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SUPPLEMENTAL REMEDIAL INVESTIGATION WORK PLAN (RIWP)

198 East 135th Street

Block 2319; Lot 60

Bronx, New York

NYSDEC BCP Site #C203084

Prepared For:

Deegan 135 Realty LLC

198 East 135th Street

Bronx, New York

Prepared By:

Hydro Tech Environmental, Corp.

15 Ocean Road

Brooklyn, NY 11225

Prepared On:

November 30, 2016

CERTIFICATION

I, Mark E. Robbins, certify that I am a Qualified Environmental Professional (QEP) as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared for the 198 East 135th Street (Site No. C203084) in accordance with all applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Mark E. Robbins

Name

Signature

11/30/16

Date

TABLE OF CONTENTS

TABLE OF CONTENTS i
1.0 EXECUTIVE SUMMARY 1
2.0 INTRODUCTION 2
  2.1 Site Description 2
  2.2 Summary of Previous Work 2
  2.3 Environmental Setting 3
  2.4 Objective & Project Goals 4
3.0 INVESTIGATION SPECIFICATIONS 5
  3.1 Introduction 5
  3.2 Soil Probes 5
  3.3 Groundwater Sampling 7
  3.4 Field Management of Investigation Derived Waste 7
  3.5 Laboratory Analytical Methods 8
  3.6 Quality Assurance/Quality Control 9
4.0 REPORT OF FINDINGS 10
  4.1 Anticipated Project Schedule 10
5.0 REFERENCES 11

FIGURES

Figure 1 – Site Location Map

Figure 2 – Site Plan

Figure 3 – Historic RI Sample Location Map/Proposed Sample Location Map

APPENDICES

Appendix A – Remedial Investigation Report, Hydro Tech Environmental, Corp.,   June 2015

Appendix B - Health and Safety Plan

Appendix C – Site-Specific Community Air Monitoring Program

Appendix D - Sample Boring Log

Appendix E – Sample Groundwater Sampling Log

Appendix F – Quality Assurance Project Plan

1.0 EXECUTIVE SUMMARY

This Supplemental Remedial Investigation Work Plan (Supplemental RIWP) has been prepared on behalf of Deegan 135 Realty LLC to document additional remedial investigation for the property located at 198 East 135th Street in Bronx, New York, (the "Site"). Deegan 135 Realty LLC filed an application to enter into the Brownfield Cleanup Program (BCP) with the New York State Department of Environmental Conservation (NYSDEC) as a Volunteer. The Site was admitted into the BCP and a Site number C203084 was issued to the BCP project and a Supplemental Remedial Investigation/Interim Remedial Measure Work Plan was submitted on July 21, 2016. The NYSDEC reviewed the submitted report and returned comments in a letter dated September 20, 2016.

The purpose of this Supplemental RIWP is to further characterize soil and groundwater quality at the Site and to address comments provided in the September 20, 2016 NYSDEC correspondence. The results of this investigation will help determine the next steps in the remedial investigation process and to provide additional information needed to refine the IRM Workplan, which is anticipated to be amended and re-submitted along with the Remedial Investigation Report. All investigation work will be performed in accordance with the New York State Department of Environmental Conservation (NYSDEC) requirements under the NYS Brownfield Cleanup Program (BCP) and in compliance with the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010) and other acceptable industry standards.

The investigation will be conducted through the installation and sampling of soil probes and the sampling of the existing groundwater monitoring wells. All portions of the fieldwork will be conducted in accordance with a site-specific Health & Safety Plan.

The following sections provide the details and specific information pertaining to the various components of the Supplemental RIWP.

2.0 INTRODUCTION

This Supplemental Remedial Investigation Work Plan (RIWP) has been prepared for the property located at 198 East 135th Street in Bronx, New York (the "Site"), which is located within a designated Environmental Zone (En-zone) pursuant to New York State Tax Law 21(b)(6). Deegan 135 Realty LLC entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) in February 2016, to investigate and remediate this Site as a Volunteer, under BCP Site number C203084. This Supplemental RIWP provides the protocols and specifications for the proposed supplemental remedial investigation at the Site, as requested by the NYSDEC in their September 20, 2016 letter correspondence. A supplemental IRM Workplan is anticipated to be submitted to the NYSDEC upon completion of the supplemental remedial investigation activities and will be submitted along with the Remedial Investigation Report.

2.1 Site Description

The Site is located in the Port Morris section of Bronx, New York and is identified as Block 2319 and Lot 60 on the New York City Tax Map. The Site is 48,976-square feet and is bounded by East 135th Street to the north, a commercial storage facility to the south and west and a 5-story residential property to the east. Currently, the Site is vacant. Figure 1 provides a Site Location Map. Figure 2 provides a Site Plan.

2.2 Summary of Previous Work

Hydro Tech performed a Site Remedial Investigation (RI) during June 2015 in accordance with a June 2015 Investigation Work Plan approved by the New York City Office of Environmental Remediation (OER). The purpose of the investigation was to characterize the nature and extent of contamination at the Site. A total of six (6) soil probes designated SP-1 to SP-6, three (3) monitoring wells designated MW-1 to MW-3, and five (5) soil vapor probes designated SV-1 to SV-5 were installed and sampled at the Site. In addition, one outdoor air sample was collected concurrently with soil vapor samples. Figure 3 provides the historic RI sampling locations. The RI is provided in Appendix A.

Overall findings of the remedial investigations indicate that the groundwater depth beneath the Site ranged between 8.85 to 12.02 feet and the groundwater flow direction was determined to be toward the north.

Soil samples were collected from a "shallow" and a "deep" interval as part of this investigation. The shallow interval refers to samples collected from zero to 2 feet below grade; the deep interval refers to samples collected from 10 to 12 feet below grade. Soil/fill samples collected during the RI were compared to Soil Cleanup Objectives (SCOs) presented in the New York State Department of Environmental Conservation (NYSDEC) New York Codes, Rules and Regulations (NYCRR) Section 6 Part 375. The analytical results show trace concentrations of several volatile organic compounds (VOCs) below their respective Unrestricted Use SCOs. Acetone (max. 0.068 mg/kg) exceeded its Unrestricted Use SCO of 0.05 mg/kg in two deep samples collected from 10 to 12 feet below grade at the Site. The VOC soil analytical results are summarized in Table 1 of the June 2015 RIR.

Several semi-volatile organic compounds (SVOCs) consisting of Polycyclic Aromatic Hydrocarbon (PAH) compounds were detected, with benzo(a)anthracene (max. 5.70 mg/kg), benzo(a)pyrene (max. 1.14 mg/kg), benzo(b)fluoranthene (max. 1.24 mg/kg), benzo(k)fluoranthene (max. 1.21 mg/kg) and chrysene (max. 5.49 mg/kg) exceeding their Restricted Residential SCOs of 1 mg/kg in five shallow samples and one deep sample. Dibenzo(a,h)anthracene (max. 0.453 mg/kg) and indeno(1,2,3-cd)pyrene (max. 0.874

mg/kg) were detected at concentrations exceeding their respective Restricted Residential SCOs of 0.33 mg/kg and 0.5 mg/kg in three shallow samples and one deep sample.

Pesticides were detected in four shallow samples and one deep sample at concentrations exceeding Unrestricted Use SCOs (0.0033 mg/kg), including 4,4'-DDD (max. 0.0948 mg/kg), 4,4'-DDE (max. 0.0357 mg/kg) and 4,4'DDT (max. 0.177 mg/kg). Total PCBs (max. 0.72 mg/kg) exceeded Unrestricted Use SCOs (0.1 mg/kg) in four shallow samples.

Several metals including barium (max. 635 mg/kg [USCO = 350 mg/kg]), copper (max. 158 mg/kg [USCO = 50 mg/kg]), lead (max. 618 mg/kg [USCO = 63 mg/kg]), mercury (max. 0.36 mg/kg [USCO = =0.18 mg/kg]), nickel (max. 44.30 mg/kg [USCO = 30 mg/kg]), selenium (max. 12.70 mg/kg [USCO = 3.9 mg/kg]) and zinc (max. 497 mg/kg [USCO = 109 mg/kg]) were detected in all shallow samples and three samples exceeding Unrestricted Use SCOs. Of these metals, barium and lead also exceeded their respective Restricted Residential SCOs of 350 mg/kg and 400 mg/kg in two shallow samples. Overall, soil chemistry is unremarkable and is similar to sites with historic fill in New York City.

Groundwater samples collected during the investigations were compared to the NYSDEC Technical Operational Guidance Series (TOGS) 1.1.1 Class GA Groundwater Quality Standards for the protection of drinking water (GQS). The three (3) Site monitoring wells were installed to a total depth of 25 feet below grade and are screened from 5 to 25 feet below grade. No PCBs were identified in any of the groundwater samples collected at the Site. Five (5) VOCs were detected above their respective GQS in MW-1, including 1,2,4-trimethylbenzene (500 µg/L [GQS = 5 µg /L]), 1,2-dichlorobenzene (1,200 µg/L [GQS = 3 µg /L]), acetone (1,500 µg/L [GQS = 50 µg /L]), naphthalene (1,500 µg/L [GQS = 10 µg /L]) and n-butylbenzene (670 µg/L [GQS = 5 µg /L]). No other VOCs were detected in the other two groundwater samples. Several SVOCs were detected but only phenol (5.6 µg/L) was detected in MW-3 at a concentration exceeding its GQS of 1 µg /L. Several dissolved metals were identified in groundwater but only antimony (40 ug/L [GQS = 3 µg /L]), lead (27 ug/L [GQS = 25 µg /L]), magnesium (max. 145,000 ug/L [GQS = 35,000 µg /L]), manganese (max. 3,260 ug/L [GQS = 300 µg /L]), selenium (max. 60 ug/L [GQS = 10 µg /L]) and sodium (max. 782,000 ug/L [GQS = 20,000 µg /L]) exceeded their respective GQS.

Five (5) soil vapor probes, designated SV-1 through SV-5, were installed to a depth of 6 feet below grade. The soil vapor probes were installed in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Soil vapor collected during the RI showed moderate levels of petroleum-related VOCs. The petroleum related compounds ranged from 1.10 µg/m^3 to 110 µg/m^3. N-Hexane was the highest detected petroleum-related compound with a concentration of 110 µg/m^3 in SV-5. Total concentrations of petroleum-related VOCs (BTEX) was 100 µg/m^3 in SV-5. Chlorinated VOCs were also detected with tetrachloroethylene (PCE) detected at a maximum concentration of 130 µg/m^3 in SV-4, exceeding the 100µg/m^3 threshold in sub-slab soil vapor that would recommend a monitoring action within the NYSDOH Soil Vapor Guidance Matrix. PCE, trichloroethylene and carbon tetrachloride were also detected in the original outdoor ambient air sample but not in the second resample.

2.3 Environmental Setting

The Site is located in the southern portion of Bronx County, New York. Refer to Figure 1 for the site location. The elevation of the Subject Property is approximately 15 feet above mean sea level (USGS 7 ½-Minute Central Park, New York Quadrangle, 1995).

The vicinity of the Subject Property is characterized by metamorphosed sequence of bedrock known as the Manhattan Prong of the Hartland Formation.

The Hartland Formation was formed during the late Cambrian to early Ordovician period and consists of undivided pelitic schist with gneiss and amphibolite. The formation is frequently cross cut by transverse and parallel faults. The area is overlain by Pleistocene aged glacial till deposits.

Based on the RI groundwater monitoring results, the depth to groundwater at the Site ranges between 8.85 to 12.02 feet below grade. The observed groundwater flow direction at the Site is toward the north.

2.4 Objective & Project Goals

The objective of the Supplemental RIWP is to further characterize soil being excavated for the proposed remediation and redevelopment of the Site. The scope of the Supplemental RIWP has developed in response to the NYSDEC comments provided in NYSDEC letter correspondence dated September 20, 2016.

All related portions of the fieldwork associated with Supplemental RIWP will be performed in accordance with a Health & Safety Plan (Appendix B), the CAMP (Appendix C) and at a minimum , in accordance with acceptable industry standards. These acceptable industry standards include, but are not limited to, the ASTM Standard Guide for Phase II Environmental Site Assessments (E 1903-97), the NYSDEC CP-51/Soil Cleanup Guidance (October 2010), the NYSDEC Bureau of Spill Prevention & Response Sampling Guidelines and Protocols (March 1991), and the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010).

3.0 INVESTIGATION SPECIFICATIONS

3.1 Introduction

The purpose of this section is to document the details and protocols intended to be utilized in the supplemental sampling at the Site. In order to further characterize soil being excavated for the remediation of the Site, Hydro Tech will install and sample a series of on-site soil probes utilizing direct-push technology. Select soil samples will be analyzed via approved analytical methods, and all laboratory results will be evaluated and documented in a Supplemental Remedial Investigation Report. In addition, the three (3) previously installed on-site monitoring wells will be sampled. These activities will be implemented consistent with a Citizen Participation Plan (CPP) and in accordance to a site-specific Health and Safety Plan (HASP) and a Community Air Monitoring Plan (CAMP). No waste characterization samples will be collected from the Site as part of this Supplemental Remedial Investigation; waste characterization will be conducted after this supplemental investigation. Appendix B provides a Site-specific HASP. Appendix C provides a Site-specific CAMP.

Prior to the performance of the fieldwork, a public utility mark-out will be requested from the New York City-Long Island One-Call Center. All work will be coordinated with representatives of the NYSDEC.

3.2 Soil Probes

A total of eight (8) soil probes designated SP-7 through SP-14 will be installed during the supplemental investigation. Table 1 below provides the specific location of each soil probe. The purpose of the additional soil probes is to further characterize and delineate the subsurface soil which will be excavated as part of the Site remediation. Consistent with NYSDEC's request in its September 20, 2016 letter, soil samples will be obtained from consecutive 2-foot intervals from the base of the proposed excavation depth to determine the feasibility of a Track 1 Cleanup at the Site. Sampling will be conducted site-wide.

Table 1 - Summary of Proposed Soil Sampling Locations and Analyses

Soil Probe	Location	Soil Sampling Depth	Analytical Methods
SP-7	Western Portion of Proposed Basement (northwestern portion of Site)	2 to 4 feet below grade; 6 to 8 feet below grade; 10 to 12 feet below grade; 12 to 14 feet below grade; 14 to 16 feet below grade	*TCL VOCs via EPA Method 8260 *TCL SVOCs via EPA Method 8270 * Pesticides via EPA Method 8081 * Polychlorinated biphenyls via EPA Method 8082 *TAL Metals via EPA Method 6010 & EPA Method 7471 for Mercury
SP-8			
SP-9	Eastern Portion of Proposed Basement (north-central portion of Site)	0 to 2 feet below grade; 2 to 4 feet below grade; 4 to 6 feet below grade; 6 to 8 feet below grade; 8 to 10 feet below grade; 12 to 14 feet below grade; 14 to 16 feet below grade	
SP-10			
SP-11	Slab-on-grade/parking construction (southern and eastern portions of Site)	2 to 4 feet below grade; 4 to 6 feet below grade; 6 to 8 feet below grade; 8 to 10 feet below grade	
SP-12			
SP-13			
SP-14			

All soil probes will be installed utilizing Hydro Tech's probe machine units fitted with Geoprobe tooling and sampling equipment. The probing machine will install the soil probes utilizing direct-push (hydraulic percussion) technology. Figure 3 provides the proposed locations of the soil probes.

Soil samples will be collected in all probes at 2-foot intervals utilizing a 4-foot long Macro Core sampler fitted with dedicated acetate liners. The Macro sampler allows for the collection of both continuous and discrete soil samples. Each sampler will be installed with 1½-inch diameter drill rods.

The soil probes will be extended to a maximum depth of 16 feet below grade. The soil samples will be placed in clean zip-lock storage bags and characterized in the field by a Hydro Tech geologist. The characterization will consist of field screening for evidence of organic vapors utilizing a Photoionization Detector or PID and soil classification.

Headspace analyses will be conducted on each soil sample by partially filling a zip lock bag and sealing it, thereby creating a void. This void is referred to as the sample headspace. To facilitate the detection of any hydrocarbons contained within the headspace, the container will be agitated for a period of thirty (30) seconds. The probe of the PID will then be placed within the headspace to measure the hydrocarbon concentrations present.

The soil classification will be based upon the Unified Soil Classification System (USCS). The USCS identifies common soil details such as grain size, shape, sorting and color. In addition, any visual or olfactory evidence of hydrocarbons will be identified. Soil probe logs will be generated based upon the soil characterization, along with the PID field screening. Appendix D provides a sample boring log.

Soil samples will be collected in accordance with NYSDEC's September 20, 2016 letter correspondence and as per the comments discussed with the NYSDEC during a November 23, 2016 teleconference. The proposed sampling depths include consecutive 2-foot intervals from the grade surface down to the base of excavation depth in the eastern portion of the proposed basement area located on the northwestern portion of the Site. The western portion of the proposed basement area will be sampled at 2-foot intervals every 4 feet from the grade surface down to the proposed excavation depth. This correlates to samples collected from the 2 to 4-foot interval, the 6 to 8-foot interval and the 10 to 12-foot interval. As discussed with the NYSDEC, the decreased sampling frequency is warranted by historical soil sampling data available for the western portion of the proposed basement area. Soil quality has previously been sufficiently assessed in the zero to 2-foot interval, which comprises the proposed excavation across the southern and eastern proposed slab-on-grade/parking portions of the Site, therefore a supplemental investigation of this interval is not required.

In addition to the supplemental investigation of the proposed excavation areas, additional soil samples will be taken at consecutive 2-foot intervals beneath the proposed excavation depth to determine the feasibility of an Unrestricted Use (Track 1) cleanup at the Site. A Track 1 cleanup is the preferred remedy for this redevelopment; however, the intended remedial track will be assessed after completion of this supplemental investigation. Samples will be collected from the 2 to 4-foot interval, the 4 to 6-foot interval, the 6 to 8-foot interval and the 8 to 10-foot interval beneath the slab-on-grade/parking portions of the Site and the 12 to 14-foot interval and the 14 to 16-foot interval beneath the proposed partial basement area. Please refer to Table 1 for a summary of sampling procedures and Figure 3 for a visual representation of sample locations and depths.

All soil samples will be containerized in laboratory supplied soil jars and appropriately labeled.

3.3 Groundwater Sampling

Hydro Tech will resample the three (3) on-site monitoring wells installed during September 2015. Prior to sample collection, the monitoring wells, designated MW-1 through MW-3, will be monitored and gauged for separate phase product and groundwater elevation. The monitoring will be performed utilizing a Solinst® 122 Oil/Water Interface Probe (Interface Probe) capable of measuring depths to water/product to 0.01 inch. The depth to water will be measured in each well from the northern portion of the casing top. Table 2 below provides the specific location and analytical methods for each groundwater sample. Previous Figure 3 provides the locations of the groundwater samples.

Table 2 - Summary of Proposed Groundwater Sampling Locations and Analyses

Monitoring Well	Location	Analytical Methods
MW-1	Northeastern portion	*TCL VOCs via EPA Method 8260 *TCL SVOCs via EPA Method 8270 * Pesticides via EPA Method 8081 * Polychlorinated biphenyls via EPA Method 8082 *TAL Metals via EPA Method 6010 & EPA Method 7471 for Mercury
MW-2	Southeastern portion	
MW-3	Western-central portion	

* - Please refer to the Quality Assurance Project Plan (QAPP) in Appendix F for additional details on the analytical methods associated with this remediation.

Prior to the groundwater sampling, each monitoring well will first be purged until groundwater conditions stabilize. The purge volume from each well will be determined based on the stabilization of water quality purging indicators utilizing a portable water quality meter YSI-6820, which utilizes an in-line flow cell for measurements. These water quality parameters include pH, temperature, specific Conductivity, Oxidation Reduction Potential, Dissolved Oxygen and turbidity. The YSI-6820 will first be calibrated prior to the groundwater sampling in accordance with the manufacturer's requirements.

The sampling will be performed following USEPA's Low Stress/Flow Groundwater Sampling Protocol (SOP #GW0001, Rev. 1996). This sampling protocol consists of a low-flow drawdown of water at flow rates of 0.1 to 0.5 Liters per minute (L/min) using a dedicated portable peristaltic pump. The pump will be connected to PVC tubing and that will be carefully lowered above the middle of the screened interval zone water in order to minimize mixing with stagnant water above and the suspension of solids that collect at the bottom of the well. Monitoring well stabilization parameters will be recorded on a Groundwater Sampling Log. An example of a typical log sheet is provided in Appendix E.

All groundwater samples will be containerized in laboratory supplied glassware and appropriately labeled.

3.4 Field Management of Investigation Derived Waste

<u>Soil Sampling</u>

-Soil cuttings generated during probe installation and sampling will be placed in a 55-gallon drum and properly disposed of.

-Fluids generated during equipment decontamination will be contained in 55-gallons drums and properly disposed of.

-Fine grade sand will be applied to direct any runoff water away from the boreholes in order to avoid any discharges of unknown surface contaminants into the subsurface soil. The sand will be disposed of into 55-gallons drums along the soil cuttings.

-Disposal of all Investigation Derived Waste will occur in accordance with applicable solid and hazardous waste regulations (e.g., 6NYCRR Parts 360, 364 and 370 Series). Materials generated during this investigation must be transported by a hauler permitted in accordance with 6 NYCRR Part 364 and, if hazardous wastes are generated, manifests in accordance with 6 NYCRR Part 372 will be recorded.

-All boreholes will be back-filled with fine grade sand and properly sealed in surface with a layer of slurry.

Groundwater Sampling

-Purge water generated during monitoring well development and sampling will be placed in a 55-gallon drum and properly disposed of.

-Fluids generated during equipment decontamination will be contained in 55-gallons drums and properly disposed of.

-Fine grade sand will be applied to direct any runoff water away from the monitoring wells in order to avoid any discharges of unknown surface contaminants into the subsurface. The sand will be disposed of into 55-gallons drums along the soil cuttings.

-Disposal of all Investigation Derived Waste will occur in accordance with applicable solid and hazardous waste regulations (e.g., 6NYCRR Parts 360, 364 and 370 Series). Materials generated during this investigation must be transported by a hauler permitted in accordance with 6 NYCRR Part 364 and, if hazardous wastes are generated, manifests in accordance with 6 NYCRR Part 372 will be recorded.

3.5 Laboratory Analytical Methods

As indicated in Table 1 and Table 2, all soil and groundwater samples will be analyzed for volatile organic compounds (VOCs) via EPA Method 8260, semi-volatile organic compounds (SVOCs) via EPA Method 8270, Pesticides via EPA Method 8081, Polychlorinated biphenyls (PCBs) via EPA Method 8082 and TAL Metals via EPA Method 6010 and EPA Method 7471 for Mercury.

3.6 Quality Assurance/Quality Control

A Hydro Tech Quality Assurance Officer (QAO) (A.J. Infante) will adopt a Quality Assurance Project Plan (QAPP) during the collection of soil samples in order to ensure that proper procedures are performed and subsequently followed during sample collection and analysis. The QAPP for this investigation is provided in Appendix F.

4.0 REPORT OF FINDINGS

A Supplemental Remedial Investigation Report (Supplemental RIR) will be prepared following the completion of the fieldwork and the laboratory analyses. This report will be certified by a QEP as per DER-10 Table 1.5 and will contain the findings and conclusions of the investigation and will include appropriate maps and diagrams, tabulations of all analytical data, written narratives, boring and sampling logs and appendices.

The soil quality results will be compared to the 6 NYCRR Part 375 Unrestricted Use and Restricted Residential Use Soil Cleanup Objectives (SCOs) and all groundwater quality results will be compared to the 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). All soil samples that exceed their respective SCOs or GQS will be highlighted in tables and shown on spider diagrams. The RIR will include a Data Usability Summary Report certified by an accepted third party reviewer.

All data will also be submitted electronically to NYSDEC through the Environmental Information Management System, using the standardized electronic data deliverable (EDD) format.

4.1 Anticipated Project Schedule

The table below provides a tentative schedule for the performance of the remedial investigation. This schedule is tentative based upon the approval of this Supplemental RIWP by the NYSDEC.

Task	**Time Interval**
DEC approval of Supplemental RIWP	-
Installation of soil probes	*Within 14 days of Supplemental RIWP approval*
Supplemental RIR	*Within 30 days of Supplemental RIWP approval*
Mail fact sheet to site contact list with RI results	*Within 5 days of DEC's direction to distribute Fact Sheet*
DEC approval of Supplemental RIR	-

5.0 REFERENCES

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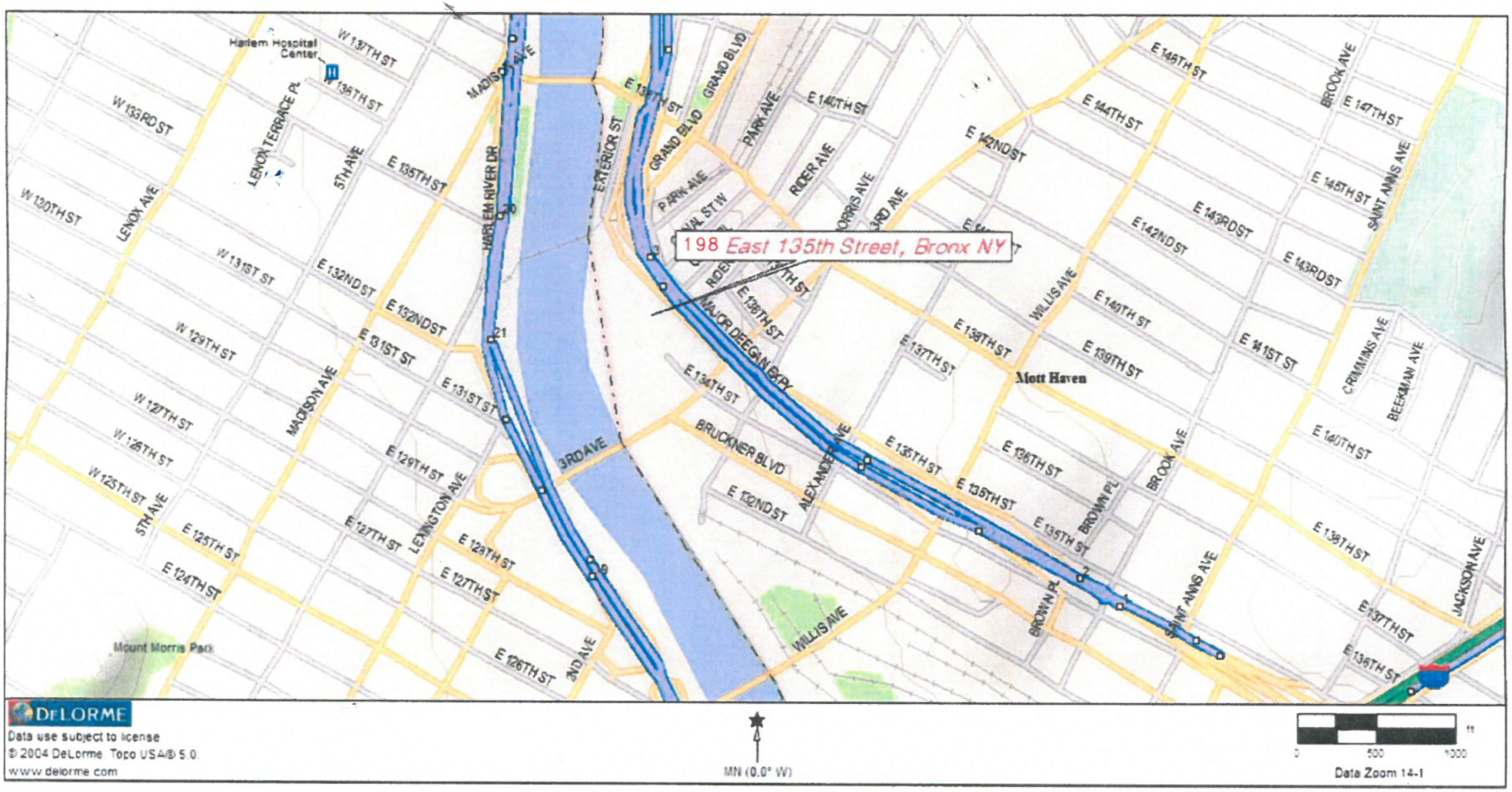
FIGURES



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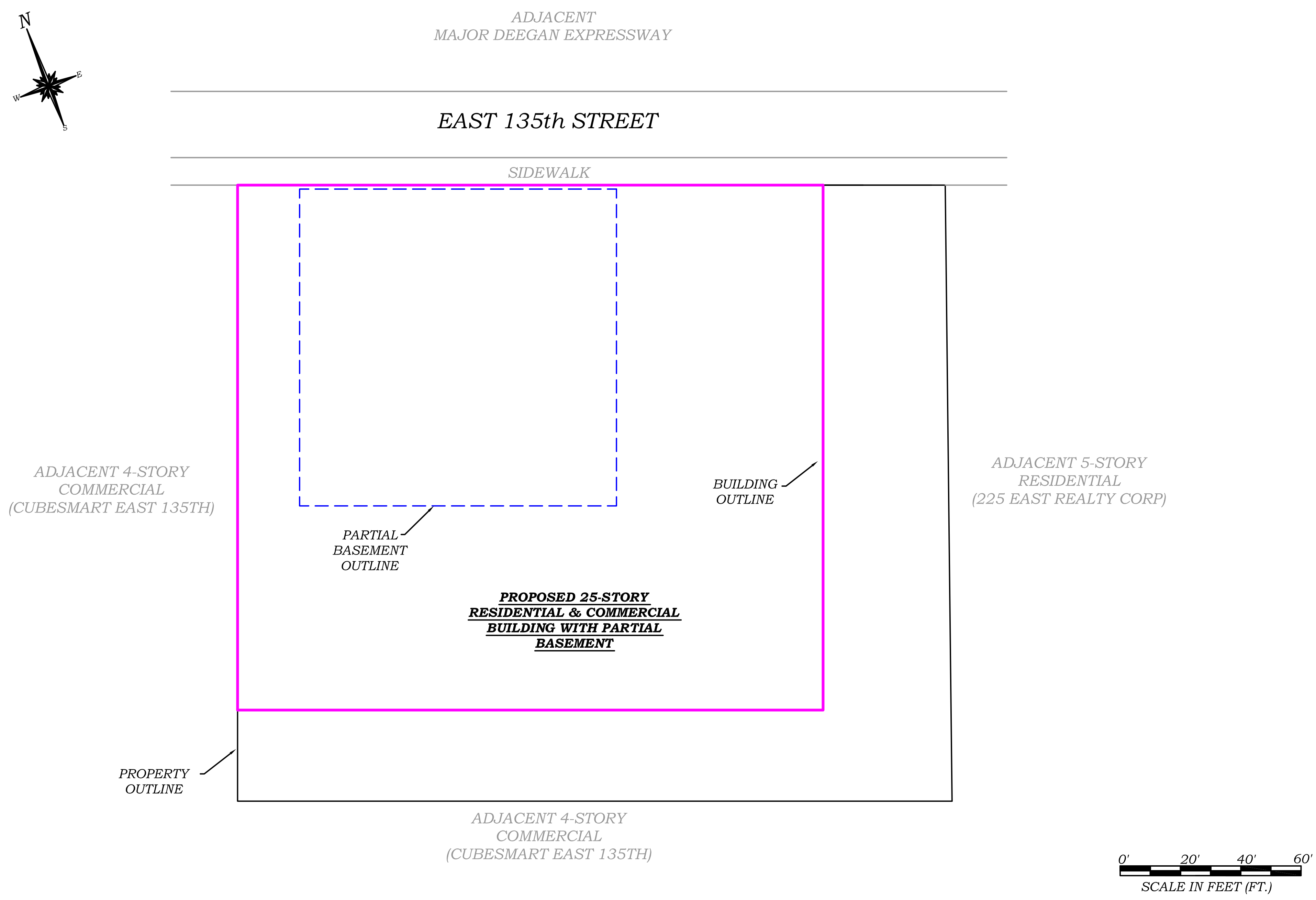
Approved By: M.R
Date: 09/11/15
Scale: AS NOTED

TITLE:

FIGURE 1 SITE LOCATION MAP



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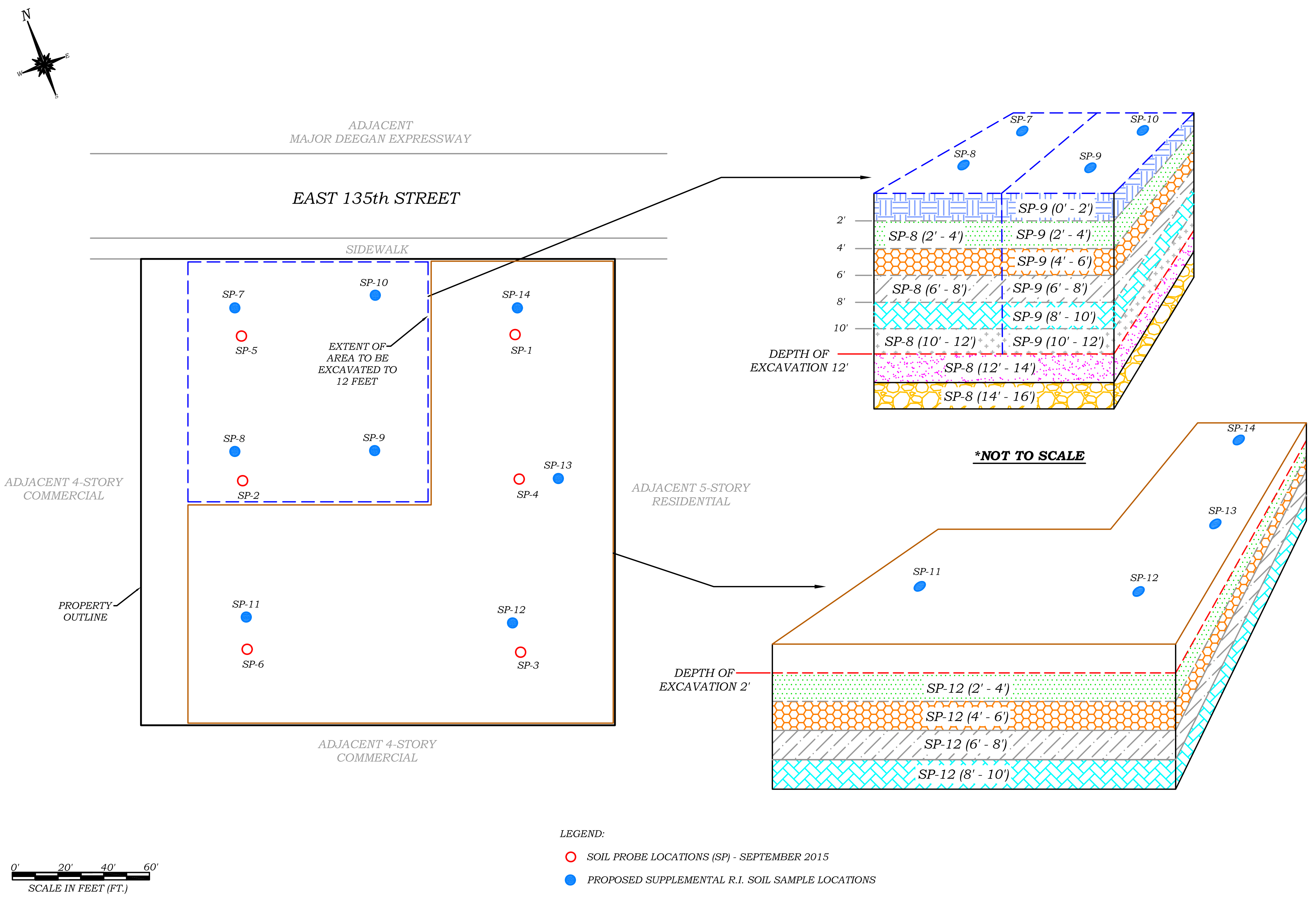
Scale: AS NOTED

TITLE:

FIGURE 2: SITE PLAN



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TITLE:

FIGURE 3: PROPOSED SAMPLING PLAN

APPENDIX A

200 EAST 135TH STREET

BRONX, NEW YORK

Remedial Investigation Report

OER Project Number: 13EHAN270X

NYC VCP Number: 16CVCP013X

Prepared for:

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September 2015

REMEDIAL INVESTIGATION REPORT

TABLE OF CONTENTS

FIGURES 3
LIST OF ACRONYMS 6
CERTIFICATION 7
EXECUTIVE SUMMARY 8
REMEDIAL INVESTIGATION REPORT 12
1.0 SITE BACKGROUND 12
  1.1 Site Location and Current Usage 12
  1.2 Proposed Redevelopment Plan 12
  1.3 Description of Surrounding Property 13
2.0 SITE HISTORY 14
  2.1 Past Uses and Ownership 14
  2.2 Previous Investigations 14
  2.3 Site Inspection 14
  2.4 Areas of Concern 15
3.0 PROJECT MANAGEMENT 16
  3.1 Project Organization 16
  3.2 Health and Safety 16
  3.3 Materials Management 16
4.0 REMEDIAL INVESTIGATION ACTIVITIES 17
  4.1 Geophysical Investigation 17
  4.2 Borings and Monitoring Wells 17
  4.3 Sample Collection and Chemical Analysis 19
5.0 ENVIRONMENTAL EVALUATION 23
  5.1 Geological and Hydrogeological Conditions 23
  5.2 Soil Chemistry 23
  5.3 Groundwater Chemistry 24
  5.4 Soil Vapor Chemistry 25
  5.5 Prior Activity 25
  5.6 Impediments to Remedial Action 25

FIGURES

Figure 1: Site Location Map

Figure 2: Site Boundary Map

Figure 3: Proposed Redevelopment Plan

Figure 4: Land Use Map

Figure 5: Map of Areas of Concern

Figure 6: Locations of Soil Borings, Monitoring Wells and Soil Vapor Samples

Figure 7: Groundwater Flow Contour Diagram

Figure 8: Map of VOCs in Soil

Figure 9: Map of SVOCs in Soil

Figure 10: Map of Pesticides and PCBs in Soil

Figure 11: Map of Metals in Soil

Figure 12: Map of VOCs in Groundwater

Figure 13: Map of SVOCs in Groundwater

Figure 14: Map of Dissolved Metals in Groundwater

Figure 15: Map of Soil Vapors

TABLES

Table 1: Soil Samples Analytical Results for VOCs

Table 2: Soil Samples Analytical Results for SVOCs

Table 3: Soil Samples Analytical Results for Pesticides and PCBs

Table 4: Soil Samples Analytical Results for Metals

Table 5: Groundwater Samples Analytical Results for VOCs

Table 6: Groundwater Samples Analytical Results for SVOCs

Table 7: Groundwater Samples Analytical Results for Pesticides and PCBs

Table 8: Groundwater Samples Analytical Results for Metals

Table 9: Soil Vapor Analytical Results

APPENDICES

Appendix A: Previous Investigation (Subsurface [Phase II] Investigation by AKRF, Inc.)

Appendix B: Photographs

Appendix C: GPR Report

Appendix D: Soil Boring Geologic Logs

Appendix E: Monitoring Well Construction Logs

Appendix F: Well Purging and Sampling Logs

Appendix G: Soil Vapor Sampling Logs

Appendix H: Laboratory Data Deliverables for Soil Analytical Data

Appendix I: Laboratory Data Deliverables for Groundwater Analytical Data

Appendix J: Laboratory Data Deliverables for Soil Vapor Analytical Data

LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
CAMP	Community Air Monitoring Plan
COC	Contaminant of Concern
CPP	Citizen Participation Plan
CSM	Conceptual Site Model
DER-10	New York State Department of Environmental Conservation Technical Guide 10
FID	Flame Ionization Detector
GPS	Global Positioning System
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IRM	Interim Remedial Measure
NAPL	Non-aqueous Phase Liquid
NYC VCP	New York City Voluntary Cleanup Program
NYC DOHMH	New York City Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYS DOH ELAP	New York State Department of Health Environmental Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
QEP	Qualified Environmental Professional
RI	Remedial Investigation
RIR	Remedial Investigation Report
SCO	Soil Cleanup Objective
SPEED	Searchable Property Environmental Electronic Database

CERTIFICATION

I, Mark E. Robbins, am a Qualified Environmental Professional, as defined in RCNY § 43-1402(ar). I have primary direct responsibility for implementation of the Remedial Investigation for the 200 East 135th Street Site, (OER Project Site No. 13EHAN270X, NYC VCP No. 16CVCP013X). I am responsible for the content of this Remedial Investigation Report (RIR), have reviewed its contents and certify that this RIR is accurate to the best of my knowledge and contains all available environmental information and data regarding the property.

Mark E. Robbins	9/25/15	
Qualified Environmental Professional	Date	Signature

EXECUTIVE SUMMARY

The Remedial Investigation Report (RIR) provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy pursuant to RCNY§ 43-1407(f). The remedial investigation (RI) described in this document is consistent with applicable guidance.

Site Location and Current Usage

The Site is located at 200 East 135th Street in the Port Morris neighborhood of Bronx, New York and is identified as Block 2319 and Lot 60 (previously part of Lot 55) on the New York City Tax Map. **Figure 1** shows the Site location. The Site is 48,976-square feet in area and is bounded by Exterior Street/Major Deegan Expressway to the north, the Harlem River to the south and west and Third Avenue to the east. A map of the site boundary is shown in **Figure 2**. The Site consists of a vacant lot; the ground surface consists of gravel.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will consist of a 25-story mixed-use commercial and residential use building. The proposed building will occupy 75% of the lot and will have a basement that will occupy 10,248-square feet of the building footprint (25% of the entire lot); the basement will be used for residential amenity, residential storage, laundry, a superintendent's office and building mechanics. The first floor will be used for parking, commercial space, a residential lobby, residential amenity, compactor room and electric meter room. The second floor will also be used for parking. Floors 3-25 will consist of residential units. The remainder of the Site will be reserved for the open air parking on the 1st and 2nd floors.

Excavation is anticipated to extend to 10 feet below grade surface (bgs) for the construction of the basement level; this depth will extend below the water table, which is approximately 8-12 feet bgs. Approximately 7,072 tons of soil will be excavated and removed from the Site.

Layout of the proposed site development is presented in **Figure 3**. The current zoning designation is M1-3/R8/MX-1. The proposed use is consistent with existing zoning for the property.

Summary of Past Uses of Site and Areas of Concern

Based upon the review of a Site Investigation by others that cited a previous Phase I, the following Site history was established. The Site was historically part of Lot 55, which was utilized as a railroad freight yard, a coal yard, a warehouse and various industrial uses. The Site is associated with NYSDEC Spill #0001384 which was reported on May 4, 2000 and subsequently closed on June 21, 2000 following the excavation and offsite removal of approximately 4,000 cubic yards of soil and the collection of post-excavation confirmatory endpoint samples from historical Lot 55.

The AOCs identified for this Site include:

1. The historical use of the Site as a railroad freight yard, a coal yard, a warehouse and various manufacturing purposes
2. The commercial use of surrounding properties includes furniture restoration.

Summary of the Work Performed under the Remedial Investigation

Hydro Tech Environmental, Corp. performed the following scope of work at the Site in June and July of 2015:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Conducted a Ground Penetrating Radar (GPR) survey of the Site to identify subsurface structures (i.e. tanks, building foundations, utilities, etc.);
3. Installed six (6) soil borings across the entire project Site, and collected twelve (12) soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed three (3) groundwater monitoring wells throughout the Site to establish groundwater flow and collected three (3) groundwater samples for chemical analysis to evaluate groundwater quality;
5. Installed five (5) soil vapor probes throughout the Site and collected six (6) samples for chemical analysis, including one (1) outdoor ambient air sample; and

6. At the request of NYCOER, collected one (1) additional ambient outdoor air sample in the southern portion of the site due to an elevated concentration of tetrachloroethylene in the original outdoor ambient air sample.

Summary of Environmental Findings

1. Elevation of the property is approximately 15 feet.
2. Depth to groundwater ranges from 8.85 to 12.02 feet at the Site.
3. Groundwater flow is generally from south to north beneath the Site.
4. Bedrock was not encountered at the Site.
5. The stratigraphy of the site, from the surface down to about 12 feet bgs, is classified as fill consisting of a mixture of gravel, sand, rocks and possibly other construction debris. Drilling did not occur deeper than 12 feet bgs and bedrock was not encountered.
6. Soil/fill samples results were compared to NYSDEC Unrestricted Use Soil Cleanup Objectives and Restricted Residential Soil Cleanup Objectives (SCOs) as presented in 6NYCRR Part 375-6.8 and CP51. Soil/fill samples collected during the RI showed trace concentrations of several volatile organic compounds (VOCs) with acetone (max. 0.068 mg/kg) exceeding Unrestricted Use SCOs in two deep samples. Several semi-volatile organic compounds (SVOCs) consisting of Polycyclic Aromatic Hydrocarbons (PAH) compounds were detected with benz(a)anthracene (max. 5.70 mg/kg), benzo(a)pyrene (max. 1.14 mg/kg), benzo(b)fluoranthene (max. 1.24 mg/kg), benzo(k)fluoranthene (max. 1.21 mg/kg), chrysene (max. 5.49 mg/kg), dibenzo(a,h)anthracene (max. 0.453 mg/kg) and indeno(1,2,3-cd)pyrene (max. 0.874 mg/kg) exceeding Restricted Residential SCOs in five shallow and one deep sample. Pesticides were detected in four shallow samples and one deep sample at concentrations exceeding Unrestricted Use SCOs, including 4,4’-DDD (max. 0.0948 mg/kg), 4,4’-DDE (max. 0.0357 mg/kg) and 4,4’DDT (max. 0.177 mg/kg). Total PCBs (max. 0.72 mg/kg) exceeded Unrestricted Use SCOs in four shallow samples. Several metals including barium (max. 635 mg/kg), copper (max. 158 mg/kg), lead (max. 618 mg/kg), mercury (max. 0.36 mg/kg), nickel (max. 44.30 mg/kg), selenium (max. 12.70 mg/kg) and zinc (max. 497 mg/kg) were detected in all shallow samples and three deep samples exceeding Unrestricted Use SCOs. Of these metals, barium and lead

also exceeded Restricted Residential SCOs in two shallow samples. Overall, soil chemistry is unremarkable and is similar to sites with historic fill in New York City.

7. Groundwater samples results were compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS). Groundwater samples collected during the investigations showed no PCBs in any sample. Five (5) VOCs were detected above GQS in MW-1, including 1,2,4-Trimethylbenzene (500 µg/L), 1,2-Dichlorobenzene (1,200 µg/L), acetone (1,500 µg/L), naphthalene (1,500 µg/L) and n-Butylbenzene (670 µg/L). No other VOCs were detected in the other two groundwater samples. Several SVOCs were detected but only phenol (5.6 µg/L) was detected in MW-3 at a concentration exceeding its GQS. One pesticide 4,4'-DDD was detected in MW-1 at a concentration less than GQS. Several dissolved metals were identified in groundwater but only antimony (40 ug/L), lead (27 ug/L), magnesium (max. 145,000 ug/L), manganese (max. 3,260 ug/L), selenium (max. 60 ug/L) and sodium (max. 782,000 ug/L) exceeded their respective GQS.

8. Soil vapor results collected during the RI were compared to compounds listed in Table 3.1 Air Guideline Values Derived by the NYSDOH located in the New York State Department of Health Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Soil vapor collected during the RI showed moderate levels of petroleum-related VOCs. The petroleum related compounds ranged from 1.10 µg/m^3 to 110 µg/m^3. N-Hexane was the highest detected compound with a concentration of 110 µg/m^3 in SV-5. Total concentrations of petroleum-related VOCs (BTEX) was 100 µg/m^3 in SV-5. Chlorinated VOCs were also detected with tetrachloroethylene (PCE) detected at a maximum of 240 µg/m^3. Concentration for PCE was above the monitoring level ranges established within the State DOH soil vapor guidance matrix. PCE, trichloroethylene and carbon tetrachloride were also detected in the original outdoor ambient air sample but not in the second resample.

REMEDIAL INVESTIGATION REPORT

1.0 SITE BACKGROUND

Chess Builders, LLC has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 1.12-acre site located at 200 East 135th Street in the Port Morris neighborhood of Bronx, New York. Mixed commercial and residential use is proposed for the property. The RI work was performed on June 10, June 11, June 16 and July 1, 2015. This RIR summarizes the nature and extent of contamination and provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy that is protective of human health and the environment consistent with the use of the property pursuant to RCNY§ 43-1407(f).

1.1 Site Location and Current Usage

The Site is located at 200 East 135th Street in the Port Morris neighborhood of Bronx, New York and is identified as Block 2319 and Lot 60 (previously part of Lot 55) on the New York City Tax Map. **Figure 1** shows the Site location. The Site is 48,976-square feet and is bounded by Exterior Street/Major Deegan Expressway to the north, the Harlem River to the south and west and Third Avenue to the east. A map of the site boundary is shown in **Figure 2**. The Site consists of a vacant lot; the ground surface consists of gravel.

1.2 Proposed Redevelopment Plan

The proposed future use of the Site will consist of a 25-story mixed-use commercial and residential use building. The proposed building will occupy 75% of the lot and will have a basement that will occupy 10,248-square feet of the building footprint (25% of the entire lot); the basement will be used for residential amenity, residential storage, laundry, a superintendent's office and building mechanics. The first floor will be used for parking, commercial space, a residential lobby, residential amenity, compactor room and electric meter room. The second floor will also be used for parking. Floors 3-25 will consist of residential units. The remainder of the Site will be reserved for the open air parking on the 1st and 2nd floors.

Excavation is anticipated to 10 feet below grade surface (bgs) for construction of the basement level; this depth will extend below the water table which is approximately 8-12 feet bgs. Approximately 7,072 tons of soil will be excavated and removed from the Site.

Layout of the proposed site development is presented in **Figure 3**. The current zoning designation is M1-3/R8/MX-1. The proposed use is consistent with existing zoning for the property.

1.3 Description of Surrounding Property

The vicinity of the Site consists of residential, commercial and industrial properties. The ground surfaces in the vicinity of the Site consist of gravel, asphalt and bare soil. The Site is located on the south side of the Major Deegan Expressway and is bordered by commercial buildings to the east and commercial storage buildings to west and south, beyond which is the Harlem River. The results of the Site inspection and an evaluation of the United States Geological Survey (USRS) 7 ½-Minute Topographic Map containing the properties indicate there are no sensitive receptors (such as schools, hospitals or day-care facilities) present within a 0.125-mile radius of the Site.

Figure 4 shows the surrounding land usage.

2.0 SITE HISTORY

2.1 Past Uses and Ownership

Based upon the review of a Site Investigation by others that cited a previous Phase I, the following Site history was established. The Site was historically part of Lot 55, which was utilized as a railroad freight yard, a coal yard, a warehouse and various industrial uses. The Site is associated with NYSDEC Spill #0001384 which was reported on May 4, 2000 and subsequently closed on June 21, 2000 following the excavation and offsite removal of approximately 4,000 cubic yards of soil and the collection of post-excavation confirmatory endpoint samples from historical Lot 55.

2.2 Previous Investigations

Previous investigations performed at the Site include the following:

- Phase I Environmental Site Assessment, September 1997, Land Tech Remedial, Inc.;
- Phase II Subsurface Investigation, January 1998, Land Tech Remedial, Inc.;
- Supplemental Phase II Subsurface Investigation, February 1998, Land Tech Remedial, Inc.;
- Remedial Activities Report, November 1999, AKRF, Inc.;
- Phase I Environmental Site Assessment, April 2004, SECOR International, Inc.;
- Phase I Environmental Site Assessment Update, August 2006, AKRF, Inc.;
- Phase II Subsurface Investigation, December 2006, AKRF, Inc.;
- Remedial Action Plan, March 2007, AKRF, Inc.

2.3 Site Inspection

Ms. Morgan Violette of Hydro Tech Environmental, Corp. performed the site inspection for the Remedial Investigation on June 10, 2015. The reconnaissance included a visual inspection of the site and selection of soil, groundwater and soil vapor sampling locations. At the time of the inspection, the Site was a vacant graveled lot utilized for various automobile storage for an adjacent parcel (CubeSmart warehouse). No evidence of underground storage tanks or aboveground storage tanks was observed.

2.4 Areas of Concern

The AOCs identified for this site include:

1. The historical use of the Site as a railroad freight yard, a coal yard, a warehouse and various manufacturing purposes
2. The commercial use of surrounding properties includes furniture restoration.

A Subsurface Investigation by AKRF, Inc. is presented in **Appendix A**. A map showing areas of concern is presented in **Figure 5**.

3.0 PROJECT MANAGEMENT

3.1 Project Organization

The Qualified Environmental Profession (QEP) responsible for preparation of this RIR is Mark E. Robbins.

3.2 Health and Safety

All work described in this RIR was performed in full compliance with applicable laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements.

3.3 Materials Management

All material encountered during the RI was managed in accordance with applicable laws and regulations.

4.0 REMEDIAL INVESTIGATION ACTIVITIES

Hydro Tech Environmental, Corp. performed the following scope of work at the Site in June and July of 2015:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Conducted a Ground Penetrating Radar (GPR) survey of the Site to identify subsurface structures (i.e. tanks, building foundations, utilities, etc.);
3. Installed six (6) soil borings across the entire project Site, and collected twelve (12) soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed three (3) groundwater monitoring wells throughout the Site to establish groundwater flow and collected three (3) groundwater samples for chemical analysis to evaluate groundwater quality;
5. Installed five (5) soil vapor probes throughout the Site and collected six (6) samples for chemical analysis, including one (1) outdoor ambient air sample; and
6. At the request of NYCOER, collected one (1) additional ambient outdoor air sample in the southern portion of the Site due to an elevated concentration of tetrachloroethylene in the original outdoor ambient air sample.

4.1 Geophysical Investigation

A geophysical survey was performed on June 10, 2015 across the entire Site to investigate for the presence of potential USTs, drums, etc. No anomalies were identified. A copy of the geophysical survey scan is included in Appendix C.

4.2 Borings and Monitoring Wells

Drilling and Soil Logging

A total of six (6) soil probes, designated SP-1 through SP-6, were installed to a depth of 12 feet bgs. All soil probes were installed utilizing Hydro Tech's fleet of Geoprobe units with Geoprobe tooling and sampling equipment. Soil samples were collected utilizing a 4-foot long Macro Core sampler fitted with dedicated acetate liners. The soil was screened and characterized at two-foot intervals. Each Macro Core was cut open and immediately screened with a Photo

Ionization Detector (PID) for VOCs, prior to collecting the required samples for laboratory analysis. No PID readings above background concentrations were detected. Continuous soil samples were collected during soil probe installation.

Boring logs were prepared by a geologist are attached in **Appendix D**. A map showing the location of soil borings and monitor wells is shown in **Figure 6**.

Groundwater Monitoring Well Construction

Three (3) groundwater monitoring wells, designated MW-1 through MW-3, were installed using a Geoprobe to a total depth of 25 feet bgs and are constructed of 1-inch diameter PVC. The well screens consist of 0.020-inch slots and extend 20 feet from the bottom of the well to intersect the water table. The remaining portions of the wells consist of solid riser.

Monitoring well locations are shown in **Figure 6**. Details of the monitoring well construction are presented in **Appendix E**.

Survey

Soil borings, monitoring wells and soil gas sampling locations were located by measuring to permanent site features.

Water Level Measurement

Prior to groundwater purging and sampling of the monitoring wells, the wells were gauged for the presence of Light, Non-Aqueous Phase Liquid (LNAPL) and also monitored to determine the depth to water. The well gauging and monitoring was performed utilizing a Solinst® 122 Oil/Water Interface Probe (Interface Probe). The Interface Probe can measure depths to water to 0.01 inch. Well gauging and monitoring was performed in the wells from the northern portion of the casing top. LNAPL was not identified in the monitoring wells during the well gauging exercise.

Groundwater was encountered between 8.85 feet to 12.02 feet bgs at the Site. The groundwater flow contour diagram is shown in **Figure 7**. Water level data is included in **Appendix F**.

Soil Vapor

Five (5) soil vapor probes, designated SV-1 through SV-5, were installed to a depth of 6 feet bgs. The soil vapor probes were installed in accordance with the NYSDOH guidance for evaluating soil vapor intrusion dated October 2006. Each soil vapor sampling point consists of a stainless steel screen, or implant, fitted with dedicated polyethylene tubing. Each of the implants was of 1 ½-inch diameter. Glass beads were poured into the hole to fully encompass the screen implant and the hole was sealed with bentonite and quick dry-lock non-VOC quick set cement. A map showing the locations of soil vapor implants is shown in **Figure 6**.

4.3 Sample Collection and Chemical Analysis

Sampling performed as part of the field investigation was conducted for all Areas of Concern and also considered other means for bias of sampling based on professional judgment, area history, discolored soil, stressed vegetation, drainage patterns, field instrument measurements, odor, or other field indicators. All media including soil, groundwater and soil vapor have been sampled and evaluated in the RIR. Discrete (grab) samples have been used for final delineation of the nature and extent of contamination and to determine the impact of contaminants on public health and the environment. The sampling performed and presented in this RIR provides sufficient basis for evaluation of remedial action alternatives, establishment of a qualitative human health exposure assessment, and selection of a final remedy.

Soil Sampling

Twelve (12) soil samples were collected for chemical analysis during this RI; these include six (6) samples from zero to 2 feet bgs and six (6) samples from 10 to 12 feet bgs. Samples were collected utilizing a 4-foot long Macro Core sampler fitted with dedicated acetate liners.

All samples were properly handled and placed into the pre-cleaned, appropriately labeled, laboratory supplied containers. Two field blank samples and one trip blank were collected and submitted to the laboratory. The samples were placed in a cooler filled with ice and maintained at a maximum of 4 degrees Celsius. All samples were transmitted under proper chain of custody procedures to a New York State Department of Health ELAP-certified laboratory for confirmatory laboratory analyses. All soil samples were analyzed for the presence of volatile organic compounds (VOCs) by EPA Method 8260, semi-volatile organic compounds (SVOCs) by EPA Method 8270, pesticides/PCBs by EPA Methods 8081/8082, and target analyte list

(TAL) metals. The laboratory did not report any irregularities with respect to their internal Quality Assurance/Quality Control.

Data on soil sample collection for chemical analyses, including dates of collection and sample depths, is reported in **Tables 1** through **4**. **Figure 6** shows the location of samples collected in this investigation. Laboratories and analytical methods are shown below.

Groundwater Sampling

Three (3) groundwater samples were collected for chemical analysis during this RI. Groundwater samples from the monitoring wells were collected using the low stress (low flow) purging and sampling procedures. The low flow was accomplished with a Solinst Bladder Pump and the continuous flow was monitored with a Horiba U-52 water quality meter until the readings had stabilized.

The water samples were collected in laboratory-supplied jars, properly labeled with the sample number, the date and time of sampling, the analytical requirements, and then placed on ice for the duration of the sampling and transport to the laboratory. A chain of custody form was completed at the time of sampling and maintained until disposition of the samples at the ELAP certified and accredited laboratory. The groundwater samples were analyzed for TCL VOCs, TCL SVOCs, pesticides, PCBs, dissolved and total TAL metals.

Groundwater sample collection data is reported in **Tables 5** through **8**. Sampling logs with information on purging and sampling of groundwater monitor wells is included in **Appendix F**. **Figure 6** shows the location of groundwater sampling. Laboratories and analytical methods are shown below.

Soil Vapor Sampling

Five (5) soil vapor probes were installed and five (5) soil vapor samples were collected for chemical analysis during this RI. Soil vapor sampling locations are shown in **Figure 6**. Soil vapor sample collection data is reported in **Table 9**. Soil vapor sampling logs are included in **Appendix G**. Methodologies used for soil vapor assessment conform to the *NYS DOH Final Guidance on Soil Vapor Intrusion, October 2006.*

Dedicated tubing was used for each soil vapor probe. A soil vapor sample was collected from each vapor probe utilizing a 6 liter pre-cleaned, passivated, evacuated whole air Summa® Canister. In order to insure the integrity of the borehole seal and to verify that ambient air is not inadvertently drawn into the sample, a tracer gas, Helium, was used to enrich the atmosphere in the immediate vicinity of the sampling location. Plastic sheeting was used to keep the tracer gas in contact with the soil vapor probe during the sampling while continuously monitoring air drawn from the implant with a helium detector (Dielectric Model MGD-2002, Multi-gas Detector). Helium detector readings did not exceed zero ppm indicating Helium was not detected. Following verification that the surface seal was tight and prior to soil vapor sampling, approximately 0.3 ml of air was purged out of all vapor points utilizing a syringe.

The soil vapor probes were connected to ¼-inch outer diameter inert Teflon-lined polyethylene tubing which extended above ground surface to allow for purging and sampling. The Summa Canisters were calibrated for 4 hours and the soil vapor sampling was run on each canister for the duration of 4 hours. The initial vacuum (inches of mercury) and start time was recorded immediately after opening each Summa Canister. After the sampling was complete, the final vacuum and stop time was recorded. After the soil vapor sampling, each Summa was labeled and sent to a laboratory certified to perform air analysis in New York State and analyzed for VOCs via EPA TO-15.

Chemical Analysis

Chemical analytical work presented in this RIR has been performed in the following manner:

Factor	Description
Quality Assurance Officer	The chemical analytical quality assurance is directed by Mark E. Robbins
Chemical Analytical Laboratory	Chemical analytical laboratory(s) used in the RI is NYS ELAP certified and were York Analytical Laboratories, Inc.
Chemical Analytical Methods	Soil and groundwater analytical methods: • TAL Metals by EPA Method 6010C (rev. 2007); • VOCs by EPA Method 8260C (rev. 2006); • SVOCs by EPA Method 8270D (rev. 2007);

Factor	Description
	• Pesticides by EPA Method 8081B (rev. 2000); • PCBs by EPA Method 8082A (rev. 2000); Soil vapor analytical methods: • VOCs by TO-15 VOC parameters.

Results of Chemical Analyses

Laboratory data for soil, groundwater and soil vapor are summarized in **Tables 1** through **9**. Laboratory data deliverables for all samples evaluated in this RIR are provided in digital form in **Appendices H through J**.

5.0 ENVIRONMENTAL EVALUATION

5.1 Geological and Hydrogeological Conditions

The Site is located in the southwest portion of Bronx County, New York. The elevation of the Site is approximately 15 feet above mean sea level (USGS 7 ½-Minute Central Park, New York Quadrangle, 1995).

Stratigraphy

The stratigraphy of the Site, from the surface down to about 12 feet bgs, is classified as fill consisting of a mixture of gravel, sand, rocks and possibly construction debris. Drilling did not occur deeper than 12 feet bgs and bedrock was not encountered.

Hydrogeology

Water level data for all monitoring wells is included in **Appendix F**. The depth to water ranges from 8.85 feet to 12.02 feet. A map of groundwater level elevations with groundwater contours and inferred flow lines is shown in **Figure 7**. Groundwater flow is towards the north.

5.2 Soil Chemistry

Soil/fill samples collected during the RI show one volatile organic compound (VOC), acetone (max. 0.068 mg/kg), exceeding Track 1 Unrestricted Use Soil Cleanup Objectives in two deep samples. VOCs detected but not exceeding Track 1 SCOs include 2-Butanone, Methyl tert-butyl ether (MTBE), Methylene chloride and Naphthalene. Semi-volatile organic compounds (SVOCs) consisting of PAH compounds were detected in five shallow soil samples and one deep soil sample at concentrations exceeding Track 1 SCOs, including Benzo(a)anthracene (max. 5.70 mg/kg), Benzo(a)pyrene (max. 1.14 mg/kg), Benzo(b)pyrene (max. 1.14 mg/kg), Benzo(k)fluoranthene (max. 1.21 mg/kg), Chrysene (max. 5.49 mg/kg), Dibenzo(a,h)anthracene (max. 0.453 mg/kg) and Indeno(1,2,3-cd)pyrene (max. 0.874 mg/kg). SVOCs detected but not exceeding Track 1 SCOs include Acenaphthene, Acenaphthylene, Anthracene, Benzo(g,h,i)perylene, Benzyl butyl phthalate, Bis(2-ethylhexyl)phthalate, Dibenzofuran, Fluoranthene, Fluorene, Naphthalene, Phenanthrene and Pyrene. Pesticides were detected in four shallow samples and one deep sample at concentrations exceeding Track 1 SCOs, including 4,4’-DDD (max. 0.0948 mg/kg), 4,4’-DDE (max. 0.0357 mg/kg) and 4,4’DDT (max. 0.177 mg/kg). No pesticides were detected in any remaining soil samples. No PCBs were detected exceeding Track 1 SCOs. PCBs detected but not exceeding Track 1 SCOs include Aroclor 1248, Aroclor 1254 and Aroclor 1260. Metals were detected in all samples. One metal, Lead (max. 618 mg/kg) was detected in one shallow soil sample exceeding Track 2 Restricted Residential Use SCOs. Barium (max. 635 mg/kg), Copper (max. 158 mg/kg), Mercury (max. 0.36 mg/kg), Nickel (max. 44.30 mg/kg), Selenium (max. 12.70 mg/kg) and Zinc (max. 497 mg/kg) were detected in all shallow samples and three deep samples exceeding Track 1 SCOs. Arsenic, Cadmium, Chromium Trivalent and Manganese were detected at concentrations less than Track 1 SCOs.

Data collected during the RI is sufficient to delineate the vertical and horizontal distribution of contaminants in soil/fill at the Site. A summary table of data for chemical analyses performed on soil samples is included in **Tables 1** through **4**. **Figures 8** through **11** show the locations and posts the values for soil/fill that exceed the 6NYCRR Part 375-6.8 Track 2 Soil Cleanup Objectives.

5.3 Groundwater Chemistry

Groundwater samples collected during the RI show five (5) VOCs detected above New York State 6 NYCRR Part 703.5 Groundwater Quality Standards (GQS) in MW-1, including 1,2,4-Trimethylbenzene (500 µg/L), 1,2-Dichlorobenzene (1,200 µg/L), Acetone (1,500 µg/L), Naphthalene (1,500 µg/L) and n-Butylbenzene (670 µg/L). No other VOCs were detected in any other groundwater samples. One SVOC, phenol (5.6 µg/L), was detected in MW-3 at a concentration exceeding its GQS. The SVOCs Anthracene, Bis(2-ethylhexyl)phthalate, Fluoranthene, Fluorene, Naphthalene and Phenanthrene were detected in MW-2 at concentrations less than GQS. No other SVOCs were detected in any other groundwater samples. The pesticide 4,4'-DDD was detected in MW-1 at a concentration less than GQS. No other pesticides or PCBs were detected in any other groundwater samples. Dissolved metals Antimony (40 ug/L), Lead (27 ug/L), Magnesium (max. 145,000 ug/L), Manganese (max. 3,260 ug/L), Selenium (max. 60 ug/L) and Sodium (max. 782,000 ug/L) were detected at concentrations exceeding GQS in all groundwater samples. Dissolved metals detected but not exceeding GQS include Arsenic, Barium, Chromium and Copper.

Data collected during the RI is sufficient to delineate the distribution of contaminants in groundwater at the Site. A summary table of data for chemical analyses performed on groundwater samples is included in **Tables 5** through **8**. Exceedance of applicable groundwater standards are shown.

Figures 12 through **14** show the location and posts the values for groundwater that exceed the New York State 6NYCRR Part 703.5 Class GA groundwater standards.

5.4 Soil Vapor Chemistry

Soil vapor results collected during the RI were compared to compounds listed in Table 3.1 Air Guideline Values Derived by the NYSDOH located in the New York State Department of Health Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Soil vapor results show petroleum related and associated derivatives in each sample. The petroleum related compounds range from 1.10 µg/m^3 to 110 µg/m^3. N-Hexane was the highest detected petroleum related compound with a concentration of 110 µg/m^3 in SV-5. Chlorinated hydrocarbons were also detected in soil vapor samples and range from 0.32 µg/m^3 to 240 µg/m^3. Concentrations of tetrachloroethylene (max. 130 µg/m^3) was also detected. Tetrachloroethylene was the highest detected chlorinated hydrocarbon with a concentration of 130 µg/m^3. PCE, trichloroethylene and carbon tetrachloride were also detected in the original outdoor ambient air sample but not in the second resample.

Data collected during the RI is sufficient to delineate the distribution of contaminants in soil vapor at the Site. A summary table of data for chemical analyses performed on soil vapor samples is included in **Table 9**.

Figure 15 shows the location and posts the values for soil vapor samples with detected concentrations.

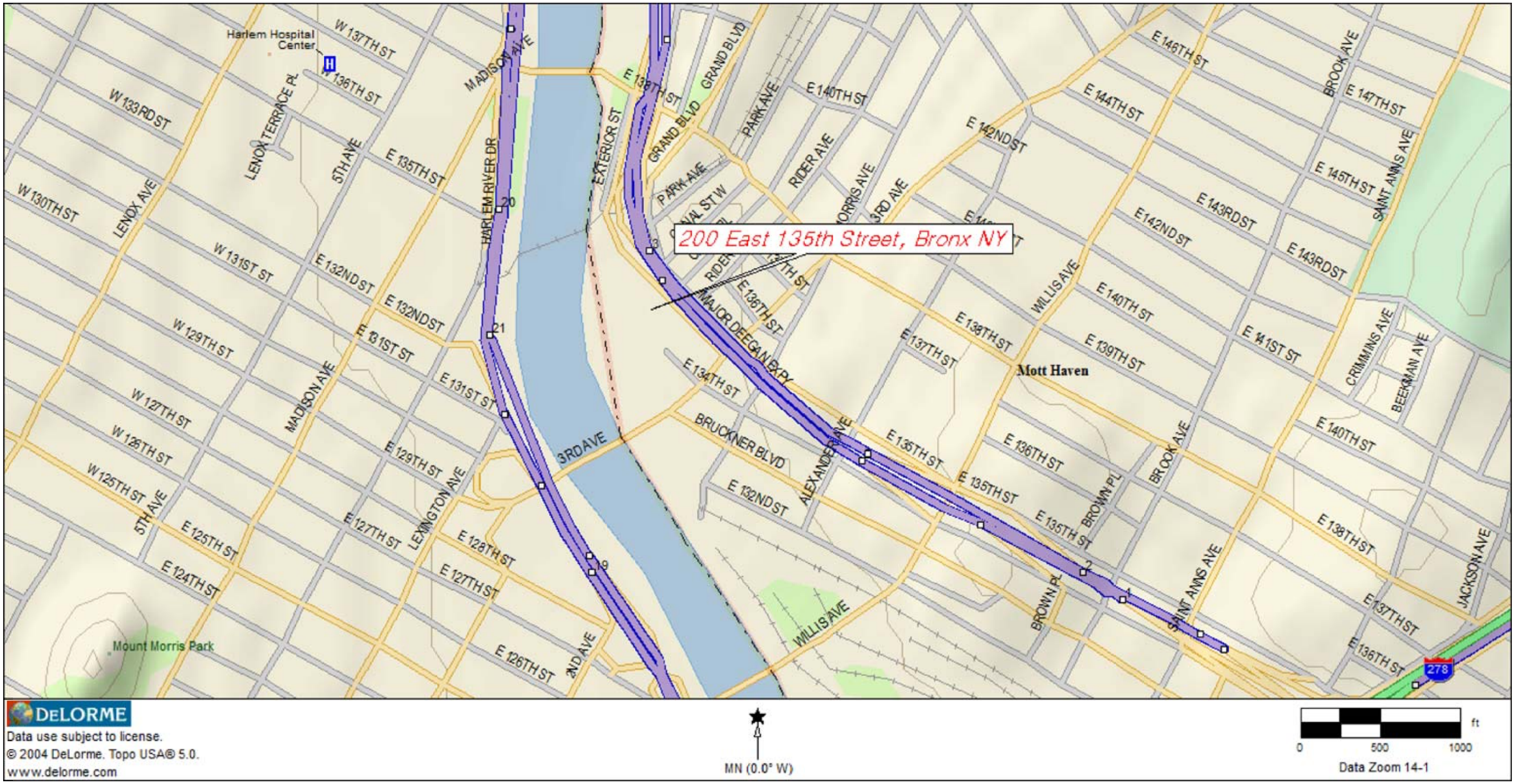
5.5 Prior Activity

Based on an evaluation of the data and information from the RIR, disposal of significant amounts of hazardous waste is not suspected at this site.

