tank.

Metro-North Railroad Poughkeepsie Intermodal Station/Parking Improvement Project, Poughkeepsie, NY

Ms. Lapin served as Project Manager of the hazardous materials investigation in connection with AKRF's provision of planning and environmental services for parking improvement projects at this station along the Hudson Line. The project included an approximately 600-space garage, additional surface parking, and an intermodal station to facilitate bus, taxi, and kiss-and-ride movements. Ms. Lapin conducted Phase I and II contaminated materials assessments and worked with the archaeologists to locate an historical roundhouse/turntable.

Metro-North Railroad Golden's Bridge Station Parking Project, Westchester County, New York

For Metro-North Railroad, Ms. Lapin managed a Phase I Environmental Site Assessment of a property that has since become the new parking area, used by the existing Golden's Bridge train station. Ms. Lapin also conducted a subsurface (Phase II) investigation of the original parking area, track area, and existing platform for the potential impact of moving tracks in the siding area to extend the existing parking area and adding an access from a proposed overhead walkway (connecting the train station to the new parking area over a highway). The study also included an assessment for lead-based paint and asbestos on the platform structures.

East River Science Park, New York, NY

Originally, New York University School of Medicine (NYUSOM) retained the firm to prepare a full Environmental Impact Statement (EIS) for its proposed East River Science Park (ERSP). The proposed complex was to occupy an underutilized portion of the Bellevue Hospital campus between East 30th Street and approximately East 28th Street, immediately south of NYU's campus. As originally contemplated, Phase I was to include 618,000 square feet of development, including a clinical practice and research building, a biotech center, 220 housing units for post-doctorate staff, a child care center, and a conference center. This phase would include reuse of the former Bellevue Psychiatric Building, a historic structure on East 30th Street east of First Avenue. Phase II was to include a second biotech building with a library to serve NYU and Bellevue at the eastern end of the block between 29th and 30th Streets. Phase III was to include a third biotech building and parking. The project's EIS considered a full range of issues, including land use, socioeconomics, shadows, historic resources, open space, traffic and transportation, air quality, noise, and construction. The firm also prepared all of the traffic and transportation studies for the urban design and master planning efforts. Ms. Lapin managed the Phase I Environmental Site Assessment and other hazardous materials-related issues.

Events relating to September 11, 2001 put a hold on the project for a number of years. When the project resurfaced, it had a new developer and a decreased scope. Ms. Lapin updated the hazardous materials issues for the new developer and consulted with them regarding remediation strategies and involvement of regulatory agencies. For the actual remediation/development, the city requested oversight by AKRF to represent its interests (the city is retaining ownership of the land). Ms. Lapin completed directing the remediation oversight on behalf of the City of New York for the remediation of the former psychiatric hospital building, laundry building and parking areas associated with Bellevue Hospital. The new development includes a biotechnology center (Commercial Life Science Research and Office Park) comprising two buildings (combined 550,000 square feet), street level retail, and an elevated plaza.

68, 76 and 78 Forest Street and 96-98 Grove Street, Stamford, CT

Ms. Lapin led this project, for which AKRF was retained to complete a Phase I Environmental Site Assessment (ESA) of five residential properties, and asbestos surveys and lead-based paint surveys of the five multi-family residential structures prior to a real estate transaction. The investigations were completed to allow demolition of the residential structures and prepare the properties for development into the Highgrove high rise condominium complex. AKRF represented the purchaser and site developer during the due diligence process, identified areas of environmental concern, and completed underground storage tank closure activities prior to initiating site development. In addition, AKRF conducted a Phase I ESA of a property on Summer Street that was being used by the developer as a "temporary" office building and a parking area utilized as a sales center and apartment model for the Highgrove residential development.

Shelton Storage Deluxe, Shelton, CT

AKRF completed Phase I, Phase II and Tank Removal/Remediation services for a storage facility in Shelton, Connecticut. Based on this information from the Phase I ESA, AKRF conducted a Phase II study that revealed groundwater impact (gasoline), possibly from an off-site source. Additional testing was then conducted to determine the source of the gasoline contamination. Testing of a wood block floor revealed concentrations of volatile and semivolatile organic compounds and total petroleum hydrocarbons; therefore, disposal of this material had to be as a petroleum-contaminated waste. The additional testing included upstream and downstream surface water samples, and on-site detention pond water and sediment samples. Subsequent to the Phase II testing, a 4,000-gallon on-site underground storage tank was removed. Upon removal, contaminated soil and groundwater were observed and a spill was called into the Connecticut Department of Environmental Protection (CTDEP). Following completion of remedial activities and submission of a closure report, the spill was closed by the CTDEP. Ms. Lapin directed the firm's efforts to complete this project.

DPR Soundview Park Playgrounds and Open Space, Bronx, NY

AKRF is part of a team working on the reconstruction of this 212-acre NYCDPR public park located along the Bronx River in the Bronx, New York. The park was identified as an underutilized park and is being improved in accordance with the goals of PlaNYC. Ms. Lapin is overseeing AKRF's hazardous materials investigations including environmental and remediation-related work. AKRF prepared the Environmental Assessment Statement (EAS) and the project has moved into the design and construction phase. The remediation/construction of multiple phases of the development is currently underway.

164 Kent Avenue, Brooklyn, NY (AKA Northside Piers and 1 North 4th Place)

The project was a multi-phase development consisting of a large waterfront block in the Williamsburg Rezoning Area. The project site has been developed with a mixed-use residential-commercial high rise towers with an esplanade and a pier along the East River. AKRF provided acquisition and development support, including performing Phase I and II environmental site assessments, and preparation of Remedial Action Plans (RAPs) and Construction Health and Safety Plan (CHASPs) for approval by DEP and OER. AKRF provided assistance with construction oversight during soil handling activities and managing the Community Air Monitoring Plan (CAMP) activities. To date, closure reports have been prepared and occupancy achieved for three of the four buildings. Ms. Lapin is the Professional Engineer (P.E.) of record for the DEP and OER RAPs, CHASPs and Remedial Closure Reports (RCRs).

Rego Park Home Depot, Queens, NY

Solvent contamination was encountered during retail development of a former industrial property in Rego Park, Queens, New York. The site work included an extensive investigation and a multi-phase remediation performed under the NYSDEC Voluntary Cleanup Program (BCP). Remediation included removal of aboveground and underground storage tanks (ASTs and USTs) and hotspot soil removal. An Air Sparging/Soil Vapor Extraction (AS/SVE) groundwater remediation system designed by AKRF was installed as part of the building construction. Continued remediation work included upgrading and expanding the AS/SVE system after the store was opened. AKRF prepared the Final Engineering Report and obtained closure with a Release and Covenant Not to Sue issued by NYSDEC in 2013. AKRF continues operations, maintenance, and monitoring under the NYSDEC-approved Site Management Plan. Ms. Lapin is the Professional Engineer (P.E.) of record for the remediation design and implementation in accordance with the NYSDEC Brownfield Cleanup Program (BCP).

250 North 10th Street, LLC., Residential Redevelopment Site, Brooklyn, NY

AKRF was retained to investigate and remediate this former industrial property in the Williamsburg section of Brooklyn, New York in connection with site redevelopment. The site is approximately 50,000 square feet, and redevelopment included a six story residential building and parking garage. The work was completed to satisfy the requirements of the NYC E-designation Program and NYC Voluntary Cleanup Program (NYC VCP). AKRF completed a Remedial Investigation (RI) to evaluate the nature and extent of site contamination, and developed a Remedial Action Work Plan (RAWP) to properly address site contamination during redevelopment. Remediation included removal of underground storage tanks, more than 7,500 tons of contaminated soil, and installation of a vapor barrier and site cap across the entire property. The remediation was completed under oversight of the NYC Office of Environmental Remediation (OER), and in a manner that has rendered the Site protective of public health and the environment consistent with residential use of the property. Ms. Lapin is the Professional Engineer (P.E.) of record for the remedial effort in accordance with the OER Voluntary Cleanup Program (VCP).

AP-Williamsburg, LLC, 50 North 5th Street Development, Brooklyn, NY

AKRF directed the remedial program at a 55,000-square foot site located in the Williamsburg section of Brooklyn, New York. The site had an industrial and manufacturing history for over 100 years that included a barrel making factory, use of kilns, and a carpet and flooring materials warehouse. AKRF completed a Remedial Investigation (RI) to evaluate the nature and extent of site contamination, and developed a Remedial Action Work Plan (RAWP) to properly address site contamination during redevelopment. Remediation included removal of more than 5,000 tons of contaminated soil, and installation of a vapor barrier and sub-slab depressurization system (SSDS) beneath the site building. The remediation was completed in a manner that has rendered the Site protective of public health and the environment consistent with commercial and residential use of the property, and in accordance with the requirements of the NYC OER E-designation program. The site includes a seven story residential apartment building with street level retail space and a parking garage. Ms. Lapin is the Professional Engineer (P.E.) of record for the NYC OER RAWP and Remedial Closure Report (RCR).

New York City School Construction Authority (SCA), Environmental Consulting Hazardous Materials Services

The SCA was established by the New York State government to construct school facilities to reduce overcrowding and to provide new schools in growing neighborhoods. Focusing on the environmental consulting services, dating back to the 1980s and the days of the New York City Board of Education, the firm continues to provide broad support to SCA's effort, including environmental assessments in meeting the requirements of the State Environmental Quality Review Act (SEQRA), and site selection and property acquisition support for potential new sites. AKRF is currently serving under three individual on-call contracts for site acquisition and environmental consulting services, hazardous materials consulting services, and architectural and engineering services.

AKRF has undertaken various assignments under two consecutive hazardous materials on-call contract, including environmental assessment, remedial design, and plumbing disinfection consulting tasks. For potential new school sites, assignments include initial due diligence, Phase I environmental site assessments (ESAs) and multi-media 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 (SSDS) and contract specifications, and construction oversight. The work has also included conducting Phase I ESAs and indoor air quality testing, 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. Ms. Lapin is the QA/QC officer for all of the SCA hazardous materials assignments and the Professional Engineer (P.E.) of record for the various remediation systems, including sub-slab depressurization systems (SSDS).

NICHOLAS C. STRACCIONE

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Marlton, NJ 08053
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nick.straccione@gmail.com

QUALIFICATIONS:

More than fifteen years of diversified laboratory experience ● Emphasis in the environmental field ● International and multiple site responsibility ● Budget planning and budget responsible ● Chemical analysis ● Quality assurance ● Extensive management experience ● Project management ● Interact and prepare reports for a diversity of government agencies ● Knowledge of OSHA, HAZMAT, EPA, DOD, and various federal and state requirements ● Data Integrity training ● Client relations ● Internal and external audits ● Train and evaluate personnel ● Maintain laboratory test equipment ● Volatile and semi-volatile departments ● Operations and production management ● Marketing via printed media, trade shows, events, and internet ● Field sampling ● Purchasing including vendor negotiations ● Known among my peers and employers for my organizational skills and ability to perform multiple projects

- Created a mobile laboratory concept which allowed on-site testing and immediate analyzation of results for site remediation.

- Effective trainer, mentor, and teacher. Train personnel in diversified testing procedures, use or laboratory equipment, Software usage, client relations, and corporate protocol.

EXPERIENCE:

SGS ACCUTEST Inc. DAYTON, NJ
An environmental testing laboratory.
Quality Assurance Manager 2013- Present

- Responsible for daily quality assurance activities of Dayton, NJ laboratory.

- Manage all aspects of Quality system: Corrective action database, Training (local and corporate), Data Integrity and Ethics training and monitoring, Data Integrity Investigations, Internal and external audits, Laboratory Traceability, Client complaints, Document Control, Update Quality System Manual, Create Annual Management Review for CEO/Directors, Maintain and update Standard Operating Procedure Directory, Review Quality Assurance Plans for accuracy, Certification requirements, MDL studies and verifications, Method revisions, Control limits, Proficiency tests, Metrics certifications, Demonstration of capability tracking, Electronic monitoring for data validation, Enforce safety procedures.

- Manage a staff of five Quality Assurance personnel.

- Assist other laboratories in Accutest's network on Quality assurance matters. Including travel to network laboratories to implement corrective actions plans that will satisfy state or other regulatory programs.

- Coordinate ongoing improvement of corporate Quality Assurance programs.

- Participate on state and regulatory committee's to maintain current with standard method requirements.
    - New Jersey Department of Environmental Protection (NJDEP) - Environmental Laboratory Advisory Committee (ELAC), Secretary.
    - The NELAC Institute (TNI) -Associate Member, Laboratory Accreditation System Executive Committee (LASEC).
    - NJDEP - Groundwater Quality Standards Rule Stakeholder.

XENCO LABORATORY LLC MIAMI LAKES, FL/MARLTON, NJ
An environmental testing laboratory.
Regional Manager 2005 to 2013
Operations Manager/Mobile Laboratory Supervisor 2001 to 2005

- Collaborated in the start-up of a major multiservice laboratory serving Florida and the Caribbean. Developed new methods and procedures based on EPA guidelines.

- Assisted with integrating acquisition laboratories to Xenco's network. Trained new personnel on Xenco's system, supported client services for major clients during transitional phase and provided additional support with daily operations.

- Sent to other facilities to improve operating procedures and relieve shortages of personnel.

- Methods and instrumentation run at multiple laboratories: SW8260/8021 Volatiles by GC-MS/GC-PID, SW 8270 Semi-volatiles by GC-MS, SW 8081/8082 Pesticides/PCB's by GC-ECD, SW 8015 Total Petroleum Hydrocarbons by GC-FID, SW 8310 PAH's by HPLC, E300 Anions - Metrohm IC, Metals SW6020 – ICP-MS, Various Wet Chemistry parameters: COD (chemical oxygen demand), BOD (biological oxygen demand), pH, Temperature, Total coliform, Hexavalent Chromium, responsible for Contract Laboratory Program (CLP) reporting format.

SOUTHERN GROUTS AND MORTARS POMPANO BEACH, FL
A manufacturer of concrete pool liners.
Project Manager & QC Manager 2000 to 2001
Research Assistant 1999 to 2000

- Quality control manager for 3 facilities in Florida. Responsible for making sure production material met quality control limits. Tested product complaint material for all 3 facilities to verify or negate consumers complaint.
- Lead Project manager for new large scale production of blue colored quartz project. Assisted in development in laboratory of blue quartz and implemented into large scale production.

- Research and development assistant that re-formulated current products to make more efficient and cost effective. Create new products as industry needed.

SPECTRUM LABORATORIES POMPANO BEACH, FL
An environmental testing laboratory.
Laboratory Technician 1997 to 1999

- Assisted in Metals Department using ICP and AA (atomic absorption) instrumentation.

- Performed extractions and assisted in Wet Chemistry areas

NOVA SOUTHEASTERN UNIVERSITY DAVIE, FL
A four year college.
Teaching Assistant,
General and Organic Laboratories, part-time 1998 to 2001

EDUCATION:

NOVA SOUTHEASTERN UNIVERSITY FT. LAUDERDALE, FL
Master of Science Degree: Marine Biology 2001

RICHARD STOCKTON COLLEGE POMONA, NJ
Bachelor of Science Degree: Marine Biology 1998
Included studies abroad at University of Wollongong Australia in the Fall of 1996.