5.6 Impediments to Remedial Action

There are no known impediments to remedial action at this property.

FIGURES



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Reviewed By: M.R
Approved By: M.R
Date: 07/20/15
Scale: AS NOTED

TITLE:

FIGURE 1: SITE LOCATION MAP

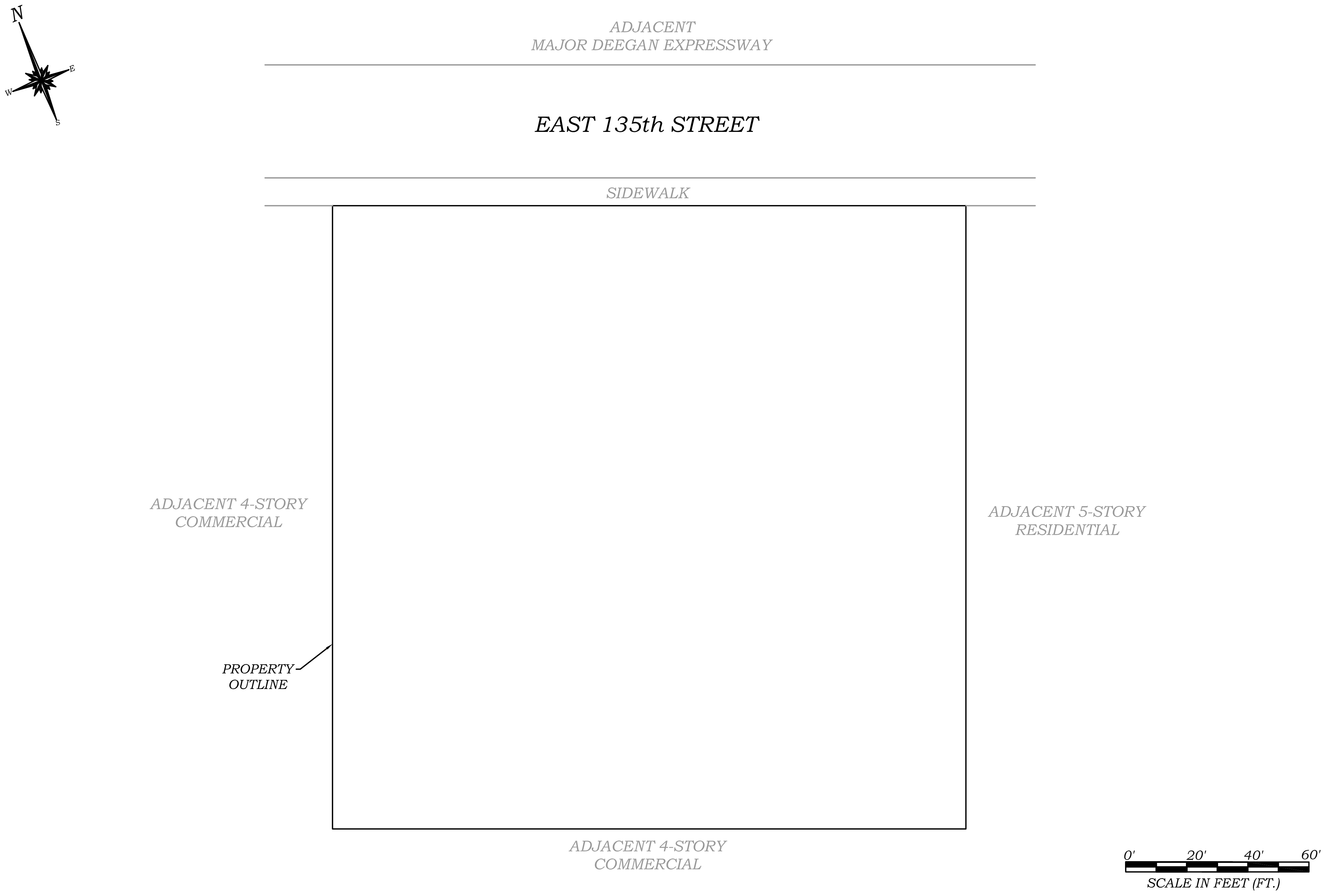

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FIGURE 2: SITE BOUNDARY MAP

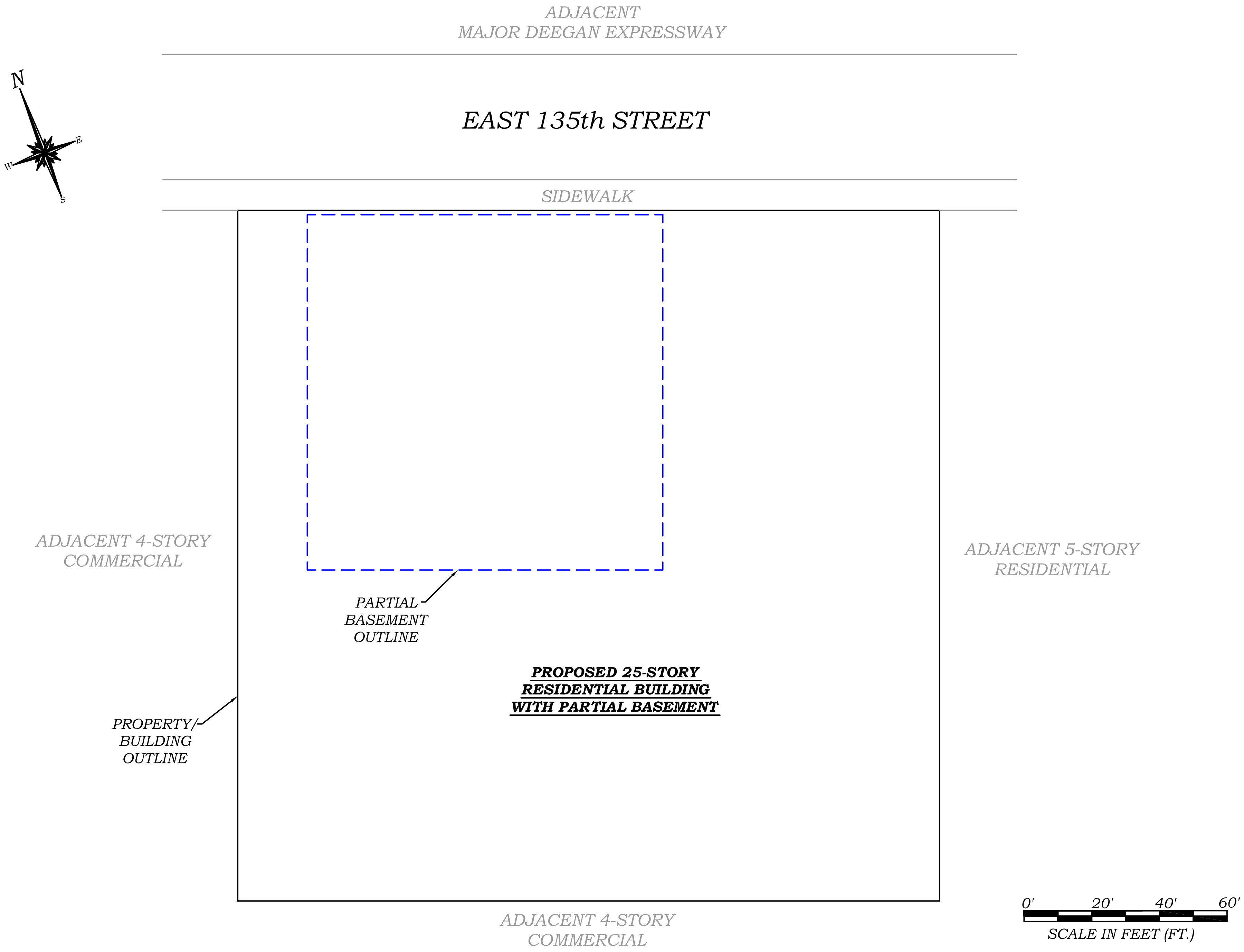

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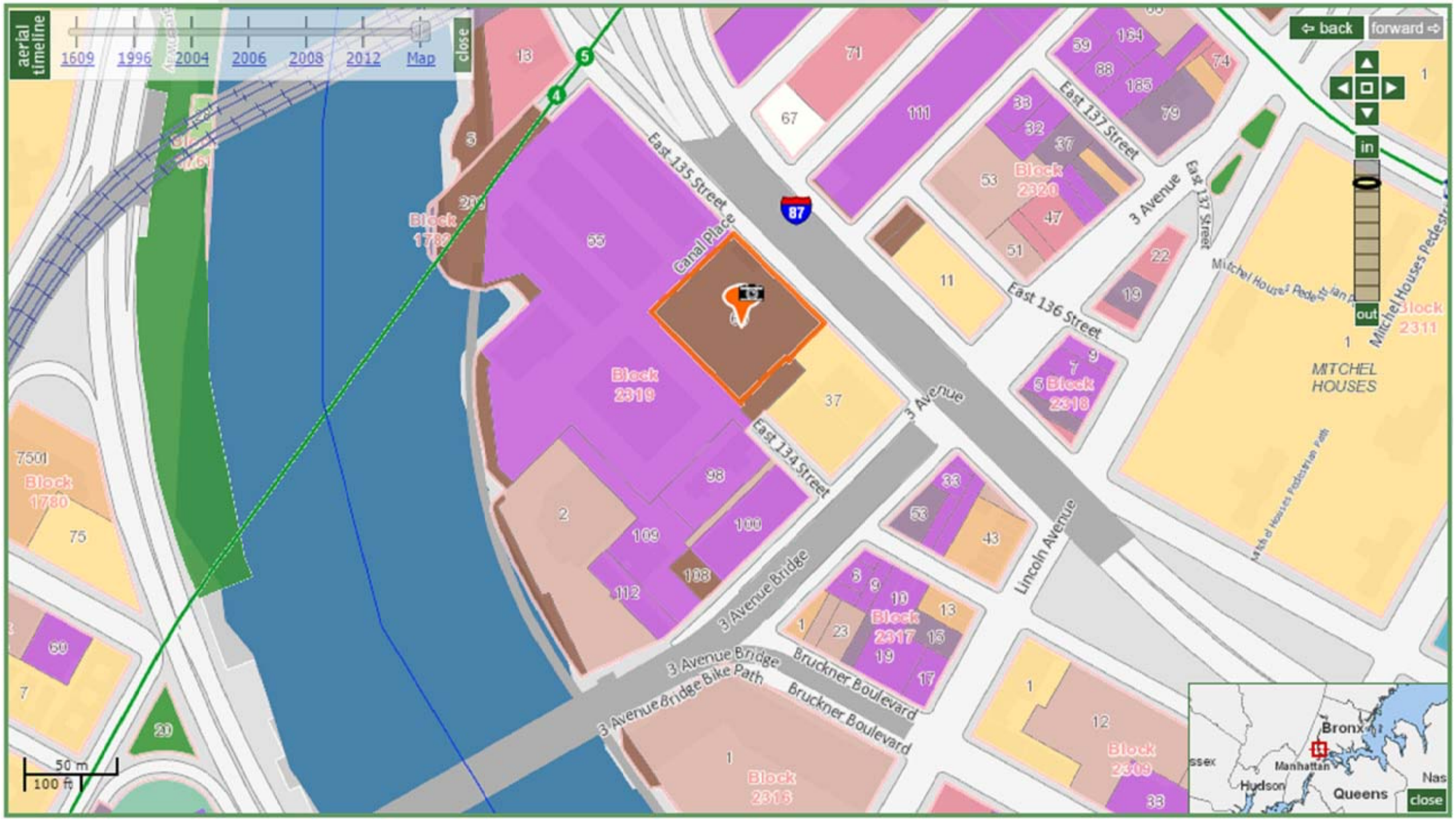
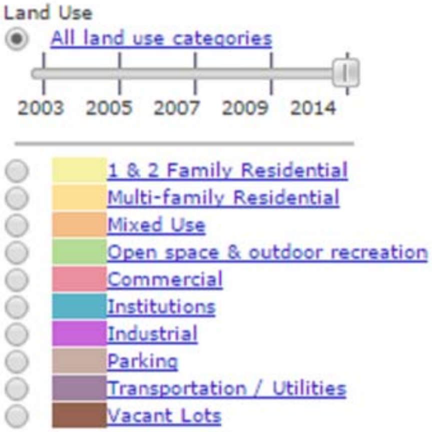
FIGURE 3: PROPOSED DEVELOPMENT PLAN





Land Use

● All land use categories

2003 2005 2007 2009 2014

○ 🟨 1 & 2 Family Residential
○ 🟨 Multi-family Residential
○ 🟧 Mixed Use
○ 🟩 Open space & outdoor recreation
○ 🟥 Commercial
○ 🟦 Institutions
○ 🟪 Industrial
○ 🟫 Parking
○ 🟪 Transportation / Utilities
○ 🟫 Vacant Lots

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FIGURE 4: LAND USE MAP

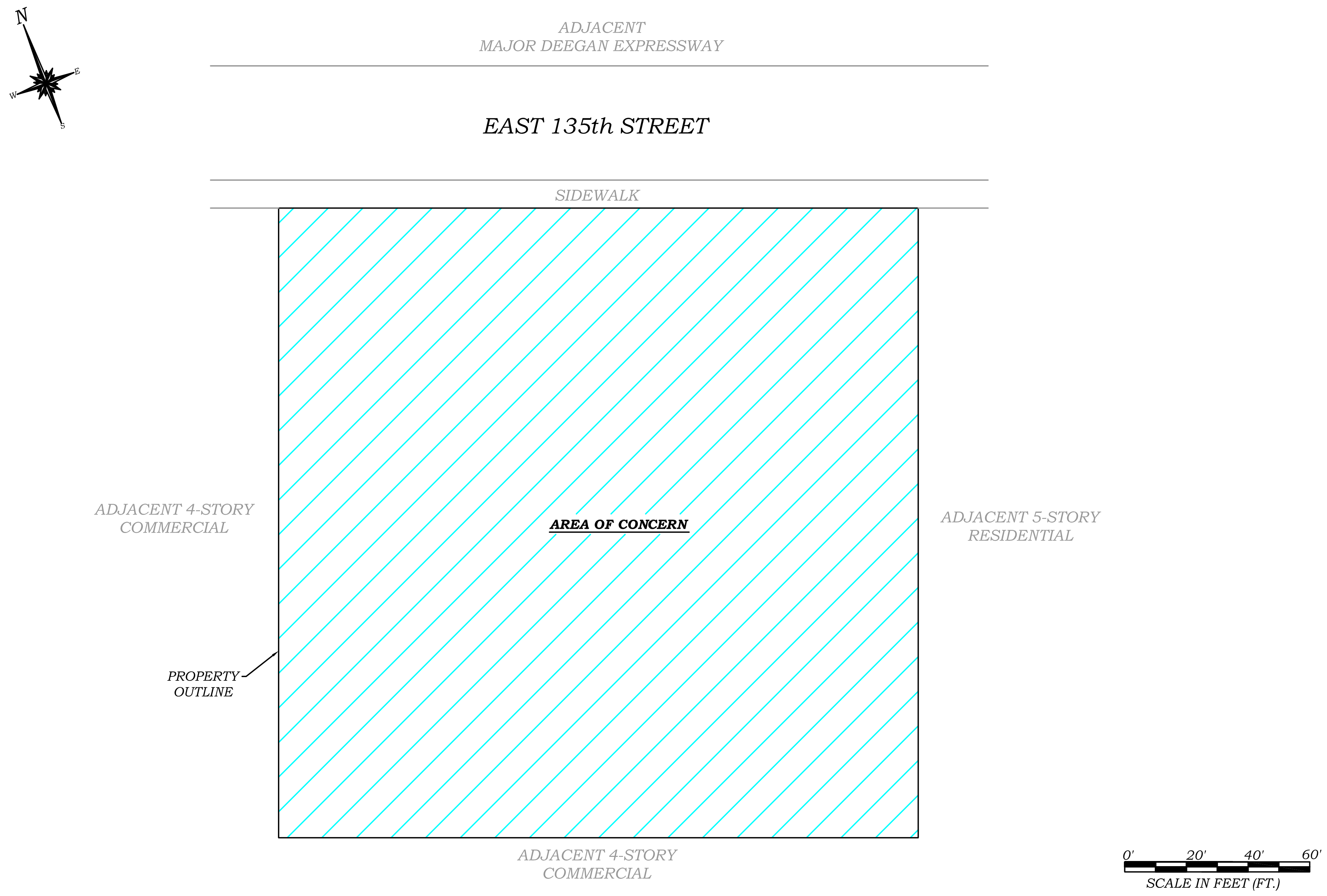

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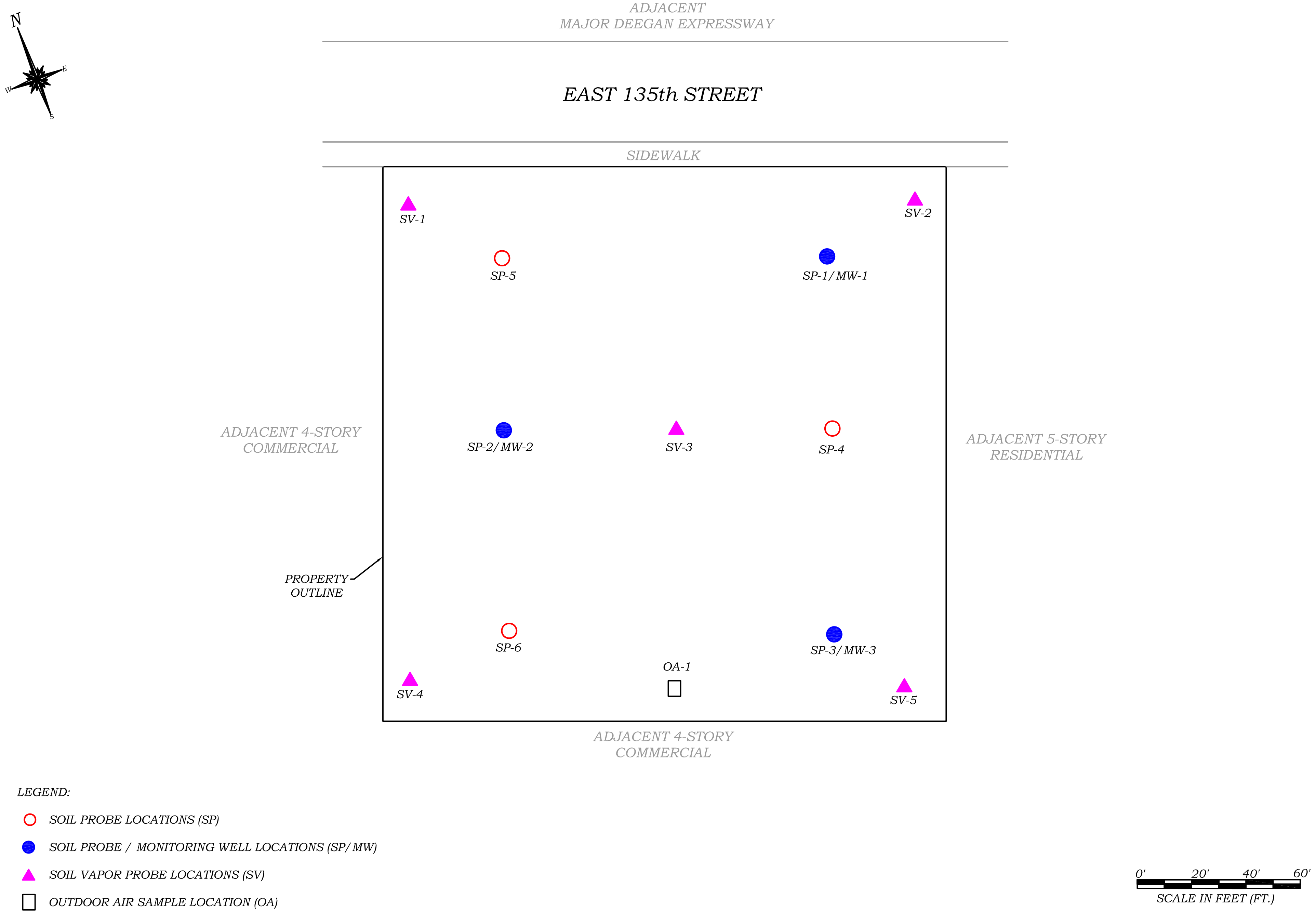
FIGURE 5: MAP OF AREAS OF CONCERN



LEGEND:

- ○ SOIL PROBE LOCATIONS (SP)
- ● SOIL PROBE / MONITORING WELL LOCATIONS (SP/MW)
- ▲ SOIL VAPOR PROBE LOCATIONS (SV)
- ☐ OUTDOOR AIR SAMPLE LOCATION (OA)

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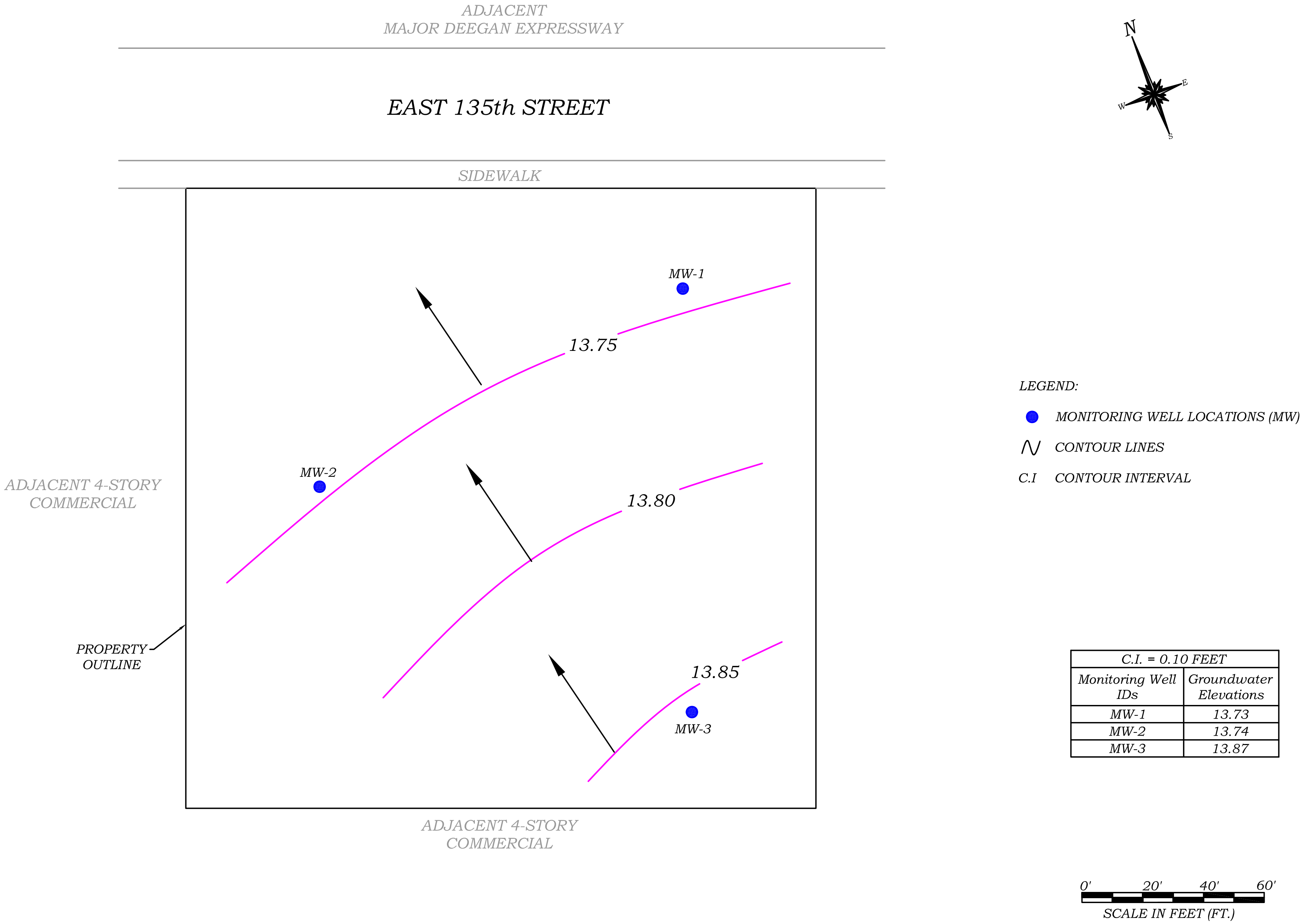
FIGURE 6: LOCATIONS OF SOIL PROBES, MONITORING WELLS AND SOIL VAPOR SAMPLES



LEGEND:

- ● MONITORING WELL LOCATIONS (MW)
- ∿ CONTOUR LINES
- C.I CONTOUR INTERVAL

C.I. = 0.10 FEET	
Monitoring Well IDs	Groundwater Elevations
MW-1	13.73
MW-2	13.74
MW-3	13.87

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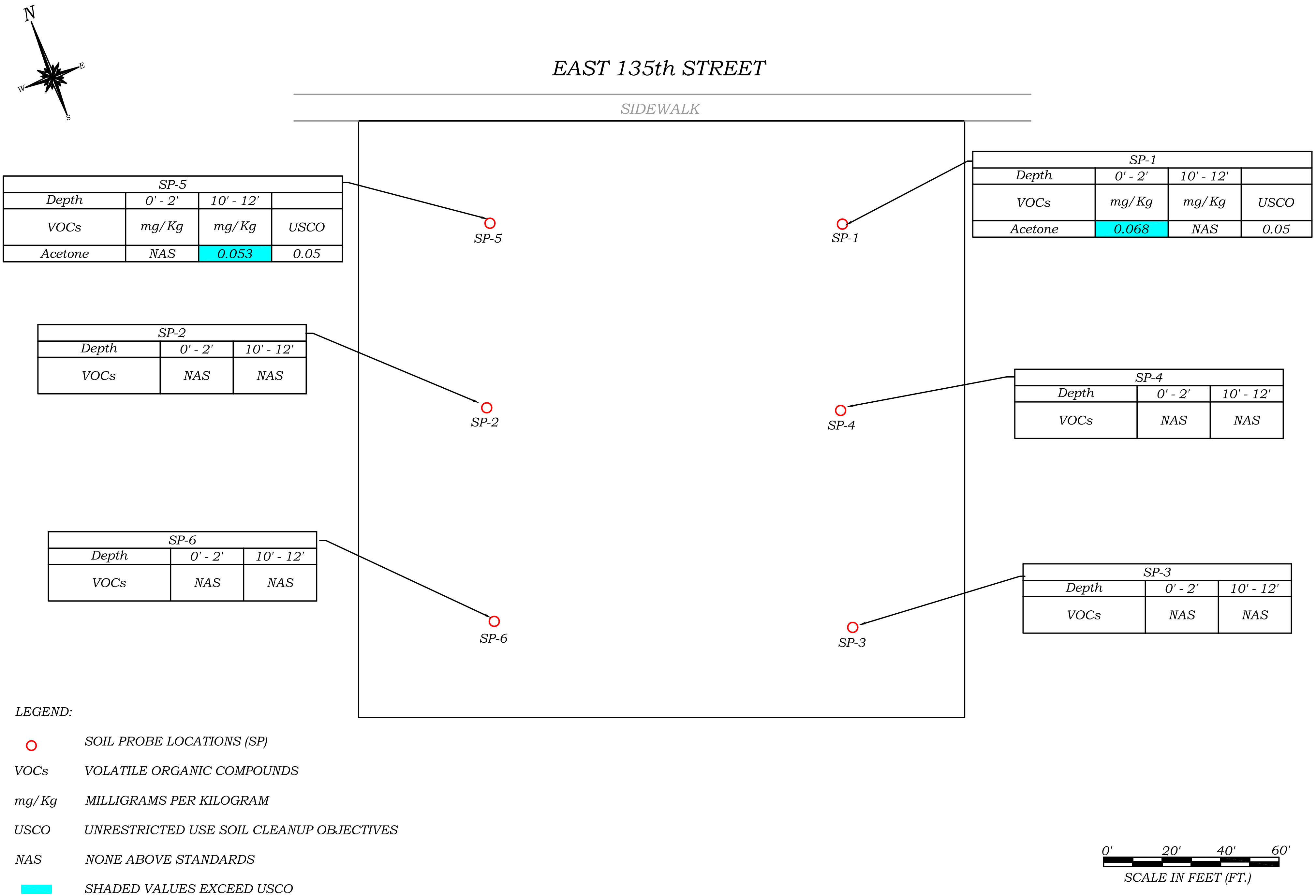
FIGURE 7: GROUNDWATER FLOW CONTOUR DIAGRAM



SP-5			
Depth	0' - 2'	10' - 12'	
VOCs	mg/Kg	mg/Kg	USCO
Acetone	NAS	0.053	0.05

SP-2		
Depth	0' - 2'	10' - 12'
VOCs	NAS	NAS

SP-6		
Depth	0' - 2'	10' - 12'
VOCs	NAS	NAS

SP-1			
Depth	0' - 2'	10' - 12'	
VOCs	mg/Kg	mg/Kg	USCO
Acetone	0.068	NAS	0.05

SP-4		
Depth	0' - 2'	10' - 12'
VOCs	NAS	NAS

SP-3		
Depth	0' - 2'	10' - 12'
VOCs	NAS	NAS

LEGEND:

○	SOIL PROBE LOCATIONS (SP)
VOCs	VOLATILE ORGANIC COMPOUNDS
mg/Kg	MILLIGRAMS PER KILOGRAM
USCO	UNRESTRICTED USE SOIL CLEANUP OBJECTIVES
NAS	NONE ABOVE STANDARDS
🟦	SHADED VALUES EXCEED USCO

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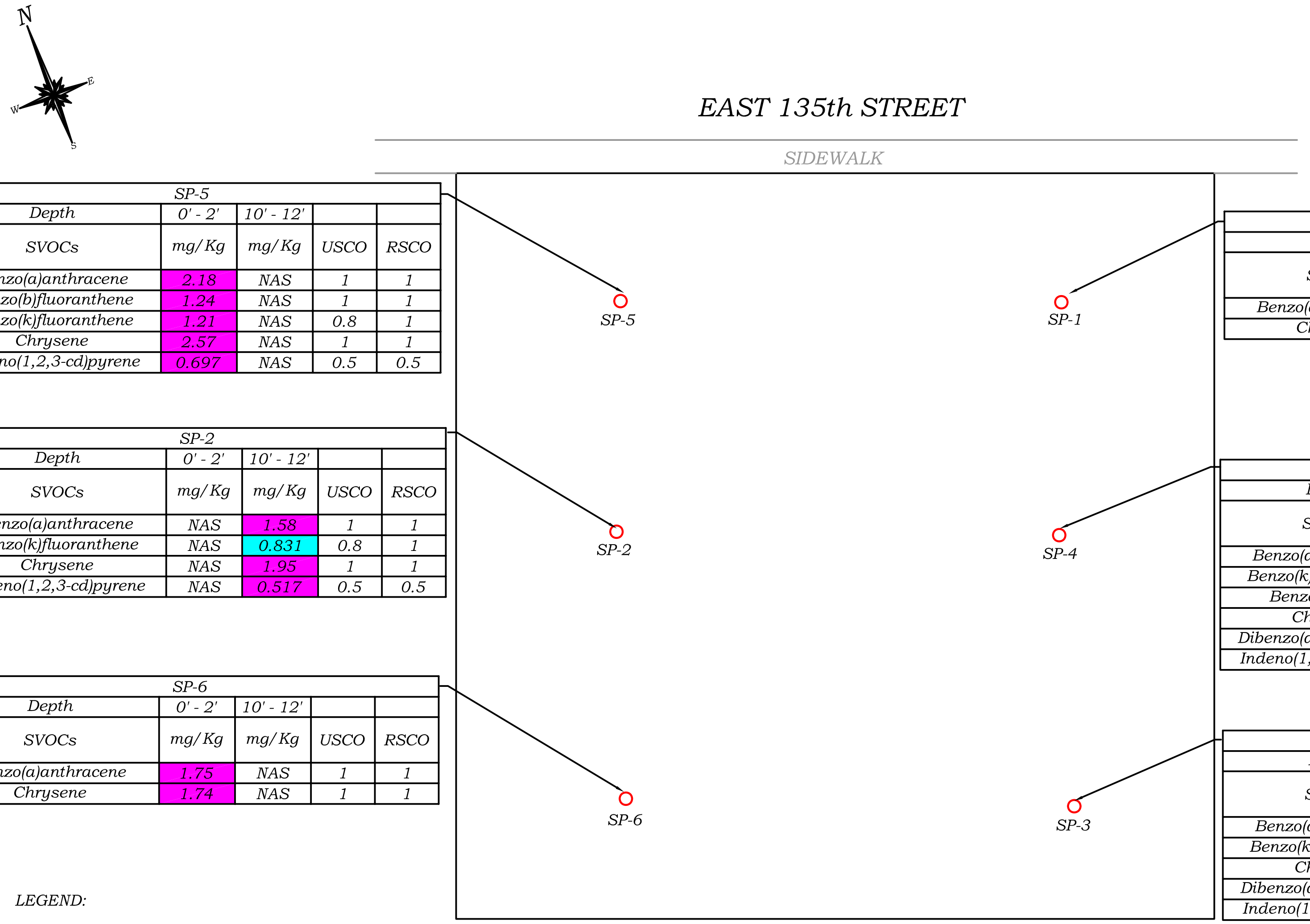
TITLE:

FIGURE 8: MAP OF VOCs IN SOIL



SP-5				
Depth	0' - 2'	10' - 12'		
SVOCs	mg/Kg	mg/Kg	USCO	RSCO
Benzo(a)anthracene	2.18	NAS	1	1
Benzo(b)fluoranthene	1.24	NAS	1	1
Benzo(k)fluoranthene	1.21	NAS	0.8	1
Chrysene	2.57	NAS	1	1
Indeno(1,2,3-cd)pyrene	0.697	NAS	0.5	0.5

SP-1				
Depth	0' - 2'	10' - 12'		
SVOCs	mg/Kg	mg/Kg	USCO	RSCO
Benzo(a)anthracene	1.81	NAS	1	1
Chrysene	1.60	NAS	1	1

SP-2				
Depth	0' - 2'	10' - 12'		
SVOCs	mg/Kg	mg/Kg	USCO	RSCO
Benzo(a)anthracene	NAS	1.58	1	1
Benzo(k)fluoranthene	NAS	0.831	0.8	1
Chrysene	NAS	1.95	1	1
Indeno(1,2,3-cd)pyrene	NAS	0.517	0.5	0.5

SP-4				
Depth	0' - 2'	10' - 12'		
SVOCs	mg/Kg	mg/Kg	USCO	RSCO
Benzo(a)anthracene	1.28	NAS	1	1
Benzo(k)fluoranthene	1.08	NAS	0.8	1
Benzo(a)Pyrene	1.14	NAS	1	1
Chrysene	1.23	NAS	1	1
Dibenzo(a,h)anthracene	0.453	NAS	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.874	NAS	0.5	0.5

SP-6				
Depth	0' - 2'	10' - 12'		
SVOCs	mg/Kg	mg/Kg	USCO	RSCO
Benzo(a)anthracene	1.75	NAS	1	1
Chrysene	1.74	NAS	1	1

SP-3				
Depth	0' - 2'	10' - 12'		
SVOCs	mg/Kg	mg/Kg	USCO	RSCO
Benzo(a)anthracene	5.7	NAS	1	1
Benzo(k)fluoranthene	0.816	NAS	0.8	1
Chrysene	5.49	NAS	1	1
Dibenzo(a,h)anthracene	0.364	NAS	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.698	NAS	0.5	0.5

LEGEND:

○	SOIL PROBE LOCATIONS (SP)
SVOCs	SEMI VOLATILE ORGANIC COMPOUNDS
mg/Kg	MILLIGRAMS PER KILOGRAM
USCO	UNRESTRICTED USE SOIL CLEANUP OBJECTIVES
RSCO	RESTRICTED USE SOIL CLEANUP OBJECTIVES
NAS	NONE ABOVE STANDARDS
🟦	BLUE SHADED VALUES EXCEED USCO
🟪	RED SHADED VALUES EXCEED RSCO

0' 20' 40' 60'

SCALE IN FEET (FT.)

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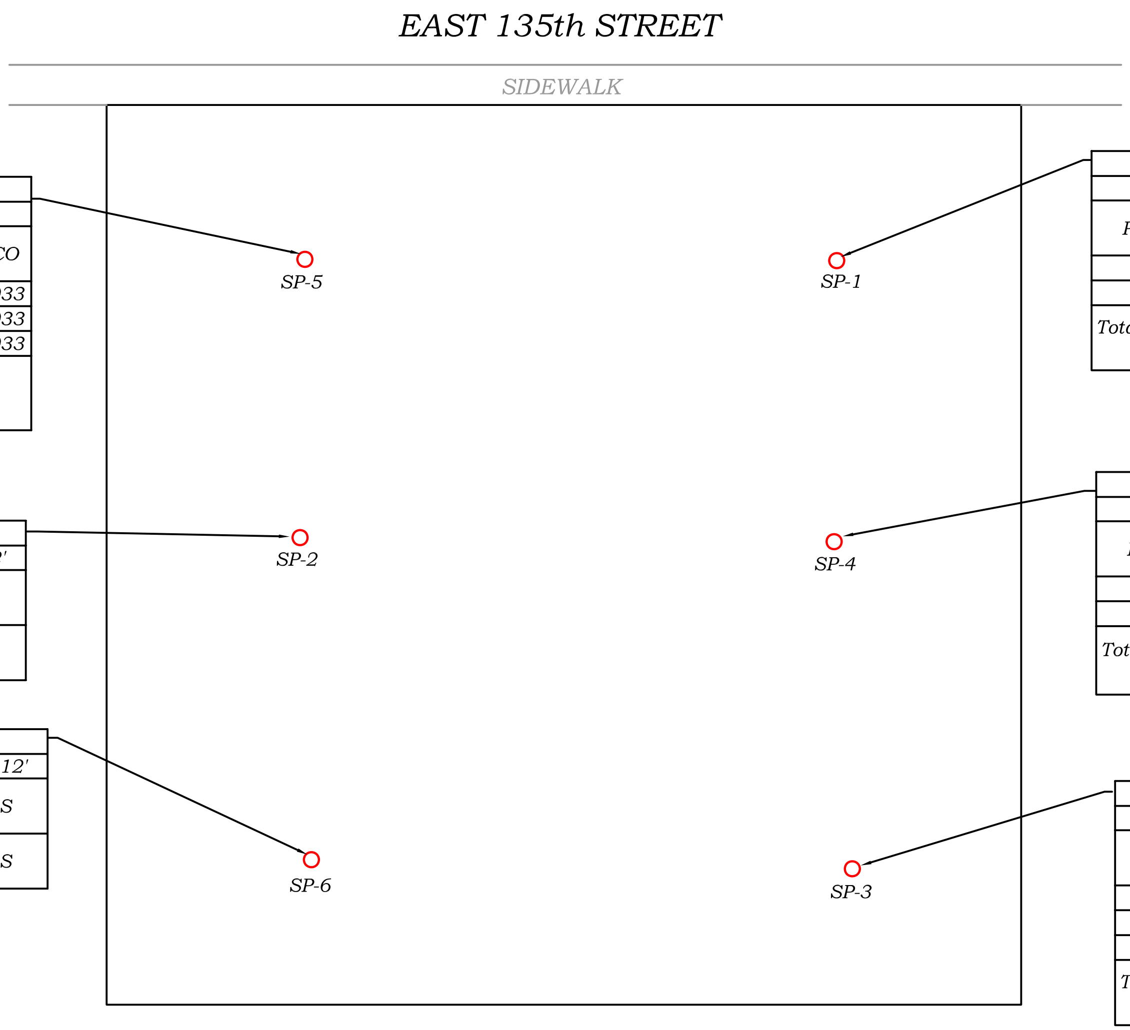
FIGURE 9: MAP OF SVOCs IN SOIL



SP-5			
Depth	0' - 2'	10' - 12'	
PESTICIDES	mg/Kg	mg/Kg	USCO
4,4'-DDD	0.0285	NAS	0.0033
4,4'-DDE	0.0357	NAS	0.0033
4,4'-DDT	0.143	NAS	0.0033
Total Pesticides & PCBs	0.069	NAS	

SP-1			
Depth	0' - 2'	10' - 12'	
PESTICIDES	mg/Kg	mg/Kg	USCO
4,4'-DDD	0.046	NAS	0.0033
4,4'-DDT	0.10	NAS	0.0033
Total Pesticides & PCBs	0.13	NAS	

SP-2		
Depth	0' - 2'	10' - 12'
PESTICIDES	NAS	NAS
Total Pesticides & PCBs	0.43	NAS

SP-4			
Depth	0' - 2'	10' - 12'	
PESTICIDES	mg/Kg	mg/Kg	USCO
4,4'-DDD	0.0948	NAS	0.0033
4,4'-DDT	0.177	NAS	0.0033
Total Pesticides & PCBs	0.72	NAS	

SP-6		
Depth	0' - 2'	10' - 12'
PESTICIDES	NAS	NAS
Total Pesticides & PCBs	0.069	NAS

SP-3			
Depth	0' - 2'	10' - 12'	
PESTICIDES	mg/Kg	mg/Kg	USCO
4,4'-DDD	0.0519	NAS	0.0033
4,4'-DDE	NAS	0.00453	0.0033
4,4'-DDT	0.107	0.00386	0.0033
Total Pesticides & PCBs	0.16	0.008	

LEGEND:

○	SOIL PROBE LOCATIONS (SP)
mg/Kg	MILLIGRAMS PER KILOGRAM
USCO	UNRESTRICTED USE SOIL CLEANUP OBJECTIVES
NAS	NONE ABOVE STANDARDS
🟦	SHADED VALUES EXCEED USCO

0' 20' 40' 60'
SCALE IN FEET (FT.)

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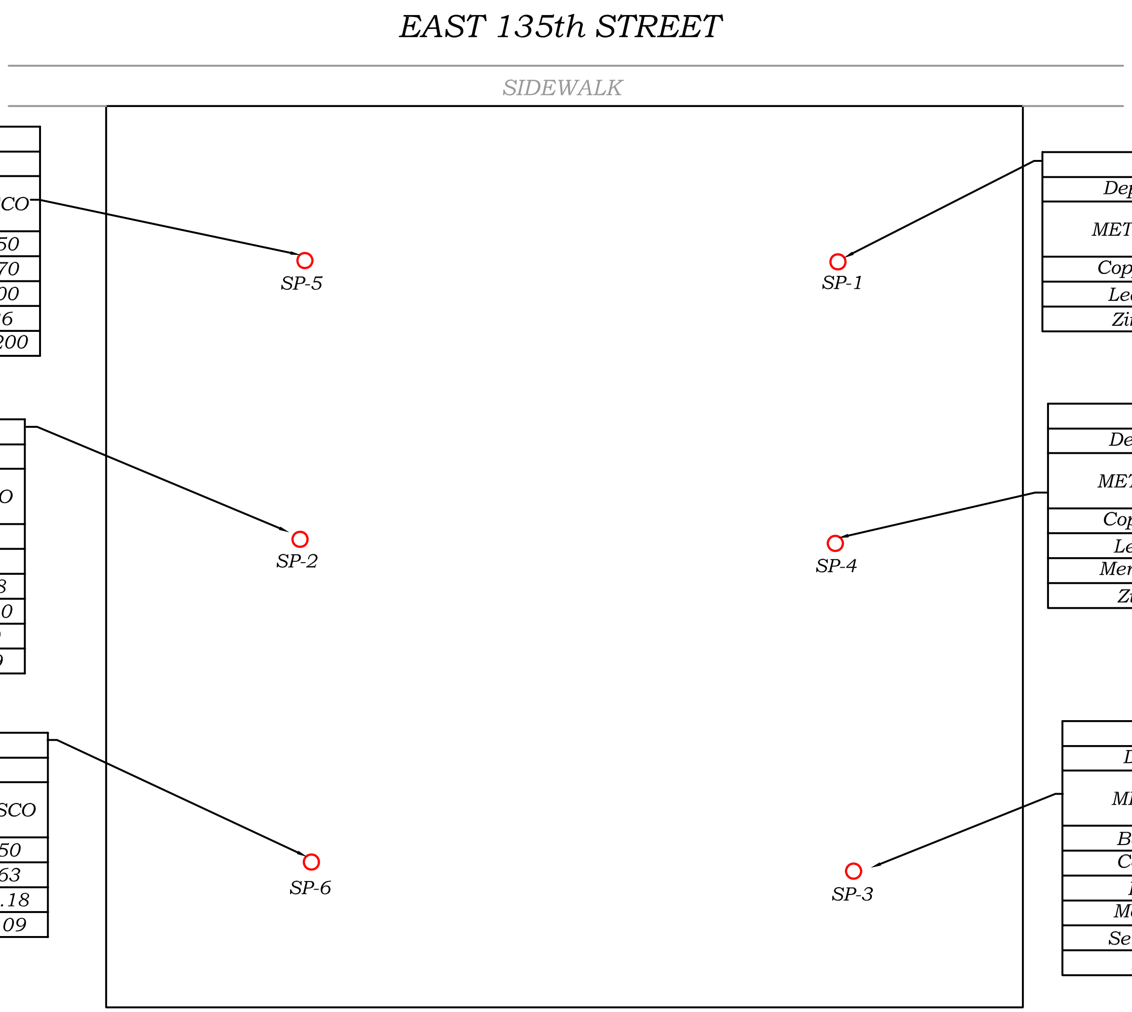
FIGURE 10: MAP OF PESTICIDES AND PCBs IN SOIL



SP-5				
Depth	0' - 2'	10' - 12'		
METALS	mg/Kg	mg/Kg	USCO	RSCO
Barium	635	NAS	350	350
Copper	105	NAS	50	270
Lead	618	NAS	63	400
Selenium	NAS	12.70	3.9	36
Zinc	417	NAS	109	2,200

SP-1			
Depth	0' - 2'	10' - 12'	
METALS	mg/Kg	mg/Kg	USCO
Copper	80.60	NAS	50
Lead	251	NAS	63
Zinc	338	NAS	109

SP-2			
Depth	0' - 2'	10' - 12'	
METALS	mg/Kg	mg/Kg	USCO
Copper	158	NAS	50
Lead	313	NAS	63
Mercury	0.28	NAS	0.18
Nickel	NAS	44.30	44.30
Selenium	NAS	4.44	3.9
Zinc	302	NAS	109

SP-4			
Depth	0' - 2'	10' - 12'	
METALS	mg/Kg	mg/Kg	USCO
Copper	85.40	NAS	50
Lead	278	NAS	63
Mercury	0.32	NAS	0.18
Zinc	345	NAS	109

SP-6			
Depth	0' - 2'	10' - 12'	
METALS	mg/Kg	mg/Kg	USCO
Copper	121	NAS	50
Lead	227	NAS	63
Mercury	0.27	NAS	0.18
Zinc	321	NAS	109

SP-3				
Depth	0' - 2'	10' - 12'		
METALS	mg/Kg	mg/Kg	USCO	RSCO
Barium	378	NAS	350	350
Copper	103	NAS	50	270
Lead	286	NAS	63	400
Mercury	0.36	NAS	0.18	0.81
Selenium	NAS	4.18	3.9	36
Zinc	497	NAS	109	2,200

LEGEND:

○	SOIL PROBE LOCATIONS (SP)
mg/Kg	MILLIGRAMS PER KILOGRAM
USCO	UNRESTRICTED USE SOIL CLEANUP OBJECTIVES
NAS	NONE ABOVE STANDARDS
🟦	BLUE SHADED VALUES EXCEED USCO
🟪	RED SHADED VALUES EXCEED RSCO

0' 20' 40' 60'

SCALE IN FEET (FT.)

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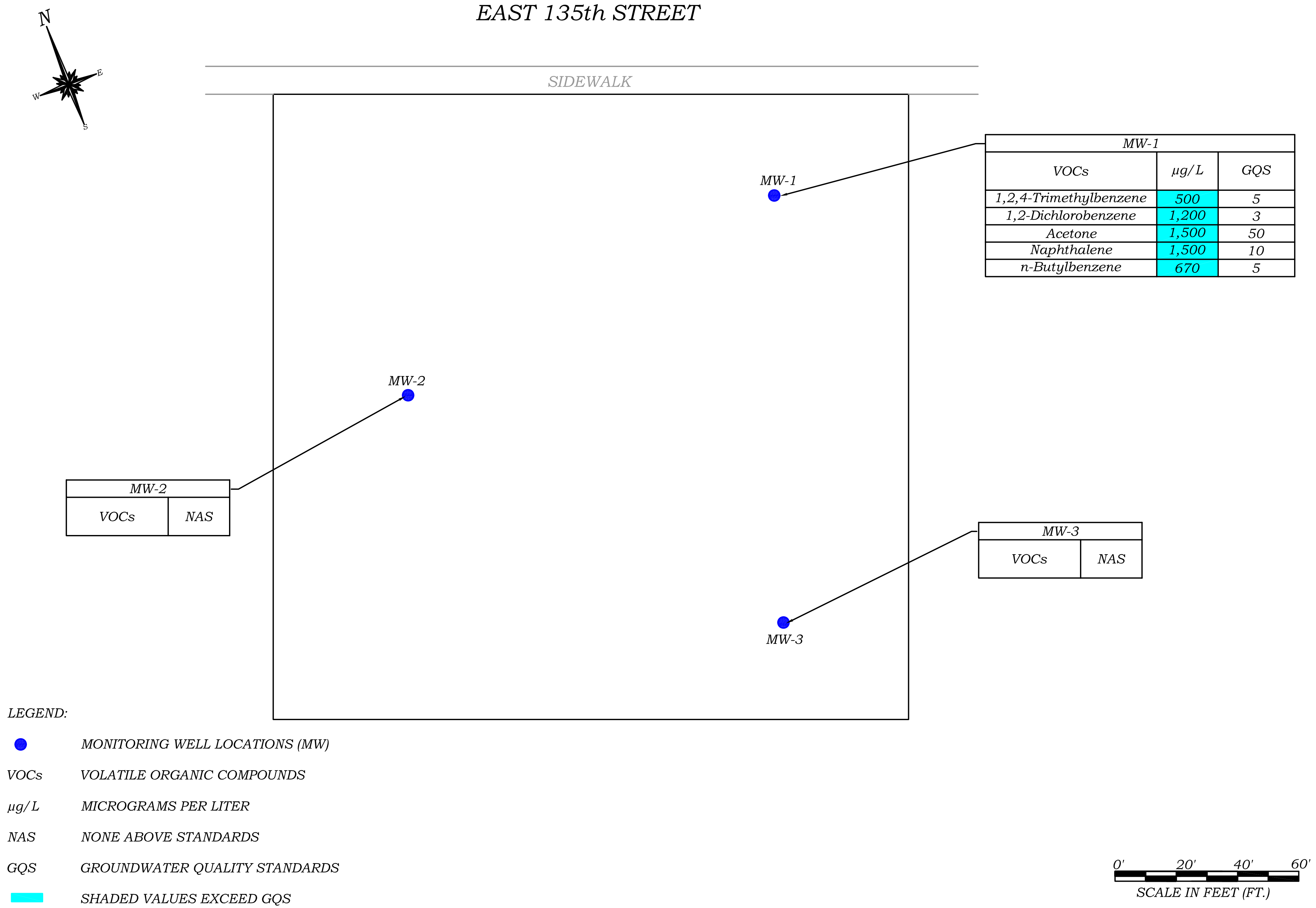
FIGURE 11: MAP OF METALS IN SOIL



MW-1		
VOCs	µg/L	GQS
1,2,4-Trimethylbenzene	500	5
1,2-Dichlorobenzene	1,200	3
Acetone	1,500	50
Naphthalene	1,500	10
n-Butylbenzene	670	5

MW-2	
VOCs	NAS

MW-3	
VOCs	NAS

LEGEND:

●	MONITORING WELL LOCATIONS (MW)
VOCs	VOLATILE ORGANIC COMPOUNDS
µg/L	MICROGRAMS PER LITER
NAS	NONE ABOVE STANDARDS
GQS	GROUNDWATER QUALITY STANDARDS
🟦	SHADED VALUES EXCEED GQS

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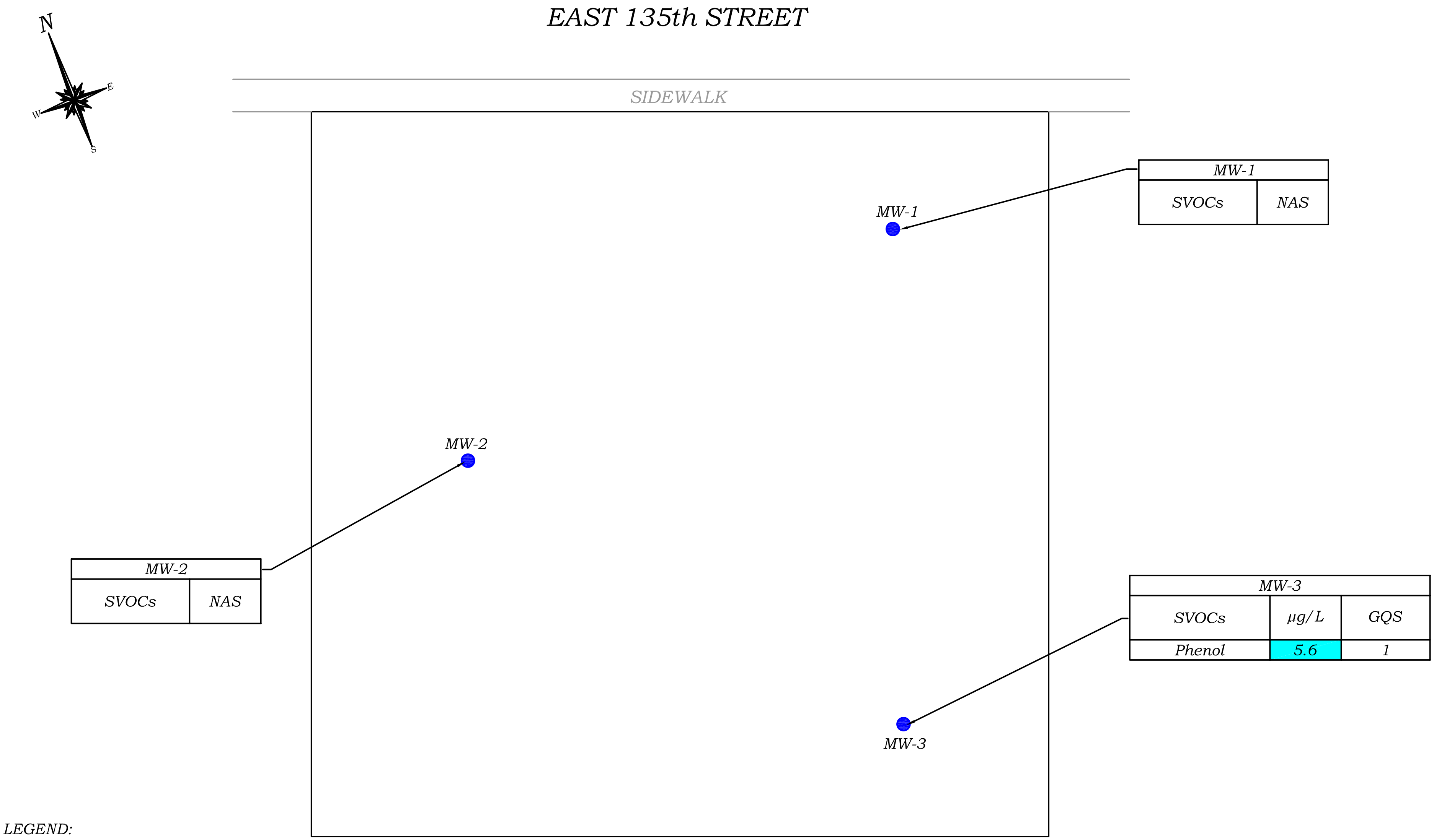
FIGURE 12: MAP OF VOCs IN GROUNDWATER



MW-1	
SVOCs	NAS

MW-2	
SVOCs	NAS

MW-3		
SVOCs	µg/L	GQS
Phenol	5.6	1

LEGEND:

●	MONITORING WELL LOCATIONS (MW)
SVOCs	SEMI VOLATILE ORGANIC COMPOUNDS
µg/L	MICROGRAMS PER LITER
NAS	NONE ABOVE STANDARDS
GQS	GROUNDWATER QUALITY STANDARDS
🟦	SHADED VALUES EXCEED GQS

0' 20' 40' 60'
SCALE IN FEET (FT.)

HYDRO TECH ENVIRONMENTAL CORP.

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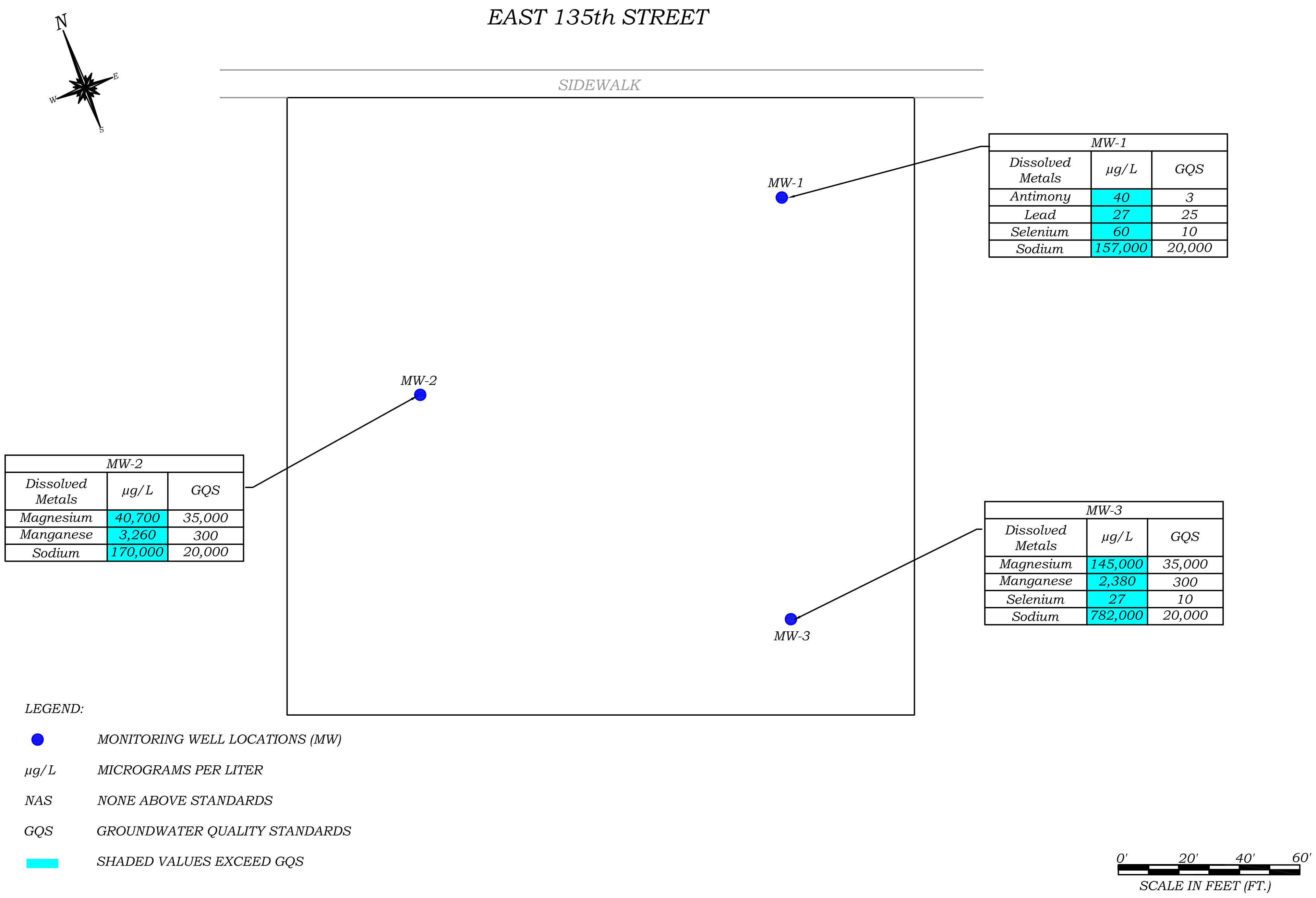
200 East 135th Street
Bronx, NY.
HTE Job # 150133

Drawn By: C.O.
Reviewed By: M.R
Approved By: M.R
Date: 07/20/15
Scale: AS NOTED

TITLE:

FIGURE 13: MAP OF SVOCs IN GROUNDWATER



MW-1		
Dissolved Metals	µg/L	GQS
Antimony	40	3
Lead	27	25
Selenium	60	10
Sodium	157,000	20,000

MW-2		
Dissolved Metals	µg/L	GQS
Magnesium	40,700	35,000
Manganese	3,260	300
Sodium	170,000	20,000

MW-3		
Dissolved Metals	µg/L	GQS
Magnesium	145,000	35,000
Manganese	2,380	300
Selenium	27	10
Sodium	782,000	20,000

LEGEND:

●	MONITORING WELL LOCATIONS (MW)
µg/L	MICROGRAMS PER LITER
NAS	NONE ABOVE STANDARDS
GQS	GROUNDWATER QUALITY STANDARDS
🟦	SHADED VALUES EXCEED GQS

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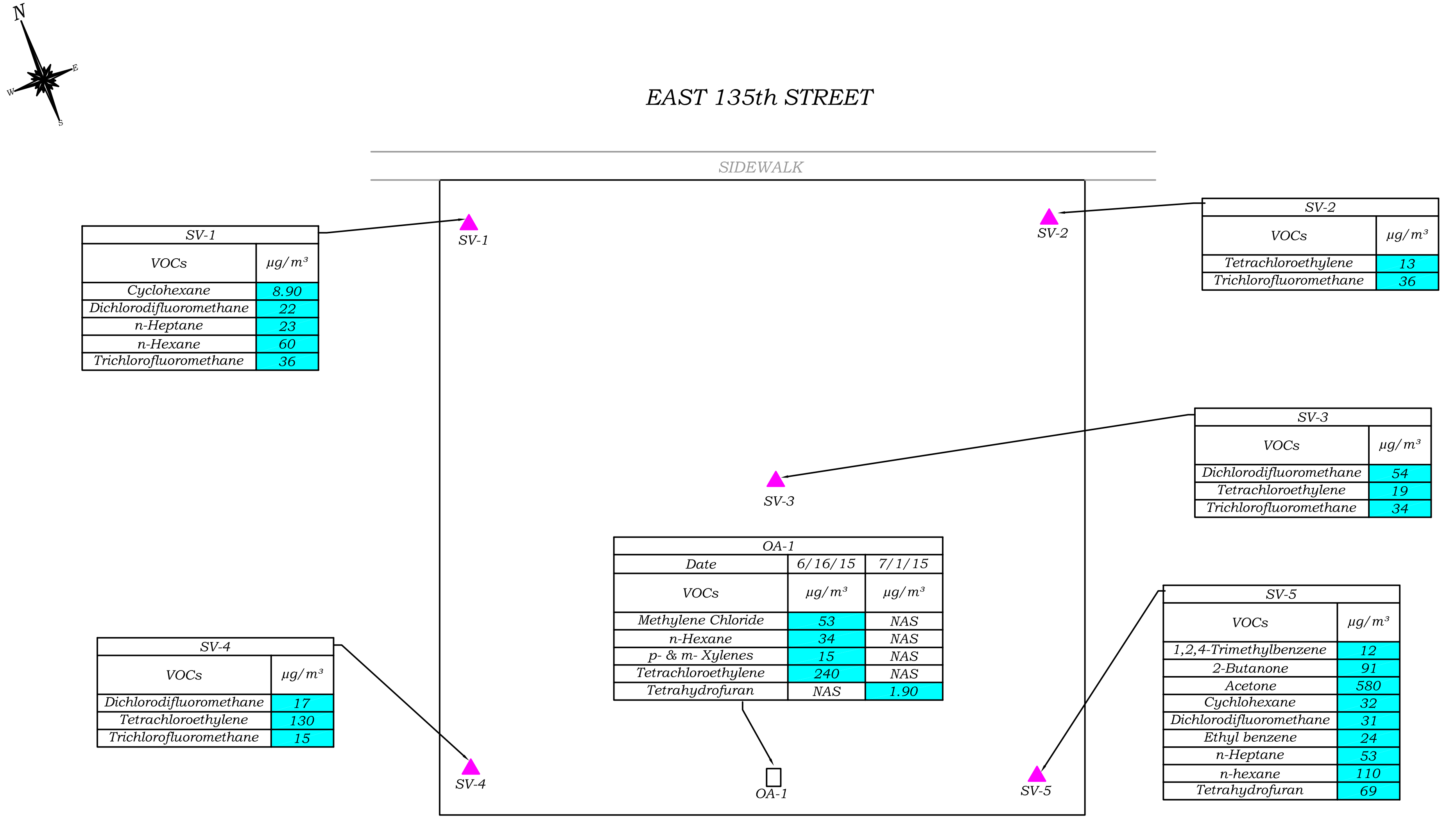
Reviewed By:
Approved By: M.R
Date: 07/20/15
Scale: AS NOTED

TITLE:

FIGURE 14: MAP OF DISSOLVED METALS IN GROUNDWATER



SV-1

VOCs	µg/m³
Cyclohexane	8.90
Dichlorodifluoromethane	22
n-Heptane	23
n-Hexane	60
Trichlorofluoromethane	36

SV-2

VOCs	µg/m³
Tetrachloroethylene	13
Trichlorofluoromethane	36

SV-3

VOCs	µg/m³
Dichlorodifluoromethane	54
Tetrachloroethylene	19
Trichlorofluoromethane	34

OA-1

Date	6/16/15	7/1/15
VOCs	µg/m³	µg/m³
Methylene Chloride	53	NAS
n-Hexane	34	NAS
p- & m- Xylenes	15	NAS
Tetrachloroethylene	240	NAS
Tetrahydrofuran	NAS	1.90

SV-4

VOCs	µg/m³
Dichlorodifluoromethane	17
Tetrachloroethylene	130
Trichlorofluoromethane	15

SV-5

VOCs	µg/m³
1,2,4-Trimethylbenzene	12
2-Butanone	91
Acetone	580
Cychlohexane	32
Dichlorodifluoromethane	31
Ethyl benzene	24
n-Heptane	53
n-hexane	110
Tetrahydrofuran	69

LEGEND:

▲	SOIL VAPOR PROBE LOCATIONS (SV)
☐	OUTDOOR AIR SAMPLE LOCATION (OA)
VOCs	VOLATILE ORGANIC COMPOUNDS
µg/m³	MICROGRAMS PER CUBIC METER
NAS	NONE ABOVE STANDARDS

0' 20' 40' 60'
SCALE IN FEET (FT.)