*References available upon request

DEBORAH SHAPIRO, QEP

VICE PRESIDENT

Deborah Shapiro is a Vice President with 17 years of experience in the assessment and remediation of hazardous waste issues. Ms. Shapiro supervises project teams and manages all aspects of assessment and remediation projects. Ms. Shapiro works with developers, non-profit organizations, architects, local community groups, local businesses, and government agencies. Her projects fall under the regulatory oversight of NYSDEC, NYCDEP, and NYCOER including the New York State Brownfield Cleanup Program (BCP), New York City Voluntary Cleanup Program (VCP), NYSDEC petroleum spills program, RCRA/UIC closures, and NYCOER's E-designation program. Ms. Shapiro has also assisted commercial and industrial property owners with maintaining the integrity of their portfolios by providing compliance related cleanup and chemical storage management services.

Ms. Shapiro manages all aspects of redevelopment projects from the initial Phase I ESA, Phase II, and remediation through post-remedial site management. In addition, her experience includes groundwater investigations, monitoring, and sampling programs; Brownfield and hazardous waste site investigations; In-Situ Chemical Oxidation; underground storage tank studies, including soil contamination delineation, classification, removal and disposal; waste characterization sampling; exposure assessments; on-going remedial action (especially AS/SVE), and permitting.

Prior to joining AKRF, Ms. Shapiro was a Senior Project Manager at CA RICH Consultants, Inc. in Plainview, New York. She was responsible for the design, implementation, and management of environmental assessment, investigation and remediation projects on Long Island and across the New York Metropolitan Area. Ms. Shapiro has also been a moderator and panelist at numerous conferences.

BACKGROUND

Education

M.S., Environmental Science, American University, 2001
B.A., Environmental Studies, American University, 1998

Professional Licenses/Certifications

Qualified Environmental Professional
Health and Safety Operations at Hazardous Materials Sites 29 CFR 1910.120
OSHA 10 Hour Occupational Construction Safety and Health

Professional Memberships

Past President, New York City Brownfield Partnership
Board Member, Residents for a More Beautiful Port Washington
Member, Institute of Professional Environmental Practitioners (IPEP)

Awards

Big Apple Brownfield Award recipient as part of the Courtlandt Crescent redevelopment team 2013
Big Apple Brownfield Award recipient as part of the Via Verde redevelopment team 2012
Big Apple Brownfield Award recipient as part of the Cornerstone B1 (LaTerraza) redevelopment team 2011

Years of Experience

Year started in company: 2013
Year started in industry: 1998

Relevant Experience

Elton Crossing, Bronx, NY

AKRF is currently providing environmental consulting services in connection with the Elton Crossing site in the Bronx, NY. The work initially involved the preparation of a Phase I Environmental Site Assessment and 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) based on its historic usage. AKRF prepared a NYCBCP Application and the site was accepted in to the NYSBCP. AKRF managed all aspects of the brownfield cleanup including; development of Remedial Investigation (RI) and Supplemental Remedial Investigation (SRI) Work Plans, conducting the RI and SRI and preparing the associated reports, preparation of a Citizen Participation Plan, distribution of public notices, and preparation of a Remedial Action Work Plan (RAWP). AKRF managed all aspects of the remediation, including providing guidance for the closure of two petroleum spills; the registration, removal, and closure of six petroleum storage tanks encountered during excavation; and waste characterization and disposal of soil with contaminants including hazardous lead, petroleum, and pesticides, and design of a Sub-Slab Depressurization System (SSDS). AKRF prepared and submitted a Site Management Plan (SMP) and a Final Engineering Report (FER), which documented compliance with the RAWP. The SMP and FER were approved by NYS in 2016. AKRF is currently providing long-term site management in accordance with the NYSBCP.

On-Call Environmental Consulting Services (Various Locations), New York City Mayor's Office of Environmental Remediation (OER) (administered by NYCEDC)

Ms. Shapiro is managing an on-call contract with the OER for brownfields environmental assessment and remediation. The work has included conducting Phase I environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor for various sites funded by EPA grants. The work plans and investigation reports were completed in accordance with OER and EPA requirements. AKRF also implemented a remedial plan for capping a park site in Staten Island. In addition, Ms. Shapiro is providing support to OER and an affordable housing developer to expedite an application for entry into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP), as well as preparation and implementation of the remedial investigation and remedial plan.

Atlantic Chestnut, Brooklyn, NY

AKRF was retained by Phipps Houses to provide environmental consulting services in connection with the purchase and development of former burned manufacturing buildings encompassing an entire city block in Brooklyn, New York. As part of due diligence, AKRF prepared a Phase I Environmental Site Assessment (ESA) Report for the property. After acquisition, the property was divided into three separate sites (3264 Fulton Street, 235 Chestnut Street, and 3301 Atlantic Avenue). AKRF prepared a Subsurface (Phase II) Investigation Work Plans and conducted Phase IIs at each of the sites, which included the collection and analysis of soil, soil vapor, and groundwater samples. Based on the results of the Phase IIs, which were documented in Subsurface (Phase II) Reports, New York State Brownfield Cleanup Program (NYSBCP) applications were prepared for each of the sites. After acceptance into the NYSBCP, AKRF prepared Citizen Participation Plans (CPPs) and distributed public notices. AKRF prepared Remedial Investigation (RI) Work Plans (RIWPs) for each of the sites to further investigate contaminated media at the site prior to redevelopment, conducted the RIs, and is in the process of preparing the RI Reports (RIRs).

Second Farms, Bronx, NY

AKRF, Inc. was contracted by the New York City Office of Environmental Remediation (NYCOER) to conduct a subsurface investigation of a 1.12-acre parcel in the Bronx, New York under the United States Environmental Protection Agency (USEPA) Brownfield Assessment Grant program. The investigation included a geophysical survey and utility mark-outs, and the collection and analysis of soil, groundwater, soil vapor, indoor air and ambient air samples.

Brook 156, Bronx, NY

AKRF was retained by Phipps Houses to provide environmental consulting services in connection with the purchase and development of two lots located at 740 Brook Avenue in the Bronx, NY. AKRF prepared a Phase I Environmental Site Assessment (ESA) of the NYC-owned former gasoline service station and a former railroad. A Tier 1 Vapor Encroachment Screening was also conducted to satisfy HUD's vapor intrusion requirements. AKRF prepared a Remedial Investigation Work Plan (RIWP) and conducted a Remedial Investigation (RI) at the site, which included the collection and analysis of soil, soil vapor, and groundwater. The results of the RI, which were documented in a Remedial Investigation Report (RIR), were used to prepare a New York City Brownfield Cleanup Program (NYCBCP) application. The site was accepted into the New York State Brownfield Cleanup Program (NYSBCP). AKRF prepared a Citizen Participation Plan (CPP), distributed public notices, and is in the process of preparing a Supplemental Remedial Investigation Work Plan (SRIWP) to further investigate soil, soil vapor, and groundwater at the site prior to redevelopment.

Warbrook Portfolio, Manhattan, NY

AKRF provided environmental consulting services to Genesis Y15 Developer LLC and the Abyssinian Development Corporation (ADC) for the proposed rehabilitation of 30 parcels in Central Harlem for low- and moderate-income tenants. The parcels comprise two vacant lots and 28 residential buildings, including several buildings that are vacant or partially vacant. The client is seeking 4% Low-Income Housing Tax Credits issued by the New York City Housing Development Corporation (HDC) through the New York City Department of Housing Preservation & Development (HPD) to rehabilitate the 30 parcels. AKRF prepared a Phase I Environmental Site Assessment for all parcels. The Phase I summarized environmental issues based on a review of available environmental reports, a review of regulatory records, and on-site inspections. Limited Phase II Environmental Site Assessments were conducted at parcels where recognized environmental concerns were identified. Based on evidence of suspect mold associated with the Property parcels, AKRF also prepared a mold specification section for use during renovation of the Property.

Courtlandt Crescent, Bronx, NY

Ms. Shapiro directed all Phases of this NYS Brownfield Cleanup Program project in the Melrose Commons section of the Bronx from the initial Phase I and II through the Certificate of Completion and is currently managing the implementation of the Site Management Plan. A New York State Brownfield Cleanup Program (BCP) Application was submitted simultaneously with the Remedial Investigation Report (RIR) and Remedial Action Work Plan (RAWP), which sped up the timetable so that the remediation could be implemented concurrently with the planned site redevelopment activities. The site comprised an entire city block whose historic usage included a gasoline filling station, auto repair shop, machine shop, auto junkyard, iron works, boiler repair shop, brass fabricator shop, universal machinery manufacturing, waste paper company, cosmetic company, and a saw works. The investigation included soil and soil vapor testing as well as the installation and sampling of groundwater monitoring wells. The remedial activities included the removal of underground storage tanks and hydraulic lifts, soil waste classification testing, the excavation and removal of approximately 23,000 tons of non-hazardous petroleum and metals contaminated soil as well as hazardous soil containing lead, in-situ chemical oxidation, and installation of a composite cover system. In addition, site dewatering activities allowed the elevator pits to be advanced into the groundwater table. A vapor barrier (and water-proofing for the elevator pits) was installed beneath the two new buildings' foundations and a sub-slab depressurization system (SSDS) was incorporated into the buildings' foundations to eliminate the potential exposure pathway for soil vapor into the new affordable housing residential buildings. Ms. Shapiro directed the remedial activities and monitoring under a construction health and safety plan, which included a community air monitoring program. Site management activities include post-remedial groundwater monitoring and sampling, SSDS start-up testing and operations and maintenance, and annual institutional control/engineering control inspections. The project was the recipient of the 2013 Big Apple Brownfield Award.

ExxonMobil, Multiple Locations, NY

Ms. Shapiro has managed the investigation and remediation of numerous ExxonMobil retail service stations in the five boroughs and Long Island. The investigations have included Phase I, II, and III site assessments, regulatory compliance, emergency spill response, UST removals, and soil and groundwater remediation.

APPENDIX B

HEALTH AND SAFETY PLAN

3500 PARK AVENUE APARTMENTS

3500 PARK AVENUE
BRONX, NEW YORK

Health and Safety Plan

BCP Site Number: C203096
CEQR Number: 08DCP022X
AKRF Project Number: 12477

Prepared for:

3500 Park Apts. HDFC, Inc.
3500 Park Apts. L.P.
290 Lenox Avenue
New York, NY 10027

Prepared by:

AKRF, Inc.
440 Park Avenue South, 7th Floor
New York, New York 10016
212-696-0670

DECEMBER 2017

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FIGURES

APPENDICES

1.0 INTRODUCTION

The project site (Site) is located at 3500 Park Avenue in the Bronx, New York (also identified as Tax Block 2389, Lot 20). Currently, the Site is an approximately 15,210-square foot asphalt-paved parking lot with a small attendant shed on the southwestern portion. The proposed development project consists of a new residential building that will contain both affordable and supportive housing units.

The Supplemental Remedial Investigation (SRI) described in the SRI Work Plan (SRIWP) will include the collection of soil and groundwater samples. This environmental Health and Safety Plan (HASP) has been developed for implementation during Site investigation activities conducted by all personnel on-site, both AKRF employees and others. This HASP does not discuss routine health and safety issues common to general construction/excavation, including but not limited to slips, trips, falls, shoring, and other physical hazards.

All AKRF employees are directed that all work must be performed in accordance with this HASP and all applicable Occupation Safety and Health Administration (OSHA) 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) without the required permit(s). 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.

Based on an evaluation of the available data and information from AKRF’s May 2016 Remedial Investigation (RI), on-site soil has been contaminated with the semivolatile organic compounds (SVOCs) and metals, including lead, mercury, and zinc.

2.0 HEALTH AND SAFETY GUIDELINES AND PROCEDURES

2.1 Hazard Evaluation

2.1.1 Hazards of Concern

Check all that apply		
(**X**) Organic Chemicals	(**X**) Inorganic Chemicals	( ) Radiological
( ) Biological	( ) Explosive/Flammable	( ) Oxygen Deficient Atm.
(**X**) Heat Stress	(**X**) Cold Stress	( ) Carbon Monoxide
Comment: No personnel are permitted to enter permit confined spaces without the required permit(s).		

2.1.2 Physical Characteristics

Check all that apply		
(**X**) Liquid	(**X**) Solid	( ) Sludge
( ) Vapors	( ) Unknown	( ) Other

2.1.3 Hazardous Materials

Check all that apply

Chemicals	**Solids**	**Sludges**	**Solvents**	**Oils**	**Other**
( ) Acids	( ) Ash	( ) Paints	( ) Halogens	( ) Transformer	( ) Lab
( ) Caustics	( ) Asbestos	( ) Metals	( ) Petroleum	( ) Other DF	( ) Pharm
( ) Pesticides	( ) Tailings	( ) POTW		(**X**) Motor or Hydraulic Oil	( ) Hospital
( ) Petroleum	(**X**) Fill Material			(**X**) Gasoline	( ) Rad
( ) Inks				(**X**) Fuel Oil	( ) MGP
( ) PCBs					( ) Mold
(**X**) Metals					( ) Cyanide
(**X**) Other: SVOCs					

2.1.4 Chemicals of Concern

Chemicals	**REL/PEL/STEL**	**Health Hazards**
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.
Copper	REL = 0.1 mg/m^3 PEL = 0.1 mg/m^3	Irritation eyes, upper respiratory system; metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough, lassitude (weakness, exhaustion); metallic or sweet taste; discoloration skin, hair.
Toluene	REL = 100 ppm PEL = 200 ppm STEL = 300 ppm	Irritation eyes, nose; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia (skin tingling or numbness); dermatitis; liver, kidney damage.
Ethylbenzene	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma.
Xylenes	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, poor coordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.
Naphthalene	REL = 10 ppm PEL = 10 ppm	Irritation eyes; headache, confusion, excitement, malaise; nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage.
Fuel Oil	REL = 350 mg/m^3 PEL = 400 ppm	Nausea, irritation – eyes, hypertension, headache, light-headedness, loss of appetite, poor coordination; long-term exposure – kidney damage, blood clotting problems; potential carcinogen.
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.
Lead	REL=0.1 mg/m^3 PEL=0.05 mg/m^3	Weakness, lassitude, insomnia; facial pallor, pale eye, anorexia, low-weight, malnutrition, constipation, abdominal pain, colic; anemia; gingival lead line; tremors, paralysis wrists and ankles; encephalopathy; kidney disease; irritation eyes; hypotension.
Polycyclic Aromatic Hydrocarbons (PAHs)	PEL = 5 mg/m^3	Harmful effects to skin, bodily fluids, and ability to fight disease, reproductive problems; [potential occupational carcinogen]
Tetrachlorethylene (PCE)	REL = Lowest possible PEL = 100 ppm STEL = 100 ppm	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination, headache, drowsiness, skin erythema (skin redness), and liver damage.