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Drawn By: C.Q.
Reviewed By: M.R
Approved By: M.R
Date: 07/20/15
Scale: AS NOTED

TITLE:

FIGURE 15: MAP OF SOIL VAPORS

TABLES

Table 1
Soil Samples Analytical Results for VOCs
200 East 135th Street, Bronx, New York

Sample ID	SP-1 (0-2')		SP-1 (10-12')		SP-2 (0-2')		SP-2 (10-12')		SP-3 (0-2')		SP-3 (10-12')		SP-4 (0-2')		SP-4 (10-12')		SP-5 (0-2')		SP-5 (10-12')		SP-6 (0-2')		SP-6 (10-12')		NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives-Residential
Sampling Date	6/11/2015		6/11/2015		6/10/2015		6/10/2015		6/11/2015		6/11/2015		6/11/2015		6/11/2015		6/10/2015		6/10/2015		6/10/2015		6/10/2015			
Client Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil			
Compound	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result			
Units	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/Kg	mg/Kg
1,1,1,2-Tetrachloroethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,1,1-Trichloroethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,1,2,2-Tetrachloroethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,1,2-Trichloroethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,1-Dichloroethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.27	19
1,1-Dichloroethylene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.33	100
1,1-Dichloropropylene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,2,3-Trichlorobenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,2,3-Trichloropropane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,2,4-Trichlorobenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,2,4-Trimethylbenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	3.6	47
1,2-Dibromo-3-chloropropane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,2-Dibromoethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,2-Dichlorobenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	1.1	100
1,2-Dichloroethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.02	2.3
1,2-Dichloropropane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,3,5-Trimethylbenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	8.4	47
1,3-Dichlorobenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	2.4	17
1,3-Dichloropropane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
1,4-Dichlorobenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	1.8	9.8
1,4-Dioxane	<0.073	U	<0.08	U	<0.055	U	<0.053	U	<0.056	U	<0.045	U	<0.064	U	<0.046	U	<0.051	U	<0.17	U	<0.048	U	<0.04	U	0.1	9.8
2,2-Dichloropropane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
2-Butanone	**0.0091**		**0.020**		<0.0028	U	<0.0026	U	**0.015**		**0.010**		<0.0032	U	**0.0052**		<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.12	100
2-Chlorotoluene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
4-Chlorotoluene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Acetone	**0.050**		**0.068**		<0.0055	U	<0.0053	U	**0.029**		<0.0045	U	<0.0064	U	**0.019**		<0.0051	U	**0.053**		**0.016**		<0.004	U	0.05	100
Benzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.06	2.9
Bromobenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Bromochloromethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Bromodichloromethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Bromoform	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Bromomethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Carbon tetrachloride	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.76	1.4
Chlorobenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	1.1	100
Chloroethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Chloroform	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.37	10
Chloromethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
cis-1,2-Dichloroethylene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.25	59
cis-1,3-Dichloropropylene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Dibromochloromethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Dibromomethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Dichlorodifluoromethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Ethyl Benzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	1	30
Hexachlorobutadiene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Isopropylbenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Methyl tert-butyl ether (MTBE)	<0.0037	U	**0.0059**	**J**	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.93	62
Methylene chloride	<0.0073	U	**0.0080**	**J**	<0.0055	U	<0.0053	U	<0.0056	U	<0.0045	U	<0.0064	U	<0.0046	U	<0.0051	U	<0.017	U	<0.0048	U	**0.011**		0.05	51
Naphthalene	**0.0072**	**J**	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	**0.021**		<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	12	100
n-Butylbenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	12	100
n-Propylbenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	3.9	100
o-Xylene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
p- & m- Xylenes	<0.0073	U	<0.008	U	<0.0055	U	<0.0053	U	<0.0056	U	<0.0045	U	<0.0064	U	<0.0046	U	<0.0051	U	<0.017	U	<0.0048	U	<0.004	U	NS	NS
p-Isopropyltoluene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
sec-Butylbenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	11	100
Styrene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
tert-Butylbenzene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	5.9	100
Tetrachloroethylene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	1.3	5.5
Toluene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.7	100
trans-1,2-Dichloroethylene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.19	100
trans-1,3-Dichloropropylene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Trichloroethylene	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.47	10
Trichlorofluoromethane	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Vinyl acetate	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	NS	NS
Vinyl Chloride	<0.0037	U	<0.004	U	<0.0028	U	<0.0026	U	<0.0028	U	<0.0023	U	<0.0032	U	<0.0023	U	<0.0025	U	<0.0085	U	<0.0024	U	<0.002	U	0.02	0.21
Total VOC's	0.066		0.102		ND		ND		0.044		0.010		0.021		0.024		ND		0.0530		0.016		0.011		NS	NS

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

U=analyte not detected at or above the level indicated

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

ND=analyte not detected at or above the level indicated

🟦	= sample exceeds NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives
⬛	= sample exceeds NYSDEC Part 375 Restricted Use Soil Cleanup Objectives-Residential

Table 2
Soil Samples Analytical Results for SVOCs
200 East 135th Street, Bronx, New York

Sample ID	SP-1 (0-2')		SP-1 (10-12')		SP-2 (0-2')		SP-2 (10-12')		SP-3 (0-2')		SP-3 (10-12')		SP-4 (0-2')		SP-4 (10-12')		SP-5 (0-2')		SP-5 (10-12')		SP-6 (0-2')		SP-6 (10-12')		NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives-Residential
Sampling Date	6/11/2015		6/11/2015		6/10/2015		6/10/2015		6/11/2015		6/11/2015		6/11/2015		6/11/2015		6/10/2015		6/10/2015		6/10/2015		6/10/2015			
Client Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil			
Compound	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result			
Units	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/Kg	mg/Kg
1,2,4-Trichlorobenzene	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
1,2-Dichlorobenzene	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	1.1	100
1,3-Dichlorobenzene	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	2.4	17
1,4-Dichlorobenzene	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	1.8	9.8
2,4,5-Trichlorophenol	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
2,4,6-Trichlorophenol	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
2,4-Dichlorophenol	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
2,4-Dimethylphenol	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
2,4-Dinitrophenol	<0.0924	U	<0.117	U	<0.0905	U	<0.0951	U	<0.0883	U	<0.113	U	<0.0888	U	<0.103	U	<0.0912	U	<0.104	U	<0.0873	U	<0.0953	U	NS	NS
2,4-Dinitrotoluene	<0.0463	U	**0.781**	**D**	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
2,6-Dinitrotoluene	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
2-Chloronaphthalene	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
2-Chlorophenol	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
2-Methylnaphthalene	**0.079**	**JD**	<0.0584	U	<0.0454	U	<0.0477	U	**0.106**	**D**	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
2-Methylphenol	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	0.33	100
2-Nitroaniline	<0.0924	U	<0.117	U	<0.0905	U	<0.0951	U	<0.0883	U	<0.113	U	<0.0888	U	<0.103	U	<0.0912	U	<0.104	U	<0.0873	U	<0.0953	U	NS	NS
2-Nitrophenol	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
3- & 4-Methylphenols	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
3,3'-Dichlorobenzidine	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
3-Nitroaniline	<0.0924	U	<0.117	U	<0.0905	U	<0.0951	U	<0.0883	U	<0.113	U	<0.0888	U	<0.103	U	<0.0912	U	<0.104	U	<0.0873	U	<0.0953	U	NS	NS
4,6-Dinitro-2-methylphenol	<0.0924	U	<0.117	U	<0.0905	U	<0.0951	U	<0.0883	U	<0.113	U	<0.0888	U	<0.103	U	<0.0912	U	<0.104	U	<0.0873	U	<0.0953	U	NS	NS
4-Bromophenyl phenyl ether	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
4-Chloro-3-methylphenol	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
4-Chloroaniline	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
4-Chlorophenyl phenyl ether	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
4-Nitroaniline	<0.0924	U	<0.117	U	<0.0905	U	<0.0951	U	<0.0883	U	<0.113	U	<0.0888	U	<0.103	U	<0.0912	U	<0.104	U	<0.0873	U	<0.0953	U	NS	NS
4-Nitrophenol	<0.0924	U	<0.117	U	<0.0905	U	<0.0951	U	<0.0883	U	<0.113	U	<0.0888	U	<0.103	U	<0.0912	U	<0.104	U	<0.0873	U	<0.0953	U	NS	NS
Acenaphthene	**0.45**	**D**	<0.0584	U	**0.19**	**D**	**0.247**	**D**	**0.773**	**D**	<0.0568	U	**0.212**	**D**	<0.0516	U	<0.0457	U	<0.0523	U	**0.295**	**D**	<0.0478	U	20	100
Acenaphthylene	<0.0463	U	<0.0584	U	<0.0454	U	**0.0844**	**JD**	**0.0756**	**JD**	<0.0568	U	**0.0937**	**D**	<0.0516	U	**0.529**	**D**	<0.0523	U	**0.0516**	**JD**	<0.0478	U	100	100
Aniline	<0.185	U	<0.233	U	<0.181	U	<0.19	U	<0.177	U	<0.227	U	<0.178	U	<0.206	U	<0.183	U	<0.209	U	<0.175	U	<0.191	U	NS	NS
Anthracene	**0.82**	**D**	<0.0584	U	**0.40**	**D**	**0.573**	**D**	**1.35**	**D**	<0.0568	U	**0.43**	**D**	<0.0516	U	**0.343**	**D**	<0.0523	U	**0.649**	**D**	<0.0478	U	100	100
Benzo(a)anthracene	**1.81**	**D**	<0.0584	U	**0.88**	**D**	**1.58**	**D**	**5.7**	**D**	<0.0568	U	**1.28**	**D**	<0.0516	U	**2.18**	**D**	<0.0523	U	**1.75**	**D**	<0.0478	U	1	1
Benzo(a)pyrene	**0.39**	**D**	<0.0584	U	**0.65**	**D**	**0.765**	**D**	**0.665**	**D**	<0.0568	U	**1.14**	**D**	<0.0516	U	**0.97**	**D**	<0.0523	U	**0.553**	**D**	<0.0478	U	1	1
Benzo(b)fluoranthene	**0.36**	**D**	<0.0584	U	**0.54**	**D**	**0.709**	**D**	**0.604**	**D**	<0.0568	U	**0.996**	**D**	<0.0516	U	**1.24**	**D**	<0.0523	U	**0.57**	**D**	<0.0478	U	1	1
Benzo(g,h,i)perylene	**0.14**	**D**	<0.0584	U	**0.24**	**D**	**0.612**	**D**	**0.705**	**D**	<0.0568	U	**0.941**	**D**	<0.0516	U	**0.635**	**D**	<0.0523	U	**0.38**	**D**	<0.0478	U	100	100
Benzo(k)fluoranthene	**0.48**	**D**	<0.0584	U	**0.67**	**D**	**0.831**	**D**	**0.816**	**D**	<0.0568	U	**1.08**	**D**	<0.0516	U	**1.21**	**D**	<0.0523	U	**0.7**	**D**	<0.0478	U	0.8	1
Benzyl alcohol	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Benzyl butyl phthalate	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	**0.06**	**JD**	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	**0.133**	**D**	<0.0478	U	NS	NS
Bis(2-chloroethoxy)methane	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Bis(2-chloroethyl)ether	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Bis(2-chloroisopropyl)ether	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Bis(2-ethylhexyl)phthalate	**0.086**	**JD**	<0.0584	U	**0.073**	**JD**	<0.0477	U	**0.705**	**D**	<0.0568	U	**0.213**	**D**	<0.0516	U	**0.157**	**D**	<0.0523	U	**0.197**	**D**	<0.0478	U	NS	NS
Chrysene	**1.60**	**D**	<0.0584	U	**0.89**	**D**	**1.95**	**D**	**5.49**	**D**	<0.0568	U	**1.23**	**D**	<0.0516	U	**2.57**	**D**	<0.0523	U	**1.74**	**D**	<0.0478	U	1	1
Dibenzo(a,h)anthracene	**0.088**	**JD**	<0.0584	U	**0.14**	**D**	**0.218**	**D**	**0.364**	**D**	<0.0568	U	**0.453**	**D**	<0.0516	U	**0.226**	**D**	<0.0523	U	**0.172**	**D**	<0.0478	U	0.33	0.33
Dibenzofuran	**0.21**	**D**	<0.0584	U	**0.070**	**JD**	**0.128**	**D**	**0.33**	**D**	<0.0568	U	**0.0774**	**JD**	<0.0516	U	**0.0911**	**JD**	<0.0523	U	**0.102**	**D**	<0.0478	U	7	14
Diethyl phthalate	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Dimethyl phthalate	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Di-n-butyl phthalate	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Di-n-octyl phthalate	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Fluoranthene	**2.80**	**D**	<0.0584	U	**1.75**	**D**	**3.27**	**D**	**11**	**D**	<0.0568	U	**2.04**	**D**	<0.0516	U	**4.76**	**D**	<0.0523	U	**3.7**	**D**	<0.0478	U	100	100
Fluorene	**0.48**	**D**	<0.0584	U	**0.15**	**D**	**0.21**	**D**	**0.792**	**D**	<0.0568	U	**0.186**	**D**	<0.0516	U	<0.0457	U	<0.0523	U	**0.215**	**D**	<0.0478	U	30	100
Hexachlorobenzene	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	0.33	0.33
Hexachlorobutadiene	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Hexachlorocyclopentadiene	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Hexachloroethane	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Indeno(1,2,3-cd)pyrene	**0.16**	**D**	<0.0584	U	**0.27**	**D**	**0.517**	**D**	**0.698**	**D**	<0.0568	U	**0.874**	**D**	<0.0516	U	**0.697**	**D**	<0.0523	U	**0.398**	**D**	<0.0478	U	0.5	0.5
Isophorone	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Naphthalene	**0.078**	**JD**	<0.0584	U	**0.054**	**JD**	**0.172**	**D**	**0.126**	**D**	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	**0.103**	**D**	<0.0478	U	12	100
Nitrobenzene	<0.0463	U	<0.0584	U	0.045	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
N-Nitrosodimethylamine	<0.0463	U	<0.0584	U	0.045	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
N-nitroso-di-n-propylamine	<0.0463	U	<0.0584	U	0.045	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
N-Nitrosodiphenylamine	<0.0463	U	<0.0584	U	0.045	U	<0.0477	U	**0.23**	**D**	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	NS	NS
Pentachlorophenol	<0.0463	U	<0.0584	U	0.045	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	0.8	2.4
Phenanthrene	**2.06**	**D**	<0.0584	U	**1.41**	**D**	**3.08**	**D**	**7.98**	**D**	<0.0568	U	**1.38**	**D**	<0.0516	U	**2.48**	**D**	<0.0523	U	**2.34**	**D**	<0.0478	U	100	100
Phenol	<0.0463	U	<0.0584	U	<0.0454	U	<0.0477	U	<0.0443	U	<0.0568	U	<0.0445	U	<0.0516	U	<0.0457	U	<0.0523	U	<0.0438	U	<0.0478	U	0.33	100
Pyrene	**4.20**	**D**	<0.0584	U	**1.70**	**D**	**3.64**	**D**	**10.2**	**D**	<0.0568	U	**1.83**	**D**	<0.0516	U	**4.39**	**D**	<0.0523	U	**3.3**	**D**	<0.0478	U	100	100
Pyridine	<0.185	U	<0.233	U	<0.181	U	<0.19	U	<0.177	U	<0.227	U	<0.178	U	<0.206	U	<0.183	U	<0.209	U	<0.175	U	<0.191	U	NS	NS
Totals SVOC's	16.2799		0.781		10.30		18.59		48.7696		ND		14.4561		ND		22.48		ND		17.35		ND		NS	NS

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

U=analyte not detected at or above the level indicated

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

ND=analyte not detected at or above the level indicated

🟦 = sample exceeds NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives

⬛ = sample exceeds NYSDEC Part 375 Restricted Use Soil Cleanup Objectives-Residential

Table 3

Soil Samples Analytical Results for Pesticides and PCBs

200 East 135th Street, Bronx, New York

Sample ID	SP-1 (0-2')		SP-1 (10-12')		SP-2 (0-2')		SP-2 (10-12')		SP-3 (0-2')		SP-3 (10-12')		SP-4 (0-2')		SP-4 (10-12')		SP-5 (0-2')		SP-5 (10-12')		SP-6 (0-2')		SP-6 (10-12')		NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives-Residential
Sampling Date	6/11/2015		6/11/2015		6/10/2015		6/10/2015		6/11/2015		6/11/2015		6/11/2015		6/11/2015		6/10/2015		6/10/2015		6/10/2015		6/10/2015			
Client Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil			
Compound	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result			
Units	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/Kg	mg/Kg
4,4'-DDD	**0.046**	**D**	<0.00231	U	<0.00179	U	<0.00188	U	**0.0519**	**D**	0.00224	U	**0.0948**	**D**	0.00204	U	**0.0285**	**D**	<0.00207	U	<0.00173	U	<0.00189	U	0.0033	2.6
4,4'-DDE	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	0.00175	U	**0.00453**	**D**	0.00176	U	0.00204	U	**0.0357**	**D**	<0.00207	U	<0.00173	U	<0.00189	U	0.0033	1.8
4,4'-DDT	**0.10**	**D**	<0.00231	U	<0.00179	U	<0.00188	U	**0.107**	**D**	**0.00386**	**D**	**0.177**	**D**	0.00204	U	**0.143**	**D**	<0.00207	U	<0.00173	U	<0.00189	U	0.0033	1.7
Aldrin	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	0.005	0.019
alpha-BHC	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	0.02	0.097
alpha-Chlordane	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	0.094	0.91
Aroclor 1016	<0.0185	U	<0.0233	U	<0.0181	U	<0.019	U	<0.0176	U	<0.0226	U	<0.0177	U	<0.0206	U	<0.0182	U	<0.0209	U	<0.0174	U	<0.019	U	NS	NS
Aroclor 1221	<0.0185	U	<0.0233	U	<0.0181	U	<0.019	U	<0.0176	U	<0.0226	U	<0.0177	U	<0.0206	U	<0.0182	U	<0.0209	U	<0.0174	U	<0.019	U	NS	NS
Aroclor 1232	<0.0185	U	<0.0233	U	<0.0181	U	<0.019	U	<0.0176	U	<0.0226	U	<0.0177	U	<0.0206	U	<0.0182	U	<0.0209	U	<0.0174	U	<0.019	U	NS	NS
Aroclor 1242	<0.0185	U	<0.0233	U	<0.0181	U	<0.019	U	<0.0176	U	<0.0226	U	<0.0177	U	<0.0206	U	<0.0182	U	<0.0209	U	<0.0174	U	<0.019	U	NS	NS
Aroclor 1248	<0.0185	U	<0.0233	U	**0.12**		<0.019	U	<0.0176	U	<0.0226	U	<0.0177	U	<0.0206	U	**0.069**		<0.0209	U	<0.0174	U	<0.019	U	NS	NS
Aroclor 1254	<0.0185	U	<0.0233	U	**0.25**		<0.019	U	<0.0176	U	<0.0226	U	**0.60**		<0.0206	U	<0.0182	U	<0.0209	U	<0.0174	U	<0.019	U	NS	NS
Aroclor 1260	**0.082**		<0.0233	U	**0.067**		<0.019	U	**0.11**		<0.0226	U	**0.13**		<0.0206	U	<0.0182	U	<0.0209	U	**0.069**		<0.019	U	NS	NS
beta-BHC	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	0.036	0.072
Chlordane, total	<0.0731	U	<0.0923	U	<0.0717	U	<0.0753	U	<0.0699	U	<0.0897	U	<0.0703	U	<0.0814	U	<0.0722	U	<0.0826	U	<0.0691	U	<0.0755	U	NS	NS
delta-BHC	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	0.04	100
Dieldrin	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	0.005	0.039
Endosulfan I	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	2.4	4.8
Endosulfan II	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	2.4	4.8
Endosulfan sulfate	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	2.4	4.8
Endrin	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	0.014	2.2
Endrin aldehyde	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	NS	NS
Endrin ketone	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	NS	NS
gamma-BHC (Lindane)	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	0.1	0.28
gamma-Chlordane	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	NS	NS
Heptachlor	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	0.042	0.42
Heptachlor epoxide	<0.00183	U	<0.00231	U	<0.00179	U	<0.00188	U	<0.00175	U	<0.00224	U	<0.00176	U	<0.00204	U	<0.0018	U	<0.00207	U	<0.00173	U	<0.00189	U	NS	NS
Methoxychlor	<0.00914	U	<0.0115	U	<0.00896	U	<0.00941	U	<0.00874	U	<0.0112	U	<0.00879	U	<0.0102	U	<0.00902	U	<0.0103	U	<0.00864	U	<0.00943	U	NS	NS
Toxaphene	<0.0925	U	<0.117	U	<0.0907	U	<0.0952	U	<0.0884	U	<0.113	U	<0.089	U	<0.103	U	<0.0913	U	<0.105	U	<0.0874	U	<0.0955	U	NS	NS
Total PCBs	**0.13**		<0.0233	U	**0.43**		<0.019	U	**0.16**		<0.0226	U	**0.72**		<0.0206	U	**0.069**		<0.0209	U	**0.069**		<0.019	U	0.1	1

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

U=analyte not detected at or above the level indicated

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

ND=analyte not detected at or above the level indicated

🟦 = sample exceeds NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives

⬛ = sample exceeds NYSDEC Part 375 Restricted Use Soil Cleanup Objectives-Residential

Table 4

Soil Samples Analytical Results for Metals

200 East 135th Street, Bronx, New York

Sample ID	SP-1 (0-2')		SP-1 (10-12')		SP-2 (0-2')		SP-2 (10-12')		SP-3 (0-2')		SP-3 (10-12')		SP-4 (0-2')		SP-4 (10-12')		SP-5 (0-2')		SP-5 (10-12')		SP-6 (0-2')		SP-6 (10-12')		NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives-Residential
Sampling Date	6/11/2015		6/11/2015		6/10/2015		6/10/2015		6/11/2015		6/11/2015		6/11/2015		6/11/2015		6/10/2015		6/10/2015		6/10/2015		6/10/2015			
Client Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil			
Compound	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result			
Units	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/Kg	mg/Kg
Aluminum	8,040		8,500		9,060		4,950		7,480		13,200		6,080		7,840		8,950		7,640		7,180		6,060		NS	NS
Antimony	<0.554	U	<0.699	U	1.10		<0.57	U	<0.53	U	<0.679	U	<0.533	U	<0.617	U	<0.547	U	<0.626	U	<0.523	U	<0.572	U	NS	NS
Arsenic	4.13		1.77		3.56		1.38		4.08		3.37		4.11		<1.23	U	3.53		<1.25	U	3.06		<1.14	U	13	16
Barium	333		19.10		245		38.40		378		34.20		336		28		635		28.30		263		20.80		350	350
Beryllium	<0.111	U	<0.14	U	<0.109	U	<0.114	U	<0.106	U	<0.136	U	<0.107	U	<0.123	U	<0.109	U	<0.125	U	<0.105	U	<0.114	U	7.2	14
Cadmium	0.95		<0.419	U	0.64		<0.342	U	1.01		<0.408	U	0.86		<0.37	U	0.63		<0.376	U	<0.852		<0.343	U	2.5	2.5
Calcium	48,600		1,710		20,500		1,420		43,900		2,620		27,800		1,550		32,200		5,020		28,900		959		NS	NS
Chromium	22.40		12.70		24.40		12.90		22.20		26.30		17.90		13.80		22.90		18.80		27.30		13		NS	NS
Chromium, Hexavalent	<0.554	U	<0.699	U	<0.543	U	<0.57	U	<0.53	U	<0.679	U	<0.533	U	<0.617	U	<0.547	U	<0.626	U	<0.523	U	<0.572	U	1	22
Chromium, Trivalent	22.40		12.70		24.40		12.90		22.20		26.30		17.90		13.80		22.90		18.80		27.30		13		30	36
Cobalt	7.57		4.05		8.29		14		10.90		10.20		6.54		4.76		10		6.70		8.10		5.05		NS	NS
Copper	80.60		7.34		158		23.80		103		12		85.40		10.10		105		11.10		121		6.74		50	270
Iron	16,500		9,170		18,200		22,600		23,700		27,600		18,600		11,600		18,100		18,700		17,900		15,700		NS	NS
Lead	251		7.82		313		19.10		286		12.80		278		9.30		618		3.18		227		7.52		63	400
Magnesium	9,030		2,160		7,740		1,970		7,500		5,490		5,350		2,540		5,260		4,720		7,410		1,820		NS	NS
Manganese	230		198		275		1,030		300		447		214		105		322		169		308		89.30		1600	2000
Mercury	0.13		<0.0419	U	0.28		0.17		0.36		<0.0408	U	0.32		0.15		0.17		<0.0376	U	0.27		<0.0343	U	0.18	0.81
Nickel	19.50		11.30		22.30		44.30		24.90		21.90		17.60		11.80		18.80		14.60		24.90		10.20		30	140
Potassium	1,710		831		1,660		1,060		1,800		2,700		1,240		962		3,010		982		1,550		1,350		NS	NS
Selenium	<1.11	U	1.79		1.12		4.44		2.11		4.18		1.76		1.75		<1.09	U	12.70		<1.05	U	<1.14	U	3.9	36
Silver	<0.554	U	<0.699	U	<0.543	U	<0.57	U	<0.53	U	<0.679	U	<0.533	U	<0.617	U	<0.547	U	<0.626	U	<0.523	U	<0.572	U	2	36
Sodium	352	B	183	B	291		211		391	B	904	B	408	B	187	B	312		234		391		331		NS	NS
Thallium	<1.11	U	<1.4	U	<1.09	U	<1.14	U	<1.06	U	<1.36	U	<1.07	U	<1.23	U	<1.09	U	<1.25	U	<1.05	U	<1.14	U	NS	NS
Vanadium	34.40		15.60		29.20		21.60		47.60		33.60		32.30		17.30		34.30		22		40		19		NS	NS
Zinc	338		28.70		302		103		497		64		345		31.30		417		33.30		321		28.30		109	2200

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

U=analyte not detected at or above the level indicated

B=analyte found in the analysis batch blank

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

ND=analyte not detected at or above the level indicated

🟦 = sample exceeds NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives

▒ = sample exceeds NYSDEC Part 375 Restricted Use Soil Cleanup Objectives-Residential

Table 5
Groundwater Analytical Results for VOCs
200 East 135th Street, Bronx, New York

Sample ID	MW-1		MW-2		MW-3		Field Blank		Trip Blank		NYSDEC TOGS Standards and Guidance Values - GA
Sampling Date	6/16/2015		7/1/2015		6/16/2015		6/16/2015		6/16/2015		
Client Matrix	Water		Water		Water		Water		Water		
Compound	Result		Result		Result		Result		Result		
Units	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L
1,1,1,2-Tetrachloroethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,1,1-Trichloroethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,1,2,2-Tetrachloroethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,1,2-Trichloroethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	1
1,1-Dichloroethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,1-Dichloroethylene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,1-Dichloropropylene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,2,3-Trichlorobenzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,2,3-Trichloropropane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	0.04
1,2,4-Trichlorobenzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,2,4-Trimethylbenzene	**500**	**D**	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,2-Dibromo-3-chloropropane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	0.04
1,2-Dibromoethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,2-Dichlorobenzene	**1,200**	**D**	<2.5	U	<2.5	U	<2.5	U	<2.5	U	3
1,2-Dichloroethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	0.6
1,2-Dichloropropane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	1
1,3,5-Trimethylbenzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,3-Dichlorobenzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	3
1,3-Dichloropropane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
1,4-Dichlorobenzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	3
2,2-Dichloropropane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
2-Butanone	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	50
2-Chlorotoluene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
4-Chlorotoluene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Acetone	**1,500**	**D**	<5	U	<5	U	<5	U	<5	U	50
Benzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	1
Bromobenzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Bromochloromethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Bromodichloromethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	50
Bromoform	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	50
Bromomethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Carbon tetrachloride	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Chlorobenzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Chloroethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Chloroform	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	7
Chloromethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
cis-1,2-Dichloroethylene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
cis-1,3-Dichloropropylene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	0.4
Dibromochloromethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	50
Dibromomethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	NS
Dichlorodifluoromethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Ethyl Benzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Hexachlorobutadiene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	0.5
Isopropylbenzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Methyl tert-butyl ether (MTBE)	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	10
Methylene chloride	<250	U	<2.5	U	<2.5	U	<2.5	U	**5.30**	**J**	5
Naphthalene	**1,500**	**D**	<2.5	U	<2.5	U	<2.5	U	<2.5	U	10
n-Butylbenzene	**670**	**D**	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
n-Propylbenzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
o-Xylene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
p- & m- Xylenes	<500	U	<5	U	<5	U	<5	U	<5	U	5
p-Isopropyltoluene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
sec-Butylbenzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Styrene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
tert-Butylbenzene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Tetrachloroethylene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Toluene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
trans-1,2-Dichloroethylene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
trans-1,3-Dichloropropylene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	0.4
Trichloroethylene	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Trichlorofluoromethane	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	5
Vinyl acetate	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	NS
Vinyl Chloride	<250	U	<2.5	U	<2.5	U	<2.5	U	<2.5	U	2
Total VOC's	3,200		ND		ND		ND		5.3		NS

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution
J=analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
U=analyte not detected at or above the level indicated
NS=this indicates that no regulatory limit has been established for this analyte
ND=analyte not detected at or above the level indicated
▨ = sample exceeds NYSDEC TOGS Standards and Guidance Values - GA

Table 6
Groundwater Analytical Results for SVOCs
200 East 135th Street, Bronx, New York

Sample ID	MW-1		MW-2		MW-3		Field Blank		NYSDEC TOGS Standards and Guidance Values - GA
Sampling Date	6/16/2015		7/1/2015		6/16/2015		6/16/2015		
Client Matrix	Water		Water		Water		Water		
Compound	Result		Result		Result		Result		
Units	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L
1,2,4-Trichlorobenzene	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
1,2-Dichlorobenzene	<2.56	U	<2.56	U	<2.56	U	<3.33	U	3
1,3-Dichlorobenzene	<2.56	U	<2.56	U	<2.56	U	<3.33	U	3
1,4-Dichlorobenzene	<2.56	U	<2.56	U	<2.56	U	<3.33	U	3
2,4,5-Trichlorophenol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	1
2,4,6-Trichlorophenol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	1
2,4-Dichlorophenol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
2,4-Dimethylphenol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	50
2,4-Dinitrophenol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	10
2,4-Dinitrotoluene	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
2,6-Dinitrotoluene	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
2-Chloronaphthalene	<2.56	U	<2.56	U	<2.56	U	<3.33	U	10
2-Chlorophenol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	1
2-Methylnaphthalene	<2.56	U	<2.56	U	<2.56	U	<3.33	U	~
2-Methylphenol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	1
2-Nitroaniline	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
2-Nitrophenol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	1
3- & 4-Methylphenols	<2.56	U	<2.56	U	<2.56	U	<3.33	U	~
3,3'-Dichlorobenzidine	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
3-Nitroaniline	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
4,6-Dinitro-2-methylphenol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	NS
4-Bromophenyl phenyl ether	<2.56	U	<2.56	U	<2.56	U	<3.33	U	NS
4-Chloro-3-methylphenol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	1
4-Chloroaniline	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
4-Chlorophenyl phenyl ether	<2.56	U	<2.56	U	<2.56	U	<3.33	U	NS
4-Nitroaniline	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
4-Nitrophenol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	1
Acenaphthene	<0.0513	U	<0.0513	U	<0.0513	U	<0.0667	U	20
Acenaphthylene	<0.0513	U	<0.0513	U	<0.0513	U	<0.0667	U	NS
Aniline	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
Anthracene	<0.0513	U	**0.072**		<0.0513	U	<0.0667	U	50
Benzo(a)anthracene	<0.0513	U	<0.0513	U	<0.0513	U	<0.0667	U	0.002
Benzo(a)pyrene	<0.0513	U	<0.0513	U	<0.0513	U	<0.0667	U	0.002
Benzo(b)fluoranthene	<0.0513	U	<0.0513	U	<0.0513	U	<0.0667	U	0.002
Benzo(g,h,i)perylene	<0.0513	U	<0.0513	U	<0.0513	U	<0.0667	U	NS
Benzo(k)fluoranthene	<0.0513	U	<0.0513	U	<0.0513	U	<0.0667	U	0.002
Benzyl alcohol	<2.56	U	<2.56	U	<2.56	U	<3.33	U	NS
Benzyl butyl phthalate	<2.56	U	<2.56	U	<2.56	U	<3.33	U	50
Bis(2-chloroethoxy)methane	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
Bis(2-chloroethyl)ether	<2.56	U	<2.56	U	<2.56	U	<3.33	U	1
Bis(2-chloroisopropyl)ether	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
Bis(2-ethylhexyl)phthalate	<0.513	U	**0.79**		<0.513	U	<0.667	U	5
Chrysene	<0.0513	U	<0.0513	U	<0.0513	U	<0.0667	U	0.002
Dibenzo(a,h)anthracene	<0.0513	U	<0.0513	U	<0.0513	U	<0.0667	U	NS
Dibenzofuran	<2.56	U	<2.56	U	<2.56	U	<3.33	U	NS
Diethyl phthalate	<2.56	U	<2.56	U	<2.56	U	<3.33	U	50
Dimethyl phthalate	<2.56	U	<2.56	U	<2.56	U	<3.33	U	50
Di-n-butyl phthalate	<2.56	U	<2.56	U	<2.56	U	<3.33	U	50
Di-n-octyl phthalate	<2.56	U	<2.56	U	<2.56	U	<3.33	U	50
Fluoranthene	<0.0513	U	**0.051**	J	<0.0513	U	<0.0667	U	50
Fluorene	<0.0513	U	**0.072**		<0.0513	U	<0.0667	U	50
Hexachlorobenzene	<0.0205	U	<0.0205	U	<0.0205	U	<0.0267	U	0.04
Hexachlorobutadiene	<0.513	U	<0.0513	U	<0.513	U	<0.667	U	0.5
Hexachlorocyclopentadiene	<2.56	U	<2.56	U	<2.56	U	<3.33	U	5
Hexachloroethane	<0.513	U	<0.513	U	<0.513	U	<0.667	U	5
Indeno(1,2,3-cd)pyrene	<0.0513	U	<0.0513	U	<0.0513	U	<0.0667	U	0.002
Isophorone	<2.56	U	<2.56	U	<2.56	U	<3.33	U	50
Naphthalene	<0.0513	U	**0.26**		<0.0513	U	<0.0667	U	10
Nitrobenzene	<0.256	U	<0.256	U	<0.256	U	<0.333	U	0.4
N-Nitrosodimethylamine	<0.513	U	<0.513	U	<0.513	U	<0.667	U	NS
N-nitroso-di-n-propylamine	<2.56	U	<2.56	U	<2.56	U	<3.33	U	NS
N-Nitrosodiphenylamine	<2.56	U	<2.56	U	<2.56	U	<3.33	U	50
Pentachlorophenol	<0.256	U	<0.256	U	<0.256	U	<0.333	U	1
Phenanthrene	<0.0513	U	**0.20**		<0.0513	U	<0.0667	U	50
Phenol	<2.56	U	<2.56	U	**5.6**		<3.33	U	1
Pyrene	<0.0513	U	<0.0513	U	<0.0513	U	<0.0667	U	50
Pyridine	<2.56	U	<2.56	U	<2.56	U	<3.33	U	50
Total SVOC's	ND		1.44		5.60		ND		NS

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

U=analyte not detected at or above the level indicated

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

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

ND=analyte not detected at or above the level indicated

▨ = sample exceeds NYSDEC TOGS Standards and Guidance Values - GA

Table 7

Groundwater Analytical Results for Pesticides and PCBs

200 East 135th Street, Bronx, New York

Sample ID	MW-1		MW-2		MW-3		Field Blank		NYSDEC TOGS Standards and Guidance Values - GA
Sampling Date	6/16/2015		7/1/2015		6/16/2015		6/16/2015		
Client Matrix	Water		Water		Water		Water		
Compound	Result		Result		Result		Result		
Units	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L
4,4'-DDD	**0.0043**		<0.00457	U	<0.00471	U	<0.00421	U	0.3
4,4'-DDE	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	0.2
4,4'-DDT	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	0.2
Aldrin	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	NS
alpha-BHC	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	0.01
alpha-Chlordane	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	NS
Aroclor 1016	<0.0513	U	<0.0571	U	<0.0588	U	<0.0526	U	NS
Aroclor 1221	<0.0513	U	<0.0571	U	<0.0588	U	<0.0526	U	NS
Aroclor 1232	<0.0513	U	<0.0571	U	<0.0588	U	<0.0526	U	NS
Aroclor 1242	<0.0513	U	<0.0571	U	<0.0588	U	<0.0526	U	NS
Aroclor 1248	<0.0513	U	<0.0571	U	<0.0588	U	<0.0526	U	NS
Aroclor 1254	<0.0513	U	<0.0571	U	<0.0588	U	<0.0526	U	NS
Aroclor 1260	<0.0513	U	<0.0571	U	<0.0588	U	<0.0526	U	NS
beta-BHC	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	0.04
Chlordane, total	<0.041	U	<0.0457	U	<0.0471	U	<0.0421	U	0.05
delta-BHC	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	0.04
Dieldrin	<0.00205	U	<0.00229	U	<0.00235	U	<0.00211	U	0.004
Endosulfan I	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	NS
Endosulfan II	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	NS
Endosulfan sulfate	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	NS
Endrin	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	NS
Endrin aldehyde	<0.0103	U	<0.0114	U	<0.0118	U	<0.0105	U	5
Endrin ketone	<0.0103	U	<0.0114	U	<0.0118	U	<0.0105	U	5
gamma-BHC (Lindane)	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	0.05
gamma-Chlordane	<0.0103	U	<0.0114	U	<0.0118	U	<0.0105	U	NS
Heptachlor	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	0.04
Heptachlor epoxide	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	0.03
Methoxychlor	<0.0041	U	<0.00457	U	<0.00471	U	<0.00421	U	35
Toxaphene	<0.103	U	<0.114	U	<0.118	U	<0.105	U	0.06
Total PCBs	<0.0513	U	<0.0571	U	<0.0588	U	<0.0526	U	0.09

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

U=analyte not detected at or above the level indicated

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

ND=analyte not detected at or above the level indicated

▨ = sample exceeds NYSDEC TOGS Standards and Guidance Values - GA

Table 8

Groundwater Analytical Results for Metals

200 East 135th Street, Bronx, New York

Sample ID	MW-1		MW-2		MW-3		Field Blank		NYSDEC TOGS Standards and Guidance Values - GA
Sampling Date	6/16/2015		7/1/2015		6/16/2015		6/16/2015		
Client Matrix	Water		Water		Water		Water		
Compound	Result		Result		Result		Result		
Units	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L
Metals, Target Analyte									
Aluminum	29,300		129		1,380		<50	U	NS
Antimony	59		<5	U	5		<5	U	3
Arsenic	<4	U	14		<4	U	<4	U	25
Barium	369		105		203		<10	U	1000
Beryllium	<1	U	<1	U	<1	U	<1	U	3
Cadmium	<3	U	<3	U	<3	U	<3	U	5
Calcium	136,000		215,000		299,000		<50	U	NS
Chromium	57		<5	U	6		<5	U	50
Chromium, Hexavalent	<10	U	<10	U	<10	U	<10	U	50
Chromium, Trivalent	57		<10	U	<10	U	<10	U	NS
Cobalt	<5	U	<5	U	<5	U	<5	U	NS
Copper	115		12		28		<3	U	200
Iron	18,400		17,700		19,500		<20	U	NS
Lead	227		6		36		<3	U	25
Magnesium	25,000		41,500		164,000		<50	U	35000
Manganese	519		3,550		2,690		<5	U	300
Mercury	<0.2	U	<0.2	U	<0.2	U	<0.2	U	0.7
Nickel	<5	U	<5	U	<5	U	<5	U	100
Potassium	24,600		26,300		77,200		139		NS
Selenium	160		<10	U	17		<10	U	10
Silver	<5	U	<5	U	<5	U	<5	U	50
Sodium	173,000	B	169,000		816,000	BE	1,090	B	20000
Thallium	<5	U	<5	U	<5	U	<5	U	NS
Vanadium	62		<10	U	<10	U	<10	U	NS
Zinc	156		31		65		14		2000
Metals, Target Analyte, Dissolved									
Aluminum	3,430		<50	U	<50	U	<50	U	NS
Antimony	40		<5	U	<5	U	<5	U	3
Arsenic	<4	U	6		<4	U	6		25
Barium	99		57		56		<10	U	1000
Beryllium	<1	U	<1	U	<1	U	<1	U	3
Cadmium	<3	U	<3	U	<3	U	<3	U	5
Calcium	112,000		214,000		273,000		<50	U	NS
Chromium	12		<5	U	<5	U	<5	U	50
Cobalt	<5	U	<5	U	<5	U	<5	U	NS
Copper	39		6		10		<3	U	200
Iron	2,140		160		1,500		<20	U	NS
Lead	27		<3	U	<3	U	<3	U	25
Magnesium	21,600		40,700		145,000		<50	U	35000
Manganese	277		3,260		2,380		<5	U	300
Mercury	<0.2	U	<0.2	U	<0.2	U	<0.2	U	0.7
Nickel	<5	U	<5	U	<5	U	<5	U	100
Potassium	16,400		25,900		71,100		133		NS
Selenium	60		<10	U	27		14		10
Silver	<5	U	<5	U	<5	U	<5	U	50
Sodium	157,000		170,000		782,000	E	1,010		20000
Thallium	<5	U	<5	U	<5	U	<5	U	NS
Vanadium	<10	U	<10	U	<10	U	<10	U	NS
Zinc	16		<10	U	15		<10	U	2000

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

U=analyte not detected at or above the level indicated

B=analyte found in the analysis batch blank

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

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

▨ = sample exceeds NYSDEC TOGS Standards and Guidance Values - GA

Table 9
Soil Vapor Analytical Results
200 East 135t Street, Bronx, New York

Sample ID	SV-1		SV-2		SV-3		SV-4		SV-5		OA-1		OA-1 Re-Test		NYSDOH Background Standards - Indoor Air - Upper Fence
Sampling Date	6/16/2015		6/16/2015		6/16/2015		6/16/2015		7/1/2015		6/16/2015		7/1/2015		
Client Matrix	Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Outdoor Ambient Air		Outdoor Ambient Air		
Compound	Result		Result		Result		Result		Result		Result		Result		
Units	ug/m3	Q	ug/m3	Q	ug/m3	Q	ug/m3	Q	ug/m3	Q	ug/m3	Q	ug/m3	Q	ug/m3
1,1,1,2-Tetrachloroethane	<15	U	<12	U	<14	U	<14	U	<16	U	<0.69	U	<0.7	U	NS
1,1,1-Trichloroethane	<12	U	<9.3	U	<11	U	<11	U	<12	U	<0.55	U	<0.55	U	2.5
1,1,2,2-Tetrachloroethane	<15	U	<12	U	<14	U	<14	U	<16	U	<0.69	U	<0.7	U	0.4
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	<16	U	<13	U	<16	U	<16	U	<18	U	<0.77	U	<0.78	U	2.5
1,1,2-Trichloroethane	<12	U	<9.3	U	<11	U	<11	U	<12	U	<0.55	U	<0.55	U	0.4
1,1-Dichloroethane	<8.7	U	<6.9	U	<8.5	U	<8.5	U	<9.3	U	<0.4	U	<0.41	U	0.4
1,1-Dichloroethylene	<8.5	U	<6.8	U	<8.3	U	<8.3	U	<9.1	U	<0.4	U	<0.4	U	0.4
1,2,4-Trichlorobenzene	<16	U	<13	U	<16	U	<16	U	<17	U	<0.74	U	<0.75	U	0.5
1,2,4-Trimethylbenzene	<11	U	<8.4	U	<10	U	<10	U	**12**	**D**	**3.90**		<0.5	U	9.8
1,2-Dibromoethane	<16	U	<13	U	<16	U	<16	U	<18	U	<0.77	U	<0.78	U	0.4
1,2-Dichlorobenzene	<13	U	<10	U	<13	U	<13	U	<14	U	<0.6	U	<0.61	U	0.5
1,2-Dichloroethane	<8.7	U	<6.9	U	<8.5	U	<8.5	U	<9.3	U	<0.4	U	<0.41	U	0.4
1,2-Dichloropropane	<9.9	U	<7.9	U	<9.7	U	<9.7	U	<11	U	<0.46	U	<0.47	U	0.4
1,2-Dichlorotetrafluoroethane	<15	U	<12	U	<15	U	<15	U	<16	U	<0.7	U	<0.71	U	0.4
1,3,5-Trimethylbenzene	<11	U	<8.4	U	<10	U	<10	U	<11	U	**1.10**		<0.5	U	3.9
1,3-Butadiene	<9.3	U	<7.4	U	<9.1	U	<9.1	U	**150**	**D**	<0.43	U	<0.44	U	NS
1,3-Dichlorobenzene	<13	U	<10	U	<13	U	<13	U	<14	U	<0.6	U	<0.61	U	0.5
1,3-Dichloropropane	<9.9	U	<7.9	U	<9.7	U	<9.7	U	<11	U	<0.46	U	<0.47	U	NS
1,4-Dichlorobenzene	<13	U	<10	U	<13	U	<13	U	<14	U	<0.6	U	<0.61	U	1.2
1,4-Dioxane	<7.7	U	<6.2	U	<7.6	U	<7.6	U	<8.3	U	<0.36	U	<0.37	U	NS
2-Butanone	<6.3	U	<5	U	<6.2	U	<6.2	U	**91**	**D**	**4.20**		**1.60**	**D**	16
2-Hexanone	<18	U	<14	U	<17	U	<17	U	<19	U	<0.82	U	<0.83	U	NS
3-Chloropropene	<6.7	U	<5.3	U	<6.6	U	<6.6	U	<7.2	U	<0.31	U	<0.32	U	NS
4-Methyl-2-pentanone	<8.8	U	<7	U	<8.6	U	<8.6	U	<9.4	U	<0.41	U	<0.42	U	1.9
Acetone	<5.1	U	**23**	**D**	**20**	**D**	**13**	**D**	**580**	**D**	**41**		**21**	**D**	115
Acrylonitrile	<4.7	U	<3.7	U	<4.6	U	<4.6	U	<5	U	<0.22	U	<0.22	U	NS
Benzene	<6.9	U	<5.5	U	<6.7	U	<6.7	U	**45**	**D**	**6.30**		**0.52**	**D**	13
Benzyl chloride	<11	U	<8.8	U	<11	U	<11	U	<12	U	<0.52	U	<0.53	U	NS
Bromodichloromethane	<13	U	<11	U	<13	U	<13	U	<14	U	<0.62	U	<0.63	U	NS
Bromoform	<22	U	<18	U	<22	U	<22	U	<24	U	<1	U	<1	U	NS
Bromomethane	<8.3	U	<6.6	U	<8.2	U	<8.2	U	<8.9	U	<0.39	U	<0.39	U	0.5
Carbon disulfide	**13**	**D**	<5.3	U	**17**	**D**	<6.5	U	**130**	**D**	<0.31	U	<0.32	U	NS
Carbon tetrachloride	<3.4	U	<2.7	U	<3.3	U	<3.3	U	<3.6	U	**0.50**		<0.16	U	1.3
Chlorobenzene	<9.9	U	<7.9	U	<9.7	U	<9.7	U	<11	U	<0.46	U	<0.47	U	0.4
Chloroethane	<5.7	U	<4.5	U	<5.5	U	<5.5	U	<6	U	<0.26	U	<0.27	U	0.4
Chloroform	<10	U	<8.3	U	<10	U	<10	U	<11	U	**0.54**		<0.5	U	1.2
Chloromethane	<4.4	U	<3.5	U	<4.3	U	<4.3	U	<4.7	U	**2.10**		**1.80**	**D**	4.2
cis-1,2-Dichloroethylene	<8.5	U	<6.8	U	<8.3	U	<8.3	U	<9.1	U	<0.4	U	<0.4	U	0.4
cis-1,3-Dichloropropylene	<9.7	U	<7.8	U	<9.5	U	<9.5	U	<10	U	<0.45	U	<0.46	U	0.4
Cyclohexane	**8.90**	**D**	<5.9	U	<7.2	U	<7.2	U	**32**	**D**	**5**		<0.35	U	6.3
Dibromochloromethane	<17	U	<14	U	<17	U	<17	U	<18	U	<0.8	U	<0.81	U	NS
Dichlorodifluoromethane	**22**	**D**	<8.4	U	**54**	**D**	**17**	**D**	**31**	**D**	**2.40**		**2.10**	**D**	10
Ethyl acetate	<15	U	<12	U	<15	U	<15	U	<17	U	<0.72	U	<0.73	U	NS
Ethyl Benzene	<9.3	U	<7.4	U	<9.1	U	<9.1	U	**24**	**D**	**3.80**		<0.44	U	6.4
Hexachlorobutadiene	<23	U	<18	U	<22	U	<22	U	<24	U	<1.1	U	<1.1	U	0.5
Isopropanol	<11	U	<8.4	U	<10	U	<10	U	<11	U	**84**		**4.10**	**D**	NS
Methyl Methacrylate	<8.8	U	<7	U	<8.6	U	<8.6	U	<9.4	U	<0.41	U	<0.42	U	0.4
Methyl tert-butyl ether (MTBE)	<7.7	U	<6.1	U	<7.6	U	<7.6	U	<8.2	U	<0.36	U	<0.37	U	14
Methylene chloride	<15	U	<12	U	<15	U	<15	U	<16	U	**53**		**0.85**	**D**	16
n-Heptane	**23**	**D**	<7	U	<8.6	U	<8.6	U	**53**	**D**	**7.70**		<0.42	U	18
n-Hexane	**60**	**D**	<6	U	<7.4	U	<7.4	U	**110**	**D**	**34**		<0.36	U	14
o-Xylene	<9.3	U	<7.4	U	<9.1	U	<9.1	U	<9.9	U	**4.80**		<0.44	U	7.1
p- & m- Xylenes	<19	U	<15	U	<18	U	<18	U	<20	U	**15**		<0.88	U	11
p-Ethyltoluene	<11	U	<8.4	U	<10	U	<10	U	<11	U	**3.50**		<0.5	U	NS
Propylene	<3.7	U	<2.9	U	<3.6	U	<3.6	U	<3.9	U	<0.17	U	<0.17	U	NS
Styrene	<9.1	U	<7.3	U	<8.9	U	<8.9	U	<9.8	U	<0.43	U	<0.43	U	1.4
Tetrachloroethylene	<3.6	U	**13**	**D**	**19**	**D**	**130**	**D**	<3.9	U	**240**		<0.17	U	2.5
Tetrahydrofuran	<6.3	U	<5	U	<6.2	U	<6.2	U	**69**	**D**	<0.29	U	**1.90**	**J**	0.8
Toluene	<8.1	U	<6.4	U	<7.9	U	<7.9	U	**31**	**D**	**32**		**1.50**	**D**	57
trans-1,2-Dichloroethylene	<8.5	U	<6.8	U	<8.3	U	<8.3	U	<9.1	U	<0.4	U	<0.4	U	NS
trans-1,3-Dichloropropylene	<9.7	U	<7.8	U	<9.5	U	<9.5	U	<10	U	<0.45	U	<0.46	U	NS
Trichloroethylene	<2.9	U	<2.3	U	<2.8	U	<2.8	U	<3.1	U	**0.32**		<0.14	U	0.5
Trichlorofluoromethane (Freon 11)	**36**	**D**	**36**	**D**	**34**	**D**	**15**	**D**	<13	U	**11**		**1.20**	**D**	12
Vinyl acetate	<7.6	U	<6	U	<7.4	U	<7.4	U	<8.1	U	<0.35	U	<0.36	U	NS
Vinyl bromide	<9.4	U	<7.5	U	<9.2	U	<9.2	U	<10	U	<0.44	U	<0.44	U	NS
Vinyl Chloride	<1.4	U	<1.1	U	<1.3	U	<1.3	U	<1.5	U	<0.064	U	<0.065	U	0.4
Total VOCs	162.90		72.00		144.00		175.00		1,358.00		556.16		36.57		NS

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

U=analyte not detected at or above the level indicated

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

APPENDICES

Appendix A: Previous Investigation (Subsurface [Phase II] Investigation by AKRF, Inc.)

Storage Deluxe
200 East 135th Street

BRONX, NEW YORK

Subsurface (Phase II) Investigation

AKRF Project Number: 80095

Prepared for:

Storage Deluxe
50 Main Street, Suite 812
White Plains, New York 10606

Prepared by:

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

DECEMBER 2006

TABLE OF CONTENTS

1.0 Introduction.......... 1
2.0 Topography and Hydrogeology.......... 1
3.0 Field Activities.......... 2
  3.1 Soil Borings.......... 2
  3.2 Field Observations and Analytical Results.......... 2
4.0 Laboratory Analytical Results.......... 3
  4.1 Soil Analytical Results.......... 3
5.0 Conclusions and Recommendations.......... 5
6.0 References.......... 6

TABLES

Table 1 - Summary of Volatile Organic Compounds (VOCs) in Soil
Table 2 - Summary of Semivolatile Organic Compounds (SVOCs) in Soil
Table 3 - Summary of Polycyclic Aromatic Hydrocarbons (PAHs) in Soil
Table 4 - Summary of PCBs and Pesticides in Soil
Table 5 - Summary of Metals in Soil

FIGURES

Figure 1 - Site Location Map
Figure 2 - Site Plan

APPENDICES

Appendix A - Soil Boring Logs
Appendix B - Soil Analytical Data Sheets
Appendix C – Post Excavation Figure from 1999 Remedial Activities Report

1.0 INTRODUCTION

AKRF, Inc. (AKRF) conducted a subsurface (Phase II) investigation at the 200 East 135th Street property in the Bronx, New York. The subject site consisted of an approximately 42,000 square-foot unpaved vacant lot located on the south side of East 135th Street between 3rd and Park Avenues. The Phase II study was intended to determine whether the site had been affected by current or former on- or off-site operations. A site location map is provided as Figure 1.

The subject site of this investigation was included in several previous environmental studies comprising a larger, approximately 6.5-acre site. The investigations included: a Phase I Environmental Site Assessment (ESA) in June 1995 by Aqua Terra Environmental Services Corp.; and a Phase I Update in September 1997, a Subsurface (Phase II) Investigation in January 1998, and a supplemental Subsurface (Phase II) Investigation in February 1998 by Land Tech Remedial, Inc. Historical on-site operations included a railroad freight yard, coal yards, warehousing and various industrial uses, some of which included oil storage. Laboratory analysis of soil samples collected during several of these investigations detected concentrations of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) and metals above the New York State Department of Environmental Conservation (NYSDEC) guidance values; however, no samples indicated that the soil would be considered a characteristic hazardous waste in accordance with state regulations.

Consequently, AKRF completed remedial activities at the 6.5-acre site in the fall of 1999 that included test pits, endpoint soil sample analysis, and the off-site removal of: approximately 4,000 cubic yards of screened soil; approximately 60 cubic yards of tires; and approximately 4,000 cubic yards of oversized masonry and co-mingled debris (concrete, wood and metal). Two of the test pits, one soil boring and five endpoint samples analyzed were from within the approximately 42,000-square foot project area of this current investigation. In addition, soil from an approximately 1,600 square-foot section of the subject site was excavated for off-site disposal. A figure from AKRF's Remedial Activities Report showing the locations of the soil removal, test pit and soil boring locations and confirmatory end-point sampling is included as Appendix C. The location of this current study site is highlighted on the old figure. Subsequent to the remediation activities, a Phase I ESA was conducted by SECOR in April 2004 and a Phase I Update was conducted by AKRF in August 2006.

This Subsurface (Phase II) study was conducted on November 1, 2006 and included the advancement of five soil borings and the collection of soil samples for laboratory analysis. The scope of work was based on the previous investigations conducted at the site. This report describes methods and results of the Phase II investigation conducted by AKRF.

2.0 TOPOGRAPHY AND HYDROGEOLOGY

The surface topography at the site is generally level. Based on the U.S. Geological Survey Central Park, New York-New Jersey topographic map, the property lies at an elevation of approximately 20 feet above the National Geodetic Vertical Datum of 1929 (an approximation of mean sea level).

Groundwater was encountered at a depth of approximately 13 feet below surface grade during this investigation. Groundwater most likely flows in a south-southwesterly direction toward the Bronx River, located approximately 400 feet southwest of the study site. However, actual groundwater flow at the site can be affected by many factors including past filling activities, underground utilities and other subsurface openings or obstructions such as basements, underground parking garages, bedrock geology, and other factors beyond the scope of this study. Groundwater in the Bronx is not used as a source of potable water.

3.0 FIELD ACTIVITIES

3.1 Soil Borings

On November 1, 2006, Zebra Environmental of Lynbrook, New York advanced five soil borings at the subject property, as shown on Figure 2. The soil borings were advanced using a truck-mounted Geoprobe® direct push probe (DPP) unit. Soil samples were collected using five-foot long, two-inch diameter, macrocore piston rod samplers fitted with acetate liners. Soil borings AK-SB-1, AK-SB-2, AK-SB-4 and AK-SB-5 were advanced to 10 feet below grade and soil boring AK-SB-3 was advanced to 15 feet below grade. Soil boring logs are provided in Appendix A.

Each sample was split lengthwise and logged by AKRF field personnel. Logging consisted of: describing the soil according to the modified Burmister Classification System; describing any evidence of contamination (e.g., staining, sheens, odors); and screening the soil for organic vapors using a photoionization detector (PID) in one-foot intervals. Two soil samples from each boring (one shallow and one deep) were selected for laboratory analysis based on PID response and visual indications of contamination. At soil boring location AK-SB-3, perched groundwater was encountered at a depth of approximately nine feet below grade. The soil was dry between the 10-foot to 13-foot interval. The groundwater table was encountered at approximately 13 feet below grade.

Soil samples designated for laboratory analysis were collected using dedicated sampling equipment, placed into laboratory-supplied containers and a chilled cooler, and submitted via courier to Alpha Analytical Laboratories in Westborough, Massachusetts, a New York State-certified laboratory. Soil samples were analyzed for volatile organics compounds (VOCs) by EPA Method 8260, semi-volatile organic compounds (SVOCs) by EPA Method 8270, polychlorinated biphenyls (PCBs) by Method 8081, pesticides by Method 8082, and target analyte list (TAL) metals.

An attempt was made to collect a groundwater sample at soil boring AK-SB-3 using a temporary PVC monitoring well, dedicated tubing and a peristaltic pump. Due to the high silt content in the well, a groundwater sample could not be collected.

One trip blank accompanied the sample shipment for quality assurance/quality control (QA/QC) purposes, which was analyzed for VOCs by EPA Method 8260 only. No additional QA/QC samples were collected.

3.2 Field Observations and Analytical Results

Soil encountered during this investigation consisted of urban fill (brick, wood, glass, ash, coal slag and coal) with some brown and gray fine sand, silt, and fine gravel. Groundwater was encountered at a depth of approximately 13 feet below surface grade at soil boring location AK-SB-3.

Recovered soil at each boring was transferred from the sampler into sealable plastic bags. The headspace of each sample was screened for volatile organic compounds (VOCs) by placing the probe of a Model 580B photoionization detector (PID) inside the plastic bags. No PID headspace readings were detected above background in soil boring locations AK-SB-1, AK-SB-2 and AK-

SB-4. A PID headspace reading of 6.4 parts per million (ppm) and a slight petroleum-like odor were detected in the soil from soil boring AK-SB-3 at a depth of approximately 9 to 10 feet below grade. A PID headspace reading of 0.7 ppm and a slight creosote-like odor were detected in soil from soil boring AK-SB-5 at a depth of approximately 8 to 9 feet below grade. Wood fragments were noted in the boring at this depth, which may have been creosote-treated. Results of the field screening activities are provided in the soil boring logs in Appendix A.

4.0 LABORATORY ANALYTICAL RESULTS

4.1 Soil Analytical Results

Ten (10) discrete soil samples, two from each boring, were collected for laboratory analysis as part of this investigation. Soil sample analytical results were compared to the Recommended Soil Cleanup Objectives (RSCO), outlined in the New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum (TAGM) 4046. In addition, results of the soil metals analyses were compared to TAGM 4046 Eastern United States background levels. Soil descriptions, observations, and photoionization detector (PID) readings were recorded on the soil boring logs provided in Appendix A. Laboratory analytical data sheets are included in Appendix B.

Soil analytical results for volatile organic compounds (VOCs) are presented in Table 1. Acetone was detected in soil samples AK-SB-3 (9’-10’) and AK-SB-4 (9’-10’) at concentrations of 0.13 parts per million (ppm) and 0.053 ppm, respectively, which are below the TAGM RSCO of 0.2 ppm. A concentration of 2-butanone was detected in soil sample AK-SB-3 (9’-10’) at 0.032 ppm, which is below the TAGM RSCO of 0.3 ppm. Naphthalene was detected in samples AK-SB-2 (1’-2’), AK-SB-3 (2’-3’), AK-SB-4 (9’-10’), and AK-SB-5 (8’-9) at concentrations ranging from 0.017 ppm to 0.49 ppm, below the RSCO of 13 ppm. A PID headspace reading of 6.4 ppm and a slight petroleum-like odor were detected in soil boring location AK-SB-3 (9’-10’); however, based on field observations and the lack of a petroleum source, the detections in these samples were most likely due to the quality of urban fill material and not to a specific release or spill.

Soil analytical results for semivolatile organic compounds (SVOCs) are presented in Table 2. SVOCs were detected in all of the soil samples analyzed, in some cases at concentrations above their respective TAGM RSCOs. To accurately quantify certain SVOCs for comparison with the established TAGM RSCOs, the polycyclic aromatic hydrocarbons (PAHs) portion of the SVOCs were reanalyzed in the laboratory at lower detection limits. In some samples, the laboratory reported elevated detection limits due to elevated concentrations of target compounds. The results of this analysis are presented in Table 3. Detected elevated compounds included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, phenol, and phenanthrene. The majority of the SVOCs detected, including those that exceeded the TAGM criteria, were PAHs, compounds typically detected in urban fill encountered in New York City. In general, soil sampled during this investigation comprised urban fill material, including coal and ash. Based on the nature and concentration of compounds detected, these levels are likely attributable to urban fill and do not reflect contamination from an on- or off-site spill or release.

Soil analytical results for polychlorinated biphenyls (PCBs) and pesticides are presented in Table 4. PCBs were detected in soil samples AK-SB-1 (1’-2’), AK-SB-2 (9’-10’), AK-SB-3 (2’-3’), AK-SB-4 (2’-3’) and AK-SB-5 (8’-9’) at concentrations below the TAGM RSCO of 10 ppm for subsurface soil. Pesticides were detected in soil samples AK-SB-1 (1’-2’), AK-SB-2 (1’-2’), AK-SB-3 (2’-3’), and AK-SB-3 (9’-10’), but at concentrations below their respective TAGM RSCOs. Based on the nature and distribution of identified PCBs and pesticides in the analyzed samples, the detected levels are likely attributable to the urban fill and do not reflect contamination from an on- or off-site spill or release.

Metals analytical results are presented in Table 5. Metals were detected in all ten samples analyzed, primarily at concentrations either below the TAGM RSCOs or within the Eastern United States background ranges. Metals concentrations exceeding both of these criteria included cadmium, calcium, chromium, copper, magnesium, mercury, nickel, and zinc. Based on the type and distribution of the identified metals concentrations, the metals detections are most likely attributable to urban fill at the site or are naturally occurring in the soil and do not appear to be indicative of environmental contamination from historic on-site operations.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Ten (10) soil samples were collected from the five (5) soil borings for laboratory analysis. Soil encountered during this investigation generally consisted of urban fill (brick, wood, glass, ash, coal slag and coal) with some brown and gray fine sand, silt, and fine gravel.

Laboratory analysis indicated that low levels of volatile organic compounds (VOCs) were detected in four of the soil samples analyzed at concentrations below their respective TAGM RSCOs. SVOCs were detected in all of the soil samples analyzed, in some cases at concentrations above their respective TAGM RSCOs. PCBs and pesticides were detected in some of the soil samples analyzed, but at concentrations below their respective TAGM RSCOs. Metals were detected in all ten samples analyzed, primarily at concentrations either below the TAGM RSCOs or within the Eastern United States background ranges. Based on the concentrations and distribution of the identified compounds and metals, the detections are most likely attributable to the urban fill at the site.

Proposed redevelopment of the subject site includes construction of a storage building. The first three floors (approximately 100,000 square feet) of the seven floor building will be for art storage. The proposed construction will be pile-supported and will not have a basement. Final first floor grade will be approximately one foot above existing grade and the loading dock will be approximately two feet below existing grade. A 10-mil thick vapor barrier will be placed on top of a four to six-inch gravel substrate. The building will include a sophisticated air handling system which will filter the incoming air that will be circulated throughout the space. Dewatering will not be necessary for site development. Any soil excavated as part of any future site development activities will be managed in accordance with all applicable regulations. Soil intended for off-site disposal will be tested in accordance with the requirements of the receiving facility. Transportation of material leaving the site for off-site disposal will be in accordance with federal, state and local requirements covering licensing of haulers and trucks, placarding, truck routes, manifesting, etc.

Because the proposed warehouse will be used only for the storage of art, and the development plans include the installation of an air purifying system to protect the art and a vapor barrier, potential vapor intrusion into the proposed warehouse is not expected to affect human health. In addition, no significant volatile organics were detected by this Phase II study in the underlying soil.

Based on the results of this investigation, and on the positive effect of the previous remedial activities conducted at the subject site, and the proposed systems that will be installed in and below the proposed building, no further investigation is warranted at this time.

6.0 REFERENCES

1. Phase I Environmental Site Assessment Update – East 135th Street and Park Avenue, Bronx, New York; Land Tech Remedial, Inc.; September 1997.
2. Phase II Subsurface Investigation – East 135th Street and Park Avenue, Bronx, New York; Land Tech Remedial, Inc.; January 1998.
3. Supplemental Phase II Subsurface Investigation – East 135th Street and Park Avenue, Bronx, New York; Land Tech Remedial, Inc.; February 1998.
4. Remedial Activities Report – East 135th Street, Bronx, New York; AKRF, Inc.; November 1999.
5. Phase I Environmental Site Assessment – East 135th Street, Bronx, New York; SECOR International, Inc.; April 2004.
6. Phase I Environmental Site Assessment Update – East 135th Street, Bronx, New York; AKRF, Inc.; August 2006.