Comments:
REL = NIOSH Recommended Exposure Limit
PEL = OSHA Permissible Exposure Limit
STEL = OSHA Short Term Exposure Limit
ppm = parts per million
mg/m^3 = milligrams per cubic meter

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 the HASP. The SSO will have a 4-year college degree in occupational safety or a related science/engineering field, and experience in implementation of air monitoring and hazardous materials sampling programs. Health and safety training required for the SSO and all field personnel are 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 the 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 impacted 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 is the zone 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 changed by SSO, depending on that day's activities. All field personnel will be informed of the location of these zones before work begins.

Task	**Exclusion Zone**	**CRZ**	**Support Zone**
Soil Borings	**10 ft from drill rig**	**25 ft from drill rig**	**As Needed**
Comments: Control measures such as "caution tape" and/or traffic cones will be placed around the perimeter of the work area when work is being done in a public area and around the groundwater well during sampling.			

2.6 Air Monitoring

The purpose of the air monitoring program is to identify any exposure of the field personnel to potential environmental hazards in the soil and groundwater. Results of the air monitoring will be used to determine the appropriate response action, if needed. Air Monitoring will be conducted in accordance with NYSDEC DER-10 Appendix 1A - NYSDOH Generic Community Air Monitoring Plan (CAMP) also enclosed as Appendix 1A. A CAMP monitor will be placed along 168th Street in the direction of Public School (PS) 132's playground during all ground-intrusive activities, regardless of wind direction.

2.6.1 Volatile Organic Compounds (VOCs)

A photoionization detector (PID) will be used to perform air monitoring during soil disturbance activities to determine airborne levels of total VOCs. The PID will be calibrated at the start of the work day with a 100 parts per million (ppm) isobutylene gas in accordance with manufacturer standards.

2.6.2 Work Zone Air Monitoring

Real time air monitoring will be performed with the PID. Measurements will be taken prior to commencement of work and continuously during the work, as outlined in the following table. Measurements will be made as close to the workers as practicable and at the breathing height of the workers. The SSO shall set up the equipment and confirm that it is working properly. His/her 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 the background level for that day. The final measurement for the day will be performed after the end of work. The action levels and required responses are listed in the following table.

Instrument	Action Level	Response Action
PID	Less than 10 ppm in breathing zone	Level D or D-Modified
	Between 10 ppm and 20 ppm	Level C
	More than 20 ppm	Stop work. Resume work when readings are less than 20 ppm.

2.7 Personal Protection Equipment (PPE)

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 Section 2.6.

LEVEL OF PROTECTION & PPE		Soil Boring/Water Sampling
Level D (**X**) Steel Toe Shoes (**X**) Hard Hat (within 25 ft of drill rig) (**X**) Work Gloves	(**X**) Safety Glasses ( ) Face Shield (**X**) Ear Plugs (within 25 ft of drill rig) (**X**) Nitrile Gloves (**X**) Tyvek for drill operator if NAPL present	Yes
Level C ***(in addition to Level D)*** (**X**) Half-Face Respirator OR (**X**) Full Face Respirator ( ) Full-Face PAPR	( ) Particulate Cartridge ( ) Organic Cartridge (**X**) Dual Organic/ Particulate Cartridge	If PID > 10 ppm (breathing zone)
Comments: Cartridges to be changed out at least once per shift unless warranted beforehand (e.g., more difficult to breathe or any odors detected).		

2.8 General Work Practices

To protect the health and safety of the field personnel, 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 eye washes. 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 taken to a hospital by on-site personnel. Directions to the hospital are provided below, and a hospital route map is attached.

3.1 HOSPITAL DIRECTIONS

Hospital Name:	Bronx Lebanon Hospital Center
Phone Number:	(718) 960-2051
Address/Location:	1650 Grand Concourse, Bronx, New York 10457
Directions:	1. Go Northwest on East 168th Street. 2. Turn right onto Clay Avenue. 3. Turn left onto East 169th Street. 4. Turn right onto Grand Concourse. The Emergency Department entrance will be at the intersection of 173rd Street and Grand Concourse.

3.2 EMERGENCY CONTACTS

Company	Individual Name	Title	Contact Number
AKRF	Deborah Shapiro	Project Manager	646-388-9544 (office)
	Michelle Lapin	Project Manager Alternate	646-388-9520 (office)
	Mark Jepsen	Site Safety Officer (SSO)	646-388-9536 (office) 614-560-5425 (cell)
	Holly Bunker	SSO Alternate	718-598-0827
3500 Park Apts. HDFC, Inc. / 3500 Park Apts. L.P.	Carole Gordon	Volunteer Representative	212-663-3000 ext. 1378 (office) 917-670-4517 (cell)
Ambulance, Fire Department & Police Department	-	-	911
NYSDEC Spill Hotline	-	-	800-457-7362

4.0 APPROVAL & ACKNOWLEDGMENTS OF HASP

APPROVAL

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 Health and Safety Plan (HASP) for the 3500 Park Avenue site. 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:	
Signed:		Company:		Date:	
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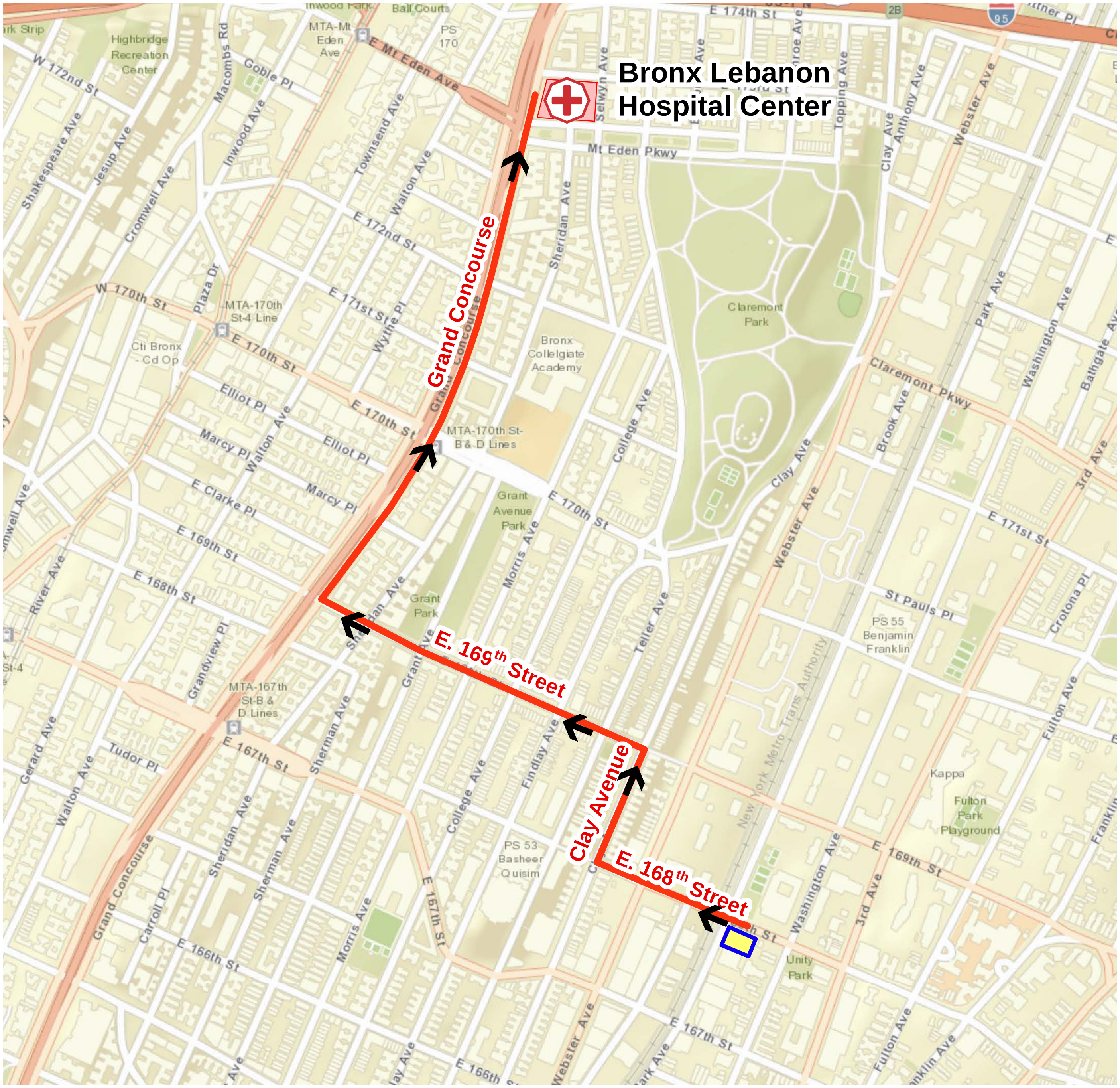
FIGURE 1

HOSPITAL ROUTE MAP



Service Layer Credits: ESRC World Street Map 2016

LEGEND

🟨 PROJECT SITE LOCATION

← ROUTE TO HOSPITAL

✚ HOSPITAL LOCATION

Bronx Lebanon Hospital Center
1650 Grand Concourse
Bronx, NY 10457
(718) 960-2051

0 800 1,600
SCALE IN FEET

AKRF
440 Park Avenue South, New York, NY 10016

3500 Park Avenue
Bronx, New York

HOSPITAL ROUTE MAP

DATE	**5/23/2017**
PROJECT NO.	**12477**
FIGURE	**1**

©2017 AKRF W:\Projects\12477 - 3500 PARK AVENUE\Technical\GIS and Graphics\hazmat\12477 Hospital Route Map.mxd5/23/2017 12:00:42 PM jszalus

APPENDIX A

POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS

ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

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 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.

Tetrachloroethylene - ToxFAQs™

CAS # 127-18-4

This fact sheet answers the most frequently asked health questions (FAQs) about tetrachloroethylene. For more information, call the CDC 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'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 (NPL) 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(PERC), 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 per formed 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

Carcinogenicity: The ability of a substance 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 and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30333.

Phone: 1-800-232-4636.

ToxFAQs^{TM} Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

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.

Mercury - ToxFAQs™

CAS # 7439-97-6

This fact sheet answers the most frequently asked health questions (FAQs) about mercury. For more information, call the CDC 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'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 (NPL) sites identified by the Environmental Protection Agency (EPA).

What is mercury?

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, some 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 fossil fuels.
- Release of mercury from dental work and medical treatments.
- Breathing contaminated workplace air or skin contact during use in the workplace.
- 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.

Mercury

CAS # 7439-97-6

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, possibly causing damage to the developing nervous system. It can also 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 affect 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 determine 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 and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30329-4027.

Phone: 1-800-232-4636.

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

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.

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COPPER

CAS # 7440-50-8

Division of Toxicology ToxFAQs™ September 2004

This fact sheet answers the most frequently asked health questions (FAQs) about copper. 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: Copper is a metal that occurs naturally in the environment, and also in plants and animals. Low levels of copper are essential for maintaining good health. High levels can cause harmful effects such as irritation of the nose, mouth and eyes, vomiting, diarrhea, stomach cramps, nausea, and even death. Copper has been found in at least 906 of the 1,647 National Priority Sites identified by the Environmental Protection Agency (EPA).

What is copper?

Copper is a metal that occurs naturally throughout the environment, in rocks, soil, water, and air. Copper is an essential element in plants and animals (including humans), which means it is necessary for us to live. Therefore, plants and animals must absorb some copper from eating, drinking, and breathing.

Copper is used to make many different kinds of products like wire, plumbing pipes, and sheet metal. U.S. pennies made before 1982 are made of copper, while those made after 1982 are only coated with copper. Copper is also combined with other metals to make brass and bronze pipes and faucets.

Copper compounds are commonly used in agriculture to treat plant diseases like mildew, for water treatment and, as preservatives for wood, leather, and fabrics.

What happens to copper when it enters the environment?

- Copper is released into the environment by mining, farming, and manufacturing operations and through waste water releases into rivers and lakes. Copper is also released from natural sources, like volcanoes, windblown dusts, decaying vegetation, and forest fires.
- Copper released into the environment usually attaches to particles made of organic matter, clay, soil, or sand.
- Copper does not break down in the environment. Copper compounds can break down and release free copper into the air, water, and foods.

How might I be exposed to copper?

- You may be exposed to copper from breathing air, drinking water, eating foods, or having skin contact with copper, particulates attached to copper, or copper-containing compounds.
- Drinking water may have high levels of copper if your house has copper pipes and acidic water.
- Lakes and rivers that have been treated with copper compounds to control algae, or that receive cooling water from power plants, can have high levels of copper. Soils can also contain high levels of copper, especially if they are near copper smelting plants.
- You may be exposed to copper by ingesting copper-containing fungicides, or if you live near a copper mine or where copper is processed into bronze or brass.
- You may be exposed to copper if you work in copper mines or if you grind metals containing copper.

How can copper affect my health?

Everyone must absorb small amounts of copper every day because copper is essential for good health. High levels of copper can be harmful. Breathing high levels of copper can cause irritation of your nose and throat. Ingesting high levels of copper can cause nausea, vomiting, and diarrhea. Very-high doses of copper can cause damage to your liver and kidneys, and can even cause death.

How likely is copper to cause cancer?

We do not know whether copper can cause cancer in humans. The EPA has determined that copper is not classifiable as to human carcinogenicity.

How can copper affect children?

Exposure to high levels of copper will result in the same type of effects in children and adults. We do not know if these effects would occur at the same dose level in children and adults. Studies in animals suggest that the young children may have more severe effects than adults, but we don't know if this would also be true in humans. There is a very small percentage of infants and children who are unusually sensitive to copper.

We do not know if copper can cause birth defects or other developmental effects in humans. Studies in animals suggest that high levels of copper may cause a decrease in fetal growth.

How can families reduce the risk of exposure to copper?

The most likely place to be exposed to copper is through drinking water, especially if your water is corrosive and you have copper pipes in your house. The best way to lower the level of copper in your drinking water is to let the water run for at least 15 seconds first thing in the morning before drinking or using it. This reduces the levels of copper in tap water dramatically.

If you work with copper, wear the necessary protective clothing and equipment, and always follow safety procedures. Shower and change your clothes before going home each day.

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

Copper is found throughout the body; in hair, nails, blood, urine, and other tissues. High levels of copper in these samples can show that you have been exposed to higher-than normal levels of copper. These tests cannot tell whether you will experience harmful effects. Tests to measure copper levels in the body are not usually available at a doctor's office because they require special equipment, but the doctor can send samples to a specialty laboratory.

Has the federal government made recommendations to protect human health?

The EPA requires that levels of copper in drinking water be less than 1.3 mg of copper per one liter of drinking water (1.3 mg/L).

The U.S. Department of Agriculture has set the recommended daily allowance for copper at 900 micrograms of copper per day (µg/day) for people older than eight years old.

The Occupational Safety and Health Administration (OSHA) requires that levels of copper in the air in workplaces not exceed 0.1 mg of copper fumes per cubic meter of air (0.1 mg/m^3) and 1.0 mg/m^3 for copper dusts.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2004. Toxicological Profile for Copper. 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.