TABLES

Table 1
200 East 135th Street
Bronx, NY
Soil Analytical Results

Volatile Organic Compounds

Client ID		AK-SB-1 (1'-2')	AK-SB-1 (6'-7')	AK-SB-2 (1'-2')	AK-SB-2 (9'-10')	AK-SB-3 (2'-3')	AK-SB-3 (9'-10')
LAB SAMPLE ID	NY-TAGM	L0615863-01	L0615863-02	L0615863-03	L0615863-04	L0615863-05	L0615863-06
SAMPLING DATE	RSCO	11/1/2006	11/1/2006	11/1/2006	11/1/2006	11/1/2006	11/1/2006
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Compounds							
1,1,1,2-Tetrachloroethane	NS	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
1,1,1-Trichloroethane	0.8	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
1,1,2,2-Tetrachloroethane	0.6	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
1,1,2-Trichloroethane	NS	0.0044 U	0.0041 U	0.0041 U	0.0042 U	0.0042 U	0.0046 U
1,1-Dichloroethane	0.2	0.0044 U	0.0041 U	0.0041 U	0.0042 U	0.0042 U	0.0046 U
1,1-Dichloroethene	0.4	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
1,1-Dichloropropene	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
1,2,3-Trichlorobenzene	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
1,2,3-Trichloropropane	0.4	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.03 U
1,2,4-Trichlorobenzene	3.4	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
1,2,4-Trimethylbenzene	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
1,2-Dibromo-3-chloropropane	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
1,2-Dibromoethane	NS	0.012 U	0.011 U	0.011 U	0.011 U	0.011 U	0.012 U
1,2-Dichlorobenzene	7.9	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
1,2-Dichloroethane	0.1	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
1,2-Dichloropropane	NS	0.01 U	0.0096 U	0.0096 U	0.0098 U	0.0097 U	0.011 U
1,3,5-Trimethylbenzene	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
1,3-Dichlorobenzene	1.6	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
1,3-Dichloropropane	0.3	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
1,4-Dichlorobenzene	8.5	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
1,4-Dichlorobutane	NS	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.03 U
2,2-Dichloropropane	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
2-Butanone	0.3	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.032
2-Hexanone	NS	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.03 U
4-Methyl-2-pentanone	1	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.03 U
Acetone	0.2	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.13
Acrolein	NS	0.073 U	0.069 U	0.069 U	0.07 U	0.069 U	0.076 U
Acrylonitrile	NS	0.012 U	0.011 U	0.011 U	0.011 U	0.011 U	0.012 U
Benzene	0.06	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
Bromobenzene	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
Bromochloromethane	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
Bromodichloromethane	NS	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
Bromoform	NS	0.012 U	0.011 U	0.011 U	0.011 U	0.011 U	0.012 U
Bromomethane	NS	0.0058 U	0.0055 U	0.0055 U	0.0056 U	0.0056 U	0.0061 U
Carbon disulfide	2.7	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.03 U
Carbon tetrachloride	0.6	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
Chlorobenzene	1.7	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
Chloroethane	1.9	0.0058 U	0.0055 U	0.0055 U	0.0056 U	0.0056 U	0.0061 U
Chloroform	0.3	0.0044 U	0.0041 U	0.0041 U	0.0042 U	0.0042 U	0.0046 U
Chloromethane	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
cis-1,2-Dichloroethene	NS	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
cis-1,3-Dichloropropene	NS	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
Dibromochloromethane	NS	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
Dibromomethane	NS	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.03 U
Dichlorodifluoromethane	NS	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.03 U
Ethyl ether	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
Ethyl methacrylate	NS	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.03 U
Ethylbenzene	5.5	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
Hexachlorobutadiene	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
Iodomethane	NS	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.03 U
Isopropylbenzene	NS	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
Methyl tert butyl ether	NS	0.0058 U	0.0055 U	0.0055 U	0.0056 U	0.0056 U	0.0061 U
Methylene chloride	0.1	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.03 U
Naphthalene	13	0.014 U	0.014 U	0.021	0.014 U	0.023	0.015 U
n-Butylbenzene	NS	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
n-Propylbenzene	NS	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
o-Chlorotoluene	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
o-Xylene	NS	0.0058 U	0.0055 U	0.0055 U	0.0056 U	0.0056 U	0.0061 U
p/m-Xylene	NS	0.0058 U	0.0055 U	0.0055 U	0.0056 U	0.0056 U	0.0061 U
p-Chlorotoluene	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
p-Isopropyltoluene	NS	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
sec-Butylbenzene	NS	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
Styrene	NS	0.0058 U	0.0055 U	0.0055 U	0.0056 U	0.0056 U	0.0061 U
tert-Butylbenzene	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
Tetrachloroethene	1.4	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
Tetrahydrofuran	NS	0.058 U	0.055 U	0.055 U	0.056 U	0.056 U	0.061 U
Toluene	1.5	0.0044 U	0.0041 U	0.0041 U	0.0042 U	0.0042 U	0.0046 U
trans-1,2-Dichloroethene	0.3	0.0044 U	0.0041 U	0.0041 U	0.0042 U	0.0042 U	0.0046 U
trans-1,3-Dichloropropene	NS	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
trans-1,4-Dichloro-2-butene	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
Trichloroethene	0.7	0.0029 U	0.0027 U	0.0027 U	0.0028 U	0.0028 U	0.003 U
Trichlorofluoromethane	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.014 U	0.015 U
Vinyl acetate	NS	0.029 U	0.027 U	0.027 U	0.028 U	0.028 U	0.03 U
Vinyl chloride	0.2	0.0058 U	0.0055 U	0.0055 U	0.0056 U	0.0056 U	0.0061 U

Table 1
200 East 135th Street
Bronx, NY

Soil Analytical Results

Volatile Organic Compounds

Client ID		AK-SB-4 (2'-3')	AK-SB-4 (9'-10')	AK-SB-5 (1'-2')	AK-SB-5 (8'-9')	TRIP BLANK
LAB SAMPLE ID	NY-TAGM	L0615863-07	L0615863-08	L0615863-09	L0615863-10	L0615863-11
SAMPLING DATE	RSCO	11/1/2006	11/1/2006	11/1/2006	11/1/2006	11/2/2006
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Compounds						
1,1,1,2-Tetrachloroethane	NS	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
1,1,1-Trichloroethane	0.8	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
1,1,2,2-Tetrachloroethane	0.6	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
1,1,2-Trichloroethane	NS	0.0043 U	0.0043 U	0.0042 U	0.0042 U	0.75 U
1,1-Dichloroethane	0.2	0.0043 U	0.0043 U	0.0042 U	0.0042 U	0.75 U
1,1-Dichloroethene	0.4	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
1,1-Dichloropropene	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
1,2,3-Trichlorobenzene	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
1,2,3-Trichloropropane	0.4	0.028 U	0.028 U	0.028 U	0.028 U	5 U
1,2,4-Trichlorobenzene	3.4	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
1,2,4-Trimethylbenzene	NS	0.014 U	0.014 U	0.014 U	0.02	2.5 U
1,2-Dibromo-3-chloropropane	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
1,2-Dibromoethane	NS	0.011 U	0.011 U	0.011 U	0.011 U	2 U
1,2-Dichlorobenzene	7.9	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
1,2-Dichloroethane	0.1	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
1,2-Dichloropropane	NS	0.0099 U	0.0099 U	0.0097 U	0.0097 U	1.8 U
1,3,5-Trimethylbenzene	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
1,3-Dichlorobenzene	1.6	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
1,3-Dichloropropane	0.3	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
1,4-Dichlorobenzene	8.5	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
1,4-Dichlorobutane	NS	0.028 U	0.028 U	0.028 U	0.028 U	5 U
2,2-Dichloropropane	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
2-Butanone	0.3	0.028 U	0.028 U	0.028 U	0.028 U	5 U
2-Hexanone	NS	0.028 U	0.028 U	0.028 U	0.028 U	5 U
4-Methyl-2-pentanone	1	0.028 U	0.028 U	0.028 U	0.028 U	5 U
Acetone	0.2	0.028 U	0.053	0.028 U	0.028 U	5 U
Acrolein	NS	0.071 U	0.071 U	0.069 U	0.069 U	12 U
Acrylonitrile	NS	0.011 U	0.011 U	0.011 U	0.011 U	5 U
Benzene	0.06	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
Bromobenzene	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
Bromochloromethane	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
Bromodichloromethane	NS	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
Bromoform	NS	0.011 U	0.011 U	0.011 U	0.011 U	2 U
Bromomethane	NS	0.0057 U	0.0057 U	0.0056 U	0.0056 U	1 U
Carbon disulfide	2.7	0.028 U	0.028 U	0.028 U	0.028 U	5 U
Carbon tetrachloride	0.6	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
Chlorobenzene	1.7	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
Chloroethane	1.9	0.0057 U	0.0057 U	0.0056 U	0.0056 U	1 U
Chloroform	0.3	0.0043 U	0.0043 U	0.0042 U	0.0042 U	0.75 U
Chloromethane	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
cis-1,2-Dichloroethene	NS	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
cis-1,3-Dichloropropene	NS	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
Dibromochloromethane	NS	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
Dibromomethane	NS	0.028 U	0.028 U	0.028 U	0.028 U	5 U
Dichlorodifluoromethane	NS	0.028 U	0.028 U	0.028 U	0.028 U	5 U
Ethyl ether	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
Ethyl methacrylate	NS	0.028 U	0.028 U	0.028 U	0.028 U	5 U
Ethylbenzene	5.5	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
Hexachlorobutadiene	NS	0.014 U	0.014 U	0.014 U	0.014 U	0.6 U
Iodomethane	NS	0.028 U	0.028 U	0.028 U	0.028 U	5 U
Isopropylbenzene	NS	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
Methyl tert butyl ether	NS	0.0057 U	0.0057 U	0.0056 U	0.0056 U	1 U
Methylene chloride	0.1	0.028 U	0.028 U	0.028 U	0.028 U	5 U
Naphthalene	13	0.014 U	0.017	0.014 U	0.49	2.5 U
n-Butylbenzene	NS	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
n-Propylbenzene	NS	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
o-Chlorotoluene	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
o-Xylene	NS	0.0057 U	0.0057 U	0.0056 U	0.0056 U	1 U
p/m-Xylene	NS	0.0057 U	0.0057 U	0.0056 U	0.0056 U	1 U
p-Chlorotoluene	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
p-Isopropyltoluene	NS	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
sec-Butylbenzene	NS	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
Styrene	NS	0.0057 U	0.0057 U	0.0056 U	0.0056 U	1 U
tert-Butylbenzene	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
Tetrachloroethene	1.4	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
Tetrahydrofuran	NS	0.057 U	0.057 U	0.056 U	0.056 U	10 U
Toluene	1.5	0.0043 U	0.0043 U	0.0042 U	0.0042 U	0.75 U
trans-1,2-Dichloroethene	0.3	0.0043 U	0.0043 U	0.0042 U	0.0042 U	0.75 U
trans-1,3-Dichloropropene	NS	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
trans-1,4-Dichloro-2-butene	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
Trichloroethene	0.7	0.0028 U	0.0028 U	0.0028 U	0.0028 U	0.5 U
Trichlorofluoromethane	NS	0.014 U	0.014 U	0.014 U	0.014 U	2.5 U
Vinyl acetate	NS	0.028 U	0.028 U	0.028 U	0.028 U	5 U
Vinyl chloride	0.2	0.0057 U	0.0057 U	0.0056 U	0.0056 U	1 U

Table 2
200 East 135th Street
Bronx, NY

Soil Analytical Results

Semi Volatile Organic Compounds

LOCATION		AK-SB-1 (1'-2')	AK-SB-1 (6'-7')	AK-SB-2 (1'-2')	AK-SB-2 (9'-10')	AK-SB-3 (2'-3')
LAB SAMPLE ID	NY-TAGM	L0615863-01	L0615863-02	L0615863-03	L0615863-04	L0615863-05
SAMPLING DATE	RSCO	11/1/2006	11/1/2006	11/1/2006	11/1/2006	11/1/2006
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Compounds						
1,2,4,5-Tetrachlorobenzene	NS	7.8 U	15 U	1.5 U	7.5 U	7.4 U
1,2,4-Trichlorobenzene	3.4	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
1,2-Dichlorobenzene	7.9	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
1,3-Dichlorobenzene	1.6	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
1,4-Dichlorobenzene	8.5	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
1-Chloronaphthalene	NS	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
1-Methylnaphthalene	NS	1.9 U	5.4	0.37 U	1.9 U	1.8 U
2,4,5-Trichlorophenol	0.1	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
2,4,6-Trichlorophenol	NS	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
2,4-Dichlorophenol	0.4	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
2,4-Dimethylphenol	NS	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
2,4-Dinitrophenol	0.2	7.8 U	15 U	1.5 U	7.5 U	7.4 U
2,4-Dinitrotoluene	NS	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
2,6-Dichlorophenol	NS	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
2,6-Dinitrotoluene	1	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
2-Chloronaphthalene	NS	2.3 U	4.4 U	0.44 U	2.2 U	2.2 U
2-Chlorophenol	0.8	2.3 U	4.4 U	0.44 U	2.2 U	2.2 U
2-Methylnaphthalene	36.4	1.9 U	4.4	0.37 U	1.9 U	1.8 U
2-Methylphenol	0.1	2.3 U	4.4 U	0.44 U	2.2 U	2.2 U
2-Nitroaniline	0.43	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
2-Nitrophenol	0.33	7.8 U	15 U	1.5 U	7.5 U	7.4 U
2-Picoline	NS	7.8 U	15 U	1.5 U	7.5 U	7.4 U
3,3'-Dichlorobenzidine	NS	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
3-Methylcholanthrene	NS	7.8 U	15 U	1.5 U	7.5 U	7.4 U
3-Methylphenol/4-Methylphenol	NS	2.3 U	4.4 U	0.44 U	2.2 U	2.2 U
3-Nitroaniline	0.5	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
4,6-Dinitro-o-cresol	NS	7.8 U	15 U	1.5 U	7.5 U	7.4 U
4-Aminobiphenyl	NS	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
4-Bromophenyl phenyl ether	NS	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
4-Chloroaniline	0.22	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
4-Chlorophenyl phenyl ether	NS	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
4-Nitroaniline	NS	2.7 U	5.1 U	0.51 U	2.6 U	2.6 U
4-Nitrophenol	0.1	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
7,12-Dimethylbenz(a)anthracene	NS	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
a,a-Dimethylphenethylamine	NS	19 U	37 U	3.7 U	19 U	18 U
Acenaphthene	50	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Acenaphthylene	41	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Acetophenone	NS	7.8 U	15 U	1.5 U	7.5 U	7.4 U
a-Naphthylamine	NS	7.8 U	15 U	1.5 U	7.5 U	7.4 U
Aniline	0.1	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
Anthracene	50	3.7	13	0.6	2.1	3.8
Azobenzene	NS	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Benzidine	NS	19 U	37 U	3.7 U	19 U	18 U
Benzo(a)anthracene	0.224	9.5	19	2	7.6	10
Benzo(a)pyrene	0.061	9.4	13	1.8	6.9	9.6
Benzo(b)fluoranthene	1.1	7.8	10	1.6	6.9	8.9
Benzo(e)pyrene	NS	6.2	7.8	1.2	4.8	6.2
Benzo(ghi)perylene	50	6.4	6	1.1	4.5	6.3
Benzo(k)fluoranthene	1.1	8.3	12	1.6	5.7	7.4

Table 2
200 East 135th Street
Bronx, NY

Soil Analytical Results

Semi Volatile Organic Compounds

LOCATION		AK-SB-1 (1'-2')	AK-SB-1 (6'-7')	AK-SB-2 (1'-2')	AK-SB-2 (9'-10')	AK-SB-3 (2'-3')
LAB SAMPLE ID	**NY-TAGM**	**L0615863-01**	**L0615863-02**	**L0615863-03**	**L0615863-04**	**L0615863-05**
SAMPLING DATE	**RSCO**	**11/1/2006**	**11/1/2006**	**11/1/2006**	**11/1/2006**	**11/1/2006**
UNITS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Compounds						
Benzoic Acid	**2.7**	19 U	37 U	3.7 U	19 U	18 U
Benzyl Alcohol	**NS**	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
Biphenyl	**NS**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Bis(2-chloroethoxy)methane	**NS**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Bis(2-chloroethyl)ether	**NS**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Bis(2-chloroisopropyl)ether	**NS**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Bis(2-ethylhexyl)phthalate	**50**	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
b-Naphthylamine	**NS**	7.8 U	15 U	1.5 U	7.5 U	7.4 U
Butyl benzyl phthalate	**50**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Carbazole	**NS**	1.9 U	4.6	0.37 U	1.9 U	1.8 U
Chlorobenzilate	**NS**	7.8 U	15 U	1.5 U	7.5 U	7.4 U
Chrysene	**0.4**	9.2	19	2	8	9.9
Dibenzo(a,h)anthracene	**0.014**	1.9 U	3.7 U	0.44	1.9 U	1.8 U
Dibenzofuran	**6.2**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Diethyl phthalate	**7.1**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Dimethoate	**NS**	7.8 U	15 U	1.5 U	7.5 U	7.4 U
Dimethyl phthalate	**2**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Di-n-butylphthalate	**8.1**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Di-n-octylphthalate	**50**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Ethyl Methanesulfonate	**NS**	5.8 U	11 U	1.1 U	5.6 U	5.6 U
Fluoranthene	**50**	21	45	4.4	19	24
Fluorene	**50**	1.9 U	6.2	0.37 U	1.9 U	1.8 U
Hexachlorobenzene	**0.41**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Hexachlorobutadiene	**NS**	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
Hexachlorocyclopentadiene	**NS**	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
Hexachloroethane	**NS**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Hexachloropropene	**NS**	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
Indeno(1,2,3-cd)pyrene	**3.2**	6.9	7.2	1.3	5.2	6.8
Isodrin	**NS**	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
Isophorone	**4.4**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Methyl methanesulfonate	**NS**	7.8 U	15 U	1.5 U	7.5 U	7.4 U
Naphthalene	**13**	1.9 U	5.9	0.37 U	1.9 U	1.8 U
NDPA/DPA	**NS**	5.8 U	11 U	1.1 U	5.6 U	5.6 U
Nitrobenzene	**0.2**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
Nitrosodi-n-butylamine	**NS**	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
Nitrosodipiperidine	**NS**	7.8 U	15 U	1.5 U	7.5 U	7.4 U
n-Nitrosodimethylamine	**NS**	19 U	37 U	3.7 U	19 U	18 U
n-Nitrosodi-n-propylamine	**NS**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
p-Chloro-m-cresol	**NS**	1.9 U	3.7 U	0.37 U	1.9 U	1.8 U
p-Dimethylaminoazobenzene	**NS**	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
Pentachlorobenzene	**NS**	7.8 U	15 U	1.5 U	7.5 U	7.4 U
Pentachloronitrobenzene	**NS**	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
Pentachlorophenol	**1**	7.8 U	15 U	1.5 U	7.5 U	7.4 U
Perylene	**NS**	2.5	3.7 U	0.48	1.9 U	2.5
Phenacetin	**NS**	3.9 U	7.3 U	0.73 U	3.7 U	3.7 U
Phenanthrene	**50**	13	59	2.5	9.8	14
Phenol	**0.03**	2.7 U	5.1 U	0.68	2.6 U	2.6 U
Pronamide	**NS**	7.8 U	15 U	1.5 U	7.5 U	7.4 U
Pyrene	**50**	18	39	3.7	16	20
Pyridine	**NS**	19 U	37 U	3.7 U	19 U	18 U

Table 2
200 East 135th Street
Bronx, NY

Soil Analytical Results

Semi Volatile Organic Compounds

LOCATION LAB SAMPLE ID SAMPLING DATE UNITS Compounds	NY-TAGM RSCO mg/kg	AK-SB-3 (9'-10') L0615863-06 11/1/2006 mg/kg	AK-SB-4 (2'-3') L0615863-07 11/1/2006 mg/kg	AK-SB-4 (9'-10') L0615863-08 11/1/2006 mg/kg	AK-SB-5 (1'-2') L0615863-09 11/1/2006 mg/kg	AK-SB-5 (8'-9') L0615863-10 11/1/2006 mg/kg
1,2,4,5-Tetrachlorobenzene	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
1,2,4-Trichlorobenzene	**3.4**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
1,2-Dichlorobenzene	**7.9**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
1,3-Dichlorobenzene	**1.6**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
1,4-Dichlorobenzene	**8.5**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
1-Chloronaphthalene	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
1-Methylnaphthalene	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
2,4,5-Trichlorophenol	**0.1**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
2,4,6-Trichlorophenol	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
2,4-Dichlorophenol	**0.4**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
2,4-Dimethylphenol	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
2,4-Dinitrophenol	**0.2**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
2,4-Dinitrotoluene	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
2,6-Dichlorophenol	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
2,6-Dinitrotoluene	**1**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
2-Chloronaphthalene	**NS**	0.49 U	0.91 U	0.45 U	0.44 U	0.8 U
2-Chlorophenol	**0.8**	0.49 U	0.91 U	0.45 U	0.44 U	0.8 U
2-Methylnaphthalene	**36.4**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
2-Methylphenol	**0.1**	0.49 U	0.91 U	0.45 U	0.44 U	0.8 U
2-Nitroaniline	**0.43**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
2-Nitrophenol	**0.33**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
2-Picoline	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
3,3'-Dichlorobenzidine	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
3-Methylcholanthrene	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
3-Methylphenol/4-Methylphenol	**NS**	0.49 U	0.91 U	0.45 U	0.44 U	0.8 U
3-Nitroaniline	**0.5**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
4,6-Dinitro-o-cresol	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
4-Aminobiphenyl	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
4-Bromophenyl phenyl ether	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
4-Chloroaniline	**0.22**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
4-Chlorophenyl phenyl ether	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
4-Nitroaniline	**NS**	0.57 U	1.1 U	0.53 U	0.52 U	0.93 U
4-Nitrophenol	**0.1**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
7,12-Dimethylbenz(a)anthracene	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
a,a-Dimethylphenethylamine	**NS**	4.1 U	7.6 U	3.8 U	3.7 U	6.7 U
Acenaphthene	**50**	0.41 U	0.76 U	0.38 U	0.37 U	0.8
Acenaphthylene	**41**	0.54	0.79	0.38 U	0.37 U	0.67 U
Acetophenone	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
a-Naphthylamine	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
Aniline	**0.1**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
Anthracene	**50**	1	1.8	0.38 U	0.37 U	2.2
Azobenzene	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Benzidine	**NS**	4.1 U	7.6 U	3.8 U	3.7 U	6.7 U
Benzo(a)anthracene	**0.224**	3.4	5.6	1.2	0.92	6.9
Benzo(a)pyrene	**0.061**	3.4	5.9	1.1	0.92	7.1
Benzo(b)fluoranthene	**1.1**	2.7	5.6	0.98	0.85	7
Benzo(e)pyrene	**NS**	2	4	0.75	0.64	4.6
Benzo(ghi)perylene	**50**	2	4.3	0.76	0.63	5
Benzo(k)fluoranthene	**1.1**	2.6	4.4	0.87	0.72	5.2

Table 2
200 East 135th Street
Bronx, NY

Soil Analytical Results

Semi Volatile Organic Compounds

LOCATION		AK-SB-3 (9'-10')	AK-SB-4 (2'-3')	AK-SB-4 (9'-10')	AK-SB-5 (1'-2')	AK-SB-5 (8'-9')
LAB SAMPLE ID	NY-TAGM	L0615863-06	L0615863-07	L0615863-08	L0615863-09	L0615863-10
SAMPLING DATE	RSCO	11/1/2006	11/1/2006	11/1/2006	11/1/2006	11/1/2006
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Compounds						
Benzoic Acid	**2.7**	4.1 U	7.6 U	3.8 U	3.7 U	6.7 U
Benzyl Alcohol	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
Biphenyl	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Bis(2-chloroethoxy)methane	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Bis(2-chloroethyl)ether	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Bis(2-chloroisopropyl)ether	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Bis(2-ethylhexyl)phthalate	**50**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
b-Naphthylamine	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
Butyl benzyl phthalate	**50**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Carbazole	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.8
Chlorobenzilate	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
Chrysene	**0.4**	3.1	5.5	1.2	0.88	6.9
Dibenzo(a,h)anthracene	**0.014**	0.5	1.2	0.38 U	0.37 U	1.3
Dibenzofuran	**6.2**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Diethyl phthalate	**7.1**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Dimethoate	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
Dimethyl phthalate	**2**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Di-n-butylphthalate	**8.1**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Di-n-octylphthalate	**50**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Ethyl Methanesulfonate	**NS**	1.2 U	2.3 U	1.1 U	1.1 U	2 U
Fluoranthene	**50**	6.2	12	2.6	1.9	16
Fluorene	**50**	0.41 U	0.76 U	0.38 U	0.37 U	0.77
Hexachlorobenzene	**0.41**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Hexachlorobutadiene	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
Hexachlorocyclopentadiene	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
Hexachloroethane	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Hexachloropropene	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
Indeno(1,2,3-cd)pyrene	**3.2**	2.2	4.6	0.81	0.7	5.2
Isodrin	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
Isophorone	**4.4**	0.41 U	0.76 U	0.38 U	1.4	0.67 U
Methyl methanesulfonate	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
Naphthalene	**13**	0.41 U	0.76 U	0.38 U	0.37 U	0.7
NDPA/DPA	**NS**	1.2 U	2.3 U	1.1 U	1.1 U	2 U
Nitrobenzene	**0.2**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
Nitrosodi-n-butylamine	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
Nitrosodipiperidine	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
n-Nitrosodimethylamine	**NS**	4.1 U	7.6 U	3.8 U	3.7 U	6.7 U
n-Nitrosodi-n-propylamine	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
p-Chloro-m-cresol	**NS**	0.41 U	0.76 U	0.38 U	0.37 U	0.67 U
p-Dimethylaminoazobenzene	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
Pentachlorobenzene	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
Pentachloronitrobenzene	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
Pentachlorophenol	**1**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
Perylene	**NS**	0.86	1.5	0.38 U	0.37 U	1.8
Phenacetin	**NS**	0.81 U	1.5 U	0.76 U	0.74 U	1.3 U
Phenanthrene	**50**	2.7	5.7	1.2	1.2	7.8
Phenol	**0.03**	0.57 U	1.1 U	0.53 U	0.52 U	0.93 U
Pronamide	**NS**	1.6 U	3 U	1.5 U	1.5 U	2.7 U
Pyrene	**50**	5.4	11	2.4	1.6	13
Pyridine	**NS**	4.1 U	7.6 U	3.8 U	3.7 U	6.7 U

Table 3
200 East 135th Street
Bronx, NY
Soil Analytical Results

Polycyclic Aromatic Hydrocarbons

LOCATION		**AK-SB-1 (1'-2')**	**AK-SB-1 (6'-7')**	**AK-SB-2 (1'-2')**	**AK-SB-2 (9'-10')**	**AK-SB-3 (2'-3')**
LAB SAMPLE ID	**NY-TAGM**	**L0615863-01**	**L0615863-02**	**L0615863-03**	**L0615863-04**	**L0615863-05**
SAMPLING DATE	**RSCO**	**11/1/2006**	**11/1/2006**	**11/1/2006**	**11/1/2006**	**11/1/2006**
UNITS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Compounds						
1-Methylnaphthalene	**NS**	0.39 U	4.1	0.073 U	0.3 U	0.3 U
1-Methylphenanthrene	**NS**	1.4	8	0.34	1.3	1.8
2,6-Dimethylnaphthalene	**NS**	0.39 U	2.2	0.073 U	0.3 U	0.3 U
2-Chloronaphthalene	**NS**	0.39 U	0.59 U	0.073 U	0.3 U	0.3 U
2-Methylnaphthalene	**36.4**	0.39 U	4.7	0.076	0.3 U	0.38
Acenaphthene	**50**	2	4.2	0.28	0.49	1.3
Acenaphthylene	**41**	0.76	0.73	0.14	0.3 U	1.7
Anthracene	**50**	4.8	16	0.87	2.6	5.3
Benzo(a)anthracene	**0.224**	15	28	3.5	11	15
Benzo(a)pyrene	**0.061**	9.3	12	3.2	6.4	16
Benzo(b)fluoranthene	**1.1**	12	16	2.3	9.5	16
Benzo(e)Pyrene	**NS**	9.4	11	1.3	6.3	8.7
Benzo(ghi)perylene	**50**	7.2	6.9	0.89	5.2	7.8
Benzo(k)fluoranthene	**1.1**	11	15	2.2	8.3	12
Biphenyl	**NS**	0.39 U	0.9	0.073 U	0.3 U	0.3 U
Chrysene	**0.4**	12	24	2.4	9.7	11
Dibenzo(a,h)anthracene	**0.014**	1.7	2.3	0.29	1.2	1.9
Fluoranthene	**50**	27	46	4.9	20	36
Fluorene	**50**	2.1	7.9	0.24	0.61	1.4
Hexachlorobenzene	**0.41**	1.6 U	2.3 U	0.29 U	1.2 U	1.2 U
Hexachlorobutadiene	**NS**	0.97 U	1.5 U	0.18 U	0.75 U	0.74 U
Hexachloroethane	**NS**	1.6 U	2.3 U	0.29 U	1.2 U	1.2 U
Indeno(1,2,3-cd)Pyrene	**3.2**	6.2	6.4	1	4.4	6.8
Naphthalene	**13**	0.67	5.8	0.11	0.44	0.85
Pentachlorophenol	**1**	1.6 U	2.3 U	0.29 U	1.2 U	1.2 U
Perylene	**NS**	2.6	2.9	0.51	1.9	2.6
Phenanthrene	**50**	15	50	2.9	10	13
Pyrene	**50**	22	40	5	17	31

Table 3
200 East 135th Street
Bronx, NY
Soil Analytical Results
Polycyclic Aromatic Hydrocarbons

LOCATION		**AK-SB-3 (9'-10')**	**AK-SB-4 (2'-3')**	**AK-SB-4 (9'-10')**	**AK-SB-5 (1'-2')**	**AK-SB-5 (8'-9')**
LAB SAMPLE ID	**NY-TAGM**	**L0615863-06**	**L0615863-07**	**L0615863-08**	**L0615863-09**	**L0615863-10**
SAMPLING DATE	**RSCO**	**11/1/2006**	**11/1/2006**	**11/1/2006**	**11/1/2006**	**11/1/2006**
UNITS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Compounds						
1-Methylnaphthalene	**NS**	0.032 U	0.3 U	0.076 U	0.074 U	0.3
1-Methylphenanthrene	**NS**	0.42	0.72	0.23	0.16	0.8
2,6-Dimethylnaphthalene	**NS**	0.032 U	0.3 U	0.076 U	0.074 U	0.15
2-Chloronaphthalene	**NS**	0.032 U	0.3 U	0.076 U	0.074 U	0.13 U
2-Methylnaphthalene	**36.4**	0.038	0.3 U	0.076 U	0.074 U	0.48
Acenaphthene	**50**	0.067	0.73	0.082	0.14	0.95
Acenaphthylene	**41**	0.46	0.66	0.12	0.16	0.48
Anthracene	**50**	1.3	2.1	0.39	0.49	3.1
Benzo(a)anthracene	**0.224**	4.2	8.6	1.6	1.4	10
Benzo(a)pyrene	**0.061**	5.3	5.9	1.8	1.7	10
Benzo(b)fluoranthene	**1.1**	4.2	7.9	1.5	1.4	9.8
Benzo(e)Pyrene	**NS**	2	5.9	0.96	0.72	5.9
Benzo(ghi)perylene	**50**	1.4	5.5	0.84	0.51	5.3
Benzo(k)fluoranthene	**1.1**	2.4	7.5	1.5	0.98	8.3
Biphenyl	**NS**	0.032 U	0.3 U	0.076 U	0.074 U	0.13 U
Chrysene	**0.4**	3.7	7.4	1.4	1	7.9
Dibenzo(a,h)anthracene	**0.014**	0.49	1.3	0.13	0.17	1.2
Fluoranthene	**50**	6	14	4.4	2.3	22
Fluorene	**50**	0.17	0.69	0.085	0.14	0.85
Hexachlorobenzene	**0.41**	0.13 U	1.2 U	0.3 U	0.3 U	0.53 U
Hexachlorobutadiene	**NS**	0.081 U	0.76 U	0.19 U	0.18 U	0.33 U
Hexachloroethane	**NS**	0.13 U	1.2 U	0.3 U	0.3 U	0.53 U
Indeno(1,2,3-cd)Pyrene	**3.2**	1.6	4.7	0.64	0.6	4.4
Naphthalene	**13**	0.15	0.3 U	0.076 U	0.074 U	0.82
Pentachlorophenol	**1**	0.13 U	1.2 U	0.3 U	0.3 U	0.53 U
Perylene	**NS**	0.77	1.8	0.38	0.29	1.9
Phenanthrene	**50**	2.7	6.4	1.4	1.4	7.7
Pyrene	**50**	5.7	12	4.1	2.1	20

Table 4
200 East 135th Street
Bronx, NY

Soil Analytical Results

Polychlorinated Biphenyls and Pesticides

Polychlorinated Biphenyls

LOCATION		AK-SB-1 (1'-2')	AK-SB-1 (6'-7')	AK-SB-2 (1'-2')	AK-SB-2 (9'-10')	AK-SB-3 (2'-3')
LAB SAMPLE ID	NY-TAGM	L0615863-01	L0615863-02	L0615863-03	L0615863-04	L0615863-05
SAMPLING DATE	RSCO	11/1/2006	11/1/2006	11/1/2006	11/1/2006	11/1/2006
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Compounds						
Total PCBs	**10**[1]	0.159	0.0366 U	0.0366 U	0.125	0.814

Pesticides

LOCATION		AK-SB-1 (1'-2')	AK-SB-1 (6'-7')	AK-SB-2 (1'-2')	AK-SB-2 (9'-10')	AK-SB-3 (2'-3')
LAB SAMPLE ID	NY-TAGM	L0615863-01	L0615863-02	L0615863-03	L0615863-04	L0615863-05
SAMPLING DATE	RSCO	11/1/2006	11/1/2006	11/1/2006	11/1/2006	11/1/2006
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Compounds						
4,4'-DDD	**2.9**	0.231	0.0183 U	0.0366 U	0.0242	0.148 U
4,4'-DDE	**2.1**	0.0775 U	0.0183 U	0.0366 U	0.0198	0.148 U
4,4'-DDT	**2.1**	0.0775 U	0.0183 U	0.0366 U	0.213	0.171
Aldrin	**0.041**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Alpha-BHC	**0.11**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Beta-BHC	**0.2**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Chlordane	**0.54**	0.31 U	0.0733 U	0.146 U	0.0749 U	0.592 U
cis-Chlordane	**NS**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Delta-BHC	**0.3**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Dieldrin	**0.044**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Endosulfan I	**0.9**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Endosulfan II	**0.9**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Endosulfan sulfate	**NS**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Endrin	**0.1**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Endrin aldehyde	**NS**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Endrin ketone	**NS**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Heptachlor	**0.1**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Heptachlor epoxide	**0.02**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Lindane	**0.06**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U
Methoxychlor	**NS**	0.31 U	0.0733 U	0.146 U	0.0749 U	0.592 U
Toxaphene	**NS**	0.31 U	0.0733 U	0.146 U	0.0749 U	0.592 U
trans-Chlordane	**NS**	0.0775 U	0.0183 U	0.0366 U	0.0187 U	0.148 U

Table 4
200 East 135th Street
Bronx, NY
Soil Analytical Results

Polychlorinated Biphenyls and Pesticides

Polychlorinated Biphenyls

LOCATION LAB SAMPLE ID SAMPLING DATE UNITS Compounds	NY-TAGM RSCO mg/kg	AK-SB-3 (9'-10') L0615863-06 11/1/2006 mg/kg	AK-SB-4 (2'-3') L0615863-07 11/1/2006 mg/kg	AK-SB-4 (9'-10') L0615863-08 11/1/2006 mg/kg	AK-SB-5 (1'-2') L0615863-09 11/1/2006 mg/kg	AK-SB-5 (8'-9') L0615863-10 11/1/2006 mg/kg
Total PCBs	**10[1]**	0.0406 U	0.176	0.0379 U	0.037 U	0.118

Pesticides

LOCATION LAB SAMPLE ID SAMPLING DATE UNITS Compounds	NY-TAGM RSCO mg/kg	AK-SB-3 (9'-10') L0615863-06 11/1/2006 mg/kg	AK-SB-4 (2'-3') L0615863-07 11/1/2006 mg/kg	AK-SB-4 (9'-10') L0615863-08 11/1/2006 mg/kg	AK-SB-5 (1'-2') L0615863-09 11/1/2006 mg/kg	AK-SB-5 (8'-9') L0615863-10 11/1/2006 mg/kg
4,4'-DDD	**2.9**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
4,4'-DDE	**2.1**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
4,4'-DDT	**2.1**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Aldrin	**0.041**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Alpha-BHC	**0.11**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Beta-BHC	**0.2**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Chlordane	**0.54**	0.0813 U	0.606 U	0.0758 U	0.148 U	0.592 U
cis-Chlordane	**NS**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Delta-BHC	**0.3**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Dieldrin	**0.044**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Endosulfan I	**0.9**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Endosulfan II	**0.9**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Endosulfan sulfate	**NS**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Endrin	**0.1**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Endrin aldehyde	**NS**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Endrin ketone	**NS**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Heptachlor	**0.1**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Heptachlor epoxide	**0.02**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Lindane	**0.06**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U
Methoxychlor	**NS**	0.0813 U	0.606 U	0.0758 U	0.148 U	0.592 U
Toxaphene	**NS**	0.0813 U	0.606 U	0.0758 U	0.148 U	0.592 U
trans-Chlordane	**NS**	0.0203 U	0.152 U	0.0189 U	0.037 U	0.148 U

Table 5
200 East 135th Street
Bronx, NY
Soil Analytical Results

Metals

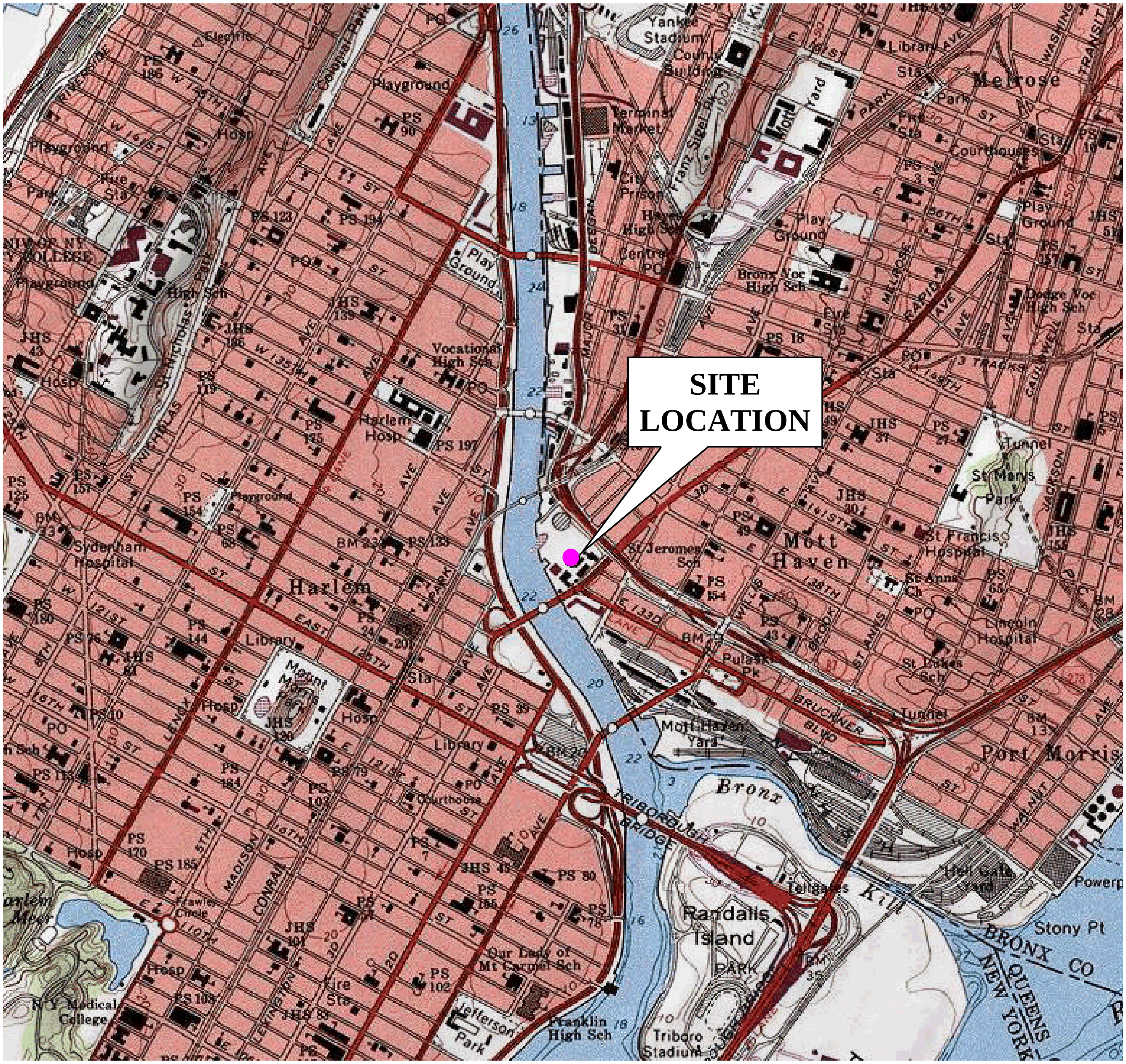
LOCATION		**Eastern US**	**AK-SB-1 (1'-2')**	**AK-SB-1 (6'-7')**	**AK-SB-2 (1'-2')**	**AK-SB-2 (9'-10')**	**AK-SB-3 (2'-3')**
LAB SAMPLE ID	**NY-TAGM**	**Background**	**L0615863-01**	**L0615863-02**	**L0615863-03**	**L0615863-04**	**L0615863-05**
SAMPLING DATE	**RSCO**	**Levels***	**11/1/2006**	**11/1/2006**	**11/1/2006**	**11/1/2006**	**11/1/2006**
UNITS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Compounds							
Aluminum, Total	**NS**	**33,000**	4800	4500	3800	5400	4800
Antimony, Total	**NS**	**NA**	3.8	2.2 U	2.2 U	2.7	2.2 U
Arsenic, Total	**7.5**	**3 - 12**	4.6	1.4	4.1	5.2	4.7
Barium, Total	**300**	**15 - 600**	58	73	41	330	96
Beryllium, Total	**0.16**	**0 - 1.75**	0.23 U	0.22 U	0.22 U	2.2 U	0.22 U
Cadmium, Total	**1**	**0.1 - 1**	0.98	0.44 U	0.43 U	0.85	0.71
Calcium, Total	**NS**	**130 - 35,000**	39000	49000	20000	49000	41000
Chromium, Total	**10**	**1.5 - 40**	13	9.3	7.7	25	13
Cobalt, Total	**30**	**2.5 - 60**	5.8	4.9	4.1	5.2	4.9
Copper, Total	**25**	**1 - 50**	160	17	91	140	81
Iron, Total	**2000**	**2,000 - 550,000**	20000	8700	11000	10000	14000
Lead, Total	**NS**	**200 - 500**	320	61	74	320	220
Magnesium, Total	**NS**	**100 - 5,000**	10000	26000	5700	8600	16000
Manganese, Total	**NS**	**50 - 5,000**	180	180	210	150	190
Mercury, Total	**0.1**	**0.001 - 0.2**	0.45	0.082 U	0.3	0.088 U	0.43
Nickel, Total	**13**	**0.5 - 25**	15	7.8	10	14	12
Potassium, Total	**NS**	**8,500 - 43,000**	1100	1700	770	1600	1200
Selenium, Total	**2**	**0.1 - 3.9**	0.92 U	0.87 U	0.86 U	0.89 U	0.87 U
Silver, Total	**NS**	**NA**	0.46 U	0.44 U	0.43 U	0.45 U	0.44 U
Sodium, Total	**NS**	**6,000 - 8,000**	230	87 U	86 U	240	150
Thallium, Total	**NS**	**NA**	0.46 U	0.44 U	0.43 U	0.45 U	0.44 U
Vanadium, Total	**150**	**1 - 300**	30	15	12	25	27
Zinc, Total	**20**	**9 - 50**	360	52	110	690	320

Table 5
200 East 135th Street
Bronx, NY
Soil Analytical Results

Metals

LOCATION **LAB SAMPLE ID** **SAMPLING DATE** **UNITS** **Compounds**	**NY-TAGM** **RSCO** **mg/kg**	**Eastern US Background Levels*** **mg/kg**	**AK-SB-3 (9'-10')** **L0615863-06** **11/1/2006** **mg/kg**	**AK-SB-4 (2'-3')** **L0615863-07** **11/1/2006** **mg/kg**	**AK-SB-4 (9'-10')** **L0615863-08** **11/1/2006** **mg/kg**	**AK-SB-5 (1'-2')** **L0615863-09** **11/1/2006** **mg/kg**	**AK-SB-5 (8'-9')** **L0615863-10** **11/1/2006** **mg/kg**
Aluminum, Total	**NS**	**33,000**	3500	4800	6200	7200	5700
Antimony, Total	**NS**	**NA**	2.4 U	2.3 U	2.6	2.2 U	2.2 U
Arsenic, Total	**7.5**	**3 - 12**	11	4.3	5.2	3.7	3.4
Barium, Total	**300**	**15 - 600**	32	68	58	110	110
Beryllium, Total	**0.16**	**0 - 1.75**	0.67	0.23 U	0.22 U	2.2 U	0.22 U
Cadmium, Total	**1**	**0.1 - 1**	1.3	0.68	0.45 U	0.54	0.6
Calcium, Total	**NS**	**130 - 35,000**	6200	31000	8900	40000	32000
Chromium, Total	**10**	**1.5 - 40**	10	16	11	180	16
Cobalt, Total	**30**	**2.5 - 60**	20	4.8	5.7	6.4	4.6
Copper, Total	**25**	**1 - 50**	54	97	160	70	97
Iron, Total	**2000**	**2,000 - 550,000**	74000	12000	12000	16000	13000
Lead, Total	**NS**	**200 - 500**	86	320	200	170	190
Magnesium, Total	**NS**	**100 - 5,000**	450	5700	2100	14000	13000
Manganese, Total	**NS**	**50 - 5,000**	1300	180	310	210	140
Mercury, Total	**0.1**	**0.001 - 0.2**	0.2	0.5	2	0.24	0.24
Nickel, Total	**13**	**0.5 - 25**	26	12	20	20	10
Potassium, Total	**NS**	**8,500 - 43,000**	150	1200	540	2300	2200
Selenium, Total	**2**	**0.1 - 3.9**	0.97 U	0.91 U	0.9 U	0.88 U	0.89 U
Silver, Total	**NS**	**NA**	0.48 U	0.45 U	0.83	0.44 U	0.44 U
Sodium, Total	**NS**	**6,000 - 8,000**	170	120	90 U	250	180
Thallium, Total	**NS**	**NA**	0.48 U	0.45 U	0.45 U	0.44 U	0.44 U
Vanadium, Total	**150**	**1 - 300**	37	31	16	35	25
Zinc, Total	**20**	**9 - 50**	1600	330	180	150	220

FIGURES



SCALE IN FEET

0’ 1000’ 2000’ 4000’

SCALE: 1”=2000’

N

SOURCE:

7.5 MINUTE SERIES USGS TOPOGRAPHIC MAP
QUADRANGLE: CENTRAL PARK, NY 1995

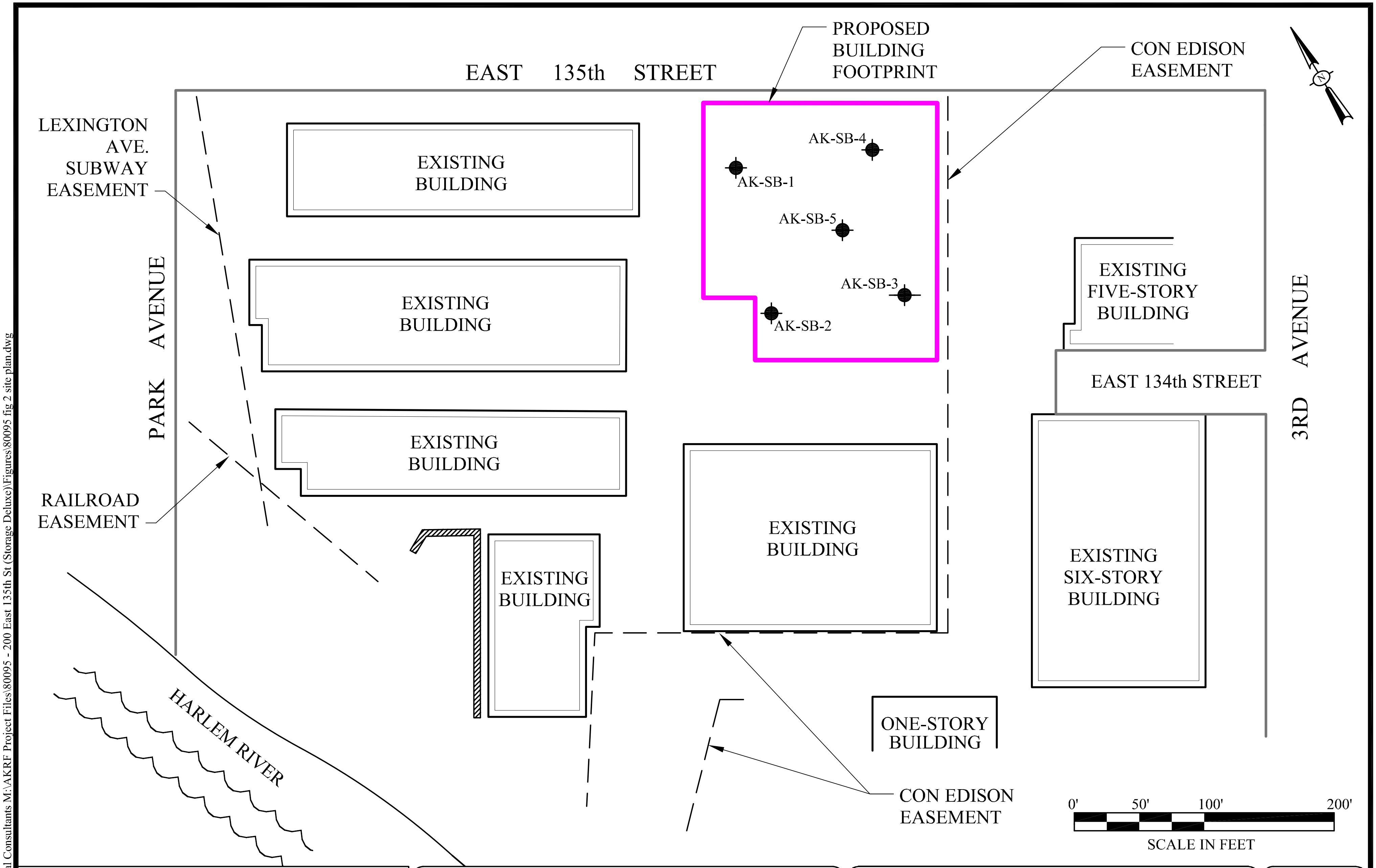
EAST 135th STREET
BRONX, NEW YORK

PROJECT SITE LOCATION

AKRF

Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE	**11.10.06**
PROJECT No.	**80095**
SCALE	**AS SHOWN**
FIGURE No.	**1**



LEGEND:

▬	PROJECT SITE BOUNDARY
— — —	EASEMENT LINE
⊕ AK-SB-3	SOIL BORNING LOCATION

200 EAST 135th STREET
NEW YORK, NEW YORK

SITE PLAN

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE 11.13.06
PROJECT No. 80095
SCALE 1"=100'
FIGURE 2

APPENDIX A

SOIL BORING LOGS

AKRF, Inc.

Storage Deluxe - 200 East 135th Street, Bronx, NY.

Boring No. **AK-SB-1**

Sheet 1 of 1

Environmental Consultants

440 Park Avenue South, 7th Floor
New York, NY 10016

Drilling Method: Direct Push
Sampling Method: 5-foot long Macro Core
Driller : Zebra
Weather: 75F, Clear
Sampler: AKRF/Steve Grens

Drilling	
Start	**Finish**
Time: 08:20	**Time:** 09:00
Date: 11/1/06	**Date:** 11/1/06

Depth (feet)	**Recovery (Inches)**	**Surface Condition: Soil**	**Soil Head Space PID Reading (ppm)**	**Odor**	**Moisture**	**Soil Samples Collected for Lab Analyses**
1	**60"**	Top 33": Dark brown fine SAND and SILT, trace fine Gravel, Brick, Wood (FILL). Bottom 27": Light brown fine to medium SAND, trace fine Gravel, Silt. (FILL)	ND	No Odor	Dry	
2			ND	No Odor	Dry	**AK-SB-1 (1'-2')**
3			ND	No Odor	Dry	
4			ND	No Odor	Dry	
5			ND	No Odor	Dry	
6	**60"**	Top 2": Light brown fine to medium SAND, trace fine Micaceous Gravel, Silt. (FILL) Middle 14": Light brown fine SAND and BRICK, trace fine Gravel, Silt. Middle 6": Fine GRAVEL (FILL). Middle 8": Gray fine SAND and SILT,trace fine Gravel. (FILL) Middle 24": Fine GRAVEL (FILL). Bottom 6": Gray fine SAND and SILT, some fine Gravel. (FILL)	ND	No Odor	Dry	
7			ND	No Odor	Dry	**AK-SB-1 (6'-7')**
8			ND	No Odor	Dry	
9			ND	No Odor	Dry	
10			ND	No Odor	Dry	
11		End of boring at 10 feet below grade.				
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						

Notes: **PID - Photoionization detector** **ND - Not Detected**
Soil samples were analyzed for VOCs (Method 8260), SVOCs (Method 8270), PCBs (Method 8081), Pesticides (Method 8082) and TAL Metals.
Groundwater was not encountered.

AKRF, Inc.

Environmental Consultants

440 Park Avenue South, 7th Floor
New York, NY 10016

Storage Deluxe - 200 East 135th Street, Bronx, NY.

Boring No. AK-SB-2

Sheet 1 of 1

Drilling Method: Direct Push
Sampling Method: 5-foot long Macro Core
Driller : Zebra
Weather: 75F, Clear
Sampler: AKRF/Steve Grens

Drilling	
Start	**Finish**
Time: 09:20	**Time:** 09:50
Date: 11/1/06	**Date:** 11/1/06

Depth (feet)	**Recovery (Inches)**	**Surface Condition: Soil**	**Soil Head Space PID Reading (ppm)**	**Odor**	**Moisture**	**Soil Samples Collected for Lab Analyses**
1		Top 36": Dark brown fine SAND and SILT, some Brick, Tile, trace fine Gravel. (FILL) Middle 2": BRICK (FILL).	ND	No Odor	Dry	
2		Middle17": Dark brown fine SAND and SILT, trace Concrete, Brick, Tile, Glass, trace fine Gravel. (FILL)	ND	No Odor	Dry	**AK-SB-2 (1'-2')**
3	56"	Bottom 1": PLASTIC and GLASS (FILL).	ND	No Odor	Dry	
4			ND	No Odor	Dry	
5			ND	No Odor	Dry	
6		Top 10": Dark brown fine SAND and SILT, trace Brick (FILL). Middle 11": BRICK (FILL).	ND	No Odor	Dry	
7		Middle 2": GRAVEL. (FILL) Bottom 19": GRAVEL, some brown fine Sand, Silt, Brick (FILL).	ND	No Odor	Dry	
8	42"		ND	No Odor	Dry	
9			ND	No Odor	Dry	
10			ND	No Odor	Dry	**AK-SB-2 (9'-10')**
11		End of boring at 10 feet below grade.				
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						

Notes: **PID - Photoionization detector** **ND - Not Detected**
Soil samples were analyzed for VOCs (Method 8260), SVOCs (Method 8270), PCBs (Method 8081), Pesticides (Method 8082) and TAL Metals.
Groundwater was not encountered.

AKRF, Inc.	**Storage Deluxe - 200 East 135th Street, Bronx, NY.**	**Boring No.** **AK-SB-3** **Sheet 1 of 1**

Environmental Consultants

440 Park Avenue South, 7th Floor
New York, NY 10016

Drilling Method:	Direct Push
Sampling Method:	5-foot long Macro Core
Driller :	Zebra
Weather:	75F, Clear
Sampler:	AKRF/Steve Grens

Drilling	
Start	**Finish**
Time: 10:00	**Time: 10:25**
Date: 11/1/06	**Date:** 11/1/06

Depth (feet)	**Recovery (Inches)**	**Surface Condition: Soil**	**Soil Head Space PID Reading (ppm)**	**Odor**	**Moisture**	**Soil Samples Collected for Lab Analyses**
1	43"	Top 13": Dark brown fine SAND and SILT, trace Coal Slag, Brick, fine Gravel (FILL). Middle 18": Brown fine SAND and SILT, trace Coal, Cloth, Wood Fragments, fine Gravel (FILL). Bottom 12": BRICK, COAL SLAG, WOOD FRAGMENTS, some fine Gravel (FILL).	ND	No Odor	Dry	
2			ND	No Odor	Dry	
3			ND	No Odor	Dry	**AK-SB-3 (2'-3')**
4			ND	No Odor	Dry	
5			ND	No Odor	Dry	
6	59"	Top 20": Brown fine SAND and SILT, trace Brick (FILL). Middle 2": ASH (FILL). Middle 12": COAL, COAL SLAG, (FILL). Middle 22": Brown fine SAND and SILT, some Coal Slag (FILL). Bottom 3": COAL, some dark brown fine Sand, Silt. (FILL)	ND	No Odor	Dry	
7			ND	No Odor	Dry	
8			ND	No Odor	Dry	
9			2.1	No Odor	Dry	
10			6.4	No Odor	Petroleum-like	**AK-SB-3 (9'-10')**
11	52"	Top 21": Dark brown fine SAND and SILT, trace Coal Slag, Brick (FILL). Middle 19": COAL and SILT (FILL). Botttom 12": Gray fine to medium SAND, trace Silt. (FILL)	1.2	No Odor	Dry	
12			ND	No Odor	Dry	
13			ND	No Odor	Dry	
14			ND	No Odor	Wet	
15			ND	No Odor	Wet	
16		End of boring at 15 feet below grade.				
17						
18						
19						
20						
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22						
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24						
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26						
27						
28						

Notes: **PID - Photoionization detector** **ND - Not Detected**

Soil samples were analyzed for VOCs (Method 8260), SVOCs (Method 8270), PCBs (Method 8081), Pesticides (Method 8082) and TAL Metals.

Groundwater encountered at approximately 13 feet below grade.

AKRF, Inc.

Storage Deluxe - 200 East 135th Street, Bronx, NY.

Boring No. **AK-SB-4**

Sheet 1 of 1

Environmental Consultants

440 Park Avenue South, 7th Floor
New York, NY 10016

Drilling Method: Direct Push
Sampling Method: 5-foot long Macro Core
Driller : Zebra
Weather: 75F, Clear
Sampler: AKRF/Steve Grens

Drilling	
Start	**Finish**
Time: 10:55	**Time:** 11:30
Date: 11/1/06	**Date:** 11/1/06

Depth (feet)	**Recovery (Inches)**	**Surface Condition: Soil**	**Soil Head Space PID Reading (ppm)**	**Odor**	**Moisture**	**Soil Samples Collected for Lab Analyses**
1		Top 40": Dark brown fine SAND and SILT, trace Brick, Wood, fine Gravel. (FILL) Middle 3": COAL SLAG (FILL). Bottom 9": BRICK, some brown fine Sand, trace Silt, Wood (FILL).	ND	No Odor	Dry	
2			ND	No Odor	Dry	
3	52"		ND	No Odor	Dry	**AK-SB-4 (2'-3')**
4			ND	No Odor	Dry	
5			ND	No Odor	Dry	
6		Top 36": BRICK, COAL SLAG, WOOD FRAGMENTS, some brown fine Sand, Silt, trace fine Gravel. (FILL) Bott,om 22": Brown fine SAND, SILT, and fine GRAVEL, trace Coal, Coal Slag (FILL).	ND	No Odor	Dry	
7			ND	No Odor	Dry	
8	58"		ND	No Odor	Dry	
9			ND	No Odor	Dry	
10			ND	No Odor	Dry	**AK-SB-4 (9'-10')**
11		End of boring at 10 feet below grade.				
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20						
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27						
28						

Notes: **PID - Photoionization detector** **ND - Not Detected**

Soil samples were analyzed for VOCs (Method 8260), SVOCs (Method 8270), PCBs (Method 8081), Pesticides (Method 8082) and TAL Metals.
Groundwater was not encountered.

AKRF, Inc.	**Storage Deluxe - 200 East 135th Street, Bronx, NY.**	**Boring No. AK-SB-5** **Sheet 1 of 1**

Environmental Consultants

440 Park Avenue South, 7th Floor
New York, NY 10016

Drilling Method:	Direct Push
Sampling Method:	5-foot long Macro Core
Driller :	Zebra
Weather:	75F, Clear
Sampler:	AKRF/Steve Grens

Drilling	
Start	**Finish**
Time: 11:40	**Time:** 12:10
Date: 11/1/06	**Date:** 11/1/06

Depth (feet)	**Recovery (Inches)**	**Surface Condition: Soil**	**Soil Head Space PID Reading (ppm)**	**Odor**	**Moisture**	**Soil Samples Collected for Lab Analyses**
1	**42"**	Top 28": Brown fine SAND and SILT, some fine Gravel, trace Brick (FILL). Bottom 14": Fine GRAVEL, some Brick, trace brown fine Sand, Silt. (FILL)	ND	No Odor	Dry	**AK-SB-5 (1'-2')**
2			ND	No Odor	Dry	
3			ND	No Odor	Dry	
4			ND	No Odor	Dry	
5			ND	No Odor	Dry	
6	**48"**	Top 36": Brown fine SAND, some Silt, trace Brick, Glass, Coal Slag, Tile (FILL). Middle 1": Fine GRAVEL. (FILL) Bottom 11": Dark brown fine SAND, some Wood Fragments (FILL).	ND	No Odor	Dry	
7			ND	No Odor	Dry	
8			ND	No Odor	Dry	
9			0.7	No Odor	Dry	**AK-SB-4 (8'-9')**
10			ND	No Odor	Dry	
11		End of boring at 10 feet below grade.				
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18						
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20						
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22						
23						
24						
25						
26						
27						
28						

Notes: **PID - Photoionization detector** **ND - Not Detected**

Soil samples were analyzed for VOCs (Method 8260), SVOCs (Method 8270), PCBs (Method 8081), Pesticides (Method 8082) and TAL Metals.
Groundwater was not encountered.

APPENDIX B

LABORATORY ANALYTICAL DATA SHEETS

ALPHA ANALYTICAL LABORATORIES

Eight Walkup Drive
Westborough, Massachusetts 01581-1019
(508) 898-9220 www.alphalab.com

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

CERTIFICATE OF ANALYSIS

Client: AKRF, Inc.

Laboratory Job Number: L0615863

Address: 440 Park Avenue South
New York, NY 10016

Date Received: 02-NOV-2006

Attn: Mr. Axel Schwendt

Date Reported: 09-NOV-2006

Project Number: 80095-0003

Delivery Method: Alpha

Site: STORAGE DELUXE

ALPHA SAMPLE NUMBER	CLIENT IDENTIFICATION	SAMPLE LOCATION
L0615863-01	AK-SB-1 (1'-2')	200 E. 135TH ST BRONX NY
L0615863-02	AK-SB-1 (6'-7')	200 E. 135TH ST BRONX NY
L0615863-03	AK-SB-2 (1'-2')	200 E. 135TH ST BRONX NY
L0615863-04	AK-SB-2 (9'-10')	200 E. 135TH ST BRONX NY
L0615863-05	AK-SB-3 (2'-3')	200 E. 135TH ST BRONX NY
L0615863-06	AK-SB-3 (9'-10')	200 E. 135TH ST BRONX NY
L0615863-07	AK-SB-4 (2'-3')	200 E. 135TH ST BRONX NY
L0615863-08	AK-SB-4 (9'-10')	200 E. 135TH ST BRONX NY
L0615863-09	AK-SB-5 (1'-2')	200 E. 135TH ST BRONX NY
L0615863-10	AK-SB-5 (8'-9')	200 E. 135TH ST BRONX NY
L0615863-11	TRIP BLANK	200 E. 135TH ST BRONX NY

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized by:
Technical Director

ALPHA ANALYTICAL LABORATORIES
NARRATIVE REPORT

Laboratory Job Number: L0615863

The samples were received in accordance with the chain of custody and no significant deviations were encountered during preparation or analysis unless otherwise noted below.

SemiVolatile Organics

L0615863-01 through -10: The requested limits were not achieved for the following compounds: Nitrobenzene, Aniline, 4-Chloroaniline, 2,4-Dichlorophenol, 2-Nitrophenol, 4-Nitrophenol, 2,4-Dinitrophenol, Phenol, 2-Methylphenol and 2,4,5-Trichlorophenol

The following samples have elevated detection limits due to the dilutions required by the matrix interferences encountered during the extraction, concentration, and/or digestion of the samples:

L0615863-01, -05: 5x

L0615863-07: 2x

L0615863-10: 1.8x

The following samples have elevated detection limits due to the dilutions required by the elevated concentrations of target compounds in the samples:

L0615863-02: 10x

L0615863-04: 5x

The following MS % recoveries are below the acceptance criteria for the method: Hexachloropropene, Pentachlorophenol, Anthracene, Fluoranthene and Pyrene.

The following MSD % recoveries are above the acceptance criteria for the method: Acenaphthene, Fluoranthene, Anthracene and Pyrene.

The following MS/MSD RPDs are above the acceptance criteria for the method: Acenaphthene, 1,2,4-Trichlorobenzene, 2-Chloronaphthalene, Fluoranthene, Anthracene, Pyrene, Hexachloropropene, 2-Chlorophenol, 2-Nitrophenol and Pentachlorophenol.

PAH

L0615863-01 through -10: The requested limits were not achieved for Benzo(b)fluoranthene, Benzo(k)fluoranthene and Chrysene.

The following samples have elevated detection limits due to the dilutions required by the matrix interferences encountered during the extraction, concentration, and/or digestion of the samples:

L0615863-01, -05: 5x

L0615863-07: 2x

L0615863-10: 1.8x

The following samples have elevated detection limits due to the dilutions required by the elevated concentrations of target compounds in the samples:

L0615863-01: 5x (total dilution 25x)

L0615863-02: 40x

L0615863-03, -08, -09: 5x

L0615863-04: 20x

L0615863-05: 4x (total dilution 20x)

L0615863-06: 2x

L0615863-07: 10x (total dilution 20x)

L0615863-10: 5x (total dilution 9x)

The surrogates were diluted out of L0615863-01 and -02, as well as the MS/MSD.

The MS % recoveries for Pentachlorophenol, Fluoranthene and Pyrene are below the acceptance criteria for the method.

The MSD % recoveries for Fluoranthene, Anthracene and Pyrene are above the acceptance criteria for the method.

The following MS/MSD RPDs are above the acceptance criteria for the method: Acenaphthene, Fluoranthene, Anthracene, Pyrene and Pentachlorophenol.

Pesticides

L0615863-01 through -10: The requested limits were not achieved.

The following samples have elevated detection limits due to the dilutions required by the matrix interferences encountered during the extraction, concentration, and/or digestion of the samples:

L0615863-03, -05, -07, -09, -10: 2x

The following samples have elevated detection limits due to the dilutions required by the elevated concentrations of target compounds in the samples:

L0615863-01: 20x

L0615863-04: 5x

L0615863-05, -07, -10: 20x (total dilutions 40x)

The following samples have elevated detection limits due to analytical dilutions required by the matrix of the samples:

L0615863-02, -06, -08: 5x

L0615863-03, -09: 5x (total dilutions 10x)

L0615863-04 required re-analysis on a 20x dilution in order to quantitate the sample within the range of the calibration. The result is reported as a greater than value for the compound that exceeded the calibration on the initial analysis. The re-analysis was performed only for the compound which exceeded the range of the calibration.

The surrogates were diluted out of L0615863-01, -03, -05, -07, -09, -10.

L0615863-04, -05, -07, -09, and -10 have target hits for 4,4'-DDT with RPDs between channels that are above the acceptance criteria for the method. Due to an obvious non-target interference, the lower of the two numbers is reported.

An MS/MSD was not analyzed due to the dilution required by the elevated concentration of target compounds present in the sample utilized for the ms/msd.

Metals

L0615863-01, -03, -04, and -07 required 10x dilutions for the analysis of Calcium in order to quantitate the samples within the calibration curve.

L0615863-02, -05, -09, and -10 required 10x dilutions for the analysis of Calcium and Magnesium in order to quantitate the samples within the calibration curve.

L0615863-04 and -09 required 10x dilutions for the analysis of Beryllium due to spectral interferences encountered during analysis.

L0615863-06 required 10x dilutions for the analysis of Iron, Manganese and Zinc in order to quantitate the sample within the calibration curve.

L0615863-08 required a 2x analytical dilution for Mercury in order to quantitate the result within the calibration curve.

The laboratory duplicate RPD for Iron is above the acceptance criteria for the method due to sample non-homogeneity.

The MS % recoveries for the following elements are invalid because the sample concentration is greater than four times the spike amount added: Aluminum, Calcium, Iron, Lead, Magnesium, Manganese and Zinc.

The MS % recoveries for Arsenic, Nickel, Thallium and Vanadium are below the acceptance criteria for the method due to sample matrix.

The MS % recovery for Potassium is above the acceptance criteria for the method due to sample matrix.

Calcium is present in the method blank, however, all associated sample results are greater than 10x the amount detected in the blank.

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615863-01
AK-SB-1 (1'-2')
Sample Matrix: SOIL

Date Collected: 01-NOV-2006 08:40
Date Received : 02-NOV-2006
Date Reported : 09-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber,1-Vial

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE		ID
						PREP	ANAL	
Solids, Total	86	%	0.10	30	2540G		1107 12:01	PD
Total Metals				1	3051			
Aluminum, Total	4800	mg/kg	4.6	1	6010B	1103 18:30	1108 15:05	AI
Antimony, Total	3.8	mg/kg	2.3	1	6010B	1103 18:30	1108 15:05	AI
Arsenic, Total	4.6	mg/kg	0.46	1	6010B	1103 18:30	1108 15:05	AI
Barium, Total	58	mg/kg	0.46	1	6010B	1103 18:30	1108 15:05	AI
Beryllium, Total	ND	mg/kg	0.23	1	6010B	1103 18:30	1108 15:05	AI
Cadmium, Total	0.98	mg/kg	0.46	1	6010B	1103 18:30	1108 15:05	AI
Calcium, Total	39000	mg/kg	46	1	6010B	1103 18:30	1109 10:15	AI
Chromium, Total	13	mg/kg	0.46	1	6010B	1103 18:30	1108 15:05	AI
Cobalt, Total	5.8	mg/kg	0.92	1	6010B	1103 18:30	1108 15:05	AI
Copper, Total	160	mg/kg	0.46	1	6010B	1103 18:30	1108 15:05	AI
Iron, Total	20000	mg/kg	2.3	1	6010B	1103 18:30	1108 15:05	AI
Lead, Total	320	mg/kg	2.3	1	6010B	1103 18:30	1108 15:05	AI
Magnesium, Total	10000	mg/kg	4.6	1	6010B	1103 18:30	1108 15:05	AI
Manganese, Total	180	mg/kg	0.46	1	6010B	1103 18:30	1108 15:05	AI
Mercury, Total	0.45	mg/kg	0.09	1	7471A	1106 16:25	1107 10:20	DM
Nickel, Total	15	mg/kg	1.2	1	6010B	1103 18:30	1108 15:05	AI
Potassium, Total	1100	mg/kg	120	1	6010B	1103 18:30	1108 15:05	AI
Selenium, Total	ND	mg/kg	0.92	1	6010B	1103 18:30	1108 15:05	AI
Silver, Total	ND	mg/kg	0.46	1	6010B	1103 18:30	1108 15:05	AI
Sodium, Total	230	mg/kg	92	1	6010B	1103 18:30	1108 15:05	AI
Thallium, Total	ND	mg/kg	0.46	1	6010B	1103 18:30	1108 15:05	AI
Vanadium, Total	30	mg/kg	0.46	1	6010B	1103 18:30	1108 15:05	AI
Zinc, Total	360	mg/kg	2.3	1	6010B	1103 18:30	1108 15:05	AI
Volatile Organics by GC/MS 8260				1	8260B		1107 17:10	RY
Methylene chloride	ND	ug/kg	29.					
1,1-Dichloroethane	ND	ug/kg	4.4					
Chloroform	ND	ug/kg	4.4					
Carbon tetrachloride	ND	ug/kg	2.9					
1,2-Dichloropropane	ND	ug/kg	10.					
Dibromochloromethane	ND	ug/kg	2.9					
1,1,2-Trichloroethane	ND	ug/kg	4.4					
Tetrachloroethene	ND	ug/kg	2.9					
Chlorobenzene	ND	ug/kg	2.9					
Trichlorofluoromethane	ND	ug/kg	14.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-01
AK-SB-1 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 17:10	RY
1,2-Dichloroethane	ND	ug/kg	2.9					
1,1,1-Trichloroethane	ND	ug/kg	2.9					
Bromodichloromethane	ND	ug/kg	2.9					
trans-1,3-Dichloropropene	ND	ug/kg	2.9					
cis-1,3-Dichloropropene	ND	ug/kg	2.9					
1,1-Dichloropropene	ND	ug/kg	14.					
Bromoform	ND	ug/kg	12.					
1,1,2,2-Tetrachloroethane	ND	ug/kg	2.9					
Benzene	ND	ug/kg	2.9					
Toluene	ND	ug/kg	4.4					
Ethylbenzene	ND	ug/kg	2.9					
Chloromethane	ND	ug/kg	14.					
Bromomethane	ND	ug/kg	5.8					
Vinyl chloride	ND	ug/kg	5.8					
Chloroethane	ND	ug/kg	5.8					
1,1-Dichloroethene	ND	ug/kg	2.9					
trans-1,2-Dichloroethene	ND	ug/kg	4.4					
Trichloroethene	ND	ug/kg	2.9					
1,2-Dichlorobenzene	ND	ug/kg	14.					
1,3-Dichlorobenzene	ND	ug/kg	14.					
1,4-Dichlorobenzene	ND	ug/kg	14.					
Methyl tert butyl ether	ND	ug/kg	5.8					
p/m-Xylene	ND	ug/kg	5.8					
o-Xylene	ND	ug/kg	5.8					
cis-1,2-Dichloroethene	ND	ug/kg	2.9					
Dibromomethane	ND	ug/kg	29.					
1,4-Dichlorobutane	ND	ug/kg	29.					
Iodomethane	ND	ug/kg	29.					
1,2,3-Trichloropropane	ND	ug/kg	29.					
Styrene	ND	ug/kg	5.8					
Dichlorodifluoromethane	ND	ug/kg	29.					
Acetone	ND	ug/kg	29.					
Carbon disulfide	ND	ug/kg	29.					
2-Butanone	ND	ug/kg	29.					
Vinyl acetate	ND	ug/kg	29.					
4-Methyl-2-pentanone	ND	ug/kg	29.					
2-Hexanone	ND	ug/kg	29.					
Ethyl methacrylate	ND	ug/kg	29.					
Acrolein	ND	ug/kg	73.					
Acrylonitrile	ND	ug/kg	12.					
Bromochloromethane	ND	ug/kg	14.					
Tetrahydrofuran	ND	ug/kg	58.					
2,2-Dichloropropane	ND	ug/kg	14.					
1,2-Dibromoethane	ND	ug/kg	12.					
1,3-Dichloropropane	ND	ug/kg	14.					
1,1,1,2-Tetrachloroethane	ND	ug/kg	2.9					
Bromobenzene	ND	ug/kg	14.					
n-Butylbenzene	ND	ug/kg	2.9					
sec-Butylbenzene	ND	ug/kg	2.9					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-01
AK-SB-1 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 17:10	RY
tert-Butylbenzene	ND	ug/kg	14.					
o-Chlorotoluene	ND	ug/kg	14.					
p-Chlorotoluene	ND	ug/kg	14.					
1,2-Dibromo-3-chloropropane	ND	ug/kg	14.					
Hexachlorobutadiene	ND	ug/kg	14.					
Isopropylbenzene	ND	ug/kg	2.9					
p-Isopropyltoluene	ND	ug/kg	2.9					
Naphthalene	ND	ug/kg	14.					
n-Propylbenzene	ND	ug/kg	2.9					
1,2,3-Trichlorobenzene	ND	ug/kg	14.					
1,2,4-Trichlorobenzene	ND	ug/kg	14.					
1,3,5-Trimethylbenzene	ND	ug/kg	14.					
1,2,4-Trimethylbenzene	ND	ug/kg	14.					
trans-1,4-Dichloro-2-butene	ND	ug/kg	14.					
Ethyl ether	ND	ug/kg	14.					
Surrogate(s)	Recovery		QC Criteria					
1,2-Dichloroethane-d4	108	%	70-130					
Toluene-d8	98.0	%	70-130					
4-Bromofluorobenzene	123	%	70-130					
Dibromofluoromethane	101	%	70-130					
SVOC's by GC/MS 8270				1	8270C	1103 20:35	1106 16:01	RL
Acenaphthene	ND	ug/kg	1900					
Benzidine	ND	ug/kg	19000					
1,2,4-Trichlorobenzene	ND	ug/kg	1900					
Hexachlorobenzene	ND	ug/kg	1900					
Bis(2-chloroethyl)ether	ND	ug/kg	1900					
1-Chloronaphthalene	ND	ug/kg	1900					
2-Chloronaphthalene	ND	ug/kg	2300					
1,2-Dichlorobenzene	ND	ug/kg	1900					
1,3-Dichlorobenzene	ND	ug/kg	1900					
1,4-Dichlorobenzene	ND	ug/kg	1900					
3,3'-Dichlorobenzidine	ND	ug/kg	3900					
2,4-Dinitrotoluene	ND	ug/kg	1900					
2,6-Dinitrotoluene	ND	ug/kg	1900					
Azobenzene	ND	ug/kg	1900					
Fluoranthene	21000	ug/kg	1900					
4-Chlorophenyl phenyl ether	ND	ug/kg	1900					
4-Bromophenyl phenyl ether	ND	ug/kg	1900					
Bis(2-chloroisopropyl)ether	ND	ug/kg	1900					
Bis(2-chloroethoxy)methane	ND	ug/kg	1900					
Hexachlorobutadiene	ND	ug/kg	3900					
Hexachlorocyclopentadiene	ND	ug/kg	3900					
Hexachloroethane	ND	ug/kg	1900					
Isophorone	ND	ug/kg	1900					
Naphthalene	ND	ug/kg	1900					
Nitrobenzene	ND	ug/kg	1900					
NDPA/DPA	ND	ug/kg	5800					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-01
AK-SB-1 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 16:01	RL
n-Nitrosodi-n-propylamine	ND	ug/kg	1900					
Bis(2-ethylhexyl)phthalate	ND	ug/kg	3900					
Butyl benzyl phthalate	ND	ug/kg	1900					
Di-n-butylphthalate	ND	ug/kg	1900					
Di-n-octylphthalate	ND	ug/kg	1900					
Diethyl phthalate	ND	ug/kg	1900					
Dimethyl phthalate	ND	ug/kg	1900					
Benzo(a)anthracene	9500	ug/kg	1900					
Benzo(a)pyrene	9400	ug/kg	1900					
Benzo(b)fluoranthene	7800	ug/kg	1900					
Benzo(k)fluoranthene	8300	ug/kg	1900					
Chrysene	9200	ug/kg	1900					
Acenaphthylene	ND	ug/kg	1900					
Anthracene	3700	ug/kg	1900					
Benzo(ghi)perylene	6400	ug/kg	1900					
Fluorene	ND	ug/kg	1900					
Phenanthrene	13000	ug/kg	1900					
Dibenzo(a,h)anthracene	ND	ug/kg	1900					
Indeno(1,2,3-cd)pyrene	6900	ug/kg	1900					
Pyrene	18000	ug/kg	1900					
Benzo(e)pyrene	6200	ug/kg	1900					
Biphenyl	ND	ug/kg	1900					
Perylene	2500	ug/kg	1900					
Aniline	ND	ug/kg	3900					
4-Chloroaniline	ND	ug/kg	1900					
1-Methylnaphthalene	ND	ug/kg	1900					
2-Nitroaniline	ND	ug/kg	1900					
3-Nitroaniline	ND	ug/kg	1900					
4-Nitroaniline	ND	ug/kg	2700					
Dibenzofuran	ND	ug/kg	1900					
a,a-Dimethylphenethylamine	ND	ug/kg	19000					
Hexachloropropene	ND	ug/kg	3900					
Nitrosodi-n-butylamine	ND	ug/kg	3900					
2-Methylnaphthalene	ND	ug/kg	1900					
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	7800					
Pentachlorobenzene	ND	ug/kg	7800					
a-Naphthylamine	ND	ug/kg	7800					
b-Naphthylamine	ND	ug/kg	7800					
Phenacetin	ND	ug/kg	3900					
Dimethoate	ND	ug/kg	7800					
4-Aminobiphenyl	ND	ug/kg	3900					
Pentachloronitrobenzene	ND	ug/kg	3900					
Isodrin	ND	ug/kg	3900					
p-Dimethylaminoazobenzene	ND	ug/kg	3900					
Chlorobenzilate	ND	ug/kg	7800					
3-Methylcholanthrene	ND	ug/kg	7800					
Ethyl Methanesulfonate	ND	ug/kg	5800					
Acetophenone	ND	ug/kg	7800					
Nitrosodipiperidine	ND	ug/kg	7800					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-01
AK-SB-1 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 16:01	RL
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	3900					
n-Nitrosodimethylamine	ND	ug/kg	19000					
2,4,6-Trichlorophenol	ND	ug/kg	1900					
p-Chloro-m-cresol	ND	ug/kg	1900					
2-Chlorophenol	ND	ug/kg	2300					
2,4-Dichlorophenol	ND	ug/kg	3900					
2,4-Dimethylphenol	ND	ug/kg	1900					
2-Nitrophenol	ND	ug/kg	7800					
4-Nitrophenol	ND	ug/kg	3900					
2,4-Dinitrophenol	ND	ug/kg	7800					
4,6-Dinitro-o-cresol	ND	ug/kg	7800					
Pentachlorophenol	ND	ug/kg	7800					
Phenol	ND	ug/kg	2700					
2-Methylphenol	ND	ug/kg	2300					
3-Methylphenol/4-Methylphenol	ND	ug/kg	2300					
2,4,5-Trichlorophenol	ND	ug/kg	1900					
2,6-Dichlorophenol	ND	ug/kg	3900					
Benzoic Acid	ND	ug/kg	19000					
Benzyl Alcohol	ND	ug/kg	3900					
Carbazole	ND	ug/kg	1900					
Pyridine	ND	ug/kg	19000					
2-Picoline	ND	ug/kg	7800					
Pronamide	ND	ug/kg	7800					
Methyl methanesulfonate	ND	ug/kg	7800					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	79.0	%	25-120					
Phenol-d6	120	%	10-120					
Nitrobenzene-d5	86.0	%	23-120					
2-Fluorobiphenyl	88.0	%	30-120					
2,4,6-Tribromophenol	95.0	%	19-120					
4-Terphenyl-d14	101	%	18-120					
PAH by GC/MS SIM 8270M				1	8270C-M	1103 20:35	1108 00:38	RL
Acenaphthene	2000	ug/kg	390					
2-Chloronaphthalene	ND	ug/kg	390					
Fluoranthene	27000	ug/kg	390					
Hexachlorobutadiene	ND	ug/kg	970					
Naphthalene	670	ug/kg	390					
Benzo(a)anthracene	15000	ug/kg	390					
Benzo(a)pyrene	9300	ug/kg	390					
Benzo(b)fluoranthene	12000	ug/kg	390					
Benzo(k)fluoranthene	11000	ug/kg	390					
Chrysene	12000	ug/kg	390					
Acenaphthylene	760	ug/kg	390					
Anthracene	4800	ug/kg	390					
Benzo(ghi)perylene	7200	ug/kg	390					
Fluorene	2100	ug/kg	390					
Phenanthrene	15000	ug/kg	390					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-01
AK-SB-1 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
PAH by GC/MS SIM 8270M cont'd				1	8270C-M	1103 20:35	1108 00:38	RL
Dibenzo(a,h)anthracene	1700	ug/kg	390					
Indeno(1,2,3-cd)Pyrene	6200	ug/kg	390					
Pyrene	22000	ug/kg	390					
1-Methylnaphthalene	ND	ug/kg	390					
2-Methylnaphthalene	ND	ug/kg	390					
Pentachlorophenol	ND	ug/kg	1600					
Hexachlorobenzene	ND	ug/kg	1600					
Perylene	2600	ug/kg	390					
Biphenyl	ND	ug/kg	390					
2,6-Dimethylnaphthalene	ND	ug/kg	390					
1-Methylphenanthrene	1400	ug/kg	390					
Benzo(e)Pyrene	9400	ug/kg	390					
Hexachloroethane	ND	ug/kg	1600					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	ND	%	25-120					
Phenol-d6	ND	%	10-120					
Nitrobenzene-d5	ND	%	23-120					
2-Fluorobiphenyl	ND	%	30-120					
2,4,6-Tribromophenol	ND	%	19-120					
4-Terphenyl-d14	ND	%	18-120					
Polychlorinated Biphenyls				1	8082	1103 16:00	1107 23:38	AK
Aroclor 1016	ND	ug/kg	38.8					
Aroclor 1221	ND	ug/kg	38.8					
Aroclor 1232	ND	ug/kg	38.8					
Aroclor 1242	ND	ug/kg	38.8					
Aroclor 1248	ND	ug/kg	38.8					
Aroclor 1254	109	ug/kg	38.8					
Aroclor 1260	49.7	ug/kg	38.8					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	47.0	%	30-150					
Decachlorobiphenyl	42.0	%	30-150					
Organochlorine Pesticides				1	8081	1103 21:40	1108 04:55	JB
Delta-BHC	ND	ug/kg	77.5					
Lindane	ND	ug/kg	77.5					
Alpha-BHC	ND	ug/kg	77.5					
Beta-BHC	ND	ug/kg	77.5					
Heptachlor	ND	ug/kg	77.5					
Aldrin	ND	ug/kg	77.5					
Heptachlor epoxide	ND	ug/kg	77.5					
Endrin	ND	ug/kg	77.5					
Endrin aldehyde	ND	ug/kg	77.5					
Endrin ketone	ND	ug/kg	77.5					
Dieldrin	ND	ug/kg	77.5					
4,4'-DDE	ND	ug/kg	77.5					
4,4'-DDD	231	ug/kg	77.5					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-01
AK-SB-1 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Organochlorine Pesticides cont'd				1	8081	1103 21:40	1108 04:55	JB
4,4'-DDT	ND	ug/kg	77.5					
Endosulfan I	ND	ug/kg	77.5					
Endosulfan II	ND	ug/kg	77.5					
Endosulfan sulfate	ND	ug/kg	77.5					
Methoxychlor	ND	ug/kg	310.					
Toxaphene	ND	ug/kg	310.					
Chlordane	ND	ug/kg	310.					
cis-Chlordane	ND	ug/kg	77.5					
trans-Chlordane	ND	ug/kg	77.5					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	ND	%	30-150					
Decachlorobiphenyl	ND	%	30-150					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615863-02
AK-SB-1 (6'-7')
Sample Matrix: SOIL