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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
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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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ETHYLBENZENE

CAS # 100-41-4

Agency for Toxic Substances and Disease Registry ToxFAQs June 1999

This fact sheet answers the most frequently asked health questions (FAQs) about ethylbenzene. 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: Ethylbenzene is a colorless liquid found in a number of products including gasoline and paints. Breathing very high levels can cause dizziness and throat and eye irritation. Ethylbenzene has been found in at least 731 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is ethylbenzene?

(Pronounced ĕth′ əl bĕn′ zēn′)

Ethylbenzene is a colorless, flammable liquid that smells like gasoline. It is found in natural products such as coal tar and petroleum and is also found in manufactured products such as inks, insecticides, and paints.

Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

What happens to ethylbenzene when it enters the environment?

- Ethylbenzene moves easily into the air from water and soil.
- It takes about 3 days for ethylbenzene to be broken down in air into other chemicals.
- Ethylbenzene may be released to water from industrial discharges or leaking underground storage tanks.
- In surface water, ethylbenzene breaks down by reacting with other chemicals found naturally in water.
- In soil, it is broken down by soil bacteria.

How might I be exposed to ethylbenzene?

- Breathing air containing ethylbenzene, particularly in areas near factories or highways.
- Drinking contaminated tap water.
- Working in an industry where ethylbenzene is used or made.
- Using products containing it, such as gasoline, carpet glues, varnishes, and paints.

How can ethylbenzene affect my health?

Limited information is available on the effects of ethylbenzene on people's health. The available information shows dizziness, throat and eye irritation, tightening of the chest, and a burning sensation in the eyes of people exposed to high levels of ethylbenzene in air.

Animals studies have shown effects on the nervous system, liver, kidneys, and eyes from breathing ethylbenzene in air.

How likely is ethylbenzene to cause cancer?

The EPA has determined that ethylbenzene is not classifiable as to human carcinogenicity.

No studies in people have shown that ethylbenzene exposure can result in cancer. Two available animal studies suggest that ethylbenzene may cause tumors.

How can ethylbenzene affect children?

Children may be exposed to ethylbenzene through inhalation of consumer products, including gasoline, paints, inks, pesticides, and carpet glue. We do not know whether children are more sensitive to the effects of ethylbenzene than adults.

It is not known whether ethylbenzene can affect the development of the human fetus. Animal studies have shown that when pregnant animals were exposed to ethylbenzene in air, their babies had an increased number of birth defects.

How can families reduce the risk of exposure to ethylbenzene?

Exposure to ethylbenzene vapors from household products and newly installed carpeting can be minimized by using adequate ventilation.

Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.

Sometimes older children sniff household chemicals, including ethylbenzene, in an attempt to get high. Talk with your children about the dangers of sniffing chemicals.

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

Ethylbenzene is found in the blood, urine, breath, and some body tissues of exposed people. The most common way to test for ethylbenzene is in the urine. This test measures substances formed by the breakdown of ethylbenzene. This test needs to be done within a few hours after exposure occurs, because the substances leave the body very quickly.

These tests can show you were exposed to ethylbenzene, but cannot predict the kind of health effects that might occur.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level of 0.7 milligrams of ethylbenzene per liter of drinking water (0.7 mg/L).

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of ethylbenzene be reported to the EPA.

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

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for ethylbenzene. 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.

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FUEL OILS

CAS # 8008-20-6, 70892-10-3, 68476-30-2, 68476-34-6, 68476-31-3

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

This fact sheet answers the most frequently asked health questions (FAQs) about fuel oils. 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.

SUMMARY: Fuel oils are liquid mixtures produced from petroleum, and their use mostly involves burning them as fuels. Drinking or breathing fuel oils may cause nausea or nervous system effects. However, exposure under normal use conditions is not likely to be harmful. Fuel oils have been found in at least 26 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are fuel oils?
(Pronounced fyo͞o′əl oilz)

Fuel oils are a variety of yellowish to light brown liquid mixtures that come from crude petroleum. Some chemicals found in fuel oils may evaporate easily, while others may more easily dissolve in water.

Fuel oils are produced by different petroleum refining processes, depending on their intended uses. Fuel oils may be used as fuel for engines, lamps, heaters, furnaces, and stoves, or as solvents.

Some commonly found fuel oils include kerosene, diesel fuel, jet fuel, range oil, and home heating oil. These fuel oils differ from one another by their hydrocarbon compositions, boiling point ranges, chemical additives, and uses.

What happens to fuel oils when they enter the environment?

☐ Some chemicals found in fuel oils may evaporate into the air from open containers or contaminated soil or water.

☐ Some chemicals found in fuel oils may dissolve in water after spills to surface waters or leaks from underground storage tanks.

☐ Some chemicals found in fuel oils may stick to particles in water, which will eventually cause them to settle to the bottom sediment.

☐ Some of the chemicals found in fuel oils may be broken down slowly in air, water, and soil by sunlight or small organisms.

☐ Some of the chemicals found in fuel oils may build up significantly in plants and animals.

How might I be exposed to fuel oils?

☐ Using a home kerosene heater or stove, or using fuel oils at work.

☐ Breathing air in home or building basements that has been contaminated with fuel oil vapors entering from the soil.

☐ Drinking or swimming in water that has been contaminated with fuel oils from a spill or a leaking underground storage tank.

☐ Touching soil contaminated with fuel oils.

☐ Using fuel oils to wash paint or grease from skin or equipment.

How can fuel oils affect my health?

Little information is available about the health effects that may be caused by fuel oils. People who use kerosene stoves for cooking do not seem to have any health problems related to their exposure.

Breathing some fuel oils for short periods may cause nausea, eye irritation, increased blood pressure, headache, lightheadedness, loss of appetite, poor coordination, and difficulty concentrating. Breathing diesel fuel vapors for long periods may cause kidney damage and lower your blood's ability to clot.

Drinking small amounts of kerosene may cause vomiting, diarrhea, coughing, stomach swelling and cramps, drowsiness, restlessness, painful breathing, irritability, and unconsciousness. Drinking large amounts of kerosene may cause convulsions, coma, or death. Skin contact with kerosene for short periods may cause itchy, red, sore, or peeling skin.

How likely are fuel oils to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that some fuel oils (heavy) may possibly cause cancer in humans, but for other fuel oils (light) there is not enough information to make a determination. IARC has also determined that occupational exposures to fuel oils during petroleum refining are probably carcinogenic in humans.

Some studies with mice have suggested that repeated contact with fuel oils may cause liver or skin cancer. However, other mouse studies have found this not to be the case. No studies are available in other animals or in people on the carcinogenic effects of fuel oils.

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

There is no medical test that shows if you have been exposed to fuel oils. Tests are available to determine if some of the chemicals commonly found in fuel oils are in your blood. However, the presence of these chemicals in blood may not necessarily mean that you have been exposed to fuel oils.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) and the Air Force Office of Safety and Health (AFOSH) have set a permissible exposure level (PEL) of 400 parts of petroleum distillates per million parts of air (400 ppm) for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that average workplace air levels not exceed 350 milligrams of petroleum distillates per cubic meter of air (350 mg/m^3) for a 40-hour workweek.

The Department of Transportation (DOT) lists fuel oils as hazardous materials and, therefore, regulates their transportation.

Glossary

Carcinogenic: Able to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or a gas.

Hydrocarbon: Any compound made up of hydrogen and carbon.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Sediment: Mud and debris that have settled to the bottom of a body of water.

References

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

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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.

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POLYCHLORINATED BIPHENYLS

Division of Toxicology ToxFAQs™ February 2001

This fact sheet answers the most frequently asked health questions (FAQs) about polychlorinated biphenyls. 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: Polychlorinated biphenyls (PCBs) are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. PCBs have been found in at least 500 of the 1,598 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polychlorinated biphenyls?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

What happens to PCBs when they enter the environment?