Date Collected: 01-NOV-2006 08:55
Date Received : 02-NOV-2006
Date Reported : 09-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber,1-Vial

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	91	%	0.10	30	2540G		1107 12:01	PD
Total Metals				1	3051			
Aluminum, Total	4500	mg/kg	4.4	1	6010B	1103 18:30	1108 15:17	AI
Antimony, Total	ND	mg/kg	2.2	1	6010B	1103 18:30	1108 15:17	AI
Arsenic, Total	1.4	mg/kg	0.44	1	6010B	1103 18:30	1108 15:17	AI
Barium, Total	73	mg/kg	0.44	1	6010B	1103 18:30	1108 15:17	AI
Beryllium, Total	ND	mg/kg	0.22	1	6010B	1103 18:30	1108 15:17	AI
Cadmium, Total	ND	mg/kg	0.44	1	6010B	1103 18:30	1108 15:17	AI
Calcium, Total	49000	mg/kg	44	1	6010B	1103 18:30	1109 10:25	AI
Chromium, Total	9.3	mg/kg	0.44	1	6010B	1103 18:30	1108 15:17	AI
Cobalt, Total	4.9	mg/kg	0.87	1	6010B	1103 18:30	1108 15:17	AI
Copper, Total	17	mg/kg	0.44	1	6010B	1103 18:30	1108 15:17	AI
Iron, Total	8700	mg/kg	2.2	1	6010B	1103 18:30	1108 15:17	AI
Lead, Total	61	mg/kg	2.2	1	6010B	1103 18:30	1108 15:17	AI
Magnesium, Total	26000	mg/kg	44	1	6010B	1103 18:30	1109 10:25	AI
Manganese, Total	180	mg/kg	0.44	1	6010B	1103 18:30	1108 15:17	AI
Mercury, Total	ND	mg/kg	0.08	1	7471A	1106 16:25	1107 10:21	DM
Nickel, Total	7.8	mg/kg	1.1	1	6010B	1103 18:30	1108 15:17	AI
Potassium, Total	1700	mg/kg	110	1	6010B	1103 18:30	1108 15:17	AI
Selenium, Total	ND	mg/kg	0.87	1	6010B	1103 18:30	1108 15:17	AI
Silver, Total	ND	mg/kg	0.44	1	6010B	1103 18:30	1108 15:17	AI
Sodium, Total	ND	mg/kg	87	1	6010B	1103 18:30	1108 15:17	AI
Thallium, Total	ND	mg/kg	0.44	1	6010B	1103 18:30	1108 15:17	AI
Vanadium, Total	15	mg/kg	0.44	1	6010B	1103 18:30	1108 15:17	AI
Zinc, Total	52	mg/kg	2.2	1	6010B	1103 18:30	1108 15:17	AI
Volatile Organics by GC/MS 8260				1	8260B		1107 17:46	RY
Methylene chloride	ND	ug/kg	27.					
1,1-Dichloroethane	ND	ug/kg	4.1					
Chloroform	ND	ug/kg	4.1					
Carbon tetrachloride	ND	ug/kg	2.7					
1,2-Dichloropropane	ND	ug/kg	9.6					
Dibromochloromethane	ND	ug/kg	2.7					
1,1,2-Trichloroethane	ND	ug/kg	4.1					
Tetrachloroethene	ND	ug/kg	2.7					
Chlorobenzene	ND	ug/kg	2.7					
Trichlorofluoromethane	ND	ug/kg	14.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-02
AK-SB-1 (6'-7')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 17:46	RY
1,2-Dichloroethane	ND	ug/kg	2.7					
1,1,1-Trichloroethane	ND	ug/kg	2.7					
Bromodichloromethane	ND	ug/kg	2.7					
trans-1,3-Dichloropropene	ND	ug/kg	2.7					
cis-1,3-Dichloropropene	ND	ug/kg	2.7					
1,1-Dichloropropene	ND	ug/kg	14.					
Bromoform	ND	ug/kg	11.					
1,1,2,2-Tetrachloroethane	ND	ug/kg	2.7					
Benzene	ND	ug/kg	2.7					
Toluene	ND	ug/kg	4.1					
Ethylbenzene	ND	ug/kg	2.7					
Chloromethane	ND	ug/kg	14.					
Bromomethane	ND	ug/kg	5.5					
Vinyl chloride	ND	ug/kg	5.5					
Chloroethane	ND	ug/kg	5.5					
1,1-Dichloroethene	ND	ug/kg	2.7					
trans-1,2-Dichloroethene	ND	ug/kg	4.1					
Trichloroethene	ND	ug/kg	2.7					
1,2-Dichlorobenzene	ND	ug/kg	14.					
1,3-Dichlorobenzene	ND	ug/kg	14.					
1,4-Dichlorobenzene	ND	ug/kg	14.					
Methyl tert butyl ether	ND	ug/kg	5.5					
p/m-Xylene	ND	ug/kg	5.5					
o-Xylene	ND	ug/kg	5.5					
cis-1,2-Dichloroethene	ND	ug/kg	2.7					
Dibromomethane	ND	ug/kg	27.					
1,4-Dichlorobutane	ND	ug/kg	27.					
Iodomethane	ND	ug/kg	27.					
1,2,3-Trichloropropane	ND	ug/kg	27.					
Styrene	ND	ug/kg	5.5					
Dichlorodifluoromethane	ND	ug/kg	27.					
Acetone	ND	ug/kg	27.					
Carbon disulfide	ND	ug/kg	27.					
2-Butanone	ND	ug/kg	27.					
Vinyl acetate	ND	ug/kg	27.					
4-Methyl-2-pentanone	ND	ug/kg	27.					
2-Hexanone	ND	ug/kg	27.					
Ethyl methacrylate	ND	ug/kg	27.					
Acrolein	ND	ug/kg	69.					
Acrylonitrile	ND	ug/kg	11.					
Bromochloromethane	ND	ug/kg	14.					
Tetrahydrofuran	ND	ug/kg	55.					
2,2-Dichloropropane	ND	ug/kg	14.					
1,2-Dibromoethane	ND	ug/kg	11.					
1,3-Dichloropropane	ND	ug/kg	14.					
1,1,1,2-Tetrachloroethane	ND	ug/kg	2.7					
Bromobenzene	ND	ug/kg	14.					
n-Butylbenzene	ND	ug/kg	2.7					
sec-Butylbenzene	ND	ug/kg	2.7					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-02
AK-SB-1 (6'-7')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 17:46	RY
tert-Butylbenzene	ND	ug/kg	14.					
o-Chlorotoluene	ND	ug/kg	14.					
p-Chlorotoluene	ND	ug/kg	14.					
1,2-Dibromo-3-chloropropane	ND	ug/kg	14.					
Hexachlorobutadiene	ND	ug/kg	14.					
Isopropylbenzene	ND	ug/kg	2.7					
p-Isopropyltoluene	ND	ug/kg	2.7					
Naphthalene	ND	ug/kg	14.					
n-Propylbenzene	ND	ug/kg	2.7					
1,2,3-Trichlorobenzene	ND	ug/kg	14.					
1,2,4-Trichlorobenzene	ND	ug/kg	14.					
1,3,5-Trimethylbenzene	ND	ug/kg	14.					
1,2,4-Trimethylbenzene	ND	ug/kg	14.					
trans-1,4-Dichloro-2-butene	ND	ug/kg	14.					
Ethyl ether	ND	ug/kg	14.					
Surrogate(s)	Recovery		QC Criteria					
1,2-Dichloroethane-d4	106	%	70-130					
Toluene-d8	93.0	%	70-130					
4-Bromofluorobenzene	102	%	70-130					
Dibromofluoromethane	98.0	%	70-130					
SVOC's by GC/MS 8270				1	8270C	1103 20:35	1107 18:41	RL
Acenaphthene	ND	ug/kg	3700					
Benzidine	ND	ug/kg	37000					
1,2,4-Trichlorobenzene	ND	ug/kg	3700					
Hexachlorobenzene	ND	ug/kg	3700					
Bis(2-chloroethyl)ether	ND	ug/kg	3700					
1-Chloronaphthalene	ND	ug/kg	3700					
2-Chloronaphthalene	ND	ug/kg	4400					
1,2-Dichlorobenzene	ND	ug/kg	3700					
1,3-Dichlorobenzene	ND	ug/kg	3700					
1,4-Dichlorobenzene	ND	ug/kg	3700					
3,3'-Dichlorobenzidine	ND	ug/kg	7300					
2,4-Dinitrotoluene	ND	ug/kg	3700					
2,6-Dinitrotoluene	ND	ug/kg	3700					
Azobenzene	ND	ug/kg	3700					
Fluoranthene	45000	ug/kg	3700					
4-Chlorophenyl phenyl ether	ND	ug/kg	3700					
4-Bromophenyl phenyl ether	ND	ug/kg	3700					
Bis(2-chloroisopropyl)ether	ND	ug/kg	3700					
Bis(2-chloroethoxy)methane	ND	ug/kg	3700					
Hexachlorobutadiene	ND	ug/kg	7300					
Hexachlorocyclopentadiene	ND	ug/kg	7300					
Hexachloroethane	ND	ug/kg	3700					
Isophorone	ND	ug/kg	3700					
Naphthalene	5900	ug/kg	3700					
Nitrobenzene	ND	ug/kg	3700					
NDPA/DPA	ND	ug/kg	11000					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-02
AK-SB-1 (6'-7')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1107 18:41	RL
n-Nitrosodi-n-propylamine	ND	ug/kg	3700					
Bis(2-ethylhexyl)phthalate	ND	ug/kg	7300					
Butyl benzyl phthalate	ND	ug/kg	3700					
Di-n-butylphthalate	ND	ug/kg	3700					
Di-n-octylphthalate	ND	ug/kg	3700					
Diethyl phthalate	ND	ug/kg	3700					
Dimethyl phthalate	ND	ug/kg	3700					
Benzo(a)anthracene	19000	ug/kg	3700					
Benzo(a)pyrene	13000	ug/kg	3700					
Benzo(b)fluoranthene	10000	ug/kg	3700					
Benzo(k)fluoranthene	12000	ug/kg	3700					
Chrysene	19000	ug/kg	3700					
Acenaphthylene	ND	ug/kg	3700					
Anthracene	13000	ug/kg	3700					
Benzo(ghi)perylene	6000	ug/kg	3700					
Fluorene	6200	ug/kg	3700					
Phenanthrene	59000	ug/kg	3700					
Dibenzo(a,h)anthracene	ND	ug/kg	3700					
Indeno(1,2,3-cd)pyrene	7200	ug/kg	3700					
Pyrene	39000	ug/kg	3700					
Benzo(e)pyrene	7800	ug/kg	3700					
Biphenyl	ND	ug/kg	3700					
Perylene	ND	ug/kg	3700					
Aniline	ND	ug/kg	7300					
4-Chloroaniline	ND	ug/kg	3700					
1-Methylnaphthalene	5400	ug/kg	3700					
2-Nitroaniline	ND	ug/kg	3700					
3-Nitroaniline	ND	ug/kg	3700					
4-Nitroaniline	ND	ug/kg	5100					
Dibenzofuran	ND	ug/kg	3700					
a,a-Dimethylphenethylamine	ND	ug/kg	37000					
Hexachloropropene	ND	ug/kg	7300					
Nitrosodi-n-butylamine	ND	ug/kg	7300					
2-Methylnaphthalene	4400	ug/kg	3700					
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	15000					
Pentachlorobenzene	ND	ug/kg	15000					
a-Naphthylamine	ND	ug/kg	15000					
b-Naphthylamine	ND	ug/kg	15000					
Phenacetin	ND	ug/kg	7300					
Dimethoate	ND	ug/kg	15000					
4-Aminobiphenyl	ND	ug/kg	7300					
Pentachloronitrobenzene	ND	ug/kg	7300					
Isodrin	ND	ug/kg	7300					
p-Dimethylaminoazobenzene	ND	ug/kg	7300					
Chlorobenzilate	ND	ug/kg	15000					
3-Methylcholanthrene	ND	ug/kg	15000					
Ethyl Methanesulfonate	ND	ug/kg	11000					
Acetophenone	ND	ug/kg	15000					
Nitrosodipiperidine	ND	ug/kg	15000					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-02
AK-SB-1 (6'-7')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1107 18:41	RL
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	7300					
n-Nitrosodimethylamine	ND	ug/kg	37000					
2,4,6-Trichlorophenol	ND	ug/kg	3700					
p-Chloro-m-cresol	ND	ug/kg	3700					
2-Chlorophenol	ND	ug/kg	4400					
2,4-Dichlorophenol	ND	ug/kg	7300					
2,4-Dimethylphenol	ND	ug/kg	3700					
2-Nitrophenol	ND	ug/kg	15000					
4-Nitrophenol	ND	ug/kg	7300					
2,4-Dinitrophenol	ND	ug/kg	15000					
4,6-Dinitro-o-cresol	ND	ug/kg	15000					
Pentachlorophenol	ND	ug/kg	15000					
Phenol	ND	ug/kg	5100					
2-Methylphenol	ND	ug/kg	4400					
3-Methylphenol/4-Methylphenol	ND	ug/kg	4400					
2,4,5-Trichlorophenol	ND	ug/kg	3700					
2,6-Dichlorophenol	ND	ug/kg	7300					
Benzoic Acid	ND	ug/kg	37000					
Benzyl Alcohol	ND	ug/kg	7300					
Carbazole	4600	ug/kg	3700					
Pyridine	ND	ug/kg	37000					
2-Picoline	ND	ug/kg	15000					
Pronamide	ND	ug/kg	15000					
Methyl methanesulfonate	ND	ug/kg	15000					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	54.0	%	25-120					
Phenol-d6	90.0	%	10-120					
Nitrobenzene-d5	64.0	%	23-120					
2-Fluorobiphenyl	76.0	%	30-120					
2,4,6-Tribromophenol	84.0	%	19-120					
4-Terphenyl-d14	93.0	%	18-120					
PAH by GC/MS SIM 8270M				1	8270C-M	1103 20:35	1108 01:27	RL
Acenaphthene	4200	ug/kg	590					
2-Chloronaphthalene	ND	ug/kg	590					
Fluoranthene	46000	ug/kg	590					
Hexachlorobutadiene	ND	ug/kg	1500					
Naphthalene	5800	ug/kg	590					
Benzo(a)anthracene	28000	ug/kg	590					
Benzo(a)pyrene	12000	ug/kg	590					
Benzo(b)fluoranthene	16000	ug/kg	590					
Benzo(k)fluoranthene	15000	ug/kg	590					
Chrysene	24000	ug/kg	590					
Acenaphthylene	730	ug/kg	590					
Anthracene	16000	ug/kg	590					
Benzo(ghi)perylene	6900	ug/kg	590					
Fluorene	7900	ug/kg	590					
Phenanthrene	50000	ug/kg	590					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-02
AK-SB-1 (6'-7')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
PAH by GC/MS SIM 8270M cont'd				1	8270C-M	1103 20:35	1108 01:27	RL
Dibenzo(a,h)anthracene	2300	ug/kg	590					
Indeno(1,2,3-cd)Pyrene	6400	ug/kg	590					
Pyrene	40000	ug/kg	590					
1-Methylnaphthalene	4100	ug/kg	590					
2-Methylnaphthalene	4700	ug/kg	590					
Pentachlorophenol	ND	ug/kg	2300					
Hexachlorobenzene	ND	ug/kg	2300					
Perylene	2900	ug/kg	590					
Biphenyl	900	ug/kg	590					
2,6-Dimethylnaphthalene	2200	ug/kg	590					
1-Methylphenanthrene	8000	ug/kg	590					
Benzo(e)Pyrene	11000	ug/kg	590					
Hexachloroethane	ND	ug/kg	2300					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	ND	%	25-120					
Phenol-d6	ND	%	10-120					
Nitrobenzene-d5	ND	%	23-120					
2-Fluorobiphenyl	ND	%	30-120					
2,4,6-Tribromophenol	ND	%	19-120					
4-Terphenyl-d14	ND	%	18-120					
Polychlorinated Biphenyls				1	8082	1103 16:00	1108 00:07	AK
Aroclor 1016	ND	ug/kg	36.6					
Aroclor 1221	ND	ug/kg	36.6					
Aroclor 1232	ND	ug/kg	36.6					
Aroclor 1242	ND	ug/kg	36.6					
Aroclor 1248	ND	ug/kg	36.6					
Aroclor 1254	ND	ug/kg	36.6					
Aroclor 1260	ND	ug/kg	36.6					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	46.0	%	30-150					
Decachlorobiphenyl	42.0	%	30-150					
Organochlorine Pesticides				1	8081	1103 21:40	1108 00:09	JB
Delta-BHC	ND	ug/kg	18.3					
Lindane	ND	ug/kg	18.3					
Alpha-BHC	ND	ug/kg	18.3					
Beta-BHC	ND	ug/kg	18.3					
Heptachlor	ND	ug/kg	18.3					
Aldrin	ND	ug/kg	18.3					
Heptachlor epoxide	ND	ug/kg	18.3					
Endrin	ND	ug/kg	18.3					
Endrin aldehyde	ND	ug/kg	18.3					
Endrin ketone	ND	ug/kg	18.3					
Dieldrin	ND	ug/kg	18.3					
4,4'-DDE	ND	ug/kg	18.3					
4,4'-DDD	ND	ug/kg	18.3					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-02
AK-SB-1 (6'-7')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Organochlorine Pesticides cont'd				1	8081	1103 21:40	1108 00:09	JB
4,4'-DDT	ND	ug/kg	18.3					
Endosulfan I	ND	ug/kg	18.3					
Endosulfan II	ND	ug/kg	18.3					
Endosulfan sulfate	ND	ug/kg	18.3					
Methoxychlor	ND	ug/kg	73.3					
Toxaphene	ND	ug/kg	73.3					
Chlordane	ND	ug/kg	73.3					
cis-Chlordane	ND	ug/kg	18.3					
trans-Chlordane	ND	ug/kg	18.3					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	65.0	%	30-150					
Decachlorobiphenyl	116	%	30-150					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615863-03
AK-SB-2 (1'-2')
Sample Matrix: SOIL

Date Collected: 01-NOV-2006 09:35
Date Received : 02-NOV-2006
Date Reported : 09-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber,1-Vial

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	91	%	0.10	30	2540G		1103 14:08	PD
Total Metals				1	3051			
Aluminum, Total	3800	mg/kg	4.3	1	6010B	1103 18:30	1108 15:21	AI
Antimony, Total	ND	mg/kg	2.2	1	6010B	1103 18:30	1108 15:21	AI
Arsenic, Total	4.1	mg/kg	0.43	1	6010B	1103 18:30	1108 15:21	AI
Barium, Total	41	mg/kg	0.43	1	6010B	1103 18:30	1108 15:21	AI
Beryllium, Total	ND	mg/kg	0.22	1	6010B	1103 18:30	1108 15:21	AI
Cadmium, Total	ND	mg/kg	0.43	1	6010B	1103 18:30	1108 15:21	AI
Calcium, Total	20000	mg/kg	43	1	6010B	1103 18:30	1109 10:29	AI
Chromium, Total	7.7	mg/kg	0.43	1	6010B	1103 18:30	1108 15:21	AI
Cobalt, Total	4.1	mg/kg	0.86	1	6010B	1103 18:30	1108 15:21	AI
Copper, Total	91	mg/kg	0.43	1	6010B	1103 18:30	1108 15:21	AI
Iron, Total	11000	mg/kg	2.2	1	6010B	1103 18:30	1108 15:21	AI
Lead, Total	74	mg/kg	2.2	1	6010B	1103 18:30	1108 15:21	AI
Magnesium, Total	5700	mg/kg	4.3	1	6010B	1103 18:30	1108 15:21	AI
Manganese, Total	210	mg/kg	0.43	1	6010B	1103 18:30	1108 15:21	AI
Mercury, Total	0.30	mg/kg	0.09	1	7471A	1106 16:25	1107 10:23	DM
Nickel, Total	10	mg/kg	1.1	1	6010B	1103 18:30	1108 15:21	AI
Potassium, Total	770	mg/kg	110	1	6010B	1103 18:30	1108 15:21	AI
Selenium, Total	ND	mg/kg	0.86	1	6010B	1103 18:30	1108 15:21	AI
Silver, Total	ND	mg/kg	0.43	1	6010B	1103 18:30	1108 15:21	AI
Sodium, Total	ND	mg/kg	86	1	6010B	1103 18:30	1108 15:21	AI
Thallium, Total	ND	mg/kg	0.43	1	6010B	1103 18:30	1108 15:21	AI
Vanadium, Total	12	mg/kg	0.43	1	6010B	1103 18:30	1108 15:21	AI
Zinc, Total	110	mg/kg	2.2	1	6010B	1103 18:30	1108 15:21	AI
Volatile Organics by GC/MS 8260				1	8260B		1107 18:21	RY
Methylene chloride	ND	ug/kg	27.					
1,1-Dichloroethane	ND	ug/kg	4.1					
Chloroform	ND	ug/kg	4.1					
Carbon tetrachloride	ND	ug/kg	2.7					
1,2-Dichloropropane	ND	ug/kg	9.6					
Dibromochloromethane	ND	ug/kg	2.7					
1,1,2-Trichloroethane	ND	ug/kg	4.1					
Tetrachloroethene	ND	ug/kg	2.7					
Chlorobenzene	ND	ug/kg	2.7					
Trichlorofluoromethane	ND	ug/kg	14.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-03
AK-SB-2 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 18:21	RY
1,2-Dichloroethane	ND	ug/kg	2.7					
1,1,1-Trichloroethane	ND	ug/kg	2.7					
Bromodichloromethane	ND	ug/kg	2.7					
trans-1,3-Dichloropropene	ND	ug/kg	2.7					
cis-1,3-Dichloropropene	ND	ug/kg	2.7					
1,1-Dichloropropene	ND	ug/kg	14.					
Bromoform	ND	ug/kg	11.					
1,1,2,2-Tetrachloroethane	ND	ug/kg	2.7					
Benzene	ND	ug/kg	2.7					
Toluene	ND	ug/kg	4.1					
Ethylbenzene	ND	ug/kg	2.7					
Chloromethane	ND	ug/kg	14.					
Bromomethane	ND	ug/kg	5.5					
Vinyl chloride	ND	ug/kg	5.5					
Chloroethane	ND	ug/kg	5.5					
1,1-Dichloroethene	ND	ug/kg	2.7					
trans-1,2-Dichloroethene	ND	ug/kg	4.1					
Trichloroethene	ND	ug/kg	2.7					
1,2-Dichlorobenzene	ND	ug/kg	14.					
1,3-Dichlorobenzene	ND	ug/kg	14.					
1,4-Dichlorobenzene	ND	ug/kg	14.					
Methyl tert butyl ether	ND	ug/kg	5.5					
p/m-Xylene	ND	ug/kg	5.5					
o-Xylene	ND	ug/kg	5.5					
cis-1,2-Dichloroethene	ND	ug/kg	2.7					
Dibromomethane	ND	ug/kg	27.					
1,4-Dichlorobutane	ND	ug/kg	27.					
Iodomethane	ND	ug/kg	27.					
1,2,3-Trichloropropane	ND	ug/kg	27.					
Styrene	ND	ug/kg	5.5					
Dichlorodifluoromethane	ND	ug/kg	27.					
Acetone	ND	ug/kg	27.					
Carbon disulfide	ND	ug/kg	27.					
2-Butanone	ND	ug/kg	27.					
Vinyl acetate	ND	ug/kg	27.					
4-Methyl-2-pentanone	ND	ug/kg	27.					
2-Hexanone	ND	ug/kg	27.					
Ethyl methacrylate	ND	ug/kg	27.					
Acrolein	ND	ug/kg	69.					
Acrylonitrile	ND	ug/kg	11.					
Bromochloromethane	ND	ug/kg	14.					
Tetrahydrofuran	ND	ug/kg	55.					
2,2-Dichloropropane	ND	ug/kg	14.					
1,2-Dibromoethane	ND	ug/kg	11.					
1,3-Dichloropropane	ND	ug/kg	14.					
1,1,1,2-Tetrachloroethane	ND	ug/kg	2.7					
Bromobenzene	ND	ug/kg	14.					
n-Butylbenzene	ND	ug/kg	2.7					
sec-Butylbenzene	ND	ug/kg	2.7					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-03
AK-SB-2 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 18:21	RY
tert-Butylbenzene	ND	ug/kg	14.					
o-Chlorotoluene	ND	ug/kg	14.					
p-Chlorotoluene	ND	ug/kg	14.					
1,2-Dibromo-3-chloropropane	ND	ug/kg	14.					
Hexachlorobutadiene	ND	ug/kg	14.					
Isopropylbenzene	ND	ug/kg	2.7					
p-Isopropyltoluene	ND	ug/kg	2.7					
Naphthalene	21	ug/kg	14					
n-Propylbenzene	ND	ug/kg	2.7					
1,2,3-Trichlorobenzene	ND	ug/kg	14.					
1,2,4-Trichlorobenzene	ND	ug/kg	14.					
1,3,5-Trimethylbenzene	ND	ug/kg	14.					
1,2,4-Trimethylbenzene	ND	ug/kg	14.					
trans-1,4-Dichloro-2-butene	ND	ug/kg	14.					
Ethyl ether	ND	ug/kg	14.					
Surrogate(s)	Recovery		QC Criteria					
1,2-Dichloroethane-d4	108	%	70-130					
Toluene-d8	99.0	%	70-130					
4-Bromofluorobenzene	120	%	70-130					
Dibromofluoromethane	102	%	70-130					
SVOC's by GC/MS 8270				1	8270C	1103 20:35	1106 16:51	RL
Acenaphthene	ND	ug/kg	370					
Benzidine	ND	ug/kg	3700					
1,2,4-Trichlorobenzene	ND	ug/kg	370					
Hexachlorobenzene	ND	ug/kg	370					
Bis(2-chloroethyl)ether	ND	ug/kg	370					
1-Chloronaphthalene	ND	ug/kg	370					
2-Chloronaphthalene	ND	ug/kg	440					
1,2-Dichlorobenzene	ND	ug/kg	370					
1,3-Dichlorobenzene	ND	ug/kg	370					
1,4-Dichlorobenzene	ND	ug/kg	370					
3,3'-Dichlorobenzidine	ND	ug/kg	730					
2,4-Dinitrotoluene	ND	ug/kg	370					
2,6-Dinitrotoluene	ND	ug/kg	370					
Azobenzene	ND	ug/kg	370					
Fluoranthene	4400	ug/kg	370					
4-Chlorophenyl phenyl ether	ND	ug/kg	370					
4-Bromophenyl phenyl ether	ND	ug/kg	370					
Bis(2-chloroisopropyl)ether	ND	ug/kg	370					
Bis(2-chloroethoxy)methane	ND	ug/kg	370					
Hexachlorobutadiene	ND	ug/kg	730					
Hexachlorocyclopentadiene	ND	ug/kg	730					
Hexachloroethane	ND	ug/kg	370					
Isophorone	ND	ug/kg	370					
Naphthalene	ND	ug/kg	370					
Nitrobenzene	ND	ug/kg	370					
NDPA/DPA	ND	ug/kg	1100					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-03
AK-SB-2 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 16:51	RL
n-Nitrosodi-n-propylamine	ND	ug/kg	370					
Bis(2-ethylhexyl)phthalate	ND	ug/kg	730					
Butyl benzyl phthalate	ND	ug/kg	370					
Di-n-butylphthalate	ND	ug/kg	370					
Di-n-octylphthalate	ND	ug/kg	370					
Diethyl phthalate	ND	ug/kg	370					
Dimethyl phthalate	ND	ug/kg	370					
Benzo(a)anthracene	2000	ug/kg	370					
Benzo(a)pyrene	1800	ug/kg	370					
Benzo(b)fluoranthene	1600	ug/kg	370					
Benzo(k)fluoranthene	1600	ug/kg	370					
Chrysene	2000	ug/kg	370					
Acenaphthylene	ND	ug/kg	370					
Anthracene	600	ug/kg	370					
Benzo(ghi)perylene	1100	ug/kg	370					
Fluorene	ND	ug/kg	370					
Phenanthrene	2500	ug/kg	370					
Dibenzo(a,h)anthracene	440	ug/kg	370					
Indeno(1,2,3-cd)pyrene	1300	ug/kg	370					
Pyrene	3700	ug/kg	370					
Benzo(e)pyrene	1200	ug/kg	370					
Biphenyl	ND	ug/kg	370					
Perylene	480	ug/kg	370					
Aniline	ND	ug/kg	730					
4-Chloroaniline	ND	ug/kg	370					
1-Methylnaphthalene	ND	ug/kg	370					
2-Nitroaniline	ND	ug/kg	370					
3-Nitroaniline	ND	ug/kg	370					
4-Nitroaniline	ND	ug/kg	510					
Dibenzofuran	ND	ug/kg	370					
a,a-Dimethylphenethylamine	ND	ug/kg	3700					
Hexachloropropene	ND	ug/kg	730					
Nitrosodi-n-butylamine	ND	ug/kg	730					
2-Methylnaphthalene	ND	ug/kg	370					
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	1500					
Pentachlorobenzene	ND	ug/kg	1500					
a-Naphthylamine	ND	ug/kg	1500					
b-Naphthylamine	ND	ug/kg	1500					
Phenacetin	ND	ug/kg	730					
Dimethoate	ND	ug/kg	1500					
4-Aminobiphenyl	ND	ug/kg	730					
Pentachloronitrobenzene	ND	ug/kg	730					
Isodrin	ND	ug/kg	730					
p-Dimethylaminoazobenzene	ND	ug/kg	730					
Chlorobenzilate	ND	ug/kg	1500					
3-Methylcholanthrene	ND	ug/kg	1500					
Ethyl Methanesulfonate	ND	ug/kg	1100					
Acetophenone	ND	ug/kg	1500					
Nitrosodipiperidine	ND	ug/kg	1500					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-03
AK-SB-2 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 16:51	RL
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	730					
n-Nitrosodimethylamine	ND	ug/kg	3700					
2,4,6-Trichlorophenol	ND	ug/kg	370					
p-Chloro-m-cresol	ND	ug/kg	370					
2-Chlorophenol	ND	ug/kg	440					
2,4-Dichlorophenol	ND	ug/kg	730					
2,4-Dimethylphenol	ND	ug/kg	370					
2-Nitrophenol	ND	ug/kg	1500					
4-Nitrophenol	ND	ug/kg	730					
2,4-Dinitrophenol	ND	ug/kg	1500					
4,6-Dinitro-o-cresol	ND	ug/kg	1500					
Pentachlorophenol	ND	ug/kg	1500					
Phenol	680	ug/kg	510					
2-Methylphenol	ND	ug/kg	440					
3-Methylphenol/4-Methylphenol	ND	ug/kg	440					
2,4,5-Trichlorophenol	ND	ug/kg	370					
2,6-Dichlorophenol	ND	ug/kg	730					
Benzoic Acid	ND	ug/kg	3700					
Benzyl Alcohol	ND	ug/kg	730					
Carbazole	ND	ug/kg	370					
Pyridine	ND	ug/kg	3700					
2-Picoline	ND	ug/kg	1500					
Pronamide	ND	ug/kg	1500					
Methyl methanesulfonate	ND	ug/kg	1500					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	68.0	%	25-120					
Phenol-d6	107	%	10-120					
Nitrobenzene-d5	75.0	%	23-120					
2-Fluorobiphenyl	82.0	%	30-120					
2,4,6-Tribromophenol	91.0	%	19-120					
4-Terphenyl-d14	108	%	18-120					
PAH by GC/MS SIM 8270M				1	8270C-M	1103 20:35	1106 18:40	RL
Acenaphthene	280	ug/kg	73					
2-Chloronaphthalene	ND	ug/kg	73.					
Fluoranthene	4900	ug/kg	73					
Hexachlorobutadiene	ND	ug/kg	180					
Naphthalene	110	ug/kg	73					
Benzo(a)anthracene	3500	ug/kg	73					
Benzo(a)pyrene	3200	ug/kg	73					
Benzo(b)fluoranthene	2300	ug/kg	73					
Benzo(k)fluoranthene	2200	ug/kg	73					
Chrysene	2400	ug/kg	73					
Acenaphthylene	140	ug/kg	73					
Anthracene	870	ug/kg	73					
Benzo(ghi)perylene	890	ug/kg	73					
Fluorene	240	ug/kg	73					
Phenanthrene	2900	ug/kg	73					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-03
AK-SB-2 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
PAH by GC/MS SIM 8270M cont'd				1	8270C-M	1103 20:35	1106 18:40	RL
Dibenzo(a,h)anthracene	290	ug/kg	73					
Indeno(1,2,3-cd)Pyrene	1000	ug/kg	73					
Pyrene	5000	ug/kg	73					
1-Methylnaphthalene	ND	ug/kg	73.					
2-Methylnaphthalene	76	ug/kg	73					
Pentachlorophenol	ND	ug/kg	290					
Hexachlorobenzene	ND	ug/kg	290					
Perylene	510	ug/kg	73					
Biphenyl	ND	ug/kg	73.					
2,6-Dimethylnaphthalene	ND	ug/kg	73.					
1-Methylphenanthrene	340	ug/kg	73					
Benzo(e)Pyrene	1300	ug/kg	73					
Hexachloroethane	ND	ug/kg	290					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	78.0	%	25-120					
Phenol-d6	120	%	10-120					
Nitrobenzene-d5	78.0	%	23-120					
2-Fluorobiphenyl	79.0	%	30-120					
2,4,6-Tribromophenol	94.0	%	19-120					
4-Terphenyl-d14	104	%	18-120					
Polychlorinated Biphenyls				1	8082	1103 16:00	1108 00:35	AK
Aroclor 1016	ND	ug/kg	36.6					
Aroclor 1221	ND	ug/kg	36.6					
Aroclor 1232	ND	ug/kg	36.6					
Aroclor 1242	ND	ug/kg	36.6					
Aroclor 1248	ND	ug/kg	36.6					
Aroclor 1254	ND	ug/kg	36.6					
Aroclor 1260	ND	ug/kg	36.6					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	48.0	%	30-150					
Decachlorobiphenyl	36.0	%	30-150					
Organochlorine Pesticides				1	8081	1103 21:40	1108 05:24	JB
Delta-BHC	ND	ug/kg	36.6					
Lindane	ND	ug/kg	36.6					
Alpha-BHC	ND	ug/kg	36.6					
Beta-BHC	ND	ug/kg	36.6					
Heptachlor	ND	ug/kg	36.6					
Aldrin	ND	ug/kg	36.6					
Heptachlor epoxide	ND	ug/kg	36.6					
Endrin	ND	ug/kg	36.6					
Endrin aldehyde	ND	ug/kg	36.6					
Endrin ketone	ND	ug/kg	36.6					
Dieldrin	ND	ug/kg	36.6					
4,4'-DDE	ND	ug/kg	36.6					
4,4'-DDD	ND	ug/kg	36.6					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-03
AK-SB-2 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Organochlorine Pesticides cont'd				1	8081	1103 21:40	1108 05:24	JB
4,4'-DDT	ND	ug/kg	36.6					
Endosulfan I	ND	ug/kg	36.6					
Endosulfan II	ND	ug/kg	36.6					
Endosulfan sulfate	ND	ug/kg	36.6					
Methoxychlor	ND	ug/kg	146.					
Toxaphene	ND	ug/kg	146.					
Chlordane	ND	ug/kg	146.					
cis-Chlordane	ND	ug/kg	36.6					
trans-Chlordane	ND	ug/kg	36.6					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	ND	%	30-150					
Decachlorobiphenyl	ND	%	30-150					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615863-04 **Date Collected:** 01-NOV-2006 09:45
AK-SB-2 (9'-10') **Date Received :** 02-NOV-2006
Sample Matrix: SOIL **Date Reported :** 09-NOV-2006

Condition of Sample: Satisfactory **Field Prep:** None

Number & Type of Containers: 1-Amber,1-Vial

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	89	%	0.10	30	2540G		1107 12:01	PD
Total Metals				1	3051			
Aluminum, Total	5400	mg/kg	4.5	1	6010B	1103 18:30	1108 15:26	AI
Antimony, Total	2.7	mg/kg	2.2	1	6010B	1103 18:30	1108 15:26	AI
Arsenic, Total	5.2	mg/kg	0.45	1	6010B	1103 18:30	1108 15:26	AI
Barium, Total	330	mg/kg	0.45	1	6010B	1103 18:30	1108 15:26	AI
Beryllium, Total	ND	mg/kg	2.2	1	6010B	1103 18:30	1109 10:32	AI
Cadmium, Total	0.85	mg/kg	0.45	1	6010B	1103 18:30	1108 15:26	AI
Calcium, Total	49000	mg/kg	45	1	6010B	1103 18:30	1109 10:32	AI
Chromium, Total	25	mg/kg	0.45	1	6010B	1103 18:30	1108 15:26	AI
Cobalt, Total	5.2	mg/kg	0.89	1	6010B	1103 18:30	1108 15:26	AI
Copper, Total	140	mg/kg	0.45	1	6010B	1103 18:30	1108 15:26	AI
Iron, Total	10000	mg/kg	2.2	1	6010B	1103 18:30	1108 15:26	AI
Lead, Total	320	mg/kg	2.2	1	6010B	1103 18:30	1108 15:26	AI
Magnesium, Total	8600	mg/kg	4.5	1	6010B	1103 18:30	1108 15:26	AI
Manganese, Total	150	mg/kg	0.45	1	6010B	1103 18:30	1108 15:26	AI
Mercury, Total	ND	mg/kg	0.09	1	7471A	1106 16:25	1107 10:25	DM
Nickel, Total	14	mg/kg	1.1	1	6010B	1103 18:30	1108 15:26	AI
Potassium, Total	1600	mg/kg	110	1	6010B	1103 18:30	1108 15:26	AI
Selenium, Total	ND	mg/kg	0.89	1	6010B	1103 18:30	1108 15:26	AI
Silver, Total	ND	mg/kg	0.45	1	6010B	1103 18:30	1108 15:26	AI
Sodium, Total	240	mg/kg	89	1	6010B	1103 18:30	1108 15:26	AI
Thallium, Total	ND	mg/kg	0.45	1	6010B	1103 18:30	1108 15:26	AI
Vanadium, Total	25	mg/kg	0.45	1	6010B	1103 18:30	1108 15:26	AI
Zinc, Total	690	mg/kg	2.2	1	6010B	1103 18:30	1108 15:26	AI
Volatile Organics by GC/MS 8260				1	8260B		1107 18:57	RY
Methylene chloride	ND	ug/kg	28.					
1,1-Dichloroethane	ND	ug/kg	4.2					
Chloroform	ND	ug/kg	4.2					
Carbon tetrachloride	ND	ug/kg	2.8					
1,2-Dichloropropane	ND	ug/kg	9.8					
Dibromochloromethane	ND	ug/kg	2.8					
1,1,2-Trichloroethane	ND	ug/kg	4.2					
Tetrachloroethene	ND	ug/kg	2.8					
Chlorobenzene	ND	ug/kg	2.8					
Trichlorofluoromethane	ND	ug/kg	14.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-04
AK-SB-2 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 18:57	RY
1,2-Dichloroethane	ND	ug/kg	2.8					
1,1,1-Trichloroethane	ND	ug/kg	2.8					
Bromodichloromethane	ND	ug/kg	2.8					
trans-1,3-Dichloropropene	ND	ug/kg	2.8					
cis-1,3-Dichloropropene	ND	ug/kg	2.8					
1,1-Dichloropropene	ND	ug/kg	14.					
Bromoform	ND	ug/kg	11.					
1,1,2,2-Tetrachloroethane	ND	ug/kg	2.8					
Benzene	ND	ug/kg	2.8					
Toluene	ND	ug/kg	4.2					
Ethylbenzene	ND	ug/kg	2.8					
Chloromethane	ND	ug/kg	14.					
Bromomethane	ND	ug/kg	5.6					
Vinyl chloride	ND	ug/kg	5.6					
Chloroethane	ND	ug/kg	5.6					
1,1-Dichloroethene	ND	ug/kg	2.8					
trans-1,2-Dichloroethene	ND	ug/kg	4.2					
Trichloroethene	ND	ug/kg	2.8					
1,2-Dichlorobenzene	ND	ug/kg	14.					
1,3-Dichlorobenzene	ND	ug/kg	14.					
1,4-Dichlorobenzene	ND	ug/kg	14.					
Methyl tert butyl ether	ND	ug/kg	5.6					
p/m-Xylene	ND	ug/kg	5.6					
o-Xylene	ND	ug/kg	5.6					
cis-1,2-Dichloroethene	ND	ug/kg	2.8					
Dibromomethane	ND	ug/kg	28.					
1,4-Dichlorobutane	ND	ug/kg	28.					
Iodomethane	ND	ug/kg	28.					
1,2,3-Trichloropropane	ND	ug/kg	28.					
Styrene	ND	ug/kg	5.6					
Dichlorodifluoromethane	ND	ug/kg	28.					
Acetone	ND	ug/kg	28.					
Carbon disulfide	ND	ug/kg	28.					
2-Butanone	ND	ug/kg	28.					
Vinyl acetate	ND	ug/kg	28.					
4-Methyl-2-pentanone	ND	ug/kg	28.					
2-Hexanone	ND	ug/kg	28.					
Ethyl methacrylate	ND	ug/kg	28.					
Acrolein	ND	ug/kg	70.					
Acrylonitrile	ND	ug/kg	11.					
Bromochloromethane	ND	ug/kg	14.					
Tetrahydrofuran	ND	ug/kg	56.					
2,2-Dichloropropane	ND	ug/kg	14.					
1,2-Dibromoethane	ND	ug/kg	11.					
1,3-Dichloropropane	ND	ug/kg	14.					
1,1,1,2-Tetrachloroethane	ND	ug/kg	2.8					
Bromobenzene	ND	ug/kg	14.					
n-Butylbenzene	ND	ug/kg	2.8					
sec-Butylbenzene	ND	ug/kg	2.8					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-04
AK-SB-2 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 18:57	RY
tert-Butylbenzene	ND	ug/kg	14.					
o-Chlorotoluene	ND	ug/kg	14.					
p-Chlorotoluene	ND	ug/kg	14.					
1,2-Dibromo-3-chloropropane	ND	ug/kg	14.					
Hexachlorobutadiene	ND	ug/kg	14.					
Isopropylbenzene	ND	ug/kg	2.8					
p-Isopropyltoluene	ND	ug/kg	2.8					
Naphthalene	ND	ug/kg	14.					
n-Propylbenzene	ND	ug/kg	2.8					
1,2,3-Trichlorobenzene	ND	ug/kg	14.					
1,2,4-Trichlorobenzene	ND	ug/kg	14.					
1,3,5-Trimethylbenzene	ND	ug/kg	14.					
1,2,4-Trimethylbenzene	ND	ug/kg	14.					
trans-1,4-Dichloro-2-butene	ND	ug/kg	14.					
Ethyl ether	ND	ug/kg	14.					
Surrogate(s)	Recovery		QC Criteria					
1,2-Dichloroethane-d4	105	%	70-130					
Toluene-d8	95.0	%	70-130					
4-Bromofluorobenzene	106	%	70-130					
Dibromofluoromethane	99.0	%	70-130					
SVOC's by GC/MS 8270				1	8270C	1103 20:35	1107 19:06	RL
Acenaphthene	ND	ug/kg	1900					
Benzidine	ND	ug/kg	19000					
1,2,4-Trichlorobenzene	ND	ug/kg	1900					
Hexachlorobenzene	ND	ug/kg	1900					
Bis(2-chloroethyl)ether	ND	ug/kg	1900					
1-Chloronaphthalene	ND	ug/kg	1900					
2-Chloronaphthalene	ND	ug/kg	2200					
1,2-Dichlorobenzene	ND	ug/kg	1900					
1,3-Dichlorobenzene	ND	ug/kg	1900					
1,4-Dichlorobenzene	ND	ug/kg	1900					
3,3'-Dichlorobenzidine	ND	ug/kg	3700					
2,4-Dinitrotoluene	ND	ug/kg	1900					
2,6-Dinitrotoluene	ND	ug/kg	1900					
Azobenzene	ND	ug/kg	1900					
Fluoranthene	19000	ug/kg	1900					
4-Chlorophenyl phenyl ether	ND	ug/kg	1900					
4-Bromophenyl phenyl ether	ND	ug/kg	1900					
Bis(2-chloroisopropyl)ether	ND	ug/kg	1900					
Bis(2-chloroethoxy)methane	ND	ug/kg	1900					
Hexachlorobutadiene	ND	ug/kg	3700					
Hexachlorocyclopentadiene	ND	ug/kg	3700					
Hexachloroethane	ND	ug/kg	1900					
Isophorone	ND	ug/kg	1900					
Naphthalene	ND	ug/kg	1900					
Nitrobenzene	ND	ug/kg	1900					
NDPA/DPA	ND	ug/kg	5600					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-04
AK-SB-2 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1107 19:06	RL
n-Nitrosodi-n-propylamine	ND	ug/kg	1900					
Bis(2-ethylhexyl)phthalate	ND	ug/kg	3700					
Butyl benzyl phthalate	ND	ug/kg	1900					
Di-n-butylphthalate	ND	ug/kg	1900					
Di-n-octylphthalate	ND	ug/kg	1900					
Diethyl phthalate	ND	ug/kg	1900					
Dimethyl phthalate	ND	ug/kg	1900					
Benzo(a)anthracene	7600	ug/kg	1900					
Benzo(a)pyrene	6900	ug/kg	1900					
Benzo(b)fluoranthene	6900	ug/kg	1900					
Benzo(k)fluoranthene	5700	ug/kg	1900					
Chrysene	8000	ug/kg	1900					
Acenaphthylene	ND	ug/kg	1900					
Anthracene	2100	ug/kg	1900					
Benzo(ghi)perylene	4500	ug/kg	1900					
Fluorene	ND	ug/kg	1900					
Phenanthrene	9800	ug/kg	1900					
Dibenzo(a,h)anthracene	ND	ug/kg	1900					
Indeno(1,2,3-cd)pyrene	5200	ug/kg	1900					
Pyrene	16000	ug/kg	1900					
Benzo(e)pyrene	4800	ug/kg	1900					
Biphenyl	ND	ug/kg	1900					
Perylene	ND	ug/kg	1900					
Aniline	ND	ug/kg	3700					
4-Chloroaniline	ND	ug/kg	1900					
1-Methylnaphthalene	ND	ug/kg	1900					
2-Nitroaniline	ND	ug/kg	1900					
3-Nitroaniline	ND	ug/kg	1900					
4-Nitroaniline	ND	ug/kg	2600					
Dibenzofuran	ND	ug/kg	1900					
a,a-Dimethylphenethylamine	ND	ug/kg	19000					
Hexachloropropene	ND	ug/kg	3700					
Nitrosodi-n-butylamine	ND	ug/kg	3700					
2-Methylnaphthalene	ND	ug/kg	1900					
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	7500					
Pentachlorobenzene	ND	ug/kg	7500					
a-Naphthylamine	ND	ug/kg	7500					
b-Naphthylamine	ND	ug/kg	7500					
Phenacetin	ND	ug/kg	3700					
Dimethoate	ND	ug/kg	7500					
4-Aminobiphenyl	ND	ug/kg	3700					
Pentachloronitrobenzene	ND	ug/kg	3700					
Isodrin	ND	ug/kg	3700					
p-Dimethylaminoazobenzene	ND	ug/kg	3700					
Chlorobenzilate	ND	ug/kg	7500					
3-Methylcholanthrene	ND	ug/kg	7500					
Ethyl Methanesulfonate	ND	ug/kg	5600					
Acetophenone	ND	ug/kg	7500					
Nitrosodipiperidine	ND	ug/kg	7500					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-04
AK-SB-2 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1107 19:06	RL
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	3700					
n-Nitrosodimethylamine	ND	ug/kg	19000					
2,4,6-Trichlorophenol	ND	ug/kg	1900					
p-Chloro-m-cresol	ND	ug/kg	1900					
2-Chlorophenol	ND	ug/kg	2200					
2,4-Dichlorophenol	ND	ug/kg	3700					
2,4-Dimethylphenol	ND	ug/kg	1900					
2-Nitrophenol	ND	ug/kg	7500					
4-Nitrophenol	ND	ug/kg	3700					
2,4-Dinitrophenol	ND	ug/kg	7500					
4,6-Dinitro-o-cresol	ND	ug/kg	7500					
Pentachlorophenol	ND	ug/kg	7500					
Phenol	ND	ug/kg	2600					
2-Methylphenol	ND	ug/kg	2200					
3-Methylphenol/4-Methylphenol	ND	ug/kg	2200					
2,4,5-Trichlorophenol	ND	ug/kg	1900					
2,6-Dichlorophenol	ND	ug/kg	3700					
Benzoic Acid	ND	ug/kg	19000					
Benzyl Alcohol	ND	ug/kg	3700					
Carbazole	ND	ug/kg	1900					
Pyridine	ND	ug/kg	19000					
2-Picoline	ND	ug/kg	7500					
Pronamide	ND	ug/kg	7500					
Methyl methanesulfonate	ND	ug/kg	7500					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	67.0	%	25-120					
Phenol-d6	100	%	10-120					
Nitrobenzene-d5	72.0	%	23-120					
2-Fluorobiphenyl	79.0	%	30-120					
2,4,6-Tribromophenol	87.0	%	19-120					
4-Terphenyl-d14	96.0	%	18-120					
PAH by GC/MS SIM 8270M				1	8270C-M	1103 20:35	1108 02:13	RL
Acenaphthene	490	ug/kg	300					
2-Chloronaphthalene	ND	ug/kg	300					
Fluoranthene	20000	ug/kg	300					
Hexachlorobutadiene	ND	ug/kg	750					
Naphthalene	440	ug/kg	300					
Benzo(a)anthracene	11000	ug/kg	300					
Benzo(a)pyrene	6400	ug/kg	300					
Benzo(b)fluoranthene	9500	ug/kg	300					
Benzo(k)fluoranthene	8300	ug/kg	300					
Chrysene	9700	ug/kg	300					
Acenaphthylene	ND	ug/kg	300					
Anthracene	2600	ug/kg	300					
Benzo(ghi)perylene	5200	ug/kg	300					
Fluorene	610	ug/kg	300					
Phenanthrene	10000	ug/kg	300					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-04
AK-SB-2 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
PAH by GC/MS SIM 8270M cont'd				1	8270C-M	1103 20:35	1108 02:13	RL
Dibenzo(a,h)anthracene	1200	ug/kg	300					
Indeno(1,2,3-cd)Pyrene	4400	ug/kg	300					
Pyrene	17000	ug/kg	300					
1-Methylnaphthalene	ND	ug/kg	300					
2-Methylnaphthalene	ND	ug/kg	300					
Pentachlorophenol	ND	ug/kg	1200					
Hexachlorobenzene	ND	ug/kg	1200					
Perylene	1900	ug/kg	300					
Biphenyl	ND	ug/kg	300					
2,6-Dimethylnaphthalene	ND	ug/kg	300					
1-Methylphenanthrene	1300	ug/kg	300					
Benzo(e)Pyrene	6300	ug/kg	300					
Hexachloroethane	ND	ug/kg	1200					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	66.0	%	25-120					
Phenol-d6	100	%	10-120					
Nitrobenzene-d5	74.0	%	23-120					
2-Fluorobiphenyl	78.0	%	30-120					
2,4,6-Tribromophenol	86.0	%	19-120					
4-Terphenyl-d14	96.0	%	18-120					
Polychlorinated Biphenyls				1	8082	1103 16:00	1108 01:04	AK
Aroclor 1016	ND	ug/kg	37.4					
Aroclor 1221	ND	ug/kg	37.4					
Aroclor 1232	ND	ug/kg	37.4					
Aroclor 1242	ND	ug/kg	37.4					
Aroclor 1248	ND	ug/kg	37.4					
Aroclor 1254	81.6	ug/kg	37.4					
Aroclor 1260	43.3	ug/kg	37.4					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	47.0	%	30-150					
Decachlorobiphenyl	41.0	%	30-150					
Organochlorine Pesticides				1	8081	1103 21:40	1108 01:06	JB
4,4'-DDT	180	ug/kg	74.9					
Organochlorine Pesticides				1	8081	1103 21:40	1108 05:52	JB
Delta-BHC	ND	ug/kg	18.7					
Lindane	ND	ug/kg	18.7					
Alpha-BHC	ND	ug/kg	18.7					
Beta-BHC	ND	ug/kg	18.7					
Heptachlor	ND	ug/kg	18.7					
Aldrin	ND	ug/kg	18.7					
Heptachlor epoxide	ND	ug/kg	18.7					
Endrin	ND	ug/kg	18.7					
Endrin aldehyde	ND	ug/kg	18.7					
Endrin ketone	ND	ug/kg	18.7					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-04
AK-SB-2 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Organochlorine Pesticides cont'd				1	8081	1103 21:40	1108 05:52	JB
Dieldrin	ND	ug/kg	18.7					
4,4'-DDE	19.8	ug/kg	18.7					
4,4'-DDD	24.2	ug/kg	18.7					
4,4'-DDT	>213	ug/kg	18.7					
Endosulfan I	ND	ug/kg	18.7					
Endosulfan II	ND	ug/kg	18.7					
Endosulfan sulfate	ND	ug/kg	18.7					
Methoxychlor	ND	ug/kg	74.9					
Toxaphene	ND	ug/kg	74.9					
Chlordane	ND	ug/kg	74.9					
cis-Chlordane	ND	ug/kg	18.7					
trans-Chlordane	ND	ug/kg	18.7					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	70.0	%	30-150					
Decachlorobiphenyl	127	%	30-150					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615863-05
AK-SB-3 (2'-3')
Sample Matrix: SOIL

Date Collected: 01-NOV-2006 10:05
Date Received : 02-NOV-2006
Date Reported : 09-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber,1-Vial

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE		ID
						PREP	ANAL	
Solids, Total	90	%	0.10	30	2540G		1107 12:01	PD
Total Metals				1	3051			
Aluminum, Total	4800	mg/kg	4.4	1	6010B	1103 18:30	1108 15:30	AI
Antimony, Total	ND	mg/kg	2.2	1	6010B	1103 18:30	1108 15:30	AI
Arsenic, Total	4.7	mg/kg	0.44	1	6010B	1103 18:30	1108 15:30	AI
Barium, Total	96	mg/kg	0.44	1	6010B	1103 18:30	1108 15:30	AI
Beryllium, Total	ND	mg/kg	0.22	1	6010B	1103 18:30	1108 15:30	AI
Cadmium, Total	0.71	mg/kg	0.44	1	6010B	1103 18:30	1108 15:30	AI
Calcium, Total	41000	mg/kg	44	1	6010B	1103 18:30	1109 10:36	AI
Chromium, Total	13	mg/kg	0.44	1	6010B	1103 18:30	1108 15:30	AI
Cobalt, Total	4.9	mg/kg	0.87	1	6010B	1103 18:30	1108 15:30	AI
Copper, Total	81	mg/kg	0.44	1	6010B	1103 18:30	1108 15:30	AI
Iron, Total	14000	mg/kg	2.2	1	6010B	1103 18:30	1108 15:30	AI
Lead, Total	220	mg/kg	2.2	1	6010B	1103 18:30	1108 15:30	AI
Magnesium, Total	16000	mg/kg	44	1	6010B	1103 18:30	1109 10:36	AI
Manganese, Total	190	mg/kg	0.44	1	6010B	1103 18:30	1108 15:30	AI
Mercury, Total	0.43	mg/kg	0.09	1	7471A	1106 16:25	1107 10:27	DM
Nickel, Total	12	mg/kg	1.1	1	6010B	1103 18:30	1108 15:30	AI
Potassium, Total	1200	mg/kg	110	1	6010B	1103 18:30	1108 15:30	AI
Selenium, Total	ND	mg/kg	0.87	1	6010B	1103 18:30	1108 15:30	AI
Silver, Total	ND	mg/kg	0.44	1	6010B	1103 18:30	1108 15:30	AI
Sodium, Total	150	mg/kg	87	1	6010B	1103 18:30	1108 15:30	AI
Thallium, Total	ND	mg/kg	0.44	1	6010B	1103 18:30	1108 15:30	AI
Vanadium, Total	27	mg/kg	0.44	1	6010B	1103 18:30	1108 15:30	AI
Zinc, Total	320	mg/kg	2.2	1	6010B	1103 18:30	1108 15:30	AI
Volatile Organics by GC/MS 8260				1	8260B		1107 19:32	RY
Methylene chloride	ND	ug/kg	28.					
1,1-Dichloroethane	ND	ug/kg	4.2					
Chloroform	ND	ug/kg	4.2					
Carbon tetrachloride	ND	ug/kg	2.8					
1,2-Dichloropropane	ND	ug/kg	9.7					
Dibromochloromethane	ND	ug/kg	2.8					
1,1,2-Trichloroethane	ND	ug/kg	4.2					
Tetrachloroethene	ND	ug/kg	2.8					
Chlorobenzene	ND	ug/kg	2.8					
Trichlorofluoromethane	ND	ug/kg	14.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-05
AK-SB-3 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 19:32	RY
1,2-Dichloroethane	ND	ug/kg	2.8					
1,1,1-Trichloroethane	ND	ug/kg	2.8					
Bromodichloromethane	ND	ug/kg	2.8					
trans-1,3-Dichloropropene	ND	ug/kg	2.8					
cis-1,3-Dichloropropene	ND	ug/kg	2.8					
1,1-Dichloropropene	ND	ug/kg	14.					
Bromoform	ND	ug/kg	11.					
1,1,2,2-Tetrachloroethane	ND	ug/kg	2.8					
Benzene	ND	ug/kg	2.8					
Toluene	ND	ug/kg	4.2					
Ethylbenzene	ND	ug/kg	2.8					
Chloromethane	ND	ug/kg	14.					
Bromomethane	ND	ug/kg	5.6					
Vinyl chloride	ND	ug/kg	5.6					
Chloroethane	ND	ug/kg	5.6					
1,1-Dichloroethene	ND	ug/kg	2.8					
trans-1,2-Dichloroethene	ND	ug/kg	4.2					
Trichloroethene	ND	ug/kg	2.8					
1,2-Dichlorobenzene	ND	ug/kg	14.					
1,3-Dichlorobenzene	ND	ug/kg	14.					
1,4-Dichlorobenzene	ND	ug/kg	14.					
Methyl tert butyl ether	ND	ug/kg	5.6					
p/m-Xylene	ND	ug/kg	5.6					
o-Xylene	ND	ug/kg	5.6					
cis-1,2-Dichloroethene	ND	ug/kg	2.8					
Dibromomethane	ND	ug/kg	28.					
1,4-Dichlorobutane	ND	ug/kg	28.					
Iodomethane	ND	ug/kg	28.					
1,2,3-Trichloropropane	ND	ug/kg	28.					
Styrene	ND	ug/kg	5.6					
Dichlorodifluoromethane	ND	ug/kg	28.					
Acetone	ND	ug/kg	28.					
Carbon disulfide	ND	ug/kg	28.					
2-Butanone	ND	ug/kg	28.					
Vinyl acetate	ND	ug/kg	28.					
4-Methyl-2-pentanone	ND	ug/kg	28.					
2-Hexanone	ND	ug/kg	28.					
Ethyl methacrylate	ND	ug/kg	28.					
Acrolein	ND	ug/kg	69.					
Acrylonitrile	ND	ug/kg	11.					
Bromochloromethane	ND	ug/kg	14.					
Tetrahydrofuran	ND	ug/kg	56.					
2,2-Dichloropropane	ND	ug/kg	14.					
1,2-Dibromoethane	ND	ug/kg	11.					
1,3-Dichloropropane	ND	ug/kg	14.					
1,1,1,2-Tetrachloroethane	ND	ug/kg	2.8					
Bromobenzene	ND	ug/kg	14.					
n-Butylbenzene	ND	ug/kg	2.8					
sec-Butylbenzene	ND	ug/kg	2.8					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-05
AK-SB-3 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 19:32	RY
tert-Butylbenzene	ND	ug/kg	14.					
o-Chlorotoluene	ND	ug/kg	14.					
p-Chlorotoluene	ND	ug/kg	14.					
1,2-Dibromo-3-chloropropane	ND	ug/kg	14.					
Hexachlorobutadiene	ND	ug/kg	14.					
Isopropylbenzene	ND	ug/kg	2.8					
p-Isopropyltoluene	ND	ug/kg	2.8					
Naphthalene	23	ug/kg	14					
n-Propylbenzene	ND	ug/kg	2.8					
1,2,3-Trichlorobenzene	ND	ug/kg	14.					
1,2,4-Trichlorobenzene	ND	ug/kg	14.					
1,3,5-Trimethylbenzene	ND	ug/kg	14.					
1,2,4-Trimethylbenzene	ND	ug/kg	14.					
trans-1,4-Dichloro-2-butene	ND	ug/kg	14.					
Ethyl ether	ND	ug/kg	14.					
Surrogate(s)	Recovery		QC Criteria					
1,2-Dichloroethane-d4	112	%	70-130					
Toluene-d8	98.0	%	70-130					
4-Bromofluorobenzene	122	%	70-130					
Dibromofluoromethane	102	%	70-130					
SVOC's by GC/MS 8270				1	8270C	1103 20:35	1106 17:40	RL
Acenaphthene	ND	ug/kg	1800					
Benzidine	ND	ug/kg	18000					
1,2,4-Trichlorobenzene	ND	ug/kg	1800					
Hexachlorobenzene	ND	ug/kg	1800					
Bis(2-chloroethyl)ether	ND	ug/kg	1800					
1-Chloronaphthalene	ND	ug/kg	1800					
2-Chloronaphthalene	ND	ug/kg	2200					
1,2-Dichlorobenzene	ND	ug/kg	1800					
1,3-Dichlorobenzene	ND	ug/kg	1800					
1,4-Dichlorobenzene	ND	ug/kg	1800					
3,3'-Dichlorobenzidine	ND	ug/kg	3700					
2,4-Dinitrotoluene	ND	ug/kg	1800					
2,6-Dinitrotoluene	ND	ug/kg	1800					
Azobenzene	ND	ug/kg	1800					
Fluoranthene	24000	ug/kg	1800					
4-Chlorophenyl phenyl ether	ND	ug/kg	1800					
4-Bromophenyl phenyl ether	ND	ug/kg	1800					
Bis(2-chloroisopropyl)ether	ND	ug/kg	1800					
Bis(2-chloroethoxy)methane	ND	ug/kg	1800					
Hexachlorobutadiene	ND	ug/kg	3700					
Hexachlorocyclopentadiene	ND	ug/kg	3700					
Hexachloroethane	ND	ug/kg	1800					
Isophorone	ND	ug/kg	1800					
Naphthalene	ND	ug/kg	1800					
Nitrobenzene	ND	ug/kg	1800					
NDPA/DPA	ND	ug/kg	5600					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-05
AK-SB-3 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE		ID
						PREP	ANAL	
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 17:40	RL
n-Nitrosodi-n-propylamine	ND	ug/kg	1800					
Bis(2-ethylhexyl)phthalate	ND	ug/kg	3700					
Butyl benzyl phthalate	ND	ug/kg	1800					
Di-n-butylphthalate	ND	ug/kg	1800					
Di-n-octylphthalate	ND	ug/kg	1800					
Diethyl phthalate	ND	ug/kg	1800					
Dimethyl phthalate	ND	ug/kg	1800					
Benzo(a)anthracene	10000	ug/kg	1800					
Benzo(a)pyrene	9600	ug/kg	1800					
Benzo(b)fluoranthene	8900	ug/kg	1800					
Benzo(k)fluoranthene	7400	ug/kg	1800					
Chrysene	9900	ug/kg	1800					
Acenaphthylene	ND	ug/kg	1800					
Anthracene	3800	ug/kg	1800					
Benzo(ghi)perylene	6300	ug/kg	1800					
Fluorene	ND	ug/kg	1800					
Phenanthrene	14000	ug/kg	1800					
Dibenzo(a,h)anthracene	ND	ug/kg	1800					
Indeno(1,2,3-cd)pyrene	6800	ug/kg	1800					
Pyrene	20000	ug/kg	1800					
Benzo(e)pyrene	6200	ug/kg	1800					
Biphenyl	ND	ug/kg	1800					
Perylene	2500	ug/kg	1800					
Aniline	ND	ug/kg	3700					
4-Chloroaniline	ND	ug/kg	1800					
1-Methylnaphthalene	ND	ug/kg	1800					
2-Nitroaniline	ND	ug/kg	1800					
3-Nitroaniline	ND	ug/kg	1800					
4-Nitroaniline	ND	ug/kg	2600					
Dibenzofuran	ND	ug/kg	1800					
a,a-Dimethylphenethylamine	ND	ug/kg	18000					
Hexachloropropene	ND	ug/kg	3700					
Nitrosodi-n-butylamine	ND	ug/kg	3700					
2-Methylnaphthalene	ND	ug/kg	1800					
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	7400					
Pentachlorobenzene	ND	ug/kg	7400					
a-Naphthylamine	ND	ug/kg	7400					
b-Naphthylamine	ND	ug/kg	7400					
Phenacetin	ND	ug/kg	3700					
Dimethoate	ND	ug/kg	7400					
4-Aminobiphenyl	ND	ug/kg	3700					
Pentachloronitrobenzene	ND	ug/kg	3700					
Isodrin	ND	ug/kg	3700					
p-Dimethylaminoazobenzene	ND	ug/kg	3700					
Chlorobenzilate	ND	ug/kg	7400					
3-Methylcholanthrene	ND	ug/kg	7400					
Ethyl Methanesulfonate	ND	ug/kg	5600					
Acetophenone	ND	ug/kg	7400					
Nitrosodipiperidine	ND	ug/kg	7400					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-05
AK-SB-3 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 17:40	RL
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	3700					
n-Nitrosodimethylamine	ND	ug/kg	18000					
2,4,6-Trichlorophenol	ND	ug/kg	1800					
p-Chloro-m-cresol	ND	ug/kg	1800					
2-Chlorophenol	ND	ug/kg	2200					
2,4-Dichlorophenol	ND	ug/kg	3700					
2,4-Dimethylphenol	ND	ug/kg	1800					
2-Nitrophenol	ND	ug/kg	7400					
4-Nitrophenol	ND	ug/kg	3700					
2,4-Dinitrophenol	ND	ug/kg	7400					
4,6-Dinitro-o-cresol	ND	ug/kg	7400					
Pentachlorophenol	ND	ug/kg	7400					
Phenol	ND	ug/kg	2600					
2-Methylphenol	ND	ug/kg	2200					
3-Methylphenol/4-Methylphenol	ND	ug/kg	2200					
2,4,5-Trichlorophenol	ND	ug/kg	1800					
2,6-Dichlorophenol	ND	ug/kg	3700					
Benzoic Acid	ND	ug/kg	18000					
Benzyl Alcohol	ND	ug/kg	3700					
Carbazole	ND	ug/kg	1800					
Pyridine	ND	ug/kg	18000					
2-Picoline	ND	ug/kg	7400					
Pronamide	ND	ug/kg	7400					
Methyl methanesulfonate	ND	ug/kg	7400					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	78.0	%	25-120					
Phenol-d6	116	%	10-120					
Nitrobenzene-d5	91.0	%	23-120					
2-Fluorobiphenyl	87.0	%	30-120					
2,4,6-Tribromophenol	85.0	%	19-120					
4-Terphenyl-d14	97.0	%	18-120					
PAH by GC/MS SIM 8270M				1	8270C-M	1103 20:35	1106 18:12	RL
Acenaphthene	1300	ug/kg	300					
2-Chloronaphthalene	ND	ug/kg	300					
Fluoranthene	36000	ug/kg	300					
Hexachlorobutadiene	ND	ug/kg	740					
Naphthalene	850	ug/kg	300					
Benzo(a)anthracene	15000	ug/kg	300					
Benzo(a)pyrene	16000	ug/kg	300					
Benzo(b)fluoranthene	16000	ug/kg	300					
Benzo(k)fluoranthene	12000	ug/kg	300					
Chrysene	11000	ug/kg	300					
Acenaphthylene	1700	ug/kg	300					
Anthracene	5300	ug/kg	300					
Benzo(ghi)perylene	7800	ug/kg	300					
Fluorene	1400	ug/kg	300					
Phenanthrene	13000	ug/kg	300					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-05
AK-SB-3 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
PAH by GC/MS SIM 8270M cont'd				1	8270C-M	1103 20:35	1106 18:12	RL
Dibenzo(a,h)anthracene	1900	ug/kg	300					
Indeno(1,2,3-cd)Pyrene	6800	ug/kg	300					
Pyrene	31000	ug/kg	300					
1-Methylnaphthalene	ND	ug/kg	300					
2-Methylnaphthalene	380	ug/kg	300					
Pentachlorophenol	ND	ug/kg	1200					
Hexachlorobenzene	ND	ug/kg	1200					
Perylene	2600	ug/kg	300					
Biphenyl	ND	ug/kg	300					
2,6-Dimethylnaphthalene	ND	ug/kg	300					
1-Methylphenanthrene	1800	ug/kg	300					
Benzo(e)Pyrene	8700	ug/kg	300					
Hexachloroethane	ND	ug/kg	1200					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	91.0	%	25-120					
Phenol-d6	113	%	10-120					
Nitrobenzene-d5	96.0	%	23-120					
2-Fluorobiphenyl	104	%	30-120					
2,4,6-Tribromophenol	89.0	%	19-120					
4-Terphenyl-d14	113	%	18-120					
Polychlorinated Biphenyls				1	8082	1103 16:00	1108 01:32	AK
Aroclor 1016	ND	ug/kg	37.0					
Aroclor 1221	ND	ug/kg	37.0					
Aroclor 1232	ND	ug/kg	37.0					
Aroclor 1242	ND	ug/kg	37.0					
Aroclor 1248	ND	ug/kg	37.0					
Aroclor 1254	600	ug/kg	37.0					
Aroclor 1260	214	ug/kg	37.0					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	58.0	%	30-150					
Decachlorobiphenyl	59.0	%	30-150					
Organochlorine Pesticides				1	8081	1103 21:40	1108 06:21	JB
Delta-BHC	ND	ug/kg	148.					
Lindane	ND	ug/kg	148.					
Alpha-BHC	ND	ug/kg	148.					
Beta-BHC	ND	ug/kg	148.					
Heptachlor	ND	ug/kg	148.					
Aldrin	ND	ug/kg	148.					
Heptachlor epoxide	ND	ug/kg	148.					
Endrin	ND	ug/kg	148.					
Endrin aldehyde	ND	ug/kg	148.					
Endrin ketone	ND	ug/kg	148.					
Dieldrin	ND	ug/kg	148.					
4,4'-DDE	ND	ug/kg	148.					
4,4'-DDD	ND	ug/kg	148					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-05
AK-SB-3 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Organochlorine Pesticides cont'd				1	8081	1103 21:40	1108 06:21	JB
4,4'-DDT	171	ug/kg	148					
Endosulfan I	ND	ug/kg	148.					
Endosulfan II	ND	ug/kg	148.					
Endosulfan sulfate	ND	ug/kg	148.					
Methoxychlor	ND	ug/kg	592.					
Toxaphene	ND	ug/kg	592.					
Chlordane	ND	ug/kg	592.					
cis-Chlordane	ND	ug/kg	148.					
trans-Chlordane	ND	ug/kg	148.					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	ND	%	30-150					
Decachlorobiphenyl	ND	%	30-150					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615863-06
AK-SB-3 (9'-10')
Sample Matrix: SOIL

Date Collected: 01-NOV-2006 10:25
Date Received : 02-NOV-2006
Date Reported : 09-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber,1-Vial

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE		ID
						PREP	ANAL	
Solids, Total	82	%	0.10	30	2540G		1107 12:01	PD
Total Metals				1	3051			
Aluminum, Total	3500	mg/kg	4.8	1	6010B	1103 18:30	1108 15:34	AI
Antimony, Total	ND	mg/kg	2.4	1	6010B	1103 18:30	1108 15:34	AI
Arsenic, Total	11	mg/kg	0.48	1	6010B	1103 18:30	1108 15:34	AI
Barium, Total	32	mg/kg	0.48	1	6010B	1103 18:30	1108 15:34	AI
Beryllium, Total	0.67	mg/kg	0.24	1	6010B	1103 18:30	1108 15:34	AI
Cadmium, Total	1.3	mg/kg	0.48	1	6010B	1103 18:30	1108 15:34	AI
Calcium, Total	6200	mg/kg	4.8	1	6010B	1103 18:30	1108 15:34	AI
Chromium, Total	10	mg/kg	0.48	1	6010B	1103 18:30	1108 15:34	AI
Cobalt, Total	20	mg/kg	0.97	1	6010B	1103 18:30	1108 15:34	AI
Copper, Total	54	mg/kg	0.48	1	6010B	1103 18:30	1108 15:34	AI
Iron, Total	74000	mg/kg	24	1	6010B	1103 18:30	1109 10:39	AI
Lead, Total	86	mg/kg	2.4	1	6010B	1103 18:30	1108 15:34	AI
Magnesium, Total	450	mg/kg	4.8	1	6010B	1103 18:30	1108 15:34	AI
Manganese, Total	1300	mg/kg	4.8	1	6010B	1103 18:30	1109 10:39	AI
Mercury, Total	0.20	mg/kg	0.10	1	7471A	1106 16:25	1107 10:32	DM
Nickel, Total	26	mg/kg	1.2	1	6010B	1103 18:30	1108 15:34	AI
Potassium, Total	150	mg/kg	120	1	6010B	1103 18:30	1108 15:34	AI
Selenium, Total	ND	mg/kg	0.97	1	6010B	1103 18:30	1108 15:34	AI
Silver, Total	ND	mg/kg	0.48	1	6010B	1103 18:30	1108 15:34	AI
Sodium, Total	170	mg/kg	97	1	6010B	1103 18:30	1108 15:34	AI
Thallium, Total	ND	mg/kg	0.48	1	6010B	1103 18:30	1108 15:34	AI
Vanadium, Total	37	mg/kg	0.48	1	6010B	1103 18:30	1108 15:34	AI
Zinc, Total	1600	mg/kg	24	1	6010B	1103 18:30	1109 10:39	AI
Volatile Organics by GC/MS 8260				1	8260B		1107 20:08	RY
Methylene chloride	ND	ug/kg	30.					
1,1-Dichloroethane	ND	ug/kg	4.6					
Chloroform	ND	ug/kg	4.6					
Carbon tetrachloride	ND	ug/kg	3.0					
1,2-Dichloropropane	ND	ug/kg	11.					
Dibromochloromethane	ND	ug/kg	3.0					
1,1,2-Trichloroethane	ND	ug/kg	4.6					
Tetrachloroethene	ND	ug/kg	3.0					
Chlorobenzene	ND	ug/kg	3.0					
Trichlorofluoromethane	ND	ug/kg	15.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-06
AK-SB-3 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE		ID
						PREP	ANAL	
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 20:08	RY
1,2-Dichloroethane	ND	ug/kg	3.0					
1,1,1-Trichloroethane	ND	ug/kg	3.0					
Bromodichloromethane	ND	ug/kg	3.0					
trans-1,3-Dichloropropene	ND	ug/kg	3.0					
cis-1,3-Dichloropropene	ND	ug/kg	3.0					
1,1-Dichloropropene	ND	ug/kg	15.					
Bromoform	ND	ug/kg	12.					
1,1,2,2-Tetrachloroethane	ND	ug/kg	3.0					
Benzene	ND	ug/kg	3.0					
Toluene	ND	ug/kg	4.6					
Ethylbenzene	ND	ug/kg	3.0					
Chloromethane	ND	ug/kg	15.					
Bromomethane	ND	ug/kg	6.1					
Vinyl chloride	ND	ug/kg	6.1					
Chloroethane	ND	ug/kg	6.1					
1,1-Dichloroethene	ND	ug/kg	3.0					
trans-1,2-Dichloroethene	ND	ug/kg	4.6					
Trichloroethene	ND	ug/kg	3.0					
1,2-Dichlorobenzene	ND	ug/kg	15.					
1,3-Dichlorobenzene	ND	ug/kg	15.					
1,4-Dichlorobenzene	ND	ug/kg	15.					
Methyl tert butyl ether	ND	ug/kg	6.1					
p/m-Xylene	ND	ug/kg	6.1					
o-Xylene	ND	ug/kg	6.1					
cis-1,2-Dichloroethene	ND	ug/kg	3.0					
Dibromomethane	ND	ug/kg	30.					
1,4-Dichlorobutane	ND	ug/kg	30.					
Iodomethane	ND	ug/kg	30.					
1,2,3-Trichloropropane	ND	ug/kg	30.					
Styrene	ND	ug/kg	6.1					
Dichlorodifluoromethane	ND	ug/kg	30.					
Acetone	130	ug/kg	30					
Carbon disulfide	ND	ug/kg	30.					
2-Butanone	32	ug/kg	30					
Vinyl acetate	ND	ug/kg	30.					
4-Methyl-2-pentanone	ND	ug/kg	30.					
2-Hexanone	ND	ug/kg	30.					
Ethyl methacrylate	ND	ug/kg	30.					
Acrolein	ND	ug/kg	76.					
Acrylonitrile	ND	ug/kg	12.					
Bromochloromethane	ND	ug/kg	15.					
Tetrahydrofuran	ND	ug/kg	61.					
2,2-Dichloropropane	ND	ug/kg	15.					
1,2-Dibromoethane	ND	ug/kg	12.					
1,3-Dichloropropane	ND	ug/kg	15.					
1,1,1,2-Tetrachloroethane	ND	ug/kg	3.0					
Bromobenzene	ND	ug/kg	15.					
n-Butylbenzene	ND	ug/kg	3.0					
sec-Butylbenzene	ND	ug/kg	3.0					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-06
AK-SB-3 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 20:08	RY
tert-Butylbenzene	ND	ug/kg	15.					
o-Chlorotoluene	ND	ug/kg	15.					
p-Chlorotoluene	ND	ug/kg	15.					
1,2-Dibromo-3-chloropropane	ND	ug/kg	15.					
Hexachlorobutadiene	ND	ug/kg	15.					
Isopropylbenzene	ND	ug/kg	3.0					
p-Isopropyltoluene	ND	ug/kg	3.0					
Naphthalene	ND	ug/kg	15.					
n-Propylbenzene	ND	ug/kg	3.0					
1,2,3-Trichlorobenzene	ND	ug/kg	15.					
1,2,4-Trichlorobenzene	ND	ug/kg	15.					
1,3,5-Trimethylbenzene	ND	ug/kg	15.					
1,2,4-Trimethylbenzene	ND	ug/kg	15.					
trans-1,4-Dichloro-2-butene	ND	ug/kg	15.					
Ethyl ether	ND	ug/kg	15.					
Surrogate(s)	Recovery		QC Criteria					
1,2-Dichloroethane-d4	107	%	70-130					
Toluene-d8	96.0	%	70-130					
4-Bromofluorobenzene	123	%	70-130					
Dibromofluoromethane	97.0	%	70-130					
SVOC's by GC/MS 8270				1	8270C	1103 20:35	1106 18:05	RL
Acenaphthene	ND	ug/kg	410					
Benzidine	ND	ug/kg	4100					
1,2,4-Trichlorobenzene	ND	ug/kg	410					
Hexachlorobenzene	ND	ug/kg	410					
Bis(2-chloroethyl)ether	ND	ug/kg	410					
1-Chloronaphthalene	ND	ug/kg	410					
2-Chloronaphthalene	ND	ug/kg	490					
1,2-Dichlorobenzene	ND	ug/kg	410					
1,3-Dichlorobenzene	ND	ug/kg	410					
1,4-Dichlorobenzene	ND	ug/kg	410					
3,3'-Dichlorobenzidine	ND	ug/kg	810					
2,4-Dinitrotoluene	ND	ug/kg	410					
2,6-Dinitrotoluene	ND	ug/kg	410					
Azobenzene	ND	ug/kg	410					
Fluoranthene	6200	ug/kg	410					
4-Chlorophenyl phenyl ether	ND	ug/kg	410					
4-Bromophenyl phenyl ether	ND	ug/kg	410					
Bis(2-chloroisopropyl)ether	ND	ug/kg	410					
Bis(2-chloroethoxy)methane	ND	ug/kg	410					
Hexachlorobutadiene	ND	ug/kg	810					
Hexachlorocyclopentadiene	ND	ug/kg	810					
Hexachloroethane	ND	ug/kg	410					
Isophorone	ND	ug/kg	410					
Naphthalene	ND	ug/kg	410					
Nitrobenzene	ND	ug/kg	410					
NDPA/DPA	ND	ug/kg	1200					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-06
AK-SB-3 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 18:05	RL
n-Nitrosodi-n-propylamine	ND	ug/kg	410					
Bis(2-ethylhexyl)phthalate	ND	ug/kg	810					
Butyl benzyl phthalate	ND	ug/kg	410					
Di-n-butylphthalate	ND	ug/kg	410					
Di-n-octylphthalate	ND	ug/kg	410					
Diethyl phthalate	ND	ug/kg	410					
Dimethyl phthalate	ND	ug/kg	410					
Benzo(a)anthracene	3400	ug/kg	410					
Benzo(a)pyrene	3400	ug/kg	410					
Benzo(b)fluoranthene	2700	ug/kg	410					
Benzo(k)fluoranthene	2600	ug/kg	410					
Chrysene	3100	ug/kg	410					
Acenaphthylene	540	ug/kg	410					
Anthracene	1000	ug/kg	410					
Benzo(ghi)perylene	2000	ug/kg	410					
Fluorene	ND	ug/kg	410					
Phenanthrene	2700	ug/kg	410					
Dibenzo(a,h)anthracene	500	ug/kg	410					
Indeno(1,2,3-cd)pyrene	2200	ug/kg	410					
Pyrene	5400	ug/kg	410					
Benzo(e)pyrene	2000	ug/kg	410					
Biphenyl	ND	ug/kg	410					
Perylene	860	ug/kg	410					
Aniline	ND	ug/kg	810					
4-Chloroaniline	ND	ug/kg	410					
1-Methylnaphthalene	ND	ug/kg	410					
2-Nitroaniline	ND	ug/kg	410					
3-Nitroaniline	ND	ug/kg	410					
4-Nitroaniline	ND	ug/kg	570					
Dibenzofuran	ND	ug/kg	410					
a,a-Dimethylphenethylamine	ND	ug/kg	4100					
Hexachloropropene	ND	ug/kg	810					
Nitrosodi-n-butylamine	ND	ug/kg	810					
2-Methylnaphthalene	ND	ug/kg	410					
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	1600					
Pentachlorobenzene	ND	ug/kg	1600					
a-Naphthylamine	ND	ug/kg	1600					
b-Naphthylamine	ND	ug/kg	1600					
Phenacetin	ND	ug/kg	810					
Dimethoate	ND	ug/kg	1600					
4-Aminobiphenyl	ND	ug/kg	810					
Pentachloronitrobenzene	ND	ug/kg	810					
Isodrin	ND	ug/kg	810					
p-Dimethylaminoazobenzene	ND	ug/kg	810					
Chlorobenzilate	ND	ug/kg	1600					
3-Methylcholanthrene	ND	ug/kg	1600					
Ethyl Methanesulfonate	ND	ug/kg	1200					
Acetophenone	ND	ug/kg	1600					
Nitrosodipiperidine	ND	ug/kg	1600					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-06
AK-SB-3 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 18:05	RL
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	810					
n-Nitrosodimethylamine	ND	ug/kg	4100					
2,4,6-Trichlorophenol	ND	ug/kg	410					
p-Chloro-m-cresol	ND	ug/kg	410					
2-Chlorophenol	ND	ug/kg	490					
2,4-Dichlorophenol	ND	ug/kg	810					
2,4-Dimethylphenol	ND	ug/kg	410					
2-Nitrophenol	ND	ug/kg	1600					
4-Nitrophenol	ND	ug/kg	810					
2,4-Dinitrophenol	ND	ug/kg	1600					
4,6-Dinitro-o-cresol	ND	ug/kg	1600					
Pentachlorophenol	ND	ug/kg	1600					
Phenol	ND	ug/kg	570					
2-Methylphenol	ND	ug/kg	490					
3-Methylphenol/4-Methylphenol	ND	ug/kg	490					
2,4,5-Trichlorophenol	ND	ug/kg	410					
2,6-Dichlorophenol	ND	ug/kg	810					
Benzoic Acid	ND	ug/kg	4100					
Benzyl Alcohol	ND	ug/kg	810					
Carbazole	ND	ug/kg	410					
Pyridine	ND	ug/kg	4100					
2-Picoline	ND	ug/kg	1600					
Pronamide	ND	ug/kg	1600					
Methyl methanesulfonate	ND	ug/kg	1600					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	60.0	%	25-120					
Phenol-d6	89.0	%	10-120					
Nitrobenzene-d5	62.0	%	23-120					
2-Fluorobiphenyl	66.0	%	30-120					
2,4,6-Tribromophenol	94.0	%	19-120					
4-Terphenyl-d14	97.0	%	18-120					
PAH by GC/MS SIM 8270M				1	8270C-M	1103 20:35	1106 15:40	RL
Acenaphthene	67	ug/kg	32					
2-Chloronaphthalene	ND	ug/kg	32.					
Fluoranthene	6000	ug/kg	32					
Hexachlorobutadiene	ND	ug/kg	81.					
Naphthalene	150	ug/kg	32					
Benzo(a)anthracene	4200	ug/kg	32					
Benzo(a)pyrene	5300	ug/kg	32					
Benzo(b)fluoranthene	4200	ug/kg	32					
Benzo(k)fluoranthene	2400	ug/kg	32					
Chrysene	3700	ug/kg	32					
Acenaphthylene	460	ug/kg	32					
Anthracene	1300	ug/kg	32					
Benzo(ghi)perylene	1400	ug/kg	32					
Fluorene	170	ug/kg	32					
Phenanthrene	2700	ug/kg	32					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-06
AK-SB-3 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE		ID
						PREP	ANAL	
PAH by GC/MS SIM 8270M cont'd				1	8270C-M	1103 20:35	1106 15:40	RL
Dibenzo(a,h)anthracene	490	ug/kg	32					
Indeno(1,2,3-cd)Pyrene	1600	ug/kg	32					
Pyrene	5700	ug/kg	32					
1-Methylnaphthalene	ND	ug/kg	32.					
2-Methylnaphthalene	38	ug/kg	32					
Pentachlorophenol	ND	ug/kg	130					
Hexachlorobenzene	ND	ug/kg	130					
Perylene	770	ug/kg	32					
Biphenyl	ND	ug/kg	32.					
2,6-Dimethylnaphthalene	ND	ug/kg	32.					
1-Methylphenanthrene	420	ug/kg	32					
Benzo(e)Pyrene	2000	ug/kg	32					
Hexachloroethane	ND	ug/kg	130					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	63.0	%	25-120					
Phenol-d6	91.0	%	10-120					
Nitrobenzene-d5	60.0	%	23-120					
2-Fluorobiphenyl	60.0	%	30-120					
2,4,6-Tribromophenol	85.0	%	19-120					
4-Terphenyl-d14	101	%	18-120					
Polychlorinated Biphenyls				1	8082	1103 16:00	1108 02:01	AK
Aroclor 1016	ND	ug/kg	40.6					
Aroclor 1221	ND	ug/kg	40.6					
Aroclor 1232	ND	ug/kg	40.6					
Aroclor 1242	ND	ug/kg	40.6					
Aroclor 1248	ND	ug/kg	40.6					
Aroclor 1254	ND	ug/kg	40.6					
Aroclor 1260	ND	ug/kg	40.6					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	60.0	%	30-150					
Decachlorobiphenyl	40.0	%	30-150					
Organochlorine Pesticides				1	8081	1103 21:40	1108 02:03	JB
Delta-BHC	ND	ug/kg	20.3					
Lindane	ND	ug/kg	20.3					
Alpha-BHC	ND	ug/kg	20.3					
Beta-BHC	ND	ug/kg	20.3					
Heptachlor	ND	ug/kg	20.3					
Aldrin	ND	ug/kg	20.3					
Heptachlor epoxide	ND	ug/kg	20.3					
Endrin	ND	ug/kg	20.3					
Endrin aldehyde	ND	ug/kg	20.3					
Endrin ketone	ND	ug/kg	20.3					
Dieldrin	ND	ug/kg	20.3					
4,4'-DDE	ND	ug/kg	20.3					
4,4'-DDD	ND	ug/kg	20.3					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-06
AK-SB-3 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Organochlorine Pesticides cont'd				1	8081	1103 21:40	1108 02:03	JB
4,4'-DDT	ND	ug/kg	20.3					
Endosulfan I	ND	ug/kg	20.3					
Endosulfan II	ND	ug/kg	20.3					
Endosulfan sulfate	ND	ug/kg	20.3					
Methoxychlor	ND	ug/kg	81.3					
Toxaphene	ND	ug/kg	81.3					
Chlordane	ND	ug/kg	81.3					
cis-Chlordane	ND	ug/kg	20.3					
trans-Chlordane	ND	ug/kg	20.3					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	64.0	%	30-150					
Decachlorobiphenyl	70.0	%	30-150					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615863-07
AK-SB-4 (2'-3')
Sample Matrix: SOIL

Date Collected: 01-NOV-2006 11:03
Date Received : 02-NOV-2006
Date Reported : 09-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber,1-Vial

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	88	%	0.10	30	2540G		1107 12:01	PD
Total Metals				1	3051			
Aluminum, Total	4800	mg/kg	4.5	1	6010B	1103 18:30	1108 16:00	AI
Antimony, Total	ND	mg/kg	2.3	1	6010B	1103 18:30	1108 16:00	AI
Arsenic, Total	4.3	mg/kg	0.45	1	6010B	1103 18:30	1108 16:00	AI
Barium, Total	68	mg/kg	0.45	1	6010B	1103 18:30	1108 16:00	AI
Beryllium, Total	ND	mg/kg	0.23	1	6010B	1103 18:30	1108 16:00	AI
Cadmium, Total	0.68	mg/kg	0.45	1	6010B	1103 18:30	1108 16:00	AI
Calcium, Total	31000	mg/kg	45	1	6010B	1103 18:30	1109 10:43	AI
Chromium, Total	16	mg/kg	0.45	1	6010B	1103 18:30	1108 16:00	AI
Cobalt, Total	4.8	mg/kg	0.91	1	6010B	1103 18:30	1108 16:00	AI
Copper, Total	97	mg/kg	0.45	1	6010B	1103 18:30	1108 16:00	AI
Iron, Total	12000	mg/kg	2.3	1	6010B	1103 18:30	1108 16:00	AI
Lead, Total	320	mg/kg	2.3	1	6010B	1103 18:30	1108 16:00	AI
Magnesium, Total	5700	mg/kg	4.5	1	6010B	1103 18:30	1108 16:00	AI
Manganese, Total	180	mg/kg	0.45	1	6010B	1103 18:30	1108 16:00	AI
Mercury, Total	0.50	mg/kg	0.09	1	7471A	1106 16:25	1107 10:38	DM
Nickel, Total	12	mg/kg	1.1	1	6010B	1103 18:30	1108 16:00	AI
Potassium, Total	1200	mg/kg	110	1	6010B	1103 18:30	1108 16:00	AI
Selenium, Total	ND	mg/kg	0.91	1	6010B	1103 18:30	1108 16:00	AI
Silver, Total	ND	mg/kg	0.45	1	6010B	1103 18:30	1108 16:00	AI
Sodium, Total	120	mg/kg	91	1	6010B	1103 18:30	1108 16:00	AI
Thallium, Total	ND	mg/kg	0.45	1	6010B	1103 18:30	1108 16:00	AI
Vanadium, Total	31	mg/kg	0.45	1	6010B	1103 18:30	1108 16:00	AI
Zinc, Total	330	mg/kg	2.3	1	6010B	1103 18:30	1108 16:00	AI
Volatile Organics by GC/MS 8260				1	8260B		1107 20:43	RY
Methylene chloride	ND	ug/kg	28.					
1,1-Dichloroethane	ND	ug/kg	4.3					
Chloroform	ND	ug/kg	4.3					
Carbon tetrachloride	ND	ug/kg	2.8					
1,2-Dichloropropane	ND	ug/kg	9.9					
Dibromochloromethane	ND	ug/kg	2.8					
1,1,2-Trichloroethane	ND	ug/kg	4.3					
Tetrachloroethene	ND	ug/kg	2.8					
Chlorobenzene	ND	ug/kg	2.8					
Trichlorofluoromethane	ND	ug/kg	14.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-07
AK-SB-4 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 20:43	RY
1,2-Dichloroethane	ND	ug/kg	2.8					
1,1,1-Trichloroethane	ND	ug/kg	2.8					
Bromodichloromethane	ND	ug/kg	2.8					
trans-1,3-Dichloropropene	ND	ug/kg	2.8					
cis-1,3-Dichloropropene	ND	ug/kg	2.8					
1,1-Dichloropropene	ND	ug/kg	14.					
Bromoform	ND	ug/kg	11.					
1,1,2,2-Tetrachloroethane	ND	ug/kg	2.8					
Benzene	ND	ug/kg	2.8					
Toluene	ND	ug/kg	4.3					
Ethylbenzene	ND	ug/kg	2.8					
Chloromethane	ND	ug/kg	14.					
Bromomethane	ND	ug/kg	5.7					
Vinyl chloride	ND	ug/kg	5.7					
Chloroethane	ND	ug/kg	5.7					
1,1-Dichloroethene	ND	ug/kg	2.8					
trans-1,2-Dichloroethene	ND	ug/kg	4.3					
Trichloroethene	ND	ug/kg	2.8					
1,2-Dichlorobenzene	ND	ug/kg	14.					
1,3-Dichlorobenzene	ND	ug/kg	14.					
1,4-Dichlorobenzene	ND	ug/kg	14.					
Methyl tert butyl ether	ND	ug/kg	5.7					
p/m-Xylene	ND	ug/kg	5.7					
o-Xylene	ND	ug/kg	5.7					
cis-1,2-Dichloroethene	ND	ug/kg	2.8					
Dibromomethane	ND	ug/kg	28.					
1,4-Dichlorobutane	ND	ug/kg	28.					
Iodomethane	ND	ug/kg	28.					
1,2,3-Trichloropropane	ND	ug/kg	28.					
Styrene	ND	ug/kg	5.7					
Dichlorodifluoromethane	ND	ug/kg	28.					
Acetone	ND	ug/kg	28.					
Carbon disulfide	ND	ug/kg	28.					
2-Butanone	ND	ug/kg	28.					
Vinyl acetate	ND	ug/kg	28.					
4-Methyl-2-pentanone	ND	ug/kg	28.					
2-Hexanone	ND	ug/kg	28.					
Ethyl methacrylate	ND	ug/kg	28.					
Acrolein	ND	ug/kg	71.					
Acrylonitrile	ND	ug/kg	11.					
Bromochloromethane	ND	ug/kg	14.					
Tetrahydrofuran	ND	ug/kg	57.					
2,2-Dichloropropane	ND	ug/kg	14.					
1,2-Dibromoethane	ND	ug/kg	11.					
1,3-Dichloropropane	ND	ug/kg	14.					
1,1,1,2-Tetrachloroethane	ND	ug/kg	2.8					
Bromobenzene	ND	ug/kg	14.					
n-Butylbenzene	ND	ug/kg	2.8					
sec-Butylbenzene	ND	ug/kg	2.8					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-07
AK-SB-4 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 20:43	RY
tert-Butylbenzene	ND	ug/kg	14.					
o-Chlorotoluene	ND	ug/kg	14.					
p-Chlorotoluene	ND	ug/kg	14.					
1,2-Dibromo-3-chloropropane	ND	ug/kg	14.					
Hexachlorobutadiene	ND	ug/kg	14.					
Isopropylbenzene	ND	ug/kg	2.8					
p-Isopropyltoluene	ND	ug/kg	2.8					
Naphthalene	ND	ug/kg	14.					
n-Propylbenzene	ND	ug/kg	2.8					
1,2,3-Trichlorobenzene	ND	ug/kg	14.					
1,2,4-Trichlorobenzene	ND	ug/kg	14.					
1,3,5-Trimethylbenzene	ND	ug/kg	14.					
1,2,4-Trimethylbenzene	ND	ug/kg	14.					
trans-1,4-Dichloro-2-butene	ND	ug/kg	14.					
Ethyl ether	ND	ug/kg	14.					
Surrogate(s)	Recovery		QC Criteria					
1,2-Dichloroethane-d4	102	%	70-130					
Toluene-d8	99.0	%	70-130					
4-Bromofluorobenzene	114	%	70-130					
Dibromofluoromethane	96.0	%	70-130					
SVOC's by GC/MS 8270				1	8270C	1103 20:35	1106 18:30	RL
Acenaphthene	ND	ug/kg	760					
Benzidine	ND	ug/kg	7600					
1,2,4-Trichlorobenzene	ND	ug/kg	760					
Hexachlorobenzene	ND	ug/kg	760					
Bis(2-chloroethyl)ether	ND	ug/kg	760					
1-Chloronaphthalene	ND	ug/kg	760					
2-Chloronaphthalene	ND	ug/kg	910					
1,2-Dichlorobenzene	ND	ug/kg	760					
1,3-Dichlorobenzene	ND	ug/kg	760					
1,4-Dichlorobenzene	ND	ug/kg	760					
3,3'-Dichlorobenzidine	ND	ug/kg	1500					
2,4-Dinitrotoluene	ND	ug/kg	760					
2,6-Dinitrotoluene	ND	ug/kg	760					
Azobenzene	ND	ug/kg	760					
Fluoranthene	12000	ug/kg	760					
4-Chlorophenyl phenyl ether	ND	ug/kg	760					
4-Bromophenyl phenyl ether	ND	ug/kg	760					
Bis(2-chloroisopropyl)ether	ND	ug/kg	760					
Bis(2-chloroethoxy)methane	ND	ug/kg	760					
Hexachlorobutadiene	ND	ug/kg	1500					
Hexachlorocyclopentadiene	ND	ug/kg	1500					
Hexachloroethane	ND	ug/kg	760					
Isophorone	ND	ug/kg	760					
Naphthalene	ND	ug/kg	760					
Nitrobenzene	ND	ug/kg	760					
NDPA/DPA	ND	ug/kg	2300					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-07
AK-SB-4 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE		ID
						PREP	ANAL	
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 18:30	RL
n-Nitrosodi-n-propylamine	ND	ug/kg	760					
Bis(2-ethylhexyl)phthalate	ND	ug/kg	1500					
Butyl benzyl phthalate	ND	ug/kg	760					
Di-n-butylphthalate	ND	ug/kg	760					
Di-n-octylphthalate	ND	ug/kg	760					
Diethyl phthalate	ND	ug/kg	760					
Dimethyl phthalate	ND	ug/kg	760					
Benzo(a)anthracene	5600	ug/kg	760					
Benzo(a)pyrene	5900	ug/kg	760					
Benzo(b)fluoranthene	5600	ug/kg	760					
Benzo(k)fluoranthene	4400	ug/kg	760					
Chrysene	5500	ug/kg	760					
Acenaphthylene	790	ug/kg	760					
Anthracene	1800	ug/kg	760					
Benzo(ghi)perylene	4300	ug/kg	760					
Fluorene	ND	ug/kg	760					
Phenanthrene	5700	ug/kg	760					
Dibenzo(a,h)anthracene	1200	ug/kg	760					
Indeno(1,2,3-cd)pyrene	4600	ug/kg	760					
Pyrene	11000	ug/kg	760					
Benzo(e)pyrene	4000	ug/kg	760					
Biphenyl	ND	ug/kg	760					
Perylene	1500	ug/kg	760					
Aniline	ND	ug/kg	1500					
4-Chloroaniline	ND	ug/kg	760					
1-Methylnaphthalene	ND	ug/kg	760					
2-Nitroaniline	ND	ug/kg	760					
3-Nitroaniline	ND	ug/kg	760					
4-Nitroaniline	ND	ug/kg	1100					
Dibenzofuran	ND	ug/kg	760					
a,a-Dimethylphenethylamine	ND	ug/kg	7600					
Hexachloropropene	ND	ug/kg	1500					
Nitrosodi-n-butylamine	ND	ug/kg	1500					
2-Methylnaphthalene	ND	ug/kg	760					
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	3000					
Pentachlorobenzene	ND	ug/kg	3000					
a-Naphthylamine	ND	ug/kg	3000					
b-Naphthylamine	ND	ug/kg	3000					
Phenacetin	ND	ug/kg	1500					
Dimethoate	ND	ug/kg	3000					
4-Aminobiphenyl	ND	ug/kg	1500					
Pentachloronitrobenzene	ND	ug/kg	1500					
Isodrin	ND	ug/kg	1500					
p-Dimethylaminoazobenzene	ND	ug/kg	1500					
Chlorobenzilate	ND	ug/kg	3000					
3-Methylcholanthrene	ND	ug/kg	3000					
Ethyl Methanesulfonate	ND	ug/kg	2300					
Acetophenone	ND	ug/kg	3000					
Nitrosodipiperidine	ND	ug/kg	3000					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-07
AK-SB-4 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 18:30	RL
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	1500					
n-Nitrosodimethylamine	ND	ug/kg	7600					
2,4,6-Trichlorophenol	ND	ug/kg	760					
p-Chloro-m-cresol	ND	ug/kg	760					
2-Chlorophenol	ND	ug/kg	910					
2,4-Dichlorophenol	ND	ug/kg	1500					
2,4-Dimethylphenol	ND	ug/kg	760					
2-Nitrophenol	ND	ug/kg	3000					
4-Nitrophenol	ND	ug/kg	1500					
2,4-Dinitrophenol	ND	ug/kg	3000					
4,6-Dinitro-o-cresol	ND	ug/kg	3000					
Pentachlorophenol	ND	ug/kg	3000					
Phenol	ND	ug/kg	1100					
2-Methylphenol	ND	ug/kg	910					
3-Methylphenol/4-Methylphenol	ND	ug/kg	910					
2,4,5-Trichlorophenol	ND	ug/kg	760					
2,6-Dichlorophenol	ND	ug/kg	1500					
Benzoic Acid	ND	ug/kg	7600					
Benzyl Alcohol	ND	ug/kg	1500					
Carbazole	ND	ug/kg	760					
Pyridine	ND	ug/kg	7600					
2-Picoline	ND	ug/kg	3000					
Pronamide	ND	ug/kg	3000					
Methyl methanesulfonate	ND	ug/kg	3000					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	79.0	%	25-120					
Phenol-d6	117	%	10-120					
Nitrobenzene-d5	87.0	%	23-120					
2-Fluorobiphenyl	86.0	%	30-120					
2,4,6-Tribromophenol	96.0	%	19-120					
4-Terphenyl-d14	102	%	18-120					
PAH by GC/MS SIM 8270M				1	8270C-M	1103 20:35	1108 02:59	RL
Acenaphthene	730	ug/kg	300					
2-Chloronaphthalene	ND	ug/kg	300					
Fluoranthene	14000	ug/kg	300					
Hexachlorobutadiene	ND	ug/kg	760					
Naphthalene	ND	ug/kg	300					
Benzo(a)anthracene	8600	ug/kg	300					
Benzo(a)pyrene	5900	ug/kg	300					
Benzo(b)fluoranthene	7900	ug/kg	300					
Benzo(k)fluoranthene	7500	ug/kg	300					
Chrysene	7400	ug/kg	300					
Acenaphthylene	660	ug/kg	300					
Anthracene	2100	ug/kg	300					
Benzo(ghi)perylene	5500	ug/kg	300					
Fluorene	690	ug/kg	300					
Phenanthrene	6400	ug/kg	300					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-07
AK-SB-4 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
PAH by GC/MS SIM 8270M cont'd				1	8270C-M	1103 20:35	1108 02:59	RL
Dibenzo(a,h)anthracene	1300	ug/kg	300					
Indeno(1,2,3-cd)Pyrene	4700	ug/kg	300					
Pyrene	12000	ug/kg	300					
1-Methylnaphthalene	ND	ug/kg	300					
2-Methylnaphthalene	ND	ug/kg	300					
Pentachlorophenol	ND	ug/kg	1200					
Hexachlorobenzene	ND	ug/kg	1200					
Perylene	1800	ug/kg	300					
Biphenyl	ND	ug/kg	300					
2,6-Dimethylnaphthalene	ND	ug/kg	300					
1-Methylphenanthrene	720	ug/kg	300					
Benzo(e)Pyrene	5900	ug/kg	300					
Hexachloroethane	ND	ug/kg	1200					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	78.0	%	25-120					
Phenol-d6	116	%	10-120					
Nitrobenzene-d5	84.0	%	23-120					
2-Fluorobiphenyl	85.0	%	30-120					
2,4,6-Tribromophenol	91.0	%	19-120					
4-Terphenyl-d14	102	%	18-120					
Polychlorinated Biphenyls				1	8082	1103 16:00	1108 02:58	AK
Aroclor 1016	ND	ug/kg	37.9					
Aroclor 1221	ND	ug/kg	37.9					
Aroclor 1232	ND	ug/kg	37.9					
Aroclor 1242	ND	ug/kg	37.9					
Aroclor 1248	ND	ug/kg	37.9					
Aroclor 1254	124	ug/kg	37.9					
Aroclor 1260	52.2	ug/kg	37.9					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	72.0	%	30-150					
Decachlorobiphenyl	57.0	%	30-150					
Organochlorine Pesticides				1	8081	1103 21:40	1108 06:49	JB
Delta-BHC	ND	ug/kg	152.					
Lindane	ND	ug/kg	152.					
Alpha-BHC	ND	ug/kg	152.					
Beta-BHC	ND	ug/kg	152.					
Heptachlor	ND	ug/kg	152.					
Aldrin	ND	ug/kg	152.					
Heptachlor epoxide	ND	ug/kg	152.					
Endrin	ND	ug/kg	152.					
Endrin aldehyde	ND	ug/kg	152.					
Endrin ketone	ND	ug/kg	152.					
Dieldrin	ND	ug/kg	152.					
4,4'-DDE	ND	ug/kg	152.					
4,4'-DDD	ND	ug/kg	152					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-07
AK-SB-4 (2'-3')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Organochlorine Pesticides cont'd				1	8081	1103 21:40	1108 06:49	JB
4,4'-DDT	ND	ug/kg	152					
Endosulfan I	ND	ug/kg	152.					
Endosulfan II	ND	ug/kg	152.					
Endosulfan sulfate	ND	ug/kg	152.					
Methoxychlor	ND	ug/kg	606.					
Toxaphene	ND	ug/kg	606.					
Chlordane	ND	ug/kg	606.					
cis-Chlordane	ND	ug/kg	152.					
trans-Chlordane	ND	ug/kg	152.					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	ND	%	30-150					
Decachlorobiphenyl	ND	%	30-150					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615863-08
AK-SB-4 (9'-10')
Sample Matrix: SOIL

Date Collected: 01-NOV-2006 11:20
Date Received : 02-NOV-2006
Date Reported : 09-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber,1-Vial

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	88	%	0.10	30	2540G		1107 12:01	PD
Total Metals				1	3051			
Aluminum, Total	6200	mg/kg	4.5	1	6010B	1103 18:30	1108 16:04	AI
Antimony, Total	2.6	mg/kg	2.2	1	6010B	1103 18:30	1108 16:04	AI
Arsenic, Total	5.2	mg/kg	0.45	1	6010B	1103 18:30	1108 16:04	AI
Barium, Total	58	mg/kg	0.45	1	6010B	1103 18:30	1108 16:04	AI
Beryllium, Total	ND	mg/kg	0.22	1	6010B	1103 18:30	1108 16:04	AI
Cadmium, Total	ND	mg/kg	0.45	1	6010B	1103 18:30	1108 16:04	AI
Calcium, Total	8900	mg/kg	4.5	1	6010B	1103 18:30	1108 16:04	AI
Chromium, Total	11	mg/kg	0.45	1	6010B	1103 18:30	1108 16:04	AI
Cobalt, Total	5.7	mg/kg	0.90	1	6010B	1103 18:30	1108 16:04	AI
Copper, Total	160	mg/kg	0.45	1	6010B	1103 18:30	1108 16:04	AI
Iron, Total	12000	mg/kg	2.2	1	6010B	1103 18:30	1108 16:04	AI
Lead, Total	200	mg/kg	2.2	1	6010B	1103 18:30	1108 16:04	AI
Magnesium, Total	2100	mg/kg	4.5	1	6010B	1103 18:30	1108 16:04	AI
Manganese, Total	310	mg/kg	0.45	1	6010B	1103 18:30	1108 16:04	AI
Mercury, Total	2.0	mg/kg	0.17	1	7471A	1106 16:25	1107 12:02	DM
Nickel, Total	20	mg/kg	1.1	1	6010B	1103 18:30	1108 16:04	AI
Potassium, Total	540	mg/kg	110	1	6010B	1103 18:30	1108 16:04	AI
Selenium, Total	ND	mg/kg	0.90	1	6010B	1103 18:30	1108 16:04	AI
Silver, Total	0.83	mg/kg	0.45	1	6010B	1103 18:30	1108 16:04	AI
Sodium, Total	ND	mg/kg	90	1	6010B	1103 18:30	1108 16:04	AI
Thallium, Total	ND	mg/kg	0.45	1	6010B	1103 18:30	1108 16:04	AI
Vanadium, Total	16	mg/kg	0.45	1	6010B	1103 18:30	1108 16:04	AI
Zinc, Total	180	mg/kg	2.2	1	6010B	1103 18:30	1108 16:04	AI
Volatile Organics by GC/MS 8260				1	8260B		1107 21:19	RY
Methylene chloride	ND	ug/kg	28.					
1,1-Dichloroethane	ND	ug/kg	4.3					
Chloroform	ND	ug/kg	4.3					
Carbon tetrachloride	ND	ug/kg	2.8					
1,2-Dichloropropane	ND	ug/kg	9.9					
Dibromochloromethane	ND	ug/kg	2.8					
1,1,2-Trichloroethane	ND	ug/kg	4.3					
Tetrachloroethene	ND	ug/kg	2.8					
Chlorobenzene	ND	ug/kg	2.8					
Trichlorofluoromethane	ND	ug/kg	14.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-08
AK-SB-4 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 21:19	RY
1,2-Dichloroethane	ND	ug/kg	2.8					
1,1,1-Trichloroethane	ND	ug/kg	2.8					
Bromodichloromethane	ND	ug/kg	2.8					
trans-1,3-Dichloropropene	ND	ug/kg	2.8					
cis-1,3-Dichloropropene	ND	ug/kg	2.8					
1,1-Dichloropropene	ND	ug/kg	14.					
Bromoform	ND	ug/kg	11.					
1,1,2,2-Tetrachloroethane	ND	ug/kg	2.8					
Benzene	ND	ug/kg	2.8					
Toluene	ND	ug/kg	4.3					
Ethylbenzene	ND	ug/kg	2.8					
Chloromethane	ND	ug/kg	14.					
Bromomethane	ND	ug/kg	5.7					
Vinyl chloride	ND	ug/kg	5.7					
Chloroethane	ND	ug/kg	5.7					
1,1-Dichloroethene	ND	ug/kg	2.8					
trans-1,2-Dichloroethene	ND	ug/kg	4.3					
Trichloroethene	ND	ug/kg	2.8					
1,2-Dichlorobenzene	ND	ug/kg	14.					
1,3-Dichlorobenzene	ND	ug/kg	14.					
1,4-Dichlorobenzene	ND	ug/kg	14.					
Methyl tert butyl ether	ND	ug/kg	5.7					
p/m-Xylene	ND	ug/kg	5.7					
o-Xylene	ND	ug/kg	5.7					
cis-1,2-Dichloroethene	ND	ug/kg	2.8					
Dibromomethane	ND	ug/kg	28.					
1,4-Dichlorobutane	ND	ug/kg	28.					
Iodomethane	ND	ug/kg	28.					
1,2,3-Trichloropropane	ND	ug/kg	28.					
Styrene	ND	ug/kg	5.7					
Dichlorodifluoromethane	ND	ug/kg	28.					
Acetone	53	ug/kg	28					
Carbon disulfide	ND	ug/kg	28.					
2-Butanone	ND	ug/kg	28.					
Vinyl acetate	ND	ug/kg	28.					
4-Methyl-2-pentanone	ND	ug/kg	28.					
2-Hexanone	ND	ug/kg	28.					
Ethyl methacrylate	ND	ug/kg	28.					
Acrolein	ND	ug/kg	71.					
Acrylonitrile	ND	ug/kg	11.					
Bromochloromethane	ND	ug/kg	14.					
Tetrahydrofuran	ND	ug/kg	57.					
2,2-Dichloropropane	ND	ug/kg	14.					
1,2-Dibromoethane	ND	ug/kg	11.					
1,3-Dichloropropane	ND	ug/kg	14.					
1,1,1,2-Tetrachloroethane	ND	ug/kg	2.8					
Bromobenzene	ND	ug/kg	14.					
n-Butylbenzene	ND	ug/kg	2.8					
sec-Butylbenzene	ND	ug/kg	2.8					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-08
AK-SB-4 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 21:19	RY
tert-Butylbenzene	ND	ug/kg	14.					
o-Chlorotoluene	ND	ug/kg	14.					
p-Chlorotoluene	ND	ug/kg	14.					
1,2-Dibromo-3-chloropropane	ND	ug/kg	14.					
Hexachlorobutadiene	ND	ug/kg	14.					
Isopropylbenzene	ND	ug/kg	2.8					
p-Isopropyltoluene	ND	ug/kg	2.8					
Naphthalene	17	ug/kg	14					
n-Propylbenzene	ND	ug/kg	2.8					
1,2,3-Trichlorobenzene	ND	ug/kg	14.					
1,2,4-Trichlorobenzene	ND	ug/kg	14.					
1,3,5-Trimethylbenzene	ND	ug/kg	14.					
1,2,4-Trimethylbenzene	ND	ug/kg	14.					
trans-1,4-Dichloro-2-butene	ND	ug/kg	14.					
Ethyl ether	ND	ug/kg	14.					
Surrogate(s)	Recovery		QC Criteria					
1,2-Dichloroethane-d4	101	%	70-130					
Toluene-d8	96.0	%	70-130					
4-Bromofluorobenzene	108	%	70-130					
Dibromofluoromethane	97.0	%	70-130					
SVOC's by GC/MS 8270				1	8270C	1103 20:35	1106 18:55	RL
Acenaphthene	ND	ug/kg	380					
Benzidine	ND	ug/kg	3800					
1,2,4-Trichlorobenzene	ND	ug/kg	380					
Hexachlorobenzene	ND	ug/kg	380					
Bis(2-chloroethyl)ether	ND	ug/kg	380					
1-Chloronaphthalene	ND	ug/kg	380					
2-Chloronaphthalene	ND	ug/kg	450					
1,2-Dichlorobenzene	ND	ug/kg	380					
1,3-Dichlorobenzene	ND	ug/kg	380					
1,4-Dichlorobenzene	ND	ug/kg	380					
3,3'-Dichlorobenzidine	ND	ug/kg	760					
2,4-Dinitrotoluene	ND	ug/kg	380					
2,6-Dinitrotoluene	ND	ug/kg	380					
Azobenzene	ND	ug/kg	380					
Fluoranthene	2600	ug/kg	380					
4-Chlorophenyl phenyl ether	ND	ug/kg	380					
4-Bromophenyl phenyl ether	ND	ug/kg	380					
Bis(2-chloroisopropyl)ether	ND	ug/kg	380					
Bis(2-chloroethoxy)methane	ND	ug/kg	380					
Hexachlorobutadiene	ND	ug/kg	760					
Hexachlorocyclopentadiene	ND	ug/kg	760					
Hexachloroethane	ND	ug/kg	380					
Isophorone	ND	ug/kg	380					
Naphthalene	ND	ug/kg	380					
Nitrobenzene	ND	ug/kg	380					
NDPA/DPA	ND	ug/kg	1100					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-08
AK-SB-4 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 18:55	RL
n-Nitrosodi-n-propylamine	ND	ug/kg	380					
Bis(2-ethylhexyl)phthalate	ND	ug/kg	760					
Butyl benzyl phthalate	ND	ug/kg	380					
Di-n-butylphthalate	ND	ug/kg	380					
Di-n-octylphthalate	ND	ug/kg	380					
Diethyl phthalate	ND	ug/kg	380					
Dimethyl phthalate	ND	ug/kg	380					
Benzo(a)anthracene	1200	ug/kg	380					
Benzo(a)pyrene	1100	ug/kg	380					
Benzo(b)fluoranthene	980	ug/kg	380					
Benzo(k)fluoranthene	870	ug/kg	380					
Chrysene	1200	ug/kg	380					
Acenaphthylene	ND	ug/kg	380					
Anthracene	ND	ug/kg	380					
Benzo(ghi)perylene	760	ug/kg	380					
Fluorene	ND	ug/kg	380					
Phenanthrene	1200	ug/kg	380					
Dibenzo(a,h)anthracene	ND	ug/kg	380					
Indeno(1,2,3-cd)pyrene	810	ug/kg	380					
Pyrene	2400	ug/kg	380					
Benzo(e)pyrene	750	ug/kg	380					
Biphenyl	ND	ug/kg	380					
Perylene	ND	ug/kg	380					
Aniline	ND	ug/kg	760					
4-Chloroaniline	ND	ug/kg	380					
1-Methylnaphthalene	ND	ug/kg	380					
2-Nitroaniline	ND	ug/kg	380					
3-Nitroaniline	ND	ug/kg	380					
4-Nitroaniline	ND	ug/kg	530					
Dibenzofuran	ND	ug/kg	380					
a,a-Dimethylphenethylamine	ND	ug/kg	3800					
Hexachloropropene	ND	ug/kg	760					
Nitrosodi-n-butylamine	ND	ug/kg	760					
2-Methylnaphthalene	ND	ug/kg	380					
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	1500					
Pentachlorobenzene	ND	ug/kg	1500					
a-Naphthylamine	ND	ug/kg	1500					
b-Naphthylamine	ND	ug/kg	1500					
Phenacetin	ND	ug/kg	760					
Dimethoate	ND	ug/kg	1500					
4-Aminobiphenyl	ND	ug/kg	760					
Pentachloronitrobenzene	ND	ug/kg	760					
Isodrin	ND	ug/kg	760					
p-Dimethylaminoazobenzene	ND	ug/kg	760					
Chlorobenzilate	ND	ug/kg	1500					
3-Methylcholanthrene	ND	ug/kg	1500					
Ethyl Methanesulfonate	ND	ug/kg	1100					
Acetophenone	ND	ug/kg	1500					
Nitrosodipiperidine	ND	ug/kg	1500					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-08
AK-SB-4 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE		ID
						PREP	ANAL	
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 18:55	RL
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	760					
n-Nitrosodimethylamine	ND	ug/kg	3800					
2,4,6-Trichlorophenol	ND	ug/kg	380					
p-Chloro-m-cresol	ND	ug/kg	380					
2-Chlorophenol	ND	ug/kg	450					
2,4-Dichlorophenol	ND	ug/kg	760					
2,4-Dimethylphenol	ND	ug/kg	380					
2-Nitrophenol	ND	ug/kg	1500					
4-Nitrophenol	ND	ug/kg	760					
2,4-Dinitrophenol	ND	ug/kg	1500					
4,6-Dinitro-o-cresol	ND	ug/kg	1500					
Pentachlorophenol	ND	ug/kg	1500					
Phenol	ND	ug/kg	530					
2-Methylphenol	ND	ug/kg	450					
3-Methylphenol/4-Methylphenol	ND	ug/kg	450					
2,4,5-Trichlorophenol	ND	ug/kg	380					
2,6-Dichlorophenol	ND	ug/kg	760					
Benzoic Acid	ND	ug/kg	3800					
Benzyl Alcohol	ND	ug/kg	760					
Carbazole	ND	ug/kg	380					
Pyridine	ND	ug/kg	3800					
2-Picoline	ND	ug/kg	1500					
Pronamide	ND	ug/kg	1500					
Methyl methanesulfonate	ND	ug/kg	1500					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	61.0	%	25-120					
Phenol-d6	92.0	%	10-120					
Nitrobenzene-d5	69.0	%	23-120					
2-Fluorobiphenyl	71.0	%	30-120					
2,4,6-Tribromophenol	96.0	%	19-120					
4-Terphenyl-d14	102	%	18-120					
PAH by GC/MS SIM 8270M				1	8270C-M	1103 20:35	1106 15:47	RL
Acenaphthene	82	ug/kg	76					
2-Chloronaphthalene	ND	ug/kg	76.					
Fluoranthene	4400	ug/kg	76					
Hexachlorobutadiene	ND	ug/kg	190					
Naphthalene	ND	ug/kg	76.					
Benzo(a)anthracene	1600	ug/kg	76					
Benzo(a)pyrene	1800	ug/kg	76					
Benzo(b)fluoranthene	1500	ug/kg	76					
Benzo(k)fluoranthene	1500	ug/kg	76					
Chrysene	1400	ug/kg	76					
Acenaphthylene	120	ug/kg	76					
Anthracene	390	ug/kg	76					
Benzo(ghi)perylene	840	ug/kg	76					
Fluorene	85	ug/kg	76					
Phenanthrene	1400	ug/kg	76					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-08
AK-SB-4 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
PAH by GC/MS SIM 8270M cont'd				1	8270C-M	1103 20:35	1106 15:47	RL
Dibenzo(a,h)anthracene	130	ug/kg	76					
Indeno(1,2,3-cd)Pyrene	640	ug/kg	76					
Pyrene	4100	ug/kg	76					
1-Methylnaphthalene	ND	ug/kg	76.					
2-Methylnaphthalene	ND	ug/kg	76.					
Pentachlorophenol	ND	ug/kg	300					
Hexachlorobenzene	ND	ug/kg	300					
Perylene	380	ug/kg	76					
Biphenyl	ND	ug/kg	76.					
2,6-Dimethylnaphthalene	ND	ug/kg	76.					
1-Methylphenanthrene	230	ug/kg	76					
Benzo(e)Pyrene	960	ug/kg	76					
Hexachloroethane	ND	ug/kg	300					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	71.0	%	25-120					
Phenol-d6	96.0	%	10-120					
Nitrobenzene-d5	74.0	%	23-120					
2-Fluorobiphenyl	74.0	%	30-120					
2,4,6-Tribromophenol	71.0	%	19-120					
4-Terphenyl-d14	120	%	18-120					
Polychlorinated Biphenyls				1	8082	1103 16:00	1108 03:27	AK
Aroclor 1016	ND	ug/kg	37.9					
Aroclor 1221	ND	ug/kg	37.9					
Aroclor 1232	ND	ug/kg	37.9					
Aroclor 1242	ND	ug/kg	37.9					
Aroclor 1248	ND	ug/kg	37.9					
Aroclor 1254	ND	ug/kg	37.9					
Aroclor 1260	ND	ug/kg	37.9					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	79.0	%	30-150					
Decachlorobiphenyl	59.0	%	30-150					
Organochlorine Pesticides				1	8081	1103 21:40	1108 07:18	JB
Delta-BHC	ND	ug/kg	18.9					
Lindane	ND	ug/kg	18.9					
Alpha-BHC	ND	ug/kg	18.9					
Beta-BHC	ND	ug/kg	18.9					
Heptachlor	ND	ug/kg	18.9					
Aldrin	ND	ug/kg	18.9					
Heptachlor epoxide	ND	ug/kg	18.9					
Endrin	ND	ug/kg	18.9					
Endrin aldehyde	ND	ug/kg	18.9					
Endrin ketone	ND	ug/kg	18.9					
Dieldrin	ND	ug/kg	18.9					
4,4'-DDE	ND	ug/kg	18.9					
4,4'-DDD	ND	ug/kg	18.9					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-08
AK-SB-4 (9'-10')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Organochlorine Pesticides cont'd				1	8081	1103 21:40	1108 07:18	JB
4,4'-DDT	ND	ug/kg	18.9					
Endosulfan I	ND	ug/kg	18.9					
Endosulfan II	ND	ug/kg	18.9					
Endosulfan sulfate	ND	ug/kg	18.9					
Methoxychlor	ND	ug/kg	75.8					
Toxaphene	ND	ug/kg	75.8					
Chlordane	ND	ug/kg	75.8					
cis-Chlordane	ND	ug/kg	18.9					
trans-Chlordane	ND	ug/kg	18.9					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	71.0	%	30-150					
Decachlorobiphenyl	139	%	30-150					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number:	L0615863-09 AK-SB-5 (1'-2')	**Date Collected:**	01-NOV-2006 11:45
		Date Received :	02-NOV-2006
Sample Matrix:	SOIL	**Date Reported :**	09-NOV-2006
Condition of Sample:	Satisfactory	**Field Prep:**	None

Number & Type of Containers: 1-Amber,1-Vial

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE		ID
						PREP	ANAL	
Solids, Total	90	%	0.10	30	2540G		1107 12:01	PD
Total Metals				1	3051			
Aluminum, Total	7200	mg/kg	4.4	1	6010B	1103 18:30	1108 16:09	AI
Antimony, Total	ND	mg/kg	2.2	1	6010B	1103 18:30	1108 16:09	AI
Arsenic, Total	3.7	mg/kg	0.44	1	6010B	1103 18:30	1108 16:09	AI
Barium, Total	110	mg/kg	0.44	1	6010B	1103 18:30	1108 16:09	AI
Beryllium, Total	ND	mg/kg	2.2	1	6010B	1103 18:30	1109 11:02	AI
Cadmium, Total	0.54	mg/kg	0.44	1	6010B	1103 18:30	1108 16:09	AI
Calcium, Total	40000	mg/kg	44	1	6010B	1103 18:30	1109 11:02	AI
Chromium, Total	180	mg/kg	0.44	1	6010B	1103 18:30	1108 16:09	AI
Cobalt, Total	6.4	mg/kg	0.88	1	6010B	1103 18:30	1108 16:09	AI
Copper, Total	70	mg/kg	0.44	1	6010B	1103 18:30	1108 16:09	AI
Iron, Total	16000	mg/kg	2.2	1	6010B	1103 18:30	1108 16:09	AI
Lead, Total	170	mg/kg	2.2	1	6010B	1103 18:30	1108 16:09	AI
Magnesium, Total	14000	mg/kg	44	1	6010B	1103 18:30	1109 11:02	AI
Manganese, Total	210	mg/kg	0.44	1	6010B	1103 18:30	1108 16:09	AI
Mercury, Total	0.24	mg/kg	0.09	1	7471A	1106 16:25	1107 10:42	DM
Nickel, Total	20	mg/kg	1.1	1	6010B	1103 18:30	1108 16:09	AI
Potassium, Total	2300	mg/kg	110	1	6010B	1103 18:30	1108 16:09	AI
Selenium, Total	ND	mg/kg	0.88	1	6010B	1103 18:30	1108 16:09	AI
Silver, Total	ND	mg/kg	0.44	1	6010B	1103 18:30	1108 16:09	AI
Sodium, Total	250	mg/kg	88	1	6010B	1103 18:30	1108 16:09	AI
Thallium, Total	ND	mg/kg	0.44	1	6010B	1103 18:30	1108 16:09	AI
Vanadium, Total	35	mg/kg	0.44	1	6010B	1103 18:30	1108 16:09	AI
Zinc, Total	150	mg/kg	2.2	1	6010B	1103 18:30	1108 16:09	AI
Volatile Organics by GC/MS 8260				1	8260B		1107 21:55	RY
Methylene chloride	ND	ug/kg	28.					
1,1-Dichloroethane	ND	ug/kg	4.2					
Chloroform	ND	ug/kg	4.2					
Carbon tetrachloride	ND	ug/kg	2.8					
1,2-Dichloropropane	ND	ug/kg	9.7					
Dibromochloromethane	ND	ug/kg	2.8					
1,1,2-Trichloroethane	ND	ug/kg	4.2					
Tetrachloroethene	ND	ug/kg	2.8					
Chlorobenzene	ND	ug/kg	2.8					
Trichlorofluoromethane	ND	ug/kg	14.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-09
AK-SB-5 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 21:55	RY
1,2-Dichloroethane	ND	ug/kg	2.8					
1,1,1-Trichloroethane	ND	ug/kg	2.8					
Bromodichloromethane	ND	ug/kg	2.8					
trans-1,3-Dichloropropene	ND	ug/kg	2.8					
cis-1,3-Dichloropropene	ND	ug/kg	2.8					
1,1-Dichloropropene	ND	ug/kg	14.					
Bromoform	ND	ug/kg	11.					
1,1,2,2-Tetrachloroethane	ND	ug/kg	2.8					
Benzene	ND	ug/kg	2.8					
Toluene	ND	ug/kg	4.2					
Ethylbenzene	ND	ug/kg	2.8					
Chloromethane	ND	ug/kg	14.					
Bromomethane	ND	ug/kg	5.6					
Vinyl chloride	ND	ug/kg	5.6					
Chloroethane	ND	ug/kg	5.6					
1,1-Dichloroethene	ND	ug/kg	2.8					
trans-1,2-Dichloroethene	ND	ug/kg	4.2					
Trichloroethene	ND	ug/kg	2.8					
1,2-Dichlorobenzene	ND	ug/kg	14.					
1,3-Dichlorobenzene	ND	ug/kg	14.					
1,4-Dichlorobenzene	ND	ug/kg	14.					
Methyl tert butyl ether	ND	ug/kg	5.6					
p/m-Xylene	ND	ug/kg	5.6					
o-Xylene	ND	ug/kg	5.6					
cis-1,2-Dichloroethene	ND	ug/kg	2.8					
Dibromomethane	ND	ug/kg	28.					
1,4-Dichlorobutane	ND	ug/kg	28.					
Iodomethane	ND	ug/kg	28.					
1,2,3-Trichloropropane	ND	ug/kg	28.					
Styrene	ND	ug/kg	5.6					
Dichlorodifluoromethane	ND	ug/kg	28.					
Acetone	ND	ug/kg	28.					
Carbon disulfide	ND	ug/kg	28.					
2-Butanone	ND	ug/kg	28.					
Vinyl acetate	ND	ug/kg	28.					
4-Methyl-2-pentanone	ND	ug/kg	28.					
2-Hexanone	ND	ug/kg	28.					
Ethyl methacrylate	ND	ug/kg	28.					
Acrolein	ND	ug/kg	69.					
Acrylonitrile	ND	ug/kg	11.					
Bromochloromethane	ND	ug/kg	14.					
Tetrahydrofuran	ND	ug/kg	56.					
2,2-Dichloropropane	ND	ug/kg	14.					
1,2-Dibromoethane	ND	ug/kg	11.					
1,3-Dichloropropane	ND	ug/kg	14.					
1,1,1,2-Tetrachloroethane	ND	ug/kg	2.8					
Bromobenzene	ND	ug/kg	14.					
n-Butylbenzene	ND	ug/kg	2.8					
sec-Butylbenzene	ND	ug/kg	2.8					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-09
AK-SB-5 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 21:55	RY
tert-Butylbenzene	ND	ug/kg	14.					
o-Chlorotoluene	ND	ug/kg	14.					
p-Chlorotoluene	ND	ug/kg	14.					
1,2-Dibromo-3-chloropropane	ND	ug/kg	14.					
Hexachlorobutadiene	ND	ug/kg	14.					
Isopropylbenzene	ND	ug/kg	2.8					
p-Isopropyltoluene	ND	ug/kg	2.8					
Naphthalene	ND	ug/kg	14.					
n-Propylbenzene	ND	ug/kg	2.8					
1,2,3-Trichlorobenzene	ND	ug/kg	14.					
1,2,4-Trichlorobenzene	ND	ug/kg	14.					
1,3,5-Trimethylbenzene	ND	ug/kg	14.					
1,2,4-Trimethylbenzene	ND	ug/kg	14.					
trans-1,4-Dichloro-2-butene	ND	ug/kg	14.					
Ethyl ether	ND	ug/kg	14.					
Surrogate(s)	Recovery		QC Criteria					
1,2-Dichloroethane-d4	103	%	70-130					
Toluene-d8	96.0	%	70-130					
4-Bromofluorobenzene	121	%	70-130					
Dibromofluoromethane	99.0	%	70-130					
SVOC's by GC/MS 8270				1	8270C	1103 20:35	1106 19:20	RL
Acenaphthene	ND	ug/kg	370					
Benzidine	ND	ug/kg	3700					
1,2,4-Trichlorobenzene	ND	ug/kg	370					
Hexachlorobenzene	ND	ug/kg	370					
Bis(2-chloroethyl)ether	ND	ug/kg	370					
1-Chloronaphthalene	ND	ug/kg	370					
2-Chloronaphthalene	ND	ug/kg	440					
1,2-Dichlorobenzene	ND	ug/kg	370					
1,3-Dichlorobenzene	ND	ug/kg	370					
1,4-Dichlorobenzene	ND	ug/kg	370					
3,3'-Dichlorobenzidine	ND	ug/kg	740					
2,4-Dinitrotoluene	ND	ug/kg	370					
2,6-Dinitrotoluene	ND	ug/kg	370					
Azobenzene	ND	ug/kg	370					
Fluoranthene	1900	ug/kg	370					
4-Chlorophenyl phenyl ether	ND	ug/kg	370					
4-Bromophenyl phenyl ether	ND	ug/kg	370					
Bis(2-chloroisopropyl)ether	ND	ug/kg	370					
Bis(2-chloroethoxy)methane	ND	ug/kg	370					
Hexachlorobutadiene	ND	ug/kg	740					
Hexachlorocyclopentadiene	ND	ug/kg	740					
Hexachloroethane	ND	ug/kg	370					
Isophorone	1400	ug/kg	370					
Naphthalene	ND	ug/kg	370					
Nitrobenzene	ND	ug/kg	370					
NDPA/DPA	ND	ug/kg	1100					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-09
AK-SB-5 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 19:20	RL
n-Nitrosodi-n-propylamine	ND	ug/kg	370					
Bis(2-ethylhexyl)phthalate	ND	ug/kg	740					
Butyl benzyl phthalate	ND	ug/kg	370					
Di-n-butylphthalate	ND	ug/kg	370					
Di-n-octylphthalate	ND	ug/kg	370					
Diethyl phthalate	ND	ug/kg	370					
Dimethyl phthalate	ND	ug/kg	370					
Benzo(a)anthracene	920	ug/kg	370					
Benzo(a)pyrene	920	ug/kg	370					
Benzo(b)fluoranthene	850	ug/kg	370					
Benzo(k)fluoranthene	720	ug/kg	370					
Chrysene	880	ug/kg	370					
Acenaphthylene	ND	ug/kg	370					
Anthracene	ND	ug/kg	370					
Benzo(ghi)perylene	630	ug/kg	370					
Fluorene	ND	ug/kg	370					
Phenanthrene	1200	ug/kg	370					
Dibenzo(a,h)anthracene	ND	ug/kg	370					
Indeno(1,2,3-cd)pyrene	700	ug/kg	370					
Pyrene	1600	ug/kg	370					
Benzo(e)pyrene	640	ug/kg	370					
Biphenyl	ND	ug/kg	370					
Perylene	ND	ug/kg	370					
Aniline	ND	ug/kg	740					
4-Chloroaniline	ND	ug/kg	370					
1-Methylnaphthalene	ND	ug/kg	370					
2-Nitroaniline	ND	ug/kg	370					
3-Nitroaniline	ND	ug/kg	370					
4-Nitroaniline	ND	ug/kg	520					
Dibenzofuran	ND	ug/kg	370					
a,a-Dimethylphenethylamine	ND	ug/kg	3700					
Hexachloropropene	ND	ug/kg	740					
Nitrosodi-n-butylamine	ND	ug/kg	740					
2-Methylnaphthalene	ND	ug/kg	370					
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	1500					
Pentachlorobenzene	ND	ug/kg	1500					
a-Naphthylamine	ND	ug/kg	1500					
b-Naphthylamine	ND	ug/kg	1500					
Phenacetin	ND	ug/kg	740					
Dimethoate	ND	ug/kg	1500					
4-Aminobiphenyl	ND	ug/kg	740					
Pentachloronitrobenzene	ND	ug/kg	740					
Isodrin	ND	ug/kg	740					
p-Dimethylaminoazobenzene	ND	ug/kg	740					
Chlorobenzilate	ND	ug/kg	1500					
3-Methylcholanthrene	ND	ug/kg	1500					
Ethyl Methanesulfonate	ND	ug/kg	1100					
Acetophenone	ND	ug/kg	1500					
Nitrosodipiperidine	ND	ug/kg	1500					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-09
AK-SB-5 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 19:20	RL
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	740					
n-Nitrosodimethylamine	ND	ug/kg	3700					
2,4,6-Trichlorophenol	ND	ug/kg	370					
p-Chloro-m-cresol	ND	ug/kg	370					
2-Chlorophenol	ND	ug/kg	440					
2,4-Dichlorophenol	ND	ug/kg	740					
2,4-Dimethylphenol	ND	ug/kg	370					
2-Nitrophenol	ND	ug/kg	1500					
4-Nitrophenol	ND	ug/kg	740					
2,4-Dinitrophenol	ND	ug/kg	1500					
4,6-Dinitro-o-cresol	ND	ug/kg	1500					
Pentachlorophenol	ND	ug/kg	1500					
Phenol	ND	ug/kg	520					
2-Methylphenol	ND	ug/kg	440					
3-Methylphenol/4-Methylphenol	ND	ug/kg	440					
2,4,5-Trichlorophenol	ND	ug/kg	370					
2,6-Dichlorophenol	ND	ug/kg	740					
Benzoic Acid	ND	ug/kg	3700					
Benzyl Alcohol	ND	ug/kg	740					
Carbazole	ND	ug/kg	370					
Pyridine	ND	ug/kg	3700					
2-Picoline	ND	ug/kg	1500					
Pronamide	ND	ug/kg	1500					
Methyl methanesulfonate	ND	ug/kg	1500					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	49.0	%	25-120					
Phenol-d6	79.0	%	10-120					
Nitrobenzene-d5	62.0	%	23-120					
2-Fluorobiphenyl	57.0	%	30-120					
2,4,6-Tribromophenol	41.0	%	19-120					
4-Terphenyl-d14	65.0	%	18-120					
PAH by GC/MS SIM 8270M				1	8270C-M	1103 20:35	1106 17:10	RL
Acenaphthene	140	ug/kg	74					
2-Chloronaphthalene	ND	ug/kg	74.					
Fluoranthene	2300	ug/kg	74					
Hexachlorobutadiene	ND	ug/kg	180					
Naphthalene	ND	ug/kg	74.					
Benzo(a)anthracene	1400	ug/kg	74					
Benzo(a)pyrene	1700	ug/kg	74					
Benzo(b)fluoranthene	1400	ug/kg	74					
Benzo(k)fluoranthene	980	ug/kg	74					
Chrysene	1000	ug/kg	74					
Acenaphthylene	160	ug/kg	74					
Anthracene	490	ug/kg	74					
Benzo(ghi)perylene	510	ug/kg	74					
Fluorene	140	ug/kg	74					
Phenanthrene	1400	ug/kg	74					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-09
AK-SB-5 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE		ID
						PREP	ANAL	
PAH by GC/MS SIM 8270M cont'd				1	8270C-M	1103 20:35	1106 17:10	RL
Dibenzo(a,h)anthracene	170	ug/kg	74					
Indeno(1,2,3-cd)Pyrene	600	ug/kg	74					
Pyrene	2100	ug/kg	74					
1-Methylnaphthalene	ND	ug/kg	74.					
2-Methylnaphthalene	ND	ug/kg	74.					
Pentachlorophenol	ND	ug/kg	300					
Hexachlorobenzene	ND	ug/kg	300					
Perylene	290	ug/kg	74					
Biphenyl	ND	ug/kg	74.					
2,6-Dimethylnaphthalene	ND	ug/kg	74.					
1-Methylphenanthrene	160	ug/kg	74					
Benzo(e)Pyrene	720	ug/kg	74					
Hexachloroethane	ND	ug/kg	300					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	53.0	%	25-120					
Phenol-d6	85.0	%	10-120					
Nitrobenzene-d5	60.0	%	23-120					
2-Fluorobiphenyl	57.0	%	30-120					
2,4,6-Tribromophenol	45.0	%	19-120					
4-Terphenyl-d14	77.0	%	18-120					
Polychlorinated Biphenyls				1	8082	1103 16:00	1108 03:55	AK
Aroclor 1016	ND	ug/kg	37.0					
Aroclor 1221	ND	ug/kg	37.0					
Aroclor 1232	ND	ug/kg	37.0					
Aroclor 1242	ND	ug/kg	37.0					
Aroclor 1248	ND	ug/kg	37.0					
Aroclor 1254	ND	ug/kg	37.0					
Aroclor 1260	ND	ug/kg	37.0					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	83.0	%	30-150					
Decachlorobiphenyl	63.0	%	30-150					
Organochlorine Pesticides				1	8081	1103 21:40	1108 07:47	JB
Delta-BHC	ND	ug/kg	37.0					
Lindane	ND	ug/kg	37.0					
Alpha-BHC	ND	ug/kg	37.0					
Beta-BHC	ND	ug/kg	37.0					
Heptachlor	ND	ug/kg	37.0					
Aldrin	ND	ug/kg	37.0					
Heptachlor epoxide	ND	ug/kg	37.0					
Endrin	ND	ug/kg	37.0					
Endrin aldehyde	ND	ug/kg	37.0					
Endrin ketone	ND	ug/kg	37.0					
Dieldrin	ND	ug/kg	37.0					
4,4'-DDE	ND	ug/kg	37.0					
4,4'-DDD	ND	ug/kg	37.0					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-09
AK-SB-5 (1'-2')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Organochlorine Pesticides cont'd				1	8081	1103 21:40	1108 07:47	JB
4,4'-DDT	ND	ug/kg	37.0					
Endosulfan I	ND	ug/kg	37.0					
Endosulfan II	ND	ug/kg	37.0					
Endosulfan sulfate	ND	ug/kg	37.0					
Methoxychlor	ND	ug/kg	148.					
Toxaphene	ND	ug/kg	148.					
Chlordane	ND	ug/kg	148.					
cis-Chlordane	ND	ug/kg	37.0					
trans-Chlordane	ND	ug/kg	37.0					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	ND	%	30-150					
Decachlorobiphenyl	ND	%	30-150					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615863-10
AK-SB-5 (8'-9')
Sample Matrix: SOIL