❏ PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.

❏ PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.

❏ PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.

❏ PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How might I be exposed to PCBs?

❏ Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.

❏ Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.

❏ Breathing air near hazardous waste sites and drinking contaminated well water.

❏ In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.

How can PCBs affect my health?

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are PCBs to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

How can PCBs affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

How can families reduce the risk of exposure to PCBs?

❏ You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.

❏ Children should be told not play with old appliances, electrical equipment, or transformers, since they may contain PCBs.

❏ Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.

❏ If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

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

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). 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 E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. 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.

ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

TOLUENE
CAS # 108-88-3

Division of Toxicology ToxFAQs™ **February 2001**

This fact sheet answers the most frequently asked health questions (FAQs) about toluene. 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 toluene occurs from breathing contaminated workplace air, in automobile exhaust, some consumer products paints, paint thinners, fingernail polish, lacquers, and adhesives. Toluene affects the nervous system. Toluene has been found at 959 of the 1,591 National Priority List sites identified by the Environmental Protection Agency

What is toluene?

Toluene is a clear, colorless liquid with a distinctive smell. Toluene occurs naturally in crude oil and in the tolu tree. It is also produced in the process of making gasoline and other fuels from crude oil and making coke from coal.

Toluene is used in making paints, paint thinners, fingernail polish, lacquers, adhesives, and rubber and in some printing and leather tanning processes.

What happens to toluene when it enters the environment?

❑ Toluene enters the environment when you use materials that contain it. It can also enter surface water and groundwater from spills of solvents and petrolieum products as well as from leasking underground storage tanks at gasoline stations and other facilities.

❑ When toluene-containing products are placed in landfills or waste disposal sites, the toluene can enter the soil or water near the waste site.

❑ Toluene does not usually stay in the environment long.

❑ Toluene does not concentrate or buildup to high levels in animals.

How might I be exposed to toluene?

❑ Breathing contaminated workplace air or automobile exhaust.

❑ Working with gasoline, kerosene, heating oil, paints, and lacquers.

❑ Drinking contaminated well-water.

❑ Living near uncontrolled hazardous waste sites containing toluene products.

How can toluene affect my health?

Toluene may affect the nervous system. Low to moderate levles can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and hearing and color vision loss. These symptoms usually disappear when exposure is stopped.

Inhaling High levels of toluene in a short time can make you feel light-headed, dizzy, or sleepy. It can also cause unconsciousness, and even death.

High levels of toluene may affect your kidneys.

How likely is toluene to cause cancer?

Studies in humans and animals generally indicate that toluene does not cause cancer.

The EPA has determined that the carcinogenicity of toluene can not be classified.

How can toluene affect children?

It is likely that health effects seen in children exposed to toluene will be similar to the effects seen in adults.
Some studies in animals suggest that babies may be more sensitive than adults.

Breathing very high levels of toluene during pregnancy can result in children with birth defects and retard mental abilities, and growth. We do not know if toluene harms the unborn child if the mother is exposed to low levels of toluene during pregnancy.

How can families reduce the risk of exposure to toluene?

❑ Use toluene-containing products in well-ventilated areas.

❑ When not in use, toluene-containing products should be tightly covered to prevent evaporation into the air.

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

There are tests to measure the level of toluene or its breakdown products in exhaled air, urine, and blood. To determine if you have been exposed to toluene, your urine or blood must be checked within 12 hours of exposure. Several other chemicals are also changed into the same breakdown products as toluene, so some of these tests are not specific for toluene.

Has the federal government made recommendations to protect human health?

EPA has set a limit of 1 milligram per liter of drinking water (1 mg/L).

Discharges, releases, or spills of more than 1,000 pounds of toluene must be reported to the National Response Center.

The Occupational Safety and Health Administration has set a limit of 200 parts toluene per million of workplace air (200 ppm).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Toluene. 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 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

XYLENE

CAS # 1330-20-7

Agency for Toxic Substances and Disease Registry ToxFAQs September 1996

This fact sheet answers the most frequently asked health questions (FAQs) about xylene. 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.

SUMMARY: Exposure to xylene occurs in the workplace and when you use paint, gasoline, paint thinners and other products that contain it. People who breathe high levels may have dizziness, confusion, and a change in their sense of balance. This substance has been found in at least 658 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is xylene?

(Pronounced zī′lēn)

Xylene is a colorless, sweet-smelling liquid that catches on fire easily. It occurs naturally in petroleum and coal tar and is formed during forest fires. You can smell xylene in air at 0.08–3.7 parts of xylene per million parts of air (ppm) and begin to taste it in water at 0.53–1.8 ppm.

Chemical industries produce xylene from petroleum. It's one of the top 30 chemicals produced in the United States in terms of volume.

Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

What happens to xylene when it enters the environment?

- ☐ Xylene has been found in waste sites and landfills when discarded as used solvent, or in varnish, paint, or paint thinners.
- ☐ It evaporates quickly from the soil and surface water into the air.
- ☐ In the air, it is broken down by sunlight into other less harmful chemicals.
- ☐ It is broken down by microorganisms in soil and water.
- ☐ Only a small amount of it builds up in fish, shellfish, plants, and animals living in xylene-contaminated water.

How might I be exposed to xylene?

- ☐ Breathing xylene in workplace air or in automobile exhaust.
- ☐ Breathing contaminated air.
- ☐ Touching gasoline, paint, paint removers, varnish, shellac, and rust preventatives that contain it.
- ☐ Breathing cigarette smoke that has small amounts of xylene in it.
- ☐ Drinking contaminated water or breathing air near waste sites and landfills that contain xylene.
- ☐ The amount of xylene in food is likely to be low.

How can xylene affect my health?

Xylene affects the brain. High levels from exposure for short periods (14 days or less) or long periods (more than 1 year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. We do not know if xylene harms the unborn child if the mother is exposed to low levels of xylene during pregnancy.

How likely is xylene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that xylene is not classifiable as to its carcinogenicity in humans.

Human and animal studies have not shown xylene to be carcinogenic, but these studies are not conclusive and do not provide enough information to conclude that xylene does not cause cancer.

Is there a medical test to show whether I’ve been exposed to xylene?

Laboratory tests can detect xylene or its breakdown products in exhaled air, blood, or urine. There is a high degree of agreement between the levels of exposure to xylene and the levels of xylene breakdown products in the urine. However, a urine sample must be provided very soon after exposure ends because xylene quickly leaves the body. These tests are not routinely available at your doctor’s office.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 10 ppm of xylene in drinking water.

The EPA requires that spills or accidental releases of xylenes into the environment of 1,000 pounds or more must be reported.

The Occupational Safety and Health Administration (OSHA) has set a maximum level of 100 ppm xylene in workplace air for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) also recommend exposure limits of 100 ppm in workplace air.

NIOSH has recommended that 900 ppm of xylene be considered immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

Glossary

Evaporate: To change from a liquid into a vapor or a gas.

Carcinogenic: Having the ability to cause cancer.

CAS: Chemical Abstracts Service.

ppm: Parts per million.

Solvent: A liquid that can dissolve other substances.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for xylenes (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 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.

APPENDIX B

REPORT FORMS

WEEKLY SAFETY REPORT FORM

Week Ending: ______________ Project Name/Number: ______________________________

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: ____________________ Site Location: ____________________

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.

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

____ Medical Treatment

___ Non-disabling

___ First Aid Only

___ Fatality

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

APPENDIX C

EMERGENCY HAND SIGNALS

EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communication. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

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

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATHE!	 **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 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