Date Collected: 01-NOV-2006 12:10
Date Received : 02-NOV-2006
Date Reported : 09-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber,1-Vial

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	90	%	0.10	30	2540G		1107 12:01	PD
Total Metals				1	3051			
Aluminum, Total	5700	mg/kg	4.4	1	6010B	1103 18:30	1108 16:13	AI
Antimony, Total	ND	mg/kg	2.2	1	6010B	1103 18:30	1108 16:13	AI
Arsenic, Total	3.4	mg/kg	0.44	1	6010B	1103 18:30	1108 16:13	AI
Barium, Total	110	mg/kg	0.44	1	6010B	1103 18:30	1108 16:13	AI
Beryllium, Total	ND	mg/kg	0.22	1	6010B	1103 18:30	1108 16:13	AI
Cadmium, Total	0.60	mg/kg	0.44	1	6010B	1103 18:30	1108 16:13	AI
Calcium, Total	32000	mg/kg	44	1	6010B	1103 18:30	1109 11:05	AI
Chromium, Total	16	mg/kg	0.44	1	6010B	1103 18:30	1108 16:13	AI
Cobalt, Total	4.6	mg/kg	0.89	1	6010B	1103 18:30	1108 16:13	AI
Copper, Total	97	mg/kg	0.44	1	6010B	1103 18:30	1108 16:13	AI
Iron, Total	13000	mg/kg	2.2	1	6010B	1103 18:30	1108 16:13	AI
Lead, Total	190	mg/kg	2.2	1	6010B	1103 18:30	1108 16:13	AI
Magnesium, Total	13000	mg/kg	44	1	6010B	1103 18:30	1109 11:05	AI
Manganese, Total	140	mg/kg	0.44	1	6010B	1103 18:30	1108 16:13	AI
Mercury, Total	0.24	mg/kg	0.09	1	7471A	1106 16:25	1107 10:44	DM
Nickel, Total	10	mg/kg	1.1	1	6010B	1103 18:30	1108 16:13	AI
Potassium, Total	2200	mg/kg	110	1	6010B	1103 18:30	1108 16:13	AI
Selenium, Total	ND	mg/kg	0.89	1	6010B	1103 18:30	1108 16:13	AI
Silver, Total	ND	mg/kg	0.44	1	6010B	1103 18:30	1108 16:13	AI
Sodium, Total	180	mg/kg	89	1	6010B	1103 18:30	1108 16:13	AI
Thallium, Total	ND	mg/kg	0.44	1	6010B	1103 18:30	1108 16:13	AI
Vanadium, Total	25	mg/kg	0.44	1	6010B	1103 18:30	1108 16:13	AI
Zinc, Total	220	mg/kg	2.2	1	6010B	1103 18:30	1108 16:13	AI
Volatile Organics by GC/MS 8260				1	8260B		1107 22:30	RY
Methylene chloride	ND	ug/kg	28.					
1,1-Dichloroethane	ND	ug/kg	4.2					
Chloroform	ND	ug/kg	4.2					
Carbon tetrachloride	ND	ug/kg	2.8					
1,2-Dichloropropane	ND	ug/kg	9.7					
Dibromochloromethane	ND	ug/kg	2.8					
1,1,2-Trichloroethane	ND	ug/kg	4.2					
Tetrachloroethene	ND	ug/kg	2.8					
Chlorobenzene	ND	ug/kg	2.8					
Trichlorofluoromethane	ND	ug/kg	14.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-10
AK-SB-5 (8'-9')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 22:30	RY
1,2-Dichloroethane	ND	ug/kg	2.8					
1,1,1-Trichloroethane	ND	ug/kg	2.8					
Bromodichloromethane	ND	ug/kg	2.8					
trans-1,3-Dichloropropene	ND	ug/kg	2.8					
cis-1,3-Dichloropropene	ND	ug/kg	2.8					
1,1-Dichloropropene	ND	ug/kg	14.					
Bromoform	ND	ug/kg	11.					
1,1,2,2-Tetrachloroethane	ND	ug/kg	2.8					
Benzene	ND	ug/kg	2.8					
Toluene	ND	ug/kg	4.2					
Ethylbenzene	ND	ug/kg	2.8					
Chloromethane	ND	ug/kg	14.					
Bromomethane	ND	ug/kg	5.6					
Vinyl chloride	ND	ug/kg	5.6					
Chloroethane	ND	ug/kg	5.6					
1,1-Dichloroethene	ND	ug/kg	2.8					
trans-1,2-Dichloroethene	ND	ug/kg	4.2					
Trichloroethene	ND	ug/kg	2.8					
1,2-Dichlorobenzene	ND	ug/kg	14.					
1,3-Dichlorobenzene	ND	ug/kg	14.					
1,4-Dichlorobenzene	ND	ug/kg	14.					
Methyl tert butyl ether	ND	ug/kg	5.6					
p/m-Xylene	ND	ug/kg	5.6					
o-Xylene	ND	ug/kg	5.6					
cis-1,2-Dichloroethene	ND	ug/kg	2.8					
Dibromomethane	ND	ug/kg	28.					
1,4-Dichlorobutane	ND	ug/kg	28.					
Iodomethane	ND	ug/kg	28.					
1,2,3-Trichloropropane	ND	ug/kg	28.					
Styrene	ND	ug/kg	5.6					
Dichlorodifluoromethane	ND	ug/kg	28.					
Acetone	ND	ug/kg	28.					
Carbon disulfide	ND	ug/kg	28.					
2-Butanone	ND	ug/kg	28.					
Vinyl acetate	ND	ug/kg	28.					
4-Methyl-2-pentanone	ND	ug/kg	28.					
2-Hexanone	ND	ug/kg	28.					
Ethyl methacrylate	ND	ug/kg	28.					
Acrolein	ND	ug/kg	69.					
Acrylonitrile	ND	ug/kg	11.					
Bromochloromethane	ND	ug/kg	14.					
Tetrahydrofuran	ND	ug/kg	56.					
2,2-Dichloropropane	ND	ug/kg	14.					
1,2-Dibromoethane	ND	ug/kg	11.					
1,3-Dichloropropane	ND	ug/kg	14.					
1,1,1,2-Tetrachloroethane	ND	ug/kg	2.8					
Bromobenzene	ND	ug/kg	14.					
n-Butylbenzene	ND	ug/kg	2.8					
sec-Butylbenzene	ND	ug/kg	2.8					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-10
AK-SB-5 (8'-9')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 22:30	RY
tert-Butylbenzene	ND	ug/kg	14.					
o-Chlorotoluene	ND	ug/kg	14.					
p-Chlorotoluene	ND	ug/kg	14.					
1,2-Dibromo-3-chloropropane	ND	ug/kg	14.					
Hexachlorobutadiene	ND	ug/kg	14.					
Isopropylbenzene	ND	ug/kg	2.8					
p-Isopropyltoluene	ND	ug/kg	2.8					
Naphthalene	490	ug/kg	14					
n-Propylbenzene	ND	ug/kg	2.8					
1,2,3-Trichlorobenzene	ND	ug/kg	14.					
1,2,4-Trichlorobenzene	ND	ug/kg	14.					
1,3,5-Trimethylbenzene	ND	ug/kg	14					
1,2,4-Trimethylbenzene	20	ug/kg	14					
trans-1,4-Dichloro-2-butene	ND	ug/kg	14.					
Ethyl ether	ND	ug/kg	14.					
Surrogate(s)	Recovery		QC Criteria					
1,2-Dichloroethane-d4	105	%	70-130					
Toluene-d8	99.0	%	70-130					
4-Bromofluorobenzene	122	%	70-130					
Dibromofluoromethane	97.0	%	70-130					
SVOC's by GC/MS 8270				1	8270C	1103 20:35	1106 19:45	RL
Acenaphthene	800	ug/kg	670					
Benzidine	ND	ug/kg	6700					
1,2,4-Trichlorobenzene	ND	ug/kg	670					
Hexachlorobenzene	ND	ug/kg	670					
Bis(2-chloroethyl)ether	ND	ug/kg	670					
1-Chloronaphthalene	ND	ug/kg	670					
2-Chloronaphthalene	ND	ug/kg	800					
1,2-Dichlorobenzene	ND	ug/kg	670					
1,3-Dichlorobenzene	ND	ug/kg	670					
1,4-Dichlorobenzene	ND	ug/kg	670					
3,3'-Dichlorobenzidine	ND	ug/kg	1300					
2,4-Dinitrotoluene	ND	ug/kg	670					
2,6-Dinitrotoluene	ND	ug/kg	670					
Azobenzene	ND	ug/kg	670					
Fluoranthene	16000	ug/kg	670					
4-Chlorophenyl phenyl ether	ND	ug/kg	670					
4-Bromophenyl phenyl ether	ND	ug/kg	670					
Bis(2-chloroisopropyl)ether	ND	ug/kg	670					
Bis(2-chloroethoxy)methane	ND	ug/kg	670					
Hexachlorobutadiene	ND	ug/kg	1300					
Hexachlorocyclopentadiene	ND	ug/kg	1300					
Hexachloroethane	ND	ug/kg	670					
Isophorone	ND	ug/kg	670					
Naphthalene	700	ug/kg	670					
Nitrobenzene	ND	ug/kg	670					
NDPA/DPA	ND	ug/kg	2000					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0615863-10
AK-SB-5 (8'-9')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 19:45	RL
n-Nitrosodi-n-propylamine	ND	ug/kg	670					
Bis(2-ethylhexyl)phthalate	ND	ug/kg	1300					
Butyl benzyl phthalate	ND	ug/kg	670					
Di-n-butylphthalate	ND	ug/kg	670					
Di-n-octylphthalate	ND	ug/kg	670					
Diethyl phthalate	ND	ug/kg	670					
Dimethyl phthalate	ND	ug/kg	670					
Benzo(a)anthracene	6900	ug/kg	670					
Benzo(a)pyrene	7100	ug/kg	670					
Benzo(b)fluoranthene	7000	ug/kg	670					
Benzo(k)fluoranthene	5200	ug/kg	670					
Chrysene	6900	ug/kg	670					
Acenaphthylene	ND	ug/kg	670					
Anthracene	2200	ug/kg	670					
Benzo(ghi)perylene	5000	ug/kg	670					
Fluorene	770	ug/kg	670					
Phenanthrene	7800	ug/kg	670					
Dibenzo(a,h)anthracene	1300	ug/kg	670					
Indeno(1,2,3-cd)pyrene	5200	ug/kg	670					
Pyrene	13000	ug/kg	670					
Benzo(e)pyrene	4600	ug/kg	670					
Biphenyl	ND	ug/kg	670					
Perylene	1800	ug/kg	670					
Aniline	ND	ug/kg	1300					
4-Chloroaniline	ND	ug/kg	670					
1-Methylnaphthalene	ND	ug/kg	670					
2-Nitroaniline	ND	ug/kg	670					
3-Nitroaniline	ND	ug/kg	670					
4-Nitroaniline	ND	ug/kg	930					
Dibenzofuran	ND	ug/kg	670					
a,a-Dimethylphenethylamine	ND	ug/kg	6700					
Hexachloropropene	ND	ug/kg	1300					
Nitrosodi-n-butylamine	ND	ug/kg	1300					
2-Methylnaphthalene	ND	ug/kg	670					
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	2700					
Pentachlorobenzene	ND	ug/kg	2700					
a-Naphthylamine	ND	ug/kg	2700					
b-Naphthylamine	ND	ug/kg	2700					
Phenacetin	ND	ug/kg	1300					
Dimethoate	ND	ug/kg	2700					
4-Aminobiphenyl	ND	ug/kg	1300					
Pentachloronitrobenzene	ND	ug/kg	1300					
Isodrin	ND	ug/kg	1300					
p-Dimethylaminoazobenzene	ND	ug/kg	1300					
Chlorobenzilate	ND	ug/kg	2700					
3-Methylcholanthrene	ND	ug/kg	2700					
Ethyl Methanesulfonate	ND	ug/kg	2000					
Acetophenone	ND	ug/kg	2700					
Nitrosodipiperidine	ND	ug/kg	2700					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-10
AK-SB-5 (8'-9')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 19:45	RL
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	1300					
n-Nitrosodimethylamine	ND	ug/kg	6700					
2,4,6-Trichlorophenol	ND	ug/kg	670					
p-Chloro-m-cresol	ND	ug/kg	670					
2-Chlorophenol	ND	ug/kg	800					
2,4-Dichlorophenol	ND	ug/kg	1300					
2,4-Dimethylphenol	ND	ug/kg	670					
2-Nitrophenol	ND	ug/kg	2700					
4-Nitrophenol	ND	ug/kg	1300					
2,4-Dinitrophenol	ND	ug/kg	2700					
4,6-Dinitro-o-cresol	ND	ug/kg	2700					
Pentachlorophenol	ND	ug/kg	2700					
Phenol	ND	ug/kg	930					
2-Methylphenol	ND	ug/kg	800					
3-Methylphenol/4-Methylphenol	ND	ug/kg	800					
2,4,5-Trichlorophenol	ND	ug/kg	670					
2,6-Dichlorophenol	ND	ug/kg	1300					
Benzoic Acid	ND	ug/kg	6700					
Benzyl Alcohol	ND	ug/kg	1300					
Carbazole	800	ug/kg	670					
Pyridine	ND	ug/kg	6700					
2-Picoline	ND	ug/kg	2700					
Pronamide	ND	ug/kg	2700					
Methyl methanesulfonate	ND	ug/kg	2700					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	75.0	%	25-120					
Phenol-d6	117	%	10-120					
Nitrobenzene-d5	87.0	%	23-120					
2-Fluorobiphenyl	88.0	%	30-120					
2,4,6-Tribromophenol	85.0	%	19-120					
4-Terphenyl-d14	99.0	%	18-120					
PAH by GC/MS SIM 8270M				1	8270C-M	1103 20:35	1106 16:40	RL
Acenaphthene	950	ug/kg	130					
2-Chloronaphthalene	ND	ug/kg	130					
Fluoranthene	22000	ug/kg	130					
Hexachlorobutadiene	ND	ug/kg	330					
Naphthalene	820	ug/kg	130					
Benzo(a)anthracene	10000	ug/kg	130					
Benzo(a)pyrene	10000	ug/kg	130					
Benzo(b)fluoranthene	9800	ug/kg	130					
Benzo(k)fluoranthene	8300	ug/kg	130					
Chrysene	7900	ug/kg	130					
Acenaphthylene	480	ug/kg	130					
Anthracene	3100	ug/kg	130					
Benzo(ghi)perylene	5300	ug/kg	130					
Fluorene	850	ug/kg	130					
Phenanthrene	7700	ug/kg	130					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-10
AK-SB-5 (8'-9')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
PAH by GC/MS SIM 8270M cont'd				1	8270C-M	1103 20:35	1106 16:40	RL
Dibenzo(a,h)anthracene	1200	ug/kg	130					
Indeno(1,2,3-cd)Pyrene	4400	ug/kg	130					
Pyrene	20000	ug/kg	130					
1-Methylnaphthalene	300	ug/kg	130					
2-Methylnaphthalene	480	ug/kg	130					
Pentachlorophenol	ND	ug/kg	530					
Hexachlorobenzene	ND	ug/kg	530					
Perylene	1900	ug/kg	130					
Biphenyl	ND	ug/kg	130					
2,6-Dimethylnaphthalene	150	ug/kg	130					
1-Methylphenanthrene	800	ug/kg	130					
Benzo(e)Pyrene	5900	ug/kg	130					
Hexachloroethane	ND	ug/kg	530					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	79.0	%	25-120					
Phenol-d6	107	%	10-120					
Nitrobenzene-d5	84.0	%	23-120					
2-Fluorobiphenyl	98.0	%	30-120					
2,4,6-Tribromophenol	72.0	%	19-120					
4-Terphenyl-d14	109	%	18-120					
Polychlorinated Biphenyls				1	8082	1103 16:00	1108 04:24	AK
Aroclor 1016	ND	ug/kg	37.0					
Aroclor 1221	ND	ug/kg	37.0					
Aroclor 1232	ND	ug/kg	37.0					
Aroclor 1242	ND	ug/kg	37.0					
Aroclor 1248	ND	ug/kg	37.0					
Aroclor 1254	81.3	ug/kg	37.0					
Aroclor 1260	ND	ug/kg	37.0					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	50.0	%	30-150					
Decachlorobiphenyl	36.0	%	30-150					
Organochlorine Pesticides				1	8081	1103 21:40	1108 08:15	JB
Delta-BHC	ND	ug/kg	148.					
Lindane	ND	ug/kg	148.					
Alpha-BHC	ND	ug/kg	148.					
Beta-BHC	ND	ug/kg	148.					
Heptachlor	ND	ug/kg	148.					
Aldrin	ND	ug/kg	148.					
Heptachlor epoxide	ND	ug/kg	148.					
Endrin	ND	ug/kg	148.					
Endrin aldehyde	ND	ug/kg	148.					
Endrin ketone	ND	ug/kg	148.					
Dieldrin	ND	ug/kg	148.					
4,4'-DDE	ND	ug/kg	148.					
4,4'-DDD	ND	ug/kg	148.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-10
AK-SB-5 (8'-9')

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Organochlorine Pesticides cont'd				1	8081	1103 21:40	1108 08:15	JB
4,4'-DDT	ND	ug/kg	148					
Endosulfan I	ND	ug/kg	148.					
Endosulfan II	ND	ug/kg	148.					
Endosulfan sulfate	ND	ug/kg	148.					
Methoxychlor	ND	ug/kg	592.					
Toxaphene	ND	ug/kg	592.					
Chlordane	ND	ug/kg	592.					
cis-Chlordane	ND	ug/kg	148.					
trans-Chlordane	ND	ug/kg	148.					
Surrogate(s)	Recovery		QC Criteria					
2,4,5,6-Tetrachloro-m-xylene	ND	%	30-150					
Decachlorobiphenyl	ND	%	30-150					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number:	L0615863-11 TRIP BLANK	**Date Collected:**	02-NOV-2006 09:05
		Date Received :	02-NOV-2006
Sample Matrix:	WATER	**Date Reported :**	09-NOV-2006
Condition of Sample:	Satisfactory	**Field Prep:**	None

Number & Type of Containers: 2-Vial

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260				1	8260B		1107 11:56	RY
Methylene chloride	ND	ug/l	5.0					
1,1-Dichloroethane	ND	ug/l	0.75					
Chloroform	ND	ug/l	0.75					
Carbon tetrachloride	ND	ug/l	0.50					
1,2-Dichloropropane	ND	ug/l	1.8					
Dibromochloromethane	ND	ug/l	0.50					
1,1,2-Trichloroethane	ND	ug/l	0.75					
Tetrachloroethene	ND	ug/l	0.50					
Chlorobenzene	ND	ug/l	0.50					
Trichlorofluoromethane	ND	ug/l	2.5					
1,2-Dichloroethane	ND	ug/l	0.50					
1,1,1-Trichloroethane	ND	ug/l	0.50					
Bromodichloromethane	ND	ug/l	0.50					
trans-1,3-Dichloropropene	ND	ug/l	0.50					
cis-1,3-Dichloropropene	ND	ug/l	0.50					
1,1-Dichloropropene	ND	ug/l	2.5					
Bromoform	ND	ug/l	2.0					
1,1,2,2-Tetrachloroethane	ND	ug/l	0.50					
Benzene	ND	ug/l	0.50					
Toluene	ND	ug/l	0.75					
Ethylbenzene	ND	ug/l	0.50					
Chloromethane	ND	ug/l	2.5					
Bromomethane	ND	ug/l	1.0					
Vinyl chloride	ND	ug/l	1.0					
Chloroethane	ND	ug/l	1.0					
1,1-Dichloroethene	ND	ug/l	0.50					
trans-1,2-Dichloroethene	ND	ug/l	0.75					
Trichloroethene	ND	ug/l	0.50					
1,2-Dichlorobenzene	ND	ug/l	2.5					
1,3-Dichlorobenzene	ND	ug/l	2.5					
1,4-Dichlorobenzene	ND	ug/l	2.5					
Methyl tert butyl ether	ND	ug/l	1.0					
p/m-Xylene	ND	ug/l	1.0					
o-Xylene	ND	ug/l	1.0					
cis-1,2-Dichloroethene	ND	ug/l	0.50					
Dibromomethane	ND	ug/l	5.0					
1,4-Dichlorobutane	ND	ug/l	5.0					
Iodomethane	ND	ug/l	5.0					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0615863-11
TRIP BLANK

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Volatile Organics by GC/MS 8260 cont'd				1 8260B		1107 11:56	RY
1,2,3-Trichloropropane	ND	ug/l	5.0				
Styrene	ND	ug/l	1.0				
Dichlorodifluoromethane	ND	ug/l	5.0				
Acetone	ND	ug/l	5.0				
Carbon disulfide	ND	ug/l	5.0				
2-Butanone	ND	ug/l	5.0				
Vinyl acetate	ND	ug/l	5.0				
4-Methyl-2-pentanone	ND	ug/l	5.0				
2-Hexanone	ND	ug/l	5.0				
Ethyl methacrylate	ND	ug/l	5.0				
Acrolein	ND	ug/l	12.				
Acrylonitrile	ND	ug/l	5.0				
Bromochloromethane	ND	ug/l	2.5				
Tetrahydrofuran	ND	ug/l	10.				
2,2-Dichloropropane	ND	ug/l	2.5				
1,2-Dibromoethane	ND	ug/l	2.0				
1,3-Dichloropropane	ND	ug/l	2.5				
1,1,1,2-Tetrachloroethane	ND	ug/l	0.50				
Bromobenzene	ND	ug/l	2.5				
n-Butylbenzene	ND	ug/l	0.50				
sec-Butylbenzene	ND	ug/l	0.50				
tert-Butylbenzene	ND	ug/l	2.5				
o-Chlorotoluene	ND	ug/l	2.5				
p-Chlorotoluene	ND	ug/l	2.5				
1,2-Dibromo-3-chloropropane	ND	ug/l	2.5				
Hexachlorobutadiene	ND	ug/l	0.60				
Isopropylbenzene	ND	ug/l	0.50				
p-Isopropyltoluene	ND	ug/l	0.50				
Naphthalene	ND	ug/l	2.5				
n-Propylbenzene	ND	ug/l	0.50				
1,2,3-Trichlorobenzene	ND	ug/l	2.5				
1,2,4-Trichlorobenzene	ND	ug/l	2.5				
1,3,5-Trimethylbenzene	ND	ug/l	2.5				
1,2,4-Trimethylbenzene	ND	ug/l	2.5				
trans-1,4-Dichloro-2-butene	ND	ug/l	2.5				
Ethyl ether	ND	ug/l	2.5				

Surrogate(s)	Recovery		QC Criteria
1,2-Dichloroethane-d4	112	%	70-130
Toluene-d8	117	%	70-130
4-Bromofluorobenzene	119	%	70-130
Dibromofluoromethane	104	%	70-130

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH DUPLICATE ANALYSIS

Laboratory Job Number: L0615863

Parameter	**Value 1**	**Value 2**	**Units**	**RPD**	**RPD Limits**
Solids, Total for sample(s) 03 (L0615685-02, WG259457-1)					
Solids, Total	93	93	%	0	20
Solids, Total for sample(s) 01-02,04-10 (L0615863-10, WG259746-1)					
Solids, Total	90	90	%	0	20
Total Metals for sample(s) 01-10 (L0615863-01, WG259539-1)					
Aluminum, Total	4800	5100	mg/kg	6	35
Antimony, Total	3.8	4.7	mg/kg	21	35
Arsenic, Total	4.6	3.7	mg/kg	22	35
Barium, Total	58	71	mg/kg	20	35
Beryllium, Total	ND	ND	mg/kg	NC	35
Cadmium, Total	0.98	0.82	mg/kg	18	35
Calcium, Total	39000	36000	mg/kg	8	35
Chromium, Total	13	14	mg/kg	7	35
Cobalt, Total	5.8	6.0	mg/kg	3	35
Copper, Total	160	180	mg/kg	12	35
Iron, Total	20000	13000	mg/kg	42	35
Lead, Total	320	360	mg/kg	12	35
Magnesium, Total	10000	9700	mg/kg	3	35
Manganese, Total	180	190	mg/kg	5	35
Nickel, Total	15	14	mg/kg	7	35
Potassium, Total	1100	1500	mg/kg	31	35
Selenium, Total	ND	ND	mg/kg	NC	35
Silver, Total	ND	ND	mg/kg	NC	35
Sodium, Total	230	200	mg/kg	14	35
Thallium, Total	ND	ND	mg/kg	NC	35
Vanadium, Total	30	31	mg/kg	3	35
Zinc, Total	360	370	mg/kg	3	35
Total Metals for sample(s) 01-10 (L0615863-05, WG259651-3)					
Mercury, Total	0.43	0.47	mg/kg	9	35

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH SPIKE ANALYSES

Laboratory Job Number: L0615863

Parameter	% Recovery	QC Criteria
Total Metals LCS for sample(s) 01-10 (WG259539-4)		
Aluminum, Total	94	70-140
Antimony, Total	91	70-140
Arsenic, Total	95	70-140
Barium, Total	94	70-140
Beryllium, Total	96	70-140
Cadmium, Total	94	70-140
Calcium, Total	91	70-140
Chromium, Total	94	70-140
Cobalt, Total	91	70-140
Copper, Total	88	70-140
Iron, Total	94	70-140
Lead, Total	94	70-140
Magnesium, Total	94	70-140
Manganese, Total	91	70-140
Nickel, Total	86	70-140
Potassium, Total	86	70-140
Selenium, Total	97	70-140
Silver, Total	97	70-140
Sodium, Total	91	70-140
Thallium, Total	95	70-140
Vanadium, Total	91	70-140
Zinc, Total	91	70-140
Total Metals LCS for sample(s) 01-10 (WG259651-1)		
Mercury, Total	96	85-115
Volatile Organics by GC/MS 8260 LCS for sample(s) 01-10 (WG260054-3)		
Chlorobenzene	95	60-133
Benzene	95	66-142
Toluene	89	59-139
1,1-Dichloroethene	100	59-172
Trichloroethene	97	62-137
Surrogate(s)		
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	102	70-130
Dibromofluoromethane	100	70-130
SVOC's by GC/MS 8270 LCS for sample(s) 01-10 (WG259543-2)		
Acenaphthene	65	31-137
1,2,4-Trichlorobenzene	56	38-107
2-Chloronaphthalene	63	40-140
1,2-Dichlorobenzene	51	40-140
1,4-Dichlorobenzene	52	28-104
2,4-Dinitrotoluene	86	28-89
2,6-Dinitrotoluene	86	40-140
Fluoranthene	90	40-140

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH SPIKE ANALYSES

Laboratory Job Number: L0615863

Continued

Parameter	% Recovery	QC Criteria
SVOC's by GC/MS 8270 LCS for sample(s) 01-10 (WG259543-2)		
4-Chlorophenyl phenyl ether	76	40-140
n-Nitrosodi-n-propylamine	50	41-126
Butyl benzyl phthalate	88	40-140
Anthracene	83	40-140
Pyrene	85	35-142
Hexachloropropene	61	40-140
P-Chloro-M-Cresol	67	26-103
2-Chlorophenol	51	25-102
2-Nitrophenol	51	30-130
4-Nitrophenol	82	11-114
2,4-Dinitrophenol	42	30-130
Pentachlorophenol	76	17-109
Phenol	48	26-90
Surrogate(s)		
2-Fluorophenol	47	25-120
Phenol-d6	72	10-120
Nitrobenzene-d5	55	23-120
2-Fluorobiphenyl	58	30-120
2,4,6-Tribromophenol	81	19-120
4-Terphenyl-d14	85	18-120
PAH by GC/MS SIM 8270M LCS for sample(s) 01-10 (WG259544-2)		
Acenaphthene	60	31-137
2-Chloronaphthalene	58	40-140
Fluoranthene	81	40-140
Anthracene	88	40-140
Pyrene	88	35-142
Pentachlorophenol	48	17-109
Surrogate(s)		
2-Fluorophenol	60	25-120
Phenol-d6	81	10-120
Nitrobenzene-d5	58	23-120
2-Fluorobiphenyl	53	30-120
2,4,6-Tribromophenol	63	19-120
4-Terphenyl-d14	98	18-120
Polychlorinated Biphenyls LCS for sample(s) 01-10 (WG259491-2)		
Aroclor 1016	48	40-140
Aroclor 1260	56	40-140
Surrogate(s)		
2,4,5,6-Tetrachloro-m-xylene	41	30-150
Decachlorobiphenyl	44	30-150

Laboratory Job Number: L0615863

Continued

Parameter	**% Recovery**	**QC Criteria**
Organochlorine Pesticides LCS for sample(s) 01-10 (WG259542-2)		
Delta-BHC	76	30-150
Lindane	72	30-150
Alpha-BHC	70	30-150
Beta-BHC	75	30-150
Heptachlor	82	30-150
Aldrin	71	30-150
Heptachlor epoxide	76	30-150
Endrin	87	30-150
Endrin aldehyde	57	30-150
Endrin ketone	72	30-150
Dieldrin	78	30-150
4,4'-DDE	77	30-150
4,4'-DDD	93	30-150
4,4'-DDT	82	30-150
Endosulfan I	75	30-150
Endosulfan II	75	30-150
Endosulfan sulfate	75	30-150
Methoxychlor	101	30-150
cis-Chlordane	74	30-150
trans-Chlordane	78	30-150
Surrogate(s)		
2,4,5,6-Tetrachloro-m-xylene	64	30-150
Decachlorobiphenyl	65	30-150
Total Metals SPIKE for sample(s) 01-10 (L0615863-01, WG259539-2)		
Aluminum, Total	326	70-140
Antimony, Total	75	70-140
Arsenic, Total	65	70-140
Barium, Total	78	70-140
Beryllium, Total	87	70-140
Cadmium, Total	73	70-140
Calcium, Total	0	70-140
Chromium, Total	72	70-140
Cobalt, Total	79	70-140
Copper, Total	87	70-140
Iron, Total	0	70-140
Lead, Total	0	70-140
Magnesium, Total	0	70-140
Manganese, Total	43	70-140
Nickel, Total	61	70-140
Potassium, Total	217	70-140
Selenium, Total	81	70-140
Silver, Total	97	70-140
Sodium, Total	111	70-140
Thallium, Total	69	70-140
Vanadium, Total	69	70-140
Zinc, Total	0	70-140

Parameter	% Recovery	QC Criteria
Total Metals SPIKE for sample(s) 01-10 (L0615863-05, WG259651-2)		
Mercury, Total	112	70-130

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH MS/MSD ANALYSIS

Laboratory Job Number: L0615863

Parameter	MS %	MSD %	RPD	RPD Limit	MS/MSD Limits
Volatile Organics by GC/MS 8260 for sample(s) 01-10 (L0615863-01, WG260054-2)					
Chlorobenzene	86	77	11	30	60-133
Benzene	90	84	7	30	66-142
Toluene	87	80	8	30	59-139
1,1-Dichloroethene	86	80	7	30	59-172
Trichloroethene	82	74	10	30	62-137
Surrogate(s)					
1,2-Dichloroethane-d4	92	92	0		70-130
Toluene-d8	99	99	0		70-130
4-Bromofluorobenzene	122	123	1		70-130
Dibromofluoromethane	95	95	0		70-130
Volatile Organics by GC/MS 8260 for sample(s) 11 (L0615954-04, WG260086-2)					
Chlorobenzene	97	105	8	20	75-130
Benzene	97	101	4	20	76-127
Toluene	98	105	7	20	76-125
1,1-Dichloroethene	93	98	5	20	61-145
Trichloroethene	94	95	1	20	71-120
Surrogate(s)					
1,2-Dichloroethane-d4	97	96	1		70-130
Toluene-d8	100	100	0		70-130
4-Bromofluorobenzene	101	101	0		70-130
Dibromofluoromethane	99	100	1		70-130
SVOC's by GC/MS 8270 for sample(s) 01-10 (L0615863-01, WG259543-4)					
Acenaphthene	70	140	67	50	31-137
1,2,4-Trichlorobenzene	49	89	58	50	38-107
2-Chloronaphthalene	59	99	51	50	40-140
1,2-Dichlorobenzene	49	81	49	50	40-140
1,4-Dichlorobenzene	50	83	50	50	28-104
2,4-Dinitrotoluene	59	88	39	50	28-89
2,6-Dinitrotoluene	70	100	35	50	40-140
Fluoranthene	0	460	200	50	40-140
4-Chlorophenyl phenyl ether	66	100	41	50	40-140
n-Nitrosodi-n-propylamine	54	83	42	50	41-126
Butyl benzyl phthalate	72	110	42	50	40-140
Anthracene	39	160	122	50	40-140
Pyrene	0	370	200	50	35-142
Hexachloropropene	21	46	75	50	40-140
P-Chloro-M-Cresol	65	97	40	50	26-103
2-Chlorophenol	49	84	53	50	25-102
2-Nitrophenol	40	71	56	50	30-130
4-Nitrophenol	59	90	42	50	11-114
2,4-Dinitrophenol	34	34	0	50	30-130
Pentachlorophenol	11	32	98	50	17-109
Phenol	47	77	48	50	26-90

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH MS/MSD ANALYSIS

Laboratory Job Number: L0615863

Continued

Parameter	MS %	MSD %	RPD	RPD Limit	MS/MSD Limits
SVOC's by GC/MS 8270 for sample(s) 01-10 (L0615863-01, WG259543-4)					
Surrogate(s)					
2-Fluorophenol	45	77	52		25-120
Phenol-d6	68	117	53		10-120
Nitrobenzene-d5	54	92	52		23-120
2-Fluorobiphenyl	56	90	47		30-120
2,4,6-Tribromophenol	51	91	56		19-120
4-Terphenyl-d14	65	97	40		18-120
PAH by GC/MS SIM 8270M for sample(s) 01-10 (L0615863-01, WG259544-4)					
Acenaphthene	58	140	83	50	40-140
2-Chloronaphthalene	62	100	47	50	40-140
Fluoranthene	0	390	200	50	40-140
Anthracene	53	210	119	50	40-140
Pyrene	0	340	200	50	40-140
Pentachlorophenol	28	54	63	50	40-140
Surrogate(s)					
2-Fluorophenol	0	0	NC		25-120
Phenol-d6	0	0	NC		10-120
Nitrobenzene-d5	0	0	NC		23-120
2-Fluorobiphenyl	0	0	NC		30-120
2,4,6-Tribromophenol	0	0	NC		19-120
4-Terphenyl-d14	0	0	NC		18-120
Polychlorinated Biphenyls for sample(s) 01-10 (L0615863-01, WG259491-4)					
Aroclor 1016	74	62	17	50	40-140
Aroclor 1260	60	49	21	50	40-140
Surrogate(s)					
2,4,5,6-Tetrachloro-m-xylene	60	49	20		30-150
Decachlorobiphenyl	49	44	11		30-150

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0615863

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Blank Analysis for sample(s) 01-10 (WG259539-3)								
Total Metals				1	3051			
Aluminum, Total	ND	mg/kg	4.0	1	6010B	1103 18:30	1108 14:57	AI
Antimony, Total	ND	mg/kg	2.0	1	6010B	1103 18:30	1108 14:57	AI
Arsenic, Total	ND	mg/kg	0.40	1	6010B	1103 18:30	1108 14:57	AI
Barium, Total	ND	mg/kg	0.40	1	6010B	1103 18:30	1108 14:57	AI
Beryllium, Total	ND	mg/kg	0.20	1	6010B	1103 18:30	1108 14:57	AI
Cadmium, Total	ND	mg/kg	0.40	1	6010B	1103 18:30	1108 14:57	AI
Calcium, Total	4.6	mg/kg	4.0	1	6010B	1103 18:30	1108 14:57	AI
Chromium, Total	ND	mg/kg	0.40	1	6010B	1103 18:30	1108 14:57	AI
Cobalt, Total	ND	mg/kg	0.80	1	6010B	1103 18:30	1108 14:57	AI
Copper, Total	ND	mg/kg	0.40	1	6010B	1103 18:30	1108 14:57	AI
Iron, Total	ND	mg/kg	2.0	1	6010B	1103 18:30	1108 14:57	AI
Lead, Total	ND	mg/kg	2.0	1	6010B	1103 18:30	1108 14:57	AI
Magnesium, Total	ND	mg/kg	4.0	1	6010B	1103 18:30	1108 14:57	AI
Manganese, Total	ND	mg/kg	0.40	1	6010B	1103 18:30	1108 14:57	AI
Nickel, Total	ND	mg/kg	1.0	1	6010B	1103 18:30	1108 14:57	AI
Potassium, Total	ND	mg/kg	100	1	6010B	1103 18:30	1108 14:57	AI
Selenium, Total	ND	mg/kg	0.80	1	6010B	1103 18:30	1108 14:57	AI
Silver, Total	ND	mg/kg	0.40	1	6010B	1103 18:30	1108 14:57	AI
Sodium, Total	ND	mg/kg	80	1	6010B	1103 18:30	1108 14:57	AI
Thallium, Total	ND	mg/kg	0.40	1	6010B	1103 18:30	1108 14:57	AI
Vanadium, Total	ND	mg/kg	0.40	1	6010B	1103 18:30	1108 14:57	AI
Zinc, Total	ND	mg/kg	2.0	1	6010B	1103 18:30	1108 14:57	AI
Blank Analysis for sample(s) 01-10 (WG259651-4)								
Total Metals								
Mercury, Total	ND	mg/kg	0.08	1	7471A	1106 16:25	1107 10:16	DM
Blank Analysis for sample(s) 01-10 (WG260054-4)								
Volatile Organics by GC/MS 8260				1	8260B		1107 15:23	RY
Methylene chloride	ND	ug/kg	25.					
1,1-Dichloroethane	ND	ug/kg	3.8					
Chloroform	ND	ug/kg	3.8					
Carbon tetrachloride	ND	ug/kg	2.5					
1,2-Dichloropropane	ND	ug/kg	8.8					
Dibromochloromethane	ND	ug/kg	2.5					
1,1,2-Trichloroethane	ND	ug/kg	3.8					
Tetrachloroethene	ND	ug/kg	2.5					
Chlorobenzene	ND	ug/kg	2.5					
Trichlorofluoromethane	ND	ug/kg	12.					
1,2-Dichloroethane	ND	ug/kg	2.5					
1,1,1-Trichloroethane	ND	ug/kg	2.5					
Bromodichloromethane	ND	ug/kg	2.5					
trans-1,3-Dichloropropene	ND	ug/kg	2.5					
cis-1,3-Dichloropropene	ND	ug/kg	2.5					

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0615863

Continued

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Blank Analysis for sample(s) 01-10 (WG260054-4)								
Volatile Organics by GC/MS 8260 cont'd				1	8260B		1107 15:23	RY
1,1-Dichloropropene	ND	ug/kg	12.					
Bromoform	ND	ug/kg	10.					
1,1,2,2-Tetrachloroethane	ND	ug/kg	2.5					
Benzene	ND	ug/kg	2.5					
Toluene	ND	ug/kg	3.8					
Ethylbenzene	ND	ug/kg	2.5					
Chloromethane	ND	ug/kg	12.					
Bromomethane	ND	ug/kg	5.0					
Vinyl chloride	ND	ug/kg	5.0					
Chloroethane	ND	ug/kg	5.0					
1,1-Dichloroethene	ND	ug/kg	2.5					
trans-1,2-Dichloroethene	ND	ug/kg	3.8					
Trichloroethene	ND	ug/kg	2.5					
1,2-Dichlorobenzene	ND	ug/kg	12.					
1,3-Dichlorobenzene	ND	ug/kg	12.					
1,4-Dichlorobenzene	ND	ug/kg	12.					
Methyl tert butyl ether	ND	ug/kg	5.0					
p/m-Xylene	ND	ug/kg	5.0					
o-Xylene	ND	ug/kg	5.0					
cis-1,2-Dichloroethene	ND	ug/kg	2.5					
Dibromomethane	ND	ug/kg	25.					
1,4-Dichlorobutane	ND	ug/kg	25.					
Iodomethane	ND	ug/kg	25.					
1,2,3-Trichloropropane	ND	ug/kg	25.					
Styrene	ND	ug/kg	5.0					
Dichlorodifluoromethane	ND	ug/kg	25.					
Acetone	ND	ug/kg	25.					
Carbon disulfide	ND	ug/kg	25.					
2-Butanone	ND	ug/kg	25.					
Vinyl acetate	ND	ug/kg	25.					
4-Methyl-2-pentanone	ND	ug/kg	25.					
2-Hexanone	ND	ug/kg	25.					
Ethyl methacrylate	ND	ug/kg	25.					
Acrolein	ND	ug/kg	62.					
Acrylonitrile	ND	ug/kg	10.					
Bromochloromethane	ND	ug/kg	12.					
Tetrahydrofuran	ND	ug/kg	50.					
2,2-Dichloropropane	ND	ug/kg	12.					
1,2-Dibromoethane	ND	ug/kg	10.					
1,3-Dichloropropane	ND	ug/kg	12.					
1,1,1,2-Tetrachloroethane	ND	ug/kg	2.5					
Bromobenzene	ND	ug/kg	12.					
n-Butylbenzene	ND	ug/kg	2.5					
sec-Butylbenzene	ND	ug/kg	2.5					
tert-Butylbenzene	ND	ug/kg	12.					
o-Chlorotoluene	ND	ug/kg	12.					

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0615863

Continued

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Blank Analysis for sample(s) 01-10 (WG260054-4)							
Volatile Organics by GC/MS 8260 cont'd				1 8260B		1107 15:23	RY
p-Chlorotoluene	ND	ug/kg	12.				
1,2-Dibromo-3-chloropropane	ND	ug/kg	12.				
Hexachlorobutadiene	ND	ug/kg	12.				
Isopropylbenzene	ND	ug/kg	2.5				
p-Isopropyltoluene	ND	ug/kg	2.5				
Naphthalene	ND	ug/kg	12.				
n-Propylbenzene	ND	ug/kg	2.5				
1,2,3-Trichlorobenzene	ND	ug/kg	12.				
1,2,4-Trichlorobenzene	ND	ug/kg	12.				
1,3,5-Trimethylbenzene	ND	ug/kg	12.				
1,2,4-Trimethylbenzene	ND	ug/kg	12.				
trans-1,4-Dichloro-2-butene	ND	ug/kg	12.				
Ethyl ether	ND	ug/kg	12.				
Surrogate(s)	Recovery		QC Criteria				
1,2-Dichloroethane-d4	105	%	70-130				
Toluene-d8	93.0	%	70-130				
4-Bromofluorobenzene	102	%	70-130				
Dibromofluoromethane	98.0	%	70-130				
Blank Analysis for sample(s) 01-10 (WG259543-1)							
SVOC's by GC/MS 8270				1 8270C	1103 20:35	1106 17:18	RL
Acenaphthene	ND	ug/kg	330				
Benzidine	ND	ug/kg	3300				
1,2,4-Trichlorobenzene	ND	ug/kg	330				
Hexachlorobenzene	ND	ug/kg	330				
Bis(2-chloroethyl)ether	ND	ug/kg	330				
1-Chloronaphthalene	ND	ug/kg	330				
2-Chloronaphthalene	ND	ug/kg	400				
1,2-Dichlorobenzene	ND	ug/kg	330				
1,3-Dichlorobenzene	ND	ug/kg	330				
1,4-Dichlorobenzene	ND	ug/kg	330				
3,3'-Dichlorobenzidine	ND	ug/kg	670				
2,4-Dinitrotoluene	ND	ug/kg	330				
2,6-Dinitrotoluene	ND	ug/kg	330				
Azobenzene	ND	ug/kg	330				
Fluoranthene	ND	ug/kg	330				
4-Chlorophenyl phenyl ether	ND	ug/kg	330				
4-Bromophenyl phenyl ether	ND	ug/kg	330				
Bis(2-chloroisopropyl)ether	ND	ug/kg	330				
Bis(2-chloroethoxy)methane	ND	ug/kg	330				
Hexachlorobutadiene	ND	ug/kg	670				
Hexachlorocyclopentadiene	ND	ug/kg	670				
Hexachloroethane	ND	ug/kg	330				
Isophorone	ND	ug/kg	330				
Naphthalene	ND	ug/kg	330				

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0615863

Continued

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Blank Analysis for sample(s) 01-10 (WG259543-1)								
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 17:18	RL
Nitrobenzene	ND	ug/kg	330					
NDPA/DPA	ND	ug/kg	1000					
n-Nitrosodi-n-propylamine	ND	ug/kg	330					
Bis(2-ethylhexyl)phthalate	ND	ug/kg	670					
Butyl benzyl phthalate	ND	ug/kg	330					
Di-n-butylphthalate	ND	ug/kg	330					
Di-n-octylphthalate	ND	ug/kg	330					
Diethyl phthalate	ND	ug/kg	330					
Dimethyl phthalate	ND	ug/kg	330					
Benzo(a)anthracene	ND	ug/kg	330					
Benzo(a)pyrene	ND	ug/kg	330					
Benzo(b)fluoranthene	ND	ug/kg	330					
Benzo(k)fluoranthene	ND	ug/kg	330					
Chrysene	ND	ug/kg	330					
Acenaphthylene	ND	ug/kg	330					
Anthracene	ND	ug/kg	330					
Benzo(ghi)perylene	ND	ug/kg	330					
Fluorene	ND	ug/kg	330					
Phenanthrene	ND	ug/kg	330					
Dibenzo(a,h)anthracene	ND	ug/kg	330					
Indeno(1,2,3-cd)pyrene	ND	ug/kg	330					
Pyrene	ND	ug/kg	330					
Benzo(e)pyrene	ND	ug/kg	330					
Biphenyl	ND	ug/kg	330					
Perylene	ND	ug/kg	330					
Aniline	ND	ug/kg	670					
4-Chloroaniline	ND	ug/kg	330					
1-Methylnaphthalene	ND	ug/kg	330					
2-Nitroaniline	ND	ug/kg	330					
3-Nitroaniline	ND	ug/kg	330					
4-Nitroaniline	ND	ug/kg	470					
Dibenzofuran	ND	ug/kg	330					
a,a-Dimethylphenethylamine	ND	ug/kg	3300					
Hexachloropropene	ND	ug/kg	670					
Nitrosodi-n-butylamine	ND	ug/kg	670					
2-Methylnaphthalene	ND	ug/kg	330					
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	1300					
Pentachlorobenzene	ND	ug/kg	1300					
a-Naphthylamine	ND	ug/kg	1300					
b-Naphthylamine	ND	ug/kg	1300					
Phenacetin	ND	ug/kg	670					
Dimethoate	ND	ug/kg	1300					
4-Aminobiphenyl	ND	ug/kg	670					
Pentachloronitrobenzene	ND	ug/kg	670					
Isodrin	ND	ug/kg	670					
p-Dimethylaminoazobenzene	ND	ug/kg	670					

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Blank Analysis for sample(s) 01-10 (WG259543-1)								
SVOC's by GC/MS 8270 cont'd				1	8270C	1103 20:35	1106 17:18	RL
Chlorobenzilate	ND	ug/kg	1300					
3-Methylcholanthrene	ND	ug/kg	1300					
Ethyl Methanesulfonate	ND	ug/kg	1000					
Acetophenone	ND	ug/kg	1300					
Nitrosodipiperidine	ND	ug/kg	1300					
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	670					
n-Nitrosodimethylamine	ND	ug/kg	3300					
2,4,6-Trichlorophenol	ND	ug/kg	330					
p-Chloro-m-cresol	ND	ug/kg	330					
2-Chlorophenol	ND	ug/kg	400					
2,4-Dichlorophenol	ND	ug/kg	670					
2,4-Dimethylphenol	ND	ug/kg	330					
2-Nitrophenol	ND	ug/kg	1300					
4-Nitrophenol	ND	ug/kg	670					
2,4-Dinitrophenol	ND	ug/kg	1300					
4,6-Dinitro-o-cresol	ND	ug/kg	1300					
Pentachlorophenol	ND	ug/kg	1300					
Phenol	ND	ug/kg	470					
2-Methylphenol	ND	ug/kg	400					
3-Methylphenol/4-Methylphenol	ND	ug/kg	400					
2,4,5-Trichlorophenol	ND	ug/kg	330					
2,6-Dichlorophenol	ND	ug/kg	670					
Benzoic Acid	ND	ug/kg	3300					
Benzyl Alcohol	ND	ug/kg	670					
Carbazole	ND	ug/kg	330					
Pyridine	ND	ug/kg	3300					
2-Picoline	ND	ug/kg	1300					
Pronamide	ND	ug/kg	1300					
Methyl methanesulfonate	ND	ug/kg	1300					
Surrogate(s)	Recovery		QC Criteria					
2-Fluorophenol	66.0	%	25-120					
Phenol-d6	90.0	%	10-120					
Nitrobenzene-d5	75.0	%	23-120					
2-Fluorobiphenyl	65.0	%	30-120					
2,4,6-Tribromophenol	56.0	%	19-120					
4-Terphenyl-d14	98.0	%	18-120					
Blank Analysis for sample(s) 01-10 (WG259544-1)								
PAH by GC/MS SIM 8270M				1	8270C-M	1103 20:35	1106 11:52	RL
Acenaphthene	ND	ug/kg	13.					
2-Chloronaphthalene	ND	ug/kg	13.					
Fluoranthene	ND	ug/kg	13.					
Hexachlorobutadiene	ND	ug/kg	33.					
Naphthalene	ND	ug/kg	13.					
Benzo(a)anthracene	ND	ug/kg	13.					

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0615863

Continued

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE		ID
					PREP	ANAL	
Blank Analysis for sample(s) 01-10 (WG259544-1)							
PAH by GC/MS SIM 8270M cont'd				1 8270C-M	1103 20:35	1106 11:52	RL
Benzo(a)pyrene	ND	ug/kg	13.				
Benzo(b)fluoranthene	ND	ug/kg	13.				
Benzo(k)fluoranthene	ND	ug/kg	13.				
Chrysene	ND	ug/kg	13.				
Acenaphthylene	ND	ug/kg	13.				
Anthracene	ND	ug/kg	13.				
Benzo(ghi)perylene	ND	ug/kg	13.				
Fluorene	ND	ug/kg	13.				
Phenanthrene	ND	ug/kg	13.				
Dibenzo(a,h)anthracene	ND	ug/kg	13.				
Indeno(1,2,3-cd)Pyrene	ND	ug/kg	13.				
Pyrene	ND	ug/kg	13.				
1-Methylnaphthalene	ND	ug/kg	13.				
2-Methylnaphthalene	ND	ug/kg	13.				
Pentachlorophenol	ND	ug/kg	53.				
Hexachlorobenzene	ND	ug/kg	53.				
Perylene	ND	ug/kg	13.				
Biphenyl	ND	ug/kg	13.				
2,6-Dimethylnaphthalene	ND	ug/kg	13.				
1-Methylphenanthrene	ND	ug/kg	13.				
Benzo(e)Pyrene	ND	ug/kg	13.				
Hexachloroethane	ND	ug/kg	53.				
Surrogate(s)	Recovery		QC Criteria				
2-Fluorophenol	65.0	%	25-120				
Phenol-d6	88.0	%	10-120				
Nitrobenzene-d5	66.0	%	23-120				
2-Fluorobiphenyl	56.0	%	30-120				
2,4,6-Tribromophenol	63.0	%	19-120				
4-Terphenyl-d14	93.0	%	18-120				
Blank Analysis for sample(s) 01-10 (WG259491-1)							
Polychlorinated Biphenyls				1 8082	1103 16:00	1107 19:21	AK
Aroclor 1016	ND	ug/kg	33.3				
Aroclor 1221	ND	ug/kg	33.3				
Aroclor 1232	ND	ug/kg	33.3				
Aroclor 1242	ND	ug/kg	33.3				
Aroclor 1248	ND	ug/kg	33.3				
Aroclor 1254	ND	ug/kg	33.3				
Aroclor 1260	ND	ug/kg	33.3				
Surrogate(s)	Recovery		QC Criteria				
2,4,5,6-Tetrachloro-m-xylene	46.0	%	30-150				
Decachlorobiphenyl	53.0	%	30-150				

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0615863

Continued

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Blank Analysis for sample(s) 01-10 (WG259542-1)							
Organochlorine Pesticides				1 8081	1103 21:40	1107 22:43	JB
Delta-BHC	ND	ug/kg	3.33				
Lindane	ND	ug/kg	3.33				
Alpha-BHC	ND	ug/kg	3.33				
Beta-BHC	ND	ug/kg	3.33				
Heptachlor	ND	ug/kg	3.33				
Aldrin	ND	ug/kg	3.33				
Heptachlor epoxide	ND	ug/kg	3.33				
Endrin	ND	ug/kg	3.33				
Endrin aldehyde	ND	ug/kg	3.33				
Endrin ketone	ND	ug/kg	3.33				
Dieldrin	ND	ug/kg	3.33				
4,4'-DDE	ND	ug/kg	3.33				
4,4'-DDD	ND	ug/kg	3.33				
4,4'-DDT	ND	ug/kg	3.33				
Endosulfan I	ND	ug/kg	3.33				
Endosulfan II	ND	ug/kg	3.33				
Endosulfan sulfate	ND	ug/kg	3.33				
Methoxychlor	ND	ug/kg	13.3				
Toxaphene	ND	ug/kg	13.3				
Chlordane	ND	ug/kg	13.3				
cis-Chlordane	ND	ug/kg	3.33				
trans-Chlordane	ND	ug/kg	3.33				
Surrogate(s)	Recovery		QC Criteria				
2,4,5,6-Tetrachloro-m-xylene	66.0	%	30-150				
Decachlorobiphenyl	71.0	%	30-150				

REFERENCES

1. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997.

30. Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.

GLOSSARY OF TERMS AND SYMBOLS

REF	Reference number in which test method may be found.
METHOD	Method number by which analysis was performed.
ID	Initials of the analyst.
ND	Not detected in comparison to the reported detection limit.
NI	Not Ignitable.
ug/cart	Micrograms per Cartridge.

LIMITATION OF LIABILITIES

Alpha Analytical, Inc. performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical, Inc., shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical, Inc. be held liable for any incidental consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical, Inc.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding times and splitting of samples in the field.

ALPHA
WOODS HOLE LABS

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9193

RAYNHAM, MA
TEL: 508-822-9300
FAX: 508-822-3288

CHAIN OF CUSTODY

PAGE ____ OF ____

Date Rec'd in Lab: 11/2

ALPHA Job #: L0615863

Client Information

Client: AKRF, Inc.
Address: 440 Park Ave South
New York NY 10016
Phone: 646-388-9527
Fax: 212-726-0942
Email: axel_schwendt@akrf.com
☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Storage Deluxe
Project Location: 200 E 135th St Bronx, NY
Project #: 80095-0003
Project Manager: Axel Schwendt
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH *(only confirmed if pre-approved!)*
Date Due: 11/9 Time:

Report Information - Data Deliverables

☐ FAX ☒ EMAIL
☒ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program	*Criteria*
NYSTAGM Detection Limits	

MA MCP PRESUMPTIVE CERTAINTY --- CT REASONABLE CONFIDENCE PROTOCOLS

☐ Yes ☒ No Are MCP Analytical Methods Required?
☐ Yes ☐ No Are CT RCP (Reasonable Confidence Protocols) Required?

Other Project Specific Requirements/Comments/Detection Limits:

NYS TAGM Detection Limits
* Analyze Trip Blank for VOCs (8260) only

SAMPLE HANDLING
Filtration
☐ Done
☐ Not needed
☒ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS VOCs (8260)	SVOCs (8270)	PCBs/Pests (8081/8082)	TAL Metals (6000/7000)	Sample Specific Comments	TOTAL # BOTTLES
15863-01	AK-SB-1 (1'-2')	11/1/06	08:40	S	SG	X	X	X	X		2
-02	AK-SB-1 (6'-7')	11/1/06	08:55	S	SG	X	X	X	X		2
-03	AK-SB-2 (1'-2')	11/1/06	09:35	S	SG	X	X	X	X		2
-04	AK-SB-2 (9'-10')	11/1/06	09:45	S	SG	X	X	X	X		2
-05	AK-SB-3 (2'-3')	11/1/06	10:05	S	SG	X	X	X	X		2
-06	AK-SB-3 (9'-10')	11/1/06	10:25	S	SG	X	X	X	X		2
-07	AK-SB-4 (2'-3')	11/1/06	11:03	S	SG	X	X	X	X		2
-08	AK-SB-4 (9'-10')	11/1/06	11:20	S	SG	X	X	X	X		2
-09	AK-SB-5 (1'-2')	11/1/06	11:45	S	SG	X	X	X	X		2
-10	AK-SB-5 (8'-9')	11/1/06	12:10	S	SG	X	X	X	X		2

PLEASE ANSWER QUESTIONS ABOVE!

Container Type	A	A	A	A
Preservative	A	A	A	A

IS YOUR PROJECT
MA MCP *or* CT RCP?

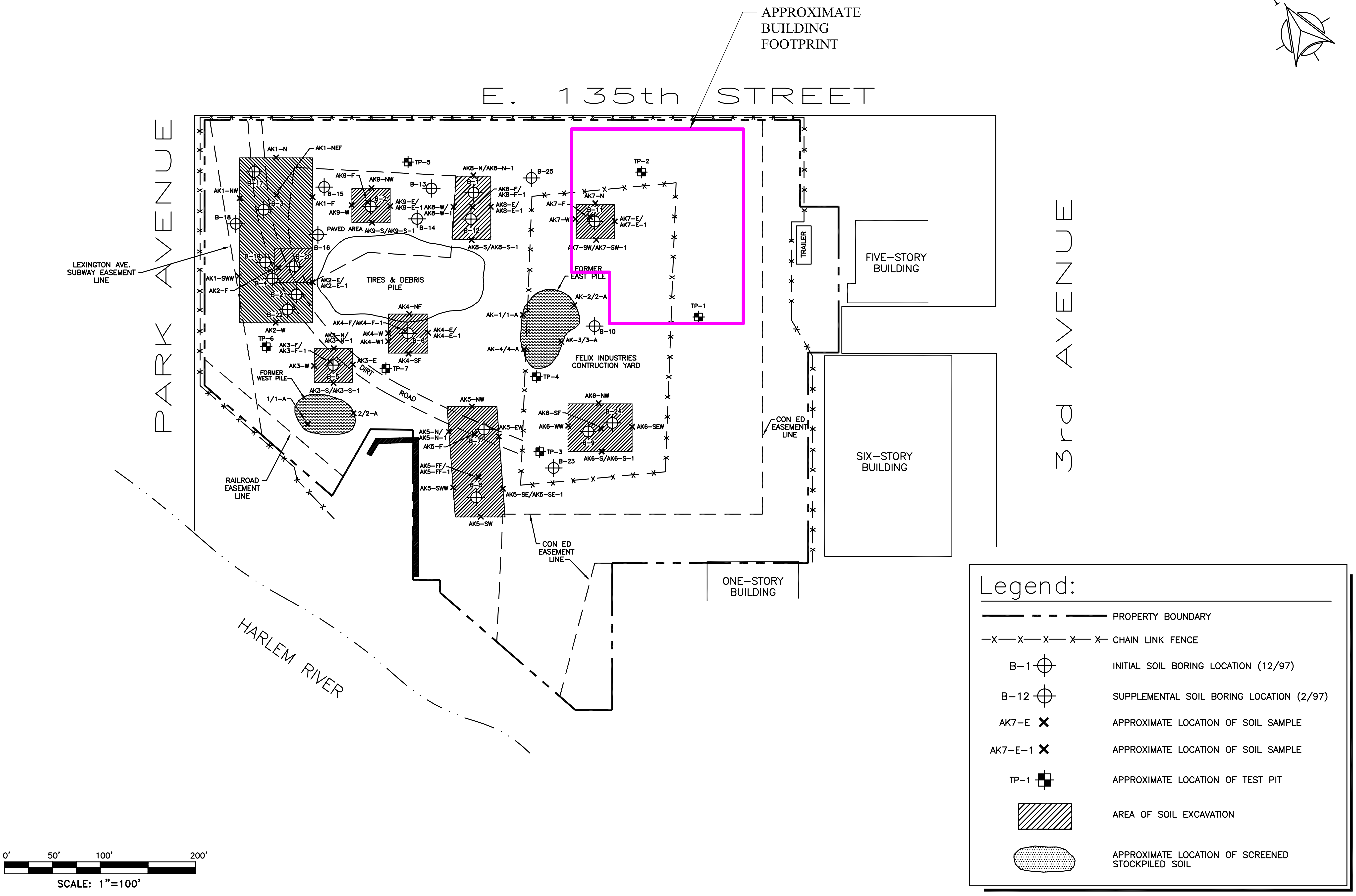
Relinquished By:	Date/Time	Received By:	Date/Time
	11/2/06 12:45		11/2 12:45
	11/2/06 1730		11/2 17:30

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms. See reverse side.

FORM NO: 01-01 (rev. 10-OCT-05)

APPENDIX C

POST-EXCAVATION FIGURE FROM 1999 REMEDIAL ACTIVITIES REPORT



Legend:

— — —	PROPERTY BOUNDARY
—X—X—X—	CHAIN LINK FENCE
B-1 ⊕	INITIAL SOIL BORING LOCATION (12/97)
B-12 ⊕	SUPPLEMENTAL SOIL BORING LOCATION (2/97)
AK7-E ✕	APPROXIMATE LOCATION OF SOIL SAMPLE
AK7-E-1 ✕	APPROXIMATE LOCATION OF SOIL SAMPLE
TP-1 ⊞	APPROXIMATE LOCATION OF TEST PIT
▨	AREA OF SOIL EXCAVATION
●	APPROXIMATE LOCATION OF SCREENED STOCKPILED SOIL

AKRF, Inc.
Environmental Consultants
149 Water Street Norwalk, CT 06854

EAST 135th STREET
BRONX, NEW YORK

POST SOIL EXCAVATION

DATE
5/24/99

SCALE
1"=100'

PROJECT No.
50154

FIGURE No.
2

M:\AKRF Project Files\80095 - 200 East 135th St (Storage Deluxe)\Figures\former 50154 figures

APPENDIX B

HEALTH & SAFETY PLAN

198 East 135th Street
Block 2319; Lot 60
Bronx, New York

NYSDEC BCP Site #C203084

Table of Content

1.0 Introduction 2
2.0 Health & Safety Staff 2
3.0 Chemical & Waste Description/Characterization 3
4.0 Hazard Assessment 4
5.0 Training 11
6.0 Medical Surveillance 12
7.0 Site Control, PPE & Communications 13
8.0 Air Monitoring Plan 15
9.0 Safety Considerations 17
10.0 Decontamination and Disposal Procedures 19
11.0 Emergency Plan 21
12.0 Logs, Reports & Record Keeping 23
13.0 Sanitation 24

Figures

1. Directions to Hospital

Attachments

A. Health and Safety Fact Sheets

1.0 Introduction

The HASP has been prepared in conformance with applicable regulations, safe work practices and the project's requirements. It addresses those activities associated with the installation and sampling of soil probes and the in-field characterization of soil samples. The Project Manager (PM), Site Safety Officer (SSO) and Hydro Tech field staff will implement the Plan during site work. Compliance with this HASP is required of all persons and third parties who perform fieldwork for this project. Assistance in implementing this HASP can be obtained from the Hydro Tech's SSO. The content of this HASP may change or undergo revision based upon additional information that is made available to health and safety personnel, monitoring results or changes in the technical scope of work. Any changes proposed must be reviewed by the SSO.

SCOPE OF WORK

The Scope of Work activities will include the following:

- Installation of soil probes
- Characterization and collection of soil samples

EMERGENCY NUMBERS

Contact	Phone Number
Lincoln Medical Center	718-579-5016
New York City EMS	911
NYPD	911
NYFD	911
National Response Center	800-424-8802
Poison Information Center	800-562-8816
Chemtree	800-424-9555

Project Management/Health and Safety Personnel

Title	Contact	Phone Number	Cell Phone
QEP	Mark E. Robbins	(631) 462-5866	(631) 457-0032
PM/SSO	A.J. Infante	(718) 636-0800	(631) 457-0033

Directions to Lincoln Medical Center *(See Figure 1)*
Upon leaving the Site, make a U-turn on Third Avenue to head northeast towards East 134th Street. Turn right onto East 134th Street and make first left onto Lincoln Avenue. Continue straight on Lincoln Avenue to merge onto Morris Avenue. Continue on Morris Avenue for approximately 0.5 miles; Lincoln Medical Center will be on the left.

2.0 Health and Safety Staff

This section briefly describes the personnel and their health and safety responsibilities for the:

PROJECT Manager (PM)

- Has the overall responsibility for the health and safety of site personnel
- Ensures that adequate resources are provided to the field health and safety staff to carry out their responsibilities as outlined below.
- Ensures that fieldwork is scheduled with adequate personnel and equipment resources to complete the job safely.
- Ensures that adequate telephone communication between field crews and emergency response personnel is maintained.
- Ensures that field site personnel are adequately trained and qualified to work at the Site.

Resumes for Hydro Tech Project Staff involved in this project are provided in the QAPP (Appendix E) of the Supplemental Remedial Investigation Work Pan (Supplemental RIWP).

SITE SAFETY OFFICER (SSO)

- Directs and coordinates health and safety monitoring activities.
- Ensures that field teams utilize proper personal protective equipment (PPE).
- Conducts initial onsite, specific training prior to personnel and/or subcontractors proceeding to work.
- Conducts and documents periodic safety briefings; ensures that field team members comply with this HASP.
- Completes and maintains Accident/Incident Report Forms.
- Notifies Hydro Tech corporate administration of all accidents/incidents.
- Determines upgrade or downgrade of PPE based on site conditions and/or downgrade of PPE based on site conditions and/or real-time monitoring results.
- Ensures that monitoring instruments are calibrated daily or as determined by manufactured suggested instructions.
- Maintains health and safety field log books.
- Develops and ensures implementation of the HASP.
- Approves revised or new safety protocols for field operations.
- Coordinates revisions of this HASP with field personnel and the SSO Division Contracting Officer.
- Responsible for the development of new company safety protocols and procedures and resolution of any outstanding safety issues which may arise during the conduction of site work.
- Reviews personnel and subcontractors current and up-to-date medical examination and acceptability of health and safety training.

FIELD PERSONNEL AND SUBCONTRACTORS (IF ANY)

- Reports any unsafe or potentially hazardous conditions to the SSO.
- Maintains knowledge of the information, instructions and emergency response actions contained in this HASP.
- Comply with rules, regulations and procedures as set forth in this HASP and any revisions that are instituted.
- Prevents admittance to work sites by unauthorized personnel.

3.0 Chemical & Waste Description/Characterization

The following list of chemicals is based on the materials either once stored onsite or believed to be formerly stored onsite:

- Unknown Contaminant(s) including VOCs, SVOCs, TAL metals, pesticides, PCBs

Attachment A contains information regarding assessing health risks from contaminants of concern.

The following information references are presented in order to identify the properties and hazards of the materials that may/will be encountered at the Site.

- Dangerous Properties of Industrial Materials - Sax
- Chemical Hazards of the Workplace - Proctor/Hughes
- Condensed Chemical Dictionary – Hawley
- Rapid Guide to Hazardous Chemical in the Workplace - Lewis 1990.
- NIOSH Guide to Chemical Hazards - 1990
- ACGIH TLV Values and Biological Exposure Indices - 1991-1992

5.4 Hazard Assessment

The potential hazards associated with planned site activities include chemical, physical and biological hazards. This section discusses those hazards that are anticipated to be encountered during the activities listed in the scope of work.

The potential to encounter chemical hazards is dependent upon the work activity performed (invasive or non-invasive), the duration and location of the work activity. Such hazards could include inhalation or skin contact with chemicals that could cause: dermatitis, skin burn, being overcome by vapors or asphyxiation. In addition, the handling of contaminated materials and chemicals could result in fire and/or explosion.

The potential to encounter physical hazards during site work includes: heat stress, exposure to excessive noise, loss of limbs, being crushed, head injuries, cuts and bruises and other physical hazards due to motor vehicle operation, heavy equipment and power tools.

CHEMICAL HAZARDS

The potential for personnel and subcontractors to come in contact with chemical hazards may occur during the following tasks:

- Installation of soil probes
- Removal of any contaminated materials during sampling

Exposure Pathways

Exposure to these compounds during ongoing activities may occur through inhalation of contaminated dust particles, inhalation of volatile (VOC) and semi-volatile (SVOC) vapor fume compounds, by way of dermal absorption, and accidental ingestion of the contaminant by either direct or indirect cross contamination activities (eating, smoking, poor hygiene). Indirectly, inhalation of contaminated dust particles (VOCs, SVOCs) can occur during adverse weather conditions (high or changing wind directions) or during operations that may generate airborne dust such as excavation, and sampling activities. Dust control measures such as applying water to roadways and work sites will be implemented, where visible dust is generated from non-contaminated and contaminated soils. Where dust control measures are not feasible or effective, respiratory protection will be used.

Additional Precautions

Dermal absorption or skin contact with chemical compounds is possible during invasive activities at the Site, including removal of product, excavation of tanks, and handling of contaminated soils. The use of PPE in accordance with Section 9.2 and strict adherence to proper decontamination procedures should significantly reduce the risk of skin contact.

The potential for accidental ingestion of potentially hazardous chemicals is expected to be remote, when good hygiene practices are used.

PHYSICAL HAZARDS

A variety of physical hazards may be present during Site activities. These hazards are similar to those associated with any construction type project. These physical hazards are due to motor vehicles, and heavy equipment operation, the use of improper use of power and hand tools, misuse of pressurized cylinders, walking on objects, tripping over objects, working on surfaces which have the potential to promote falling, mishandling and improper storage of solid and hazardous materials, skin burns, crushing of fingers, toes, limbs, hit on the head by falling objects or hit one's head due to not seeing the object of concern, temporary loss of one's hearing and/or eyesight. Theses hazards are not unique and are generally familiarly to most hazardous waste site workers at construction sites. Additional task specific safety requirements will be covered during safety briefings.

Noise

Noise is a potential hazard associated with operation of heavy equipment, power tools, pumps and generators. High noise operators will be evaluated at the discretion of the SSO. Employees with an 8-hour time weighted average exposure exceeding 85 decibels (db) will be included in the hearing conservation program in accordance with 29 CFR 1910.85.

It is mandated that employees working around heavy equipment or using power tools that dispense noise levels exceeding 95 db are to wear hearing protection that shall consist of earplugs and earphones. This is particularly relevant as the jet engines of modern airplanes can give sound level readings of greater than 110 db.

Heat/Cold Stress

Extremes in temperature and the effects of hard work in impervious clothing can result in heat stress and/or hypothermia. The human body is designed to function at a certain internal temperature. When metabolism or external sources (fire, hot summer day, winter weather, etc.) cause the body temperature to rise or fall excessively, the body seeks to protect itself by triggering cooling/warming mechanisms. Profuse sweating is an example of a cooling mechanism, while uncontrollable shivering is an example of a warming mechanism. The SSO monitor the temperature to determine potential adverse affects the weather can cause on site personnel.

Protective clothing worn to guard against chemical contact effectively stops the evaporation of perspiration. Thus the use of protective clothing increases heat stress problems. Cold stress can easily occur in winter with sub-freezing ambient temperatures. Workers in protective garments may heat-up and sweat, only to rapidly cool once out of the tank and the PPE. The major disorders due to heat stress are heat cramps, heat exhaustion and heat stroke.

HEAT CRAMPS are painful spasms that occur in the skeletal muscles of workers who sweat profusely in the heat and drink large quantities of water, but fail to replace the body's lost salts or electrolytes. Drinking water while continuing to lose salt tends to dilute the body's extra cellular fluids. Soon water seeps by osmosis into active muscles and causes pain. Muscles fatigued from work as usually most susceptible to cramps.

HEAT EXHAUSTION is characterized by extreme weakness or fatigue, dizziness, nausea, and headache. In serious cases, a person may vomit or lose consciousness. The skin is clammy and moist, complexion pale or flushed, and body temperature normal or slightly higher than normal. Treatment is rest in a cool place and replacement of body water lost by perspiration. Mild cases may recover spontaneously with this treatment; severe cases may require care for several days. There are no permanent effects.

HEAT STROKE is a very serious condition caused by the breakdown of the body's heat regulating mechanisms. The skin is very dry and hot with red mottled or bluish appearance. Unconsciousness, mental confusion or convulsions may occur. Without quick and adequate treatment, the result can be death or permanent brain damage. Get medial assistance quickly! As first aid treatment, the person should be moved to a cool place. Soaking the person's clothes with water and fanning them should reduce body heat artificially, but not too rapidly.

Steps that can be taken to reduce heat stress are:

- Acclimatize the body. Allow a period of adjustment to make further heat exposure endurable.
- Drink more liquids to replace body water lost during sweating.
- Rest is necessary and should be conducted under the monitoring condition from the SSO and the effect personnel physiological state.

- Wearing personal cooling devices. There are two basic designs; units with pockets for holding frozen packets and units that circulate a cooling fluid from a reservoir through tubes to different parts of the body. Both designs can be in the form of a vest, jacket or coverall. Some circulating units also have a copy for cooling the head.

Cold temperatures can cause problems. The severe effects are FROSTBITE and HYPOTHERMIA.

FROSTBITE is the most common injury resulting from exposure to cold. The extremities of the body are often affected. The signs of frostbite are:

- The skin turns white or grayish-yellow
- Pain is sometimes felt early but subsides later. Often there is no pain
- The affected part feels intensely cold and numb

Shivering, numbness, drowsiness, muscular weakness and a low internal body temperature characterize the condition known as HYPOTHERMIA. This can lead to unconsciousness and death. With both frostbite and hypothermia, the affected areas need to be warmed quickly. Immersing in warm, not hot, water best does this. In such cases medical assistance will be sought.

To prevent these effects from occurring, persons working in the cold should wear adequate clothing and reduce the time spent in the cold area. The field SSO, to determine appropriate time personnel may spend in adverse weather conditions, will monitor this.

Lockout/Tagout

PURPOSE -- This program establishes procedures for de-energizing, isolating and ensuring the energy isolation of equipment and machinery. The program will be used to ensure that equipment and machinery is de-energizing and isolated from unexpected energization by physically locking (Lockout) energy isolation devices or, in the absence of locking capabilities, tagout (Tagout) the device to warn against energization. These procedures will provide the means of achieving the purpose of this program, prevention of injury to Hydro Tech employees from the unexpected energization or start-up of equipment and machinery, or from the release of stored energy.

APPLICATION -- This program applies to the control of energy during the servicing and/or maintenance of equipment and machinery. This program covers normal operations only if a guard or other safety device is removed or bypassed, or any part of the body is placed into an area of the equipment or machinery where work is performed on the material, or a danger zone exists during the operating cycle. Minor tool changes, adjustments, and other minor servicing activities which take place during normal production operations do not require isolation and lockout/tagout if they are routine and integral to the use of the equipment.

SCOPE -- This program will include all employees whose duties require them to service, install, repair, adjust, lubricate, inspect or perform work on powered equipment or machinery that may also have the potential for stored energy.

PROGRAM RESPONSIBILITIES -- The SSO will have the overall responsibility of the program to ensure that; authorized and affected employees receive adequate training and information, the program is evaluated annually, and the lockout/tagout equipment is properly used and the procedures of this program are followed.

The program evaluation will be conducted to ensure that the procedures and requirements of the program are being followed and will be utilized to correct any deviations or inadequacies that may be discovered. The evaluation will consist of one or more inspections or audits of actual lockout/tagout procedures being used to isolate equipment. A review of the authorized and affected employee's responsibilities will be conducted at the time of the inspection /audit. Any authorized employee, except the one(s) utilizing the energy isolation procedure being inspected, may perform the inspection/audit.
A record will be maintained of program evaluation inspections and will include:

1. The identity of the equipment or machine on which energy control procedures were being utilized.
2. The date(s) of the inspection(s).
3. The employee(s) included in the inspection(s).
4. The person performing the inspection.

Authorized employees (persons who implement lockout/tagout procedures) will be responsible for following the procedures established by this program.

Affected employees are responsible for understanding the significance of a lockout/tagout device and the prohibition relating to attempts to restart or re-energize equipment or machinery that is locked out or tagged out.

TRAINING – Where applicable, Hydro Tech employees will be provided instruction in the purpose and functions of the energy control program to ensure that they understand the significance of locked or tagged out equipment and also have the knowledge and skill to correctly apply and remove energy controls. Training will include:

The recognition of applicable hazardous energy source(s), the type and magnitude of energy available, and the policies and procedures of the Hydro Tech energy control program.

1. Affected employees will be made aware of the purpose and use of energy control procedures and the prohibition relating to attempts to remove lockout or tagout devices.
3. Instruction in the limitations of tagout as a sole means of energy control.
    a. Tags are warning devices and <u>do not</u> provide the physical restraint that a lock would.
    b. Tags may provide a false sense of security.
    c. Tags may become detached during use.

Initial training will be provided during to energy control program implementation, when new employees are hired or when job responsibilities change to include utilization of energy control procedures.

Retraining will be conducted whenever there is a change in job assignments that require the employee to utilize energy control procedures, a change in equipment that presents a new hazard, a change in the energy control procedures or when the program evaluation identifies inadequacies in the energy control program procedures.

Records of employee training will be maintained and will include the employee's name and date(s) of training.

STANDARD OPERATING PROCEDURES –where necessary, Hydro Tech will provide the necessary devices to effectively lockout or tagout energy isolating devices. Lockout/tagout devices will be the only devices used for controlling energy and shall not be used for other purposes. Any device used for lockout/tagout will be capable of withstanding the environment to which they are exposed for the maximum period they are to be exposed. The devices will be substantial enough to prevent removal without excessive force. Excessive force for a locking device would be bolt cutters or other metal cuttings tools. Tagout devices will be attached by a non-reusable method, attachable by hand, and very difficult to remove by hand. A nylon cable tie or equivalent will be used.

Lockout/tagout devices will indicate the identity of the employee who applied the device, and the tagout device will warn against the hazards if the equipment is energized.

Lockout is the preferred method of energy isolation. When physical lockout is not possible, the energy isolation will be tagged out of service with a warning tag attached at the power source. In the case of plug-in power source, the tag will be attached at the male plug. To ensure full employee protection using tagout instead of lockout, additional steps should be taken to guard against accidental or inadvertent energization. These steps may include, where applicable: removal of fuses, blocking switches, removal of a valve handle.

STANDARD OPERATING PROCEDURES

I. APPLICATION OF CONTROLS

A. Preparing to Shut Down Equipment

1. Prior to equipment shutdown, the authorized employee(s) must have knowledge of:

    - a. The type(s) and magnitude of power.
    - b. The hazards of the energy to be controlled.
    - c. The method(s) to control the energy.
    - d. The location and identity of all isolating devices that control or feed the equipment to be locked/tagged out.
2. Notify all affected employees that the lockout/tagout system will be in effect.
3. Assemble applicable lockout/tagout devices, i.e., padlocks, tags, multiple lock hasps, etc.

B. Equipment Shutdown and Isolation

1. If equipment is in operation, shut it down by the normal stopping procedure (stop button, switch).
2. Operate disconnects, switches, valves, or other energy isolating devices so that the equipment is de-energizing and isolated from its energy source(s).
3. Verify that equipment is shut down by operating equipment from the normal operating location and any remote locations.

C. Installation of Lockout/Tagout Device, Release of Stored Energy, and Verification

1. Attach individually assigned lock(s) or tag(s) to energy isolating device(s). Where it is not possible to lock a switch, valve or other isolating device, electrical fuses must be removed, blank flanges installed in piping, lines disconnected, or other suitable methods used to ensure that equipment is isolated from energy sources. A tag must be installed at the point of power interruption to warn against energizing.
    - a. Each lock or tag must positively identify the person who applied it and locks must be individually keyed.
    - b. If more than one person is involved in the task, employees will place their own lock and tag. Multiple lock hasps are available for this.
2. Release, restrain, or dissipate stored energy such spring tension, elevated machine members, rotating flywheels, hydraulic pressure, pistons and air, gas, steam, water pressure, etc. by repositioning, blocking bleeding, or other suitable means.
3. Prior to starting work on equipment and after ensuring that no personnel are exposed, the authorized employee will verify that isolation and de-energization have been accomplished by:
    - a. Attempting, through normal effort, to operate energy isolating devices such as switches, valves, or circuit breaker with locks or tags installed.
    - b. Attempting to operate the equipment or machinery that is locked or tagged out. This includes all sources of energy, i.e. electrical, hydraulic, gravity, air, water, stream pressure, etc.
    - c. Verifying the presence and effectiveness of restraint (blocking) and energy dissipation or release (bleeding).
4. If there is a possibility of the re-accumulation of stored energy to a hazardous level, verification of isolation will be contained until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

D. Group Lockout/Tagout

1. When more than one individual is involved in locking or tagging equipment out of operation, each individual will attach their individual lock or tag, or the equivalent, to the energy isolating device(s).

    - a. An equivalent lockout device may be in the form of a group lockout device such as a multiple lock hasp or lock box.
    - b. Primary responsibility for a group of authorized employees working under a group lockout device will be vested in a designated authorized employee.
    - c. Group lockout methods will provide a level of protection equal to that afforded by a personal lockout/tagout device.

II. RETURNING EQUIPMENT TO SERVICE

A. Restore Equipment to Normal Operating Status

1. Re-install all parts or subassemblies removed for servicing or maintenance.
2. Re-install all tools, rests, or other operating devices
3. Re-install all guards and protective devices (i.e. limit switches).

   4. Remove all blocks, wedges, or other restraints from the operating area of the equipment (ways, slides, etc.).
   5. Remove all tools, equipment, and shop towels from the operating area of the equipment.

B. Verify Equipment Ready for Operation
   1. Inspect area for non-essential items
   2. Ensure that all employees are safely positioned clear of the operating areas of the equipment. Post a watch if energy isolation devices are not in line of sight of the equipment.

C. Notify Affected Employees of Impending Start-up
   1. The sudden noise of start-up may startle nearby employees.
   2. Equipment may need to be tested to determine operational safety by a qualified operator.

D. Remove Energy Isolation Devices - Only by authorized employee(s) who installed it/them.
   1. Remove line blanks, reconnect piping (if applicable), and remove warning tag.
   2. Close bleeder valves, remove warning tag.
   3. Replace fuse(s), close circuit breaker(s) and remove warning tag.
   4. Remove lock and tag from control panel, valve, etc.

Employee(s) who installed them may make an exception for removal of lockout/tagout devices. If it is necessary to operate a piece of equipment that is locked/tagged out, <u>every</u> effort must be made to locate the employee whose lock or tag is on the equipment. If he or she cannot be located and only after positive assurance is made that no one is working on the locked out equipment, the <u>supervisor</u> may personally remove the lock. The supervisor must assure that the equipment is once again locked out, or the employee notified that the equipment has been re-energized, before the employee resumes work. Employees will recheck locked out equipment if they have left the equipment (breaks, lunch, and end of shift) to make sure it is still de-energized and locked out.

III. TEMPORARY REMOVAL OF LOCKOUT/TAGOUT PROTECTION

A. In situations when the equipment must be temporarily energized to test or position the equipment or its components, the following steps will be followed:
   1. Clear the equipment of tools and materials that are non-essential to the operation.
   2. Ensure the equipment components are operationally intact.
   3. Remove employees from the equipment area.
   4. Remove the lockout/tagout devices by the employee who installed in/them.
   5. Energize and proceed with testing or positioning.
   6. De-energize all systems and re-install all energy control measures.
   7. Verify re-installed energy control measures are effective.

IV. SHIFT OR PERSONNEL CHANGES

A. The following steps will be followed to ensure continuity of employee protection during personnel changes.
   1. All personnel involved in the maintenance or servicing activity will be notified that a transfer of personal locks/tags is about to occur.
   2. Clear all personnel from hazardous area(s) of equipment.
   3. Under the supervision of the shift supervisor or group designee, the off-going employee will immediately install theirs.
      a. If an entire group or more than one employee will be transferring work responsibility, locks/tags will be removed and replaced one at a time in order of installation.
   4. When the transfer of lockout/tagout devices is complete, the effectiveness of all energy isolation devices will be verified to the satisfaction of all personnel involved.
   5. Once the effectiveness of energy isolation protection is confirmed, the service/maintenance operation may continue.

V. CONTRACTOR NOTIFICATION

A. Whenever outside personnel may be engaged in activities covered by this program, they will inform the contractor of applicable lockout/tagout procedures used to protect Hydro Tech employees from the hazards of working near energized equipment.

1. The contractor will be expected to ensure that his/her employees understand and comply with the restrictions and prohibitions of this program.
2. Hydro Tech requires, under these circumstances, the contractor to inform us of their lockout/tagout procedures so that HTE employees can comply with the restrictions and prohibitions of the contractor's program.
3. Hydro Tech also requires the contractor to notify the program administrator, the area supervisor, and affected Hydro Tech employees prior to de-energizing, isolating and locking out Hydro Tech equipment. Conversely, notification is also required when this equipment will be returned to service.

DEFINITIONS

Affected employee - An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized employee(s) - A person or persons who locks or implements a tagout system procedure to perform servicing or maintenance on a machine or equipment. An authorized employee and an affected employee may be the same person when the affected employee's duties also include performing maintenance or service on a machine or equipment that must be locked or tagged out.

"Capable of being locked out" - An energy isolating device will be considered to be capable of being locked out either if it is designed with a hasp or other attachment or integral part to which, or through which, a lock can be affixed, or if it has a locking mechanism built into it. Other energy isolating devices will also be considered to be capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently alter its energy control capability.

Energized - Connected to an energy source or containing residual or stored energy.

Energy isolating device - A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a slide gate; a slip blind; a line valve; a block; and any similar device used to block or isolate energy. The term does not include a push button, selector switch, and other control circuit type devices.

Energy source - any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other type of energy.

Lockout - The placement of lockout device on an energy-isolating device, in accordance with an established procedure, is ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device - A device that utilizes positive means such as a lock, either key or combination type, to hold an energy isolating device in the safety position and prevent the energizing of a machine or equipment.

Normal production operations - The utilization of a machine or equipment to perform its intended production function.

Servicing and/or maintenance - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

Setting up - Any work performed to prepare a machine or equipment to perform its normal production operation.

Stored energy - Energy that is available and may cause movement even after energy sources have been isolated. Stored energy may be in the form of compressed springs, elevated equipment components, hydraulic oil pressure, pressurized water, air, steam, or gas, or rotating flywheels, shafts or cams.

Tagout - The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout device - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

GENERAL MACHINERY AND EQUIPMENT LIST

EQUIPMENT/LOCATION	ENERGY SOURCES/LOCATION
A. Geoprobe Drill Rig	Diesel Engine

5.5 Training

GENERAL HEALTH AND SAFETY TRAINING

In accordance with Hydro Tech corporate policy, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations. As a minimum, the training shall have consisted of instruction in the topics outlined in the above reference. Personnel who have not met the requirements for initial training will not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical).

Completion of the Hydro Tech Health and Safety Training Course for Hazardous Waste Operations or an approved equivalent will fulfill the requirements of this section. In addition to the required initial training, each employee shall have received 3 days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.
The Hydro Tech SSO the responsibility of ensuring that personnel assigned to this project complies with these requirements. Written certification of completion of the required training will be provided to the SSO.

MANAGER/SUPERVISOR TRAINING

In accordance with 29 CFR 1910.120, onsite management and supervisors who will be directly responsible for, or who supervise employees engaged in hazardous waste operation shall receive training as required in this HASP and at least eight (8) additional hours of specialized training on managing such operations at the time of job assignment.

ANNUAL 8-HOUR REFRESHER TRAINING

Annual 8-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualification for fieldwork. The following topics will be reviewed: toxicology, respiratory protection, including air purifying devices and self-contained breathing apparatus (SCBA), medical surveillance, decontamination procedures and personnel protective clothing. In addition, topics deemed necessary by the SSO may be added to the above list.

SITE SPECIFIC TRAINING

Prior to commencement of field activities, all personnel assigned to the project will be provided training that will specifically address the activities, procedures, monitoring and equipment for the site operations. It will include Site and facility layout, hazards, and emergency services at the Site, and will highlight all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

ONSITE SAFETY BRIEFINGS

Project personnel and visitors will be given periodic onsite health and safety briefings by the SSO, or their designee, to assist site personnel in safely conducting their work activities. The briefings will include information on new operations to be conducted, changes in work practices or changes in the Site's environmental conditions. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety audits.

ADDITIONAL TRAINING

Additional training may be required by the SSO for participation in certain field tasks during the course of the project. Such additional training could be in the safe operation of heavy or power tool equipment or hazard communication training.

SUBCONTRACTOR TRAINING

Subcontractor personnel who work onsite, only occasionally, for a specific limited task and who are unlikely to be exposed over permissible exposure limits, may be exempted from the initial 40-hour training requirement. The SSO will determine if this exemption is allowed. In any case, the subcontractor personnel who are exposed to hazards are not exempted from the 40-hours training requirement nor medical surveillance requirements found in Section 8.1.

5.6 Medical Surveillance

GENERAL

All contractor and subcontractor personnel performing field work 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. Such examinations shall include a statement as to the worker's present health status, the ability to work in a hazardous environment (including any required PPE which may be used during temperature extremes), and the worker's ability to wear respiratory protection.

A medical data sheet will be completed by all onsite personnel and kept at the Site. Where possible, this medical data sheet will accompany the personnel needing medical assistance or transport to hospital facilities.

MEDICAL SURVEILLANCE PROTOCOL
The medical surveillance protocol to be implemented is the occupational physicians' responsibility, but shall meet the requirements of CFR 1910.120 and ANSI Z88.2 (1980). The medical surveillance protocol shall, as a minimum, cover the following:

a. Medical and Occupational History
b. General physical examination (including evaluation of major organ system)
c. Serum lead and ZPP
d. Chest X-ray (performed no more frequently that every four years, except when otherwise indicated).
e. Pulmonary Function Testing (FVC and FEV1.0).
f. Ability to wear respirator
g. Audiometric testing.

Additional clinical tests may be included at the discretion of the occupational physician.

5.7 Site Control, PPE & Communications

SITE CONTROL

A Support Zone (SZ) is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel or materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples. A contamination reduction corridor will be established. This is the route of entry and egress to the Site, and it provides an area for decontamination of personnel and portable equipment as well.

The area where contamination exists is considered to be the Exclusion Zone (EZ). All areas where excavation and handling of contaminated materials take place are considered the EZ. This zone will be clearly delineated by cones, tape or other means. The SSO may establish more than one EZ where different levels of protection may be employed or where different hazards exist. Personnel are not allowed in the EZ without:

- A buddy
- Appropriate personal protective equipment
- Medical authorization
- Training certification

PERSONAL PROTECTIVE EQUIPMENT

GENERAL

The level of protection worn by field personnel will be enforced by the SSO. Levels of protection for general operations are provided below and are defined in this section. Levels of protection may be upgraded or downgraded at the discretion of the SSO. The decision shall be based on real-time air monitoring, site history data, and prior site experience. Any changes in the level of protection shall be recorded in the health and safety field logbook.

PERSONAL PROTECTIVE EQUIPMENT SPECIFICATIONS

For tasks requiring Level B PPE, the following equipment shall be used:

- Cotton or disposable coveralls
- Chemical protective suit (e.g. Saran-coated Tyvek®)
- Gloves, inner (latex)
- Gloves, outer (Nitrile®)
- Boots (PVC), steel toe/shank
- Boot Covers (as needed)
- Hard Hat
- Hearing protection (as needed)

For tasks requiring Level C PPE, the following equipment shall be used:

- Cotton or disposable coveralls
- Disposable outer coveralls (Poly-coated Tyvek)
- Gloves, inner (latex)
- Gloves, outer (Nitrile®)
- Boots (PVC), steel toe/shank
- Boot covers (as needed)
- Hard Hat

- Hearing protection (as needed)
- Splash suit and face shield for decontamination operations (as needed)

For tasks requiring Level D PPE, the following equipment shall be used:

- Cotton or disposable coveralls
- Gloves, inner (latex)
- Gloves, outer (Nitrile®)
- Boots (PVC) steel toe/shank
- Boot covers (as needed)
- Hard hat
- Hearing protection (as needed)
- Safety glasses

For tasks requiring respiratory protection, the following equipment shall be used:

Level D - No respiratory protective equipment necessary except for a dust mask
Level C - A full-face air-purifying respirator equipped with organic vapor/pesticide-HEPA cartridges
Level B - An air line respirator or a self-contained breathing apparatus (SCBA)

INITIAL LEVELS OF PROTECTION
Levels of protection for the activities may be upgraded or downgraded depending on direct-reading instruments or personnel monitoring. The following are the initial levels of protection that shall be used for each planned field activity.

LEVEL OF PERSONAL PROTECTIVE EQUIPMENT REQUIRED

Activity	**Level of Protection Respiratory/PPE**
Drilling/Coring	C/D
Sampling	C/D
Ground-Penetrating Radar/Magnetometer	C/D

COMMUNICATIONS
Communications is the ability to talk with others. While working in Level C/B Protection, personnel may find that communication becomes a more difficult task and process to accomplish. This is further complicated by distance and space. In order to address this problem, electronic instruments, mechanical devices or hand signals will be used as follows:

- Walkie-Talkies - Hand held radios would be utilized as much as possible by field teams for communication between downrange operations and the Command Post base station.

- Telephones - A mobile telephone will be located in the Command Post vehicle in the Support Zone for communication with emergency support services/facilities. If a telephone is demobilized, the nearest public phones will be identified.

- Air Horns - A member of the downrange field team will carry an air horn and another will be evident in the Support Zone to alert field personnel to an emergency situation.

- Hand Signals - Members of the field team long with use of the buddy system will employ this communication method. Signals become especially important when in the vicinity of heavy moving equipment and when using Level B respiratory equipment. The signals shall become familiar to the entire field team before site operations commence and they will be reinforced and reviewed during site-specific training.

HAND SIGNALS FOR ONSITE COMMUNICATION

Signal	**Meaning**
Hand gripping throat	Out of air, can't breathe
Grip partners' wrist	Leave area immediately; no debate
Hands on top of head	Need assistance
Thumbs up	OK, I'm all right; I understand
Thumbs down	No; negative, unable to understand you. I'm not all right

5.8 Air Monitoring Plan

GENERAL

Continuous air monitoring in the EZ during invasive tasks will accompany site operations, as indicated in this HASP or as required by the SSO. Monitoring will be performed to verify the adequacy of respiratory protection, to aid in site layout and to document work exposure. All monitoring instruments shall be operated by qualified personnel only and will be calibrated daily prior to use, or more often as necessary.

REAL-TIME MONITORING

INSTRUMENTATION

At least one (1) of the following monitoring instruments will be available for use during field operations as necessary:

- Photoionization Detector (PID), Rae Instruments with 10.2 EV probe or equivalent
- Flame Ionization Detector (FID), Foxboro Model 128 or equivalent
- Combustible Gas Indicator (CGI)/Oxygen (O_2) Meter, MSA or equivalent.

A FID or PID shall be used to monitor the organic vapor concentrations in active work areas. Organic vapor concentrations shall be measured upwind of the work areas to determine background concentrations. The SSO will interpret monitoring results using professional judgment. The PPE utilized shall always be the most protective, thus the action level criteria are flexible guidelines.

A CGI/O_2 meter shall be used to monitor for combustible gases and oxygen content in the boreholes during drilling activities.

Calibration records shall be documented, and included in the health and safety logbook or instrument calibration logbook. All instruments shall be calibrated before and after each daily use in accordance with the manufacturers' procedures.

ACTION LEVELS

Action levels for upgrading of PPE in this HASP will apply to all site work during the duration of field activities at the Site. Action levels are for unknown contaminants using direct reading in the Breathing Zone (BZ) for organic vapors and dusts, and at the source for combustible gases.

MONITORING DURING FIELD ACTIVITIES

Hydro Tech shall perform real time air monitoring prior to the commencement of work to establish baseline conditions. Baseline conditions will be established at the approximate center of the Site and at the perimeter of the Site both upwind and downwind.

During all work activities real time monitoring will occur. As necessary, Hydro Tech shall have at each applicable workstation a PID, explosimeter and oxygen deficiency meter. The real time monitoring for remedial activities will be conducted approximating the Breathing Zone of the workers. The monitoring will be continuous during working operations.

The air-monitoring instrument may indicate that personnel working in the exclusion zone increase their level of protection. All personnel will be trained in the action levels. When conditions warrant an increase in protection, all personnel will stop working and immediately leave the exclusion zone. They will then don the appropriate safety equipment necessary and return to their current workstation. All of this activity will be monitored by the SSO. The SSO will keep the Hydro Tech Project Manager aware of any extraordinary situations and conditions that may occur. Working conditions and monitoring levels will be noted in the Field Notebook along with the time, date and page number. Verbal reports will be given to the Project Manager when there is a change in the PPE level.

The previous day's results shall be reviewed each morning to determine what actions are necessary and the general conditions resulting from and around the Site.

The record keeping will include:

- Date & Time of Monitoring
- Air Monitoring Location
- Instrument, Model #, Serial #
- Calibration/Background Levels
- Results of Monitoring
- SSO Signature
- Comments

Excavation Operations - Monitoring will be performed continuously during all excavation and demolition operations. A PID and/or FID shall be utilized to monitor the breathing zone, the excavated area and any material taken from the excavation. A CGI/O_2 meter shall be used to monitor the excavation for the presence of combustible gases.

ACTION LEVELS OF AIRBORNE CONTAMINANTS

Instrument	Action Level	Action to be Taken
FID/PID	< 100 ppm, for a 15-minute average	Stop work & initiate vapor control
	> 100 ppm, for a 15-minute average	Stop work & initiate evacuation procedure
CGI	10% LEL	Stop work, initiate ventilating
	50% LEL	Stop work, initiate evacuation procedure and contact fire dept.

PERSONNEL MONITORING PROCEDURE

The Site SSO, concurrent with activities that may generate the contaminants in excess of OSHA PEL's, may perform assessment and evaluation of field personnel exposures to airborne contaminants.

Procedures to be followed include:

The SSO may select high-risk individuals who may be subject to contaminant exposure based on job assignment.
The Personal Sampling is being conducted to determine the proper levels of respiratory protection required, to document potential exposures to compounds, and to assure compliance with OSHA standards. Therefore, it is important that the data collected be from "worst case" locations and personnel.

For example: when work is being conducted to excavate at an underground tank location, those persons closest to the excavation and most intimately involved with the work should be sampled. If a backhoe operator solely conducted the excavation, then that employee should be monitored. However, if there are additional workers who must enter the excavation and work with the freshly excavated soil, these persons would be closer to the potential contaminants and they should be sampled.

To meet the intent of the sampling will require sampling at periods of the most disturbances. To be accurate in determining potential exposures, as many tasks/trades shall be sampled as possible during the course of this project. At completion of the project, a goal of 20% of all workers who must perform their duties in or around the contaminated soil, tanks and excavations is sought.

Hydro Tech must provide all sampling data in writing to the employees within three (3) days of receipt of results.

Air sampling pumps used to collect employee exposure samples shall be calibrated before and after use each day. Calibration shall be accomplished using a primary standard calibration system, e.g. the bubble tube method. Results of the calibrations shall be included in the health and safety field logbook and with the exposure report.

Chemical analysis of samples collected for assessment of employee exposures shall be performed in accordance with NIOSH or OSHA analytical methods only by laboratories accredited by the American Industrial Hygiene Association.

Results of the personal exposure assessment shall be provided to the individual, in writing within fifteen (15) working days after receipt of laboratory reports. Reports to field personnel shall provide calculated time-weighted average exposures and shall provide comparative information relative to established permissible exposure limits. The air sampling data sheet and laboratory report is considered a part of the employee exposure report. A copy of the employee personal exposure assessment report shall also be included in the project file and the employees' medical record for Hydro Tech employees. Reports for subcontractor employees will be sent directly to the subcontractors' employer.

AIR MONITORING REPORTS

Air Monitoring Reports will be completed by the SSO and/or authorized personnel and submitted to the Project Manager in the daily safety logs and will include the following:

- Date of monitoring
- Equipment utilized for air monitoring
- Real-time air monitoring results from each work location
- Calibration method of equipment and results

5.9 Safety Considerations

GENERAL

In addition to the specific requirements of this HASP, common sense should be used at all times. The general safety rules and practices below will be in effect at the Site at the discretion of the Project Manager, SSO or other authorized personnel.

- The site will be suitably marked or barricaded as necessary to prevent unauthorized visitors but not hinder emergency services if needed.

- As needed, all open holes, trenches and obstacles will be properly barricaded in accordance with local site requirements. These requirements will be determined by proximity to traffic ways, both pedestrian and vehicular, and site of the hole, trench or obstacle. If holes are required to be left open during non-working hours, they will be adequately decked over or barricaded and sufficiently lighted.

- Before any digging or boring operations are conducted, underground utility locations will be identified. All boring, excavation and other site work will be planned and performed with consideration for underground lines. Any excavation work will be performed in accordance with Hydro Tech's Standard Operating Procedures for Excavations.

- Either workers or other people will enact dust-mitigating procedures when there exists the potential for the inhalation of dust particles.

- The act of smoking and ignition sources in the vicinity of potentially flammable or contaminated material is strictly prohibited.

- Drilling, boring, and use of cranes and drilling rigs, erection of towers, movement of vehicles and equipment and other activities will be planned and performed with consideration for the location, height, and relative position of aboveground utilities and fixtures, including signs; canopies; building and other structures and construction; and natural features such as trees, boulders, bodies of water, and terrain.

- When working in areas where flammable vapors may be present, particular care shall be exercised with tools and equipment that may be sources of ignition. All tools and equipment provided must be properly bonded and/or grounded. Metal buttons and zippers are prohibited on safety clothing for areas that may contain a flammable or explosive atmosphere.

- Approved and appropriate safety equipment (as specified in this HASP), such as eye protection, hard hats, foot protection, and respirators, must be worn in areas where required. In addition, eye protection must be worn when sampling soil or water that may be contaminated.

- Beards interfere with respirator fit and are not allowed within the site boundaries because all site personnel may be called upon to use respirator protection is some situations.

- No smoking, eating, chewing tobacco, gum chewing or drinking will be allowed in the contaminated areas.

- Contaminated tools and hands must be kept away from the face.

- Personnel must use personal hygiene safe guards (washing up) at the end of the shift or as soon as possible after leaving the Site.

- Each sample must be treated and handled as though it were contaminated.

- Persons with long hair and/or loose fitting clothing that could become entangled in power equipment must take adequate precautions.

- Horseplay is prohibited in the work area.

- Work while under the influence of intoxicants, narcotics or controlled substances is prohibited.

POSTED SIGNS

Posted danger signs will be used where an immediate hazard exists. Caution signs will be posted to warn against potential hazards and to caution against unsafe practices. Traffic control methods and barricades will be used as needed. Wooden stakes and flagging tape, or equally effective material will be used to demarcate all restricted areas.

Other postings may include the OSHA poster, emergency hospital route and telephone numbers of contact personnel.

INVASIVE OPERATIONS

The SSO will be present onsite during all invasive work (e.g. demolition, excavations). The SSO will ensure that appropriate levels of protection and safety procedures are followed. No personnel will enter any excavations for any reasons. All personnel will stay at least 10 feet back from the edge of the excavation and out of the swing radius of the backhoe. No drums or other potential sources will be sampled or removed during this phase without further additions to the HASP.

The proximity of water, sewer and electrical lines will be identified prior to invasive operations. The possibility of the presence of underground conduits or vessels containing materials under pressure will also be investigated prior to invasive operations. Properly-sized containment systems will be utilized and consideration of the potential volume of liquid or waste released during operations will be discussed with members of the field team to minimize the potential for spills and provide a method for collection of waste materials. Emergency evacuation procedures and the location of safety equipment will be established prior to start up operations. The use of protective clothing, especially hard hats, boots, and gloves will be required during drilling and other heavy equipment work.

SOIL SAMPLING

Personnel must wear prescribed protective clothing and equipment including eye protection, chemical resistant gloves and splash aprons (where appropriate) when sampling solids and liquids. Sample bottles are to be bagged prior to sampling to ease decontamination. Personnel must be aware of the location of emergency equipment, including spill containment materials prior to sampling. Personnel are to practice contamination avoidance at all times, as well as to utilize the buddy system and maintain communications with the Command Post.

SAMPLE HANDLING

Personnel responsible for the handling of samples will wear the prescribed level of protection. Samples are to be identified as to their hazard and packaged as to prevent spillage or breakage. Any unusual sample conditions shall be noted. Laboratory personnel and all field personnel shall be advised of sample hazard levels and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling in order to assure that the practices are appropriate for the suspected contaminants in the sample.

HEAVY EQUIPMENT DECONTAMINATION

Personnel steam cleaning heavy equipment shall use the prescribed level of protection and adhere to the buddy system. Initially this task usually employs level C. The heavy equipment decontamination shall be restricted to authorized personnel only. Special consideration will be given to wind speed and direction. Downwind areas are to be kept free of personnel to avoid unnecessary exposure to potential airborne contamination.

ADDITIONAL SAFETY CONSIDERATIONS

No other additional safety considerations at this time.

5.10 Decontamination and Disposal Procedures

CONTAMINATION PREVENTION

One of the most important aspects of decontamination is the prevention of contamination. Good contamination prevention should minimize worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

Personnel:
Do not walk through areas of obvious or known contamination
Do not directly handle or touch contaminated materials
Make sure that there are no cuts or tears on PPE
Fasten all closures in suits; cover with tape if necessary
Particular care should be taken to prevent any skin injuries
Stay upwind of airborne contaminants
Do not carry cigarettes, cosmetics, gum, etc. into contaminated areas

Sampling and Monitoring:
When required by the SSO, cover instruments with clear plastic, leaving openings for sampling ports and bag sample containers prior to emplacement of sample material.

Heavy Equipment:
Care should be taken to limit the amount of contamination that comes in contact with heavy equipment (tires, contaminated augers). Dust control measures may be needed on roads inside the site boundaries.

PERSONNEL DECONTAMINATION

All personnel shall pass through an outlined decontamination procedure when exiting the hot zone at each location. Field washes for equipment and PPE shall be set up at each drilling location. The system will include a gross wash and rinse for all disposable clothing and boots worn in the EZ. Upon exiting the EZ, all personnel will wash their hands, arms, neck, and face before entering the Support Zone.

EQUIPMENT DECONTAMINATION

Equipment used at the Site that is potentially contaminated shall be decontaminated to prevent hazardous materials from leaving the Site. All heavy equipment will be decontaminated at the decontamination pad and inspected by the SSO and Project Manager before it leaves the Site. The decontamination area will provide for the containment of all wastewater from the decontamination process. Respirators, airline and any other personnel equipment that comes in contact with contaminated soils shall pass through a field wash.

DECONTAMINATION DURING MEDICAL EMERGENCIES

If emergency life-saving first aid and/or medical treatment are required, normal decontamination procedures may need to be abbreviated or omitted. The Site SSO or designee will accompany contaminated victims to the medical facility to advice on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed, a plastic barrier between the individual and clean surfaces should be used to help prevent contaminating the inside of ambulances and /or medical personnel. Outer garments are then removed at the medical facility.

No attempt will be made to wash or rinse the victim, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material that could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed. Note that heat stroke requires prompt treatment to prevent irreversible damage or death. Protective clothing must be promptly removed. Less serious forms of heat stress also require prompt attention and removal of protective clothing immediately; unless the victim is obviously contaminated, decontamination should be omitted or minimized and treatment begun immediately.

DISPOSAL PROCEDURES

A segregating system of non-hazardous waste and hazardous waste will be developed by the SSO and PM. All discarded material, waste materials or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating sanitary hazards, or causing litter to be left on site. All potentially contaminated materials, e.g. clothing, gloves, etc., will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials shall be collected and bagged for appropriate disposal as normal domestic waste.

5.11 Emergency Plan

The potential for the development of an emergency situation is low considering the low concentrations of hazardous substances at the work site. Nevertheless, an emergency situation could occur. All Hydro Tech and subcontractor field team members prior to the start of work will know the emergency plan outlined in this section. The emergency plan will be available for use at all times during site work.

Various individual site characteristics will determine preliminary actions taken to assure that this emergency plan is successfully implemented in the event of a site emergency. Careful consideration must be given to the proximity of neighborhood housing or places of employment, and to the relative possibility of site fire, explosion or release of vapors or gases that could affect the surrounding community.

The Project Manager shall make contact with local fire, police and other emergency units prior to beginning work on site. In these contacts, the Project Manager will inform the emergency units about the nature and duration of work expected to the Site and the type of contaminants and the possible health or safety effects of emergencies involving these contaminants. At this time, the Project Manager and the emergency response units shall make the necessary arrangements to be prepared for any emergencies that could occur.

The Project Manager shall implement the contingency plan whenever conditions at the Site warrant such action. The Project Manager will be responsible for coordination of the evacuation emergency treatment, and transportation of site personnel as necessary, and notification of emergency response units and the appropriate management staff.

The cases where the PM is not available, the SSO shall serve as the alternate emergency coordinator.

EVACUATION

In the event of an emergency situation, such as fire, explosion, or significant release of toxic gases, an air horn or other appropriate device will be sounded for approximately 10 second intervals indicating the initiation of evacuation procedures. All personnel will evacuate and assemble near the entrance to the site. The location shall be upwind of the Site where possible.

For efficient and safe site evacuation and assessment of the emergency situation, the Project Manager will have authority to initiate action if outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The SSO or designated SSO must ensure that access for emergency equipment is provided and that all combustion apparatuses have been shut down once the alarm has been sounded. Once the safety of all personnel is established, the Fire Department and other emergency response groups as necessary will be notified by telephone of the emergency.

POTENTIAL OR ACTUAL FIRE OR EXPLOSION

Immediately evacuate the Site (air horn will sound for 10-second intervals), notify the local fire and police departments, and other appropriate emergency response groups if an actual fire or explosion has taken place.

PERSONNEL INJURY

Emergency first aid shall be applied on site as deemed necessary. If necessary, the individual shall be decontaminated and transported to the nearest medical facility.

The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. However, since some situations may require transport of an injured party by other means, the hospital route is identified below. A map to this facility provided with this HASP in Section 2.2.3.

ACCIDENT/INCIDENT REPORTING

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone:

1. Mark E. Robbins-Cell phone (631) 457-0030
2. The employer of any injured worker if not an Hydro Tech employee

Written confirmation of verbal reports is to be submitted within 24 hours. The report form entitled "Accident Data Report" is to be used for this purpose. All Hydro Tech representatives contacted by telephone are to receive a copy of this report. If the employee involved is not a Hydro Tech employee, his employer shall receive a copy of this report.

For reporting purposes, the term accident refers to fatalities, lost time injuries, spill or exposure to hazardous materials (toxic materials, explosive or flammable materials).
Any information released from the health care provider, which is not deemed confidential patient information, is to be attached to the appropriate form. Any medical information that is released by patient consent is to be filed in the individuals' medical records and treated as confidential.

OVERT PERSONNEL EXPOSURE

SKIN CONTACT:	Use copious amounts of soap and water. Wash/rinse affected area thoroughly, and then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination.
INHALATION:	Move personnel to fresh air and if necessary, decontaminate and transport to hospital.
INGESTION:	Decontamination and transport to emergency medical facility.
PUNCTURE WOUND OR LACERATION:	Decontaminate and transport to emergency medical facility.

ADVERSE WEATHER CONDITIONS

In the event of adverse weather conditions, the SSO or designee will determine if work can continue without sacrificing the health and safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries
- Potential for cold stress and cold-related injuries
- Treacherous weather-related conditions
- Limited visibility
- Potential for electrical storms

Site activities will be limited to daylight hours and acceptable weather conditions. Inclement working conditions include heavy rain, fog, high winds, and lighting. Observe daily weather reports and evacuate if necessary in case of inclement weather conditions.

EMERGENCY RESPONSE EQUIPMENT LIST

Some or all of the following will either be available onsite or be able to be brought to the Site within a 2-hour period:

- 55 Gallon Drums
- 85 Gallon Drums
- Absorbent Pads
- Absorbent Booms
- Speedy-Dry
- Plastic Sheeting
- Hay Bales
- Pneumatic Nibbler
- Back Hoe
- Pressure Washer
- Air Compressor
- Wilden Pumps
- Equipment Storage Trailer
- Submersible Pumps
- Miscellaneous Hand Tools
- Portable Lighting

LARGE EQUIPMENT

If necessary, Hydro Tech can have the following large equipment brought to the Site within 2-hours:

- Large Vacuum Truck
- Super Sucker
- Dump Trucks
- Drill Rig
- Utility Vehicle

5.12 Logs, Reports and Record Keeping

MEDICAL AND TRAINING RECORDS

The employer keeps medical and training records. All subcontractors must provide verification of training and medical qualifications to the SSO. The SSO will keep a log of personnel meeting appropriate training and medical qualifications for site work. The log will be kept in the project file. Medical records will be maintained in accordance with 29 CFR 1910.20.

ONSITE LOG

A log of personnel onsite each day will be kept by the SSO or designee. A copy of these logs will be sent to the Hydro Tech records coordinator for data entry. Originals will be kept in the project file.

EXPOSURE RECORDS

Any personal monitoring results, laboratory reports, calculations and air sampling data sheets are part of an employee exposure record. These records will be kept in accordance with 29 CFR 1910.20. For Hydro Tech employees, the originals will be sent to the Hydro Tech records coordinator. For subcontractor employees, the original will be sent to the subcontractor employer and a copy kept in the project file.

ACCIDENT/INCIDENT REPORTS

An accident/incident report must be completed for all accidents and incidents. Hydro Tech will send the originals to the appropriate Hydro Tech records coordinator for maintenance. Copies will be distributed as stated. A copy of the forms will be kept in the project file.

OSHA FORM 200

An OSHA Form 200 (Log of Occupational Injuries and Illnesses) will be kept at the Site. All recordable injuries or illnesses will be recorded on this form. At the end of the project, the original will be sent to the Hydro Tech corporate records administrator for maintenance. Subcontractor employers must also meet the requirements of maintaining an OSHA 200 form.

The Hydro Tech accident/incident report meets the requirements of the OSHA Form 101 (Supplemental Record) and must be maintained with the OSHA Form 200 for all recordable injuries or illnesses.

HEALTH AND SAFETY FIELD LOG BOOK

The SSO or designee will maintain the logbook in accordance with standard Hydro Tech procedures. Daily site conditions, activities, personnel, calibration records, monitoring results and significant events will be recorded. The original logbooks will become part of the exposure records file.

5.13 Sanitation

If sanitary sewers are not provided at the Site, provisions shall be made for access to sanitary systems by using nearby public facilities consistent with provisions of governing local ordinance codes. In the latter case, provisions are required for the removal of accumulated waste products within those units.

If a commercial/industrial laundry is used to clean or launder clothing that is potentially contaminated, they shall be informed of the potential harmful effects of exposure to hazardous substances related to the affected clothing.

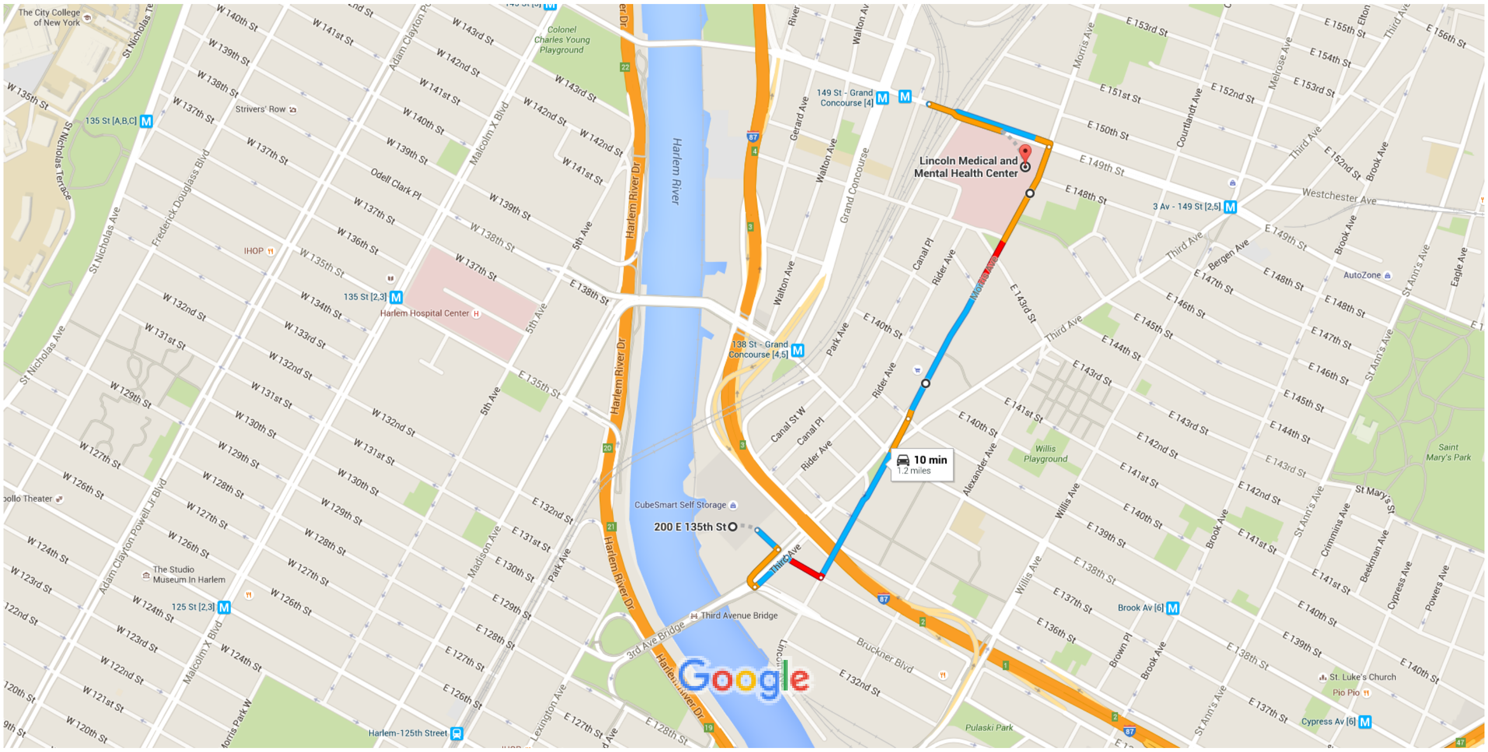
Personnel and subcontractors sites shall follow decontamination procedures described in the HASP, or as directed by the SSO. This will generally include at a minimum site-specific training in shower usage and cleanup, personal hygiene requirements and the donning of protective equipment/clothing.

FIGURE 1
DIRECTIONS TO HOSPITAL

Google Maps

200 East 135th Street, Bronx, NY to Lincoln Medical and Mental Health Center

Drive 1.2 miles, 10 min



Map data ©2015 Google 500 ft

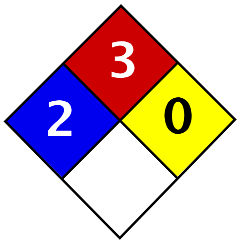
via Morris Ave

7 min without traffic

10 min

1.2 miles

ATTACHMENT A
HEALTH AND SAFETY FACT SHEETS



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

p-Xylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: p-Xylene

Catalog Codes: SLX1120

CAS#: 106-42-3

RTECS: ZE2625000

TSCA: TSCA 8(b) inventory: p-Xylene

CI#: Not applicable.

Synonym: p-Methyltoluene

Chemical Name: 1,4-Dimethylbenzene

Chemical Formula: $C_6H_4(CH_3)_2$

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{p-}Xylene	106-42-3	100

Toxicological Data on Ingredients: p-Xylene: ORAL (LD50): Acute: 5000 mg/kg [Rat.]. DERMAL (LD50): Acute: 12400 mg/kg [Rabbit.]. VAPOR (LC50): Acute: 4550 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant).
Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation.
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to blood, kidneys, the nervous system, liver.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 527°C (980.6°F)

Flash Points: CLOSED CUP: 25°C (77°F). OPEN CUP: 28.9°C (84°F) (Cleveland).

Flammable Limits: LOWER: 1.1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as oxidizing agents.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 150 (ppm) from ACGIH (TLV)
TWA: 434 STEL: 651 (mg/m3) from ACGIHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Liquid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 138°C (280.4°F)

Melting Point: 12°C (53.6°F)

Critical Temperature: Not available.

Specific Gravity: 0.86 (Water = 1)

Vapor Pressure: 9 mm of Hg (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.62 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether.

Solubility:
Easily soluble in methanol, diethyl ether.
Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 5000 mg/kg [Rat.].
Acute dermal toxicity (LD50): 12400 mg/kg [Rabbit.].
Acute toxicity of the vapor (LC50): 4550 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to blood, kidneys, the nervous system, liver.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant).
Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

0347 Animal: embryotoxic, foetotoxic, passes through the placental barrier.
0900 Detected in maternal milk in human.
Narcotic effect; may cause nervous system disturbances.

Special Remarks on other Toxic Effects on Humans: Material is irritating to mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Xylene : UN1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: p-Xylene
Florida: p-Xylene
Massachusetts RTK: p-Xylene
New Jersey: p-Xylene
TSCA 8(b) inventory: p-Xylene
SARA 313 toxic chemical notification and release reporting: p-Xylene
CERCLA: Hazardous substances.: p-Xylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R10- Flammable.
R38- Irritating to skin.
R41- Risk of serious damage to eyes.
R48/20- Harmful: danger of serious

damage to health by prolonged
exposure through inhalation.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
-Material safety data sheet emitted by: la Commission de la SantÃ© et de la SÃ©curitÃ© du Travail du QuÃ©bec.
-SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II.
-Guide de la loi et du rÃ¨glement sur le transport des marchandises dangeureuses au canada. Centre de conformitÃ© internatinal LtÃ©e. 1986.

Other Special Considerations: Not available.

Created: 10/10/2005 08:33 PM

Last Updated: 10/10/2005 08:33 PM

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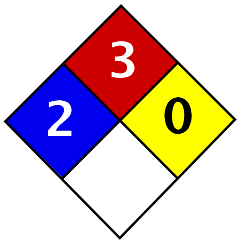

Health	2
Fire	3
Reactivity	0
Personal Protection	J

Material Safety Data Sheet
m-Xylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: m-Xylene

Catalog Codes: SLX1066

CAS#: 108-38-3

RTECS: ZE2275000

TSCA: TSCA 8(b) inventory: m-Xylene

CI#: Not applicable.

Synonym: m-Methyltoluene

Chemical Name: 1,3-Dimethylbenzene

Chemical Formula: $C_6H_4(CH_3)_2$

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{m-}Xylene	108-38-3	100

Toxicological Data on Ingredients: m-Xylene: ORAL (LD50): Acute: 5000 mg/kg [Rat.]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit.].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant).
Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation.
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to blood, kidneys, the nervous system, liver.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 527°C (980.6°F)

Flash Points: CLOSED CUP: 25°C (77°F). OPEN CUP: 28.9°C (84°F) (Cleveland).

Flammable Limits: LOWER: 1.1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid, insoluble in water.

Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as oxidizing agents.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Splash goggles. Lab coat. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 150 (ppm) from ACGIH (TLV)
TWA: 434 STEL: 651 (mg/m3) from ACGIHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Liquid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 139.3°C (282.7°F)

Melting Point: -47.87°C (-54.2°F)

Critical Temperature: Not available.

Specific Gravity: 0.86 (Water = 1)

Vapor Pressure: 6 mm of Hg (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.62 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether.

Solubility:
Easily soluble in methanol, diethyl ether.
Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact.

Toxicity to Animals:
Acute oral toxicity (LD50): 5000 mg/kg [Rat.].
Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit.].

Chronic Effects on Humans: The substance is toxic to blood, kidneys, the nervous system, liver.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant).
Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
0347 Animal: embryotoxic, foetotoxic, passes through the placental barrier.
0900 Detected in maternal milk in human.
Narcotic effect; may cause nervous system disturbances.

Special Remarks on other Toxic Effects on Humans: Material is irritating to mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Xylene : UN1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: m-Xylene
Massachusetts RTK: m-Xylene
TSCA 8(b) inventory: m-Xylene
SARA 313 toxic chemical notification and release reporting: m-Xylene
CERCLA: Hazardous substances.: m-Xylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R10- Flammable.
R38- Irritating to skin.
R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Wear appropriate respirator when
ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
-Material safety data sheet emitted by: la Commission de la SantÃ© et de la SÃ©curitÃ© du Travail du QuÃ©bec.
-SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II.
-Guide de la loi et du rÃ¨glement sur le transport des marchandises dangeureuses au canada. Centre de conformitÃ© internatinal LtÃ©e. 1986.

Other Special Considerations: Not available.

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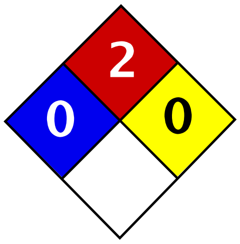

Health	0
Fire	2
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Mesitylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mesitylene

Catalog Codes: SLM2410

CAS#: 108-67-8

RTECS: OX6825000

TSCA: TSCA 8(b) inventory: Mesitylene

CI#: Not available.

Synonym: 1,3,5-Trimethylbenzene

Chemical Formula: C9H12

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mesitylene	108-67-8	100

Toxicological Data on Ingredients: Mesitylene: VAPOR (LC50): Acute: 4881.9 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation (lung irritant). Slightly hazardous in case of skin contact (irritant, permeator), .

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes,

keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 559°C (1038.2°F)

Flash Points: CLOSED CUP: 43°C (109.4°F).

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Be careful that the product is not present at a

concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Avoid contact with eyes Wear suitable protective clothing If ingested, seek medical advice immediately and show the container or the label.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 25 CEIL: 35 (ppm)
TWA: 125 CEIL: 170 (mg/m3)
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Aromatic.

Taste: Not available.

Molecular Weight: 120.2 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 164.7°C (328.5°F)

Melting Point: -44.8°C (-48.6°F)

Critical Temperature: Not available.

Specific Gravity: 0.8637 (Water = 1)

Vapor Pressure: 1.86 mm of Hg (@ 20°C)

Vapor Density: 4.14 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.23 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute toxicity of the vapor (LC50): 4881.9 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation (lung irritant).
Slightly hazardous in case of skin contact (irritant, permeator), .

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : 1,3,5-Trimethylbenzene : UN2325 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
Florida: Mesitylene
New Jersey: Mesitylene
TSCA 8(b) inventory: Mesitylene

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).

DSCL (EEC):
R10- Flammable.
R36/37- Irritating to eyes and respiratory system.

HMIS (U.S.A.):

Health Hazard: 0

Fire Hazard: 2

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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International Chemical Safety Cards

BENZO(B)FLUORANTHENE

ICSC: 0720

BENZO(B)FLUORANTHENE
Benzo(e)acephenanthrylene
2,3-Benzofluoroanthene
$C_{20}H_{12}$
Molecular mass: 252.3

CAS # 205-99-2
RTECS # CU1400000
ICSC # 0720

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
• **INHALATION**		Local exhaust or breathing protection.	Fresh air, rest.
• **SKIN**	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. Wear protective gloves when administering first aid.
• **EYES**		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**		Do not eat, drink, or smoke during work.	Wear protective gloves when inducing vomiting. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Tightly closed.	Unbreakable packaging; put breakable packaging into closed unbreakable container.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0720

International Chemical Safety Cards

BENZO(B)FLUORANTHENE

ICSC: 0720

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS TO YELLOW CRYSTALS. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. **OCCUPATIONAL EXPOSURE LIMITS (OELs):** TLV not established.	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and through the skin. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Melting point: 168°C Solubility in water: none	Vapour pressure, Pa at 20°C: <10 Octanol/water partition coefficient as log Pow: 6.04
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to the total environment. In the food chain important to humans, bioaccumulation takes place, specifically in oils and fats.	

NOTES

Depending on the degree of exposure, periodic medical examination is indicated. Data are insufficiently available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home.

ADDITIONAL INFORMATION

ICSC: 0720 **BENZO(B)FLUORANTHENE**

IMPORTANT LEGAL NOTICE:	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.

International Chemical Safety Cards

BENZO(K)FLUORANTHENE

ICSC: 0721

BENZO(K)FLUOROANTHENE
11,12-Benzofluoroanthene
Dibenzo(b,j,k)fluorene
$C_{20}H_{12}$
Molecular mass: 252.3

CAS # 207-08-9
RTECS # DF6350000
ICSC # 0721

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
• **INHALATION**		Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
• **SKIN**	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. Wear protective gloves when administering first aid.
• **EYES**		Safety goggles or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**		Do not eat, drink, or smoke during work.	Wear protective gloves when inducing vomiting. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Separated from strong oxidants. Tightly closed.	

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0721

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International Chemical Safety Cards

BENZO(K)FLUORANTHENE

ICSC: 0721

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** YELLOW CRYSTALS. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. Reacts with strong oxidants. **OCCUPATIONAL EXPOSURE LIMITS (OELs):** TLV not established.	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and through the skin. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 480°C Melting point: 215.7°C	Solubility in water: none Octanol/water partition coefficient as log Pow: 6.84
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to the total environment. In the food chain important to humans, bioaccumulation takes place, specifically in oils and fats.	

NOTES

Data are insufficiently available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home.

ADDITIONAL INFORMATION

ICSC: 0721 **BENZO(K)FLUORANTHENE**

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International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385

BENZ(a)ANTHRACENE
1,2-Benzoanthracene
Benzo(a)anthracene
2,3-Benzphenanthrene
Naphthanthracene
$C_{18}H_{12}$
Molecular mass: 228.3

CAS # 56-55-3
RTECS # CV9275000
ICSC # 0385
EC # 601-033-00-9

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.		Water spray, powder. In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		AVOID ALL CONTACT!	
• **INHALATION**		Local exhaust or breathing protection.	Fresh air, rest.
• **SKIN**		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• **EYES**		Safety goggles, face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Well closed.	T symbol R: 45 S: 53-45

SEE IMPORTANT INFORMATION ON BACK

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International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS TO YELLOW-BROWN FLUORESCENT FLAKES OR POWDER. **PHYSICAL DANGERS:** Dust explosion possible if in powder or granular form, mixed with air. **CHEMICAL DANGERS:** **OCCUPATIONAL EXPOSURE LIMITS (OELs):** TLV not established.	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation, through the skin and by ingestion. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** This substance is probably carcinogenic to humans.
PHYSICAL PROPERTIES	Sublimation point: 435°C Melting point: 162°C Relative density (water = 1): 1.274	Solubility in water: none Vapour pressure, Pa at 20°C: 292 Octanol/water partition coefficient as log Pow: 5.61
ENVIRONMENTAL DATA	In the food chain important to humans, bioaccumulation takes place, specifically in seafood.	

NOTES

This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. Tetraphene is a common name.

ADDITIONAL INFORMATION

ICSC: 0385 **BENZ(a)ANTHRACENE**

IMPORTANT LEGAL NOTICE:	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.

Material Safety Data Sheet

Benzo[a]pyrene, 98%

ACC# 37175

Section 1 - Chemical Product and Company Identification

MSDS Name: Benzo[a]pyrene, 98%
Catalog Numbers: AC105600000, AC105600010, AC105601000, AC377200000, AC377200010, AC377201000 AC377201000
Synonyms: 3,4-Benzopyrene; 3,4-Benzpyrene; Benzo[def]chrysene.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
50-32-8	Benzo[a]pyrene	>96	200-028-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow to brown powder.
Danger! May cause harm to the unborn child. May impair fertility. May cause eye, skin, and respiratory tract irritation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Cancer hazard. May cause allergic skin reaction. May cause heritable genetic damage.
Target Organs: Reproductive system, skin.

Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause skin irritation. May be harmful if absorbed through the skin. May cause an allergic reaction in certain individuals.
Ingestion: May cause irritation of the digestive tract. The toxicological properties of this substance have not been fully investigated. May be harmful if swallowed.
Inhalation: May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated. May be harmful if inhaled.
Chronic: May cause cancer in humans. May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs

Benzo[a]pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).

OSHA Vacated PELs: Benzo[a]pyrene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Powder
Appearance: yellow to brown
Odor: faint aromatic odor
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 495 deg C @ 760 mm Hg
Freezing/Melting Point:175 - 179 deg C
Decomposition Temperature: Not available.
Solubility: 1.60x10-3 mg/l @25°C
Specific Gravity/Density: Not available.
Molecular Formula:C20H12
Molecular Weight:252.31

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Dust generation.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 50-32-8: DJ3675000
LD50/LC50:

Not available.

Carcinogenicity:
CAS# 50-32-8:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: Adverse reproductive effects have occurred in experimental animals.
Mutagenicity: Mutagenic effects have occurred in humans.Mutagenic effects have occurred in experimental animals.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 50-32-8: waste number U022.

Section 14 - Transport Information

	US DOT	**Canada TDG**
Shipping Name:	NOT REGULATED FOR DOMESTIC TRANSPORT	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOL (Benzo{a} pyrene)
Hazard Class:		9
UN Number:		UN3077
Packing Group:		III

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 50-32-8 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 50-32-8: immediate, delayed.

Section 313

This material contains Benzo[a]pyrene (CAS# 50-32-8, >96%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Benzo[a]pyrene, a chemical known to the state of California to cause cancer.
California No Significant Risk Level: CAS# 50-32-8: 0.06 æg/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

R 43 May cause sensitization by skin contact.
R 45 May cause cancer.
R 46 May cause heritable genetic damage.
R 60 May impair fertility.
R 61 May cause harm to the unborn child.
R 50/53 Very toxic to aquatic organisms, may cause long-term
adverse effects in the aquatic environment.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice
immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.
S 60 This material and its container must be disposed of as hazardous waste.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)
CAS# 50-32-8: No information available.
Canada - DSL/NDSL
CAS# 50-32-8 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2A.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List
CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #7 Date: 6/30/2006

Material Safety Data Sheet

Chrysene, 98%

ACC# 95251

Section 1 - Chemical Product and Company Identification

MSDS Name: Chrysene, 98%
Catalog Numbers: AC224140000, AC224140010, AC224140050, AC224145000
Synonyms: 1,2-Benzophenanthrene; Benzo(a)phenanthrene; 1,2,5,6-Dibenzonaphthalene.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
218-01-9	Chrysene	98	205-923-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: very light beige solid.
Caution! May cause eye and skin irritation. May cause respiratory tract irritation. May cause cancer in humans.
Target Organs: Liver, skin.

Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause skin irritation.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: May cause respiratory tract irritation.
Chronic: May cause cancer according to animal studies.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air

immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: ; Flammability: 1; Instability:

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash hands before eating. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Avoid breathing dust.
Storage: Store in a tightly closed container. Store in a cool, dry area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chrysene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).

OSHA Vacated PELs: Chrysene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: very light beige
Odor: Not available.
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 448 deg C @ 760 mm Hg
Freezing/Melting Point:250-255 deg C
Decomposition Temperature: Not available.
Solubility: insoluble
Specific Gravity/Density: Not available.
Molecular Formula:$C_{18}H_{12}$
Molecular Weight:228.29

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Dust generation.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 218-01-9: GC0700000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 218-01-9:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans

- **California:** carcinogen, initial date 1/1/90
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: Chrysene was mutagenic to S. Typhimurium in the presence of an exogenous metabolic system.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Water flea LC50 = 1.9 mg/L; 2 Hr.; Unspecified Fish toxicity : LC50 (96hr) Neauthes arenacedentata >1ppm.(Rossi,S.S. et al Marine Pollut. Bull. 1978) Invertebrate toxicity : lethal treshold concentration (24hr) Daphnia Magna 0,7æg/l.(* Newsted,J.L. et al Environ. Toxicol. Chem. 1987) Bioaccumulation : 24hr Daphnia Magna log bioconcentration factor 3.7845 (*)
Environmental: Degradation studies : biodegradated by white rot fungus (Proc.Annu.Meet.Am.Wood-Preserv.Assoc.1989) May be utilised by axenic cultures of microorganisms e.g. Pseudomonas pancimobilis EPA505, which may have novel degradative systems(Mueller,J.G. et al ppl.Environ.Microbiol.1990; Mueller, J.G. et al Environ.Sci.Technol.1991).
Physical: Not found.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 218-01-9: waste number U050.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 218-01-9 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 218-01-9: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313

This material contains Chrysene (CAS# 218-01-9, 98%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water Act.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 218-01-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Chrysene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 218-01-9: 0.35 æg/day NSRL (oral)

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 45 May cause cancer.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.
S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 218-01-9: No information available.

Canada - DSL/NDSL

CAS# 218-01-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 218-01-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/30/1999
Revision #4 Date: 10/03/2005

Material Safety Data Sheet

Fluoranthene, 98%

ACC# 80991

Section 1 - Chemical Product and Company Identification

MSDS Name: Fluoranthene, 98%
Catalog Numbers: AC119170000, AC119170250, AC119171000, AC119175000
Synonyms: 1,2-(1,8-Naphthalenediyl)benzene; 1,2-(1,8-Naphthylene)benzene; 1,2-Benzacenaphthene; Benzene, 1,2-(1,8-naphthylene)-; Benzo(j,k)fluorene; Benzo(jk)fluoranthene; Benzo(jk)fluorene
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
206-44-0	Fluoranthene	98	205-912-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow needles.
Caution! Harmful. Causes eye and skin irritation and possible burns. May be harmful if absorbed through the skin. May be harmful if swallowed. May cause heart and liver injury.
Target Organs: Heart, liver, lungs.

Potential Health Effects

Eye: Causes eye irritation and possible burns.
Skin: May be harmful if absorbed through the skin. Causes severe skin irritation and possible burns.
Ingestion: May be harmful if swallowed. May cause rapid heartbeat and cardiac arrythmias. May cause liver injury, pulmonary edema, and respiratory arrest. May cause gastrointestinal disturbances such as nausea.
Inhalation: May cause effects similar to those described for ingestion. May produce cardiac failure and pulmonary edema.
Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the

upper and lower eyelids. Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Remove contaminated clothing and shoes.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Use only in a chemical fume hood. Do not breathe dust.
Storage: Keep containers tightly closed. Store in a cool, dry area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Fluoranthene	none listed	none listed	none listed

OSHA Vacated PELs: Fluoranthene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves and clothing to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Needles
Appearance: yellow
Odor: None reported.
pH: Not available.
Vapor Pressure: 0.01 mm Hg @ 20 deg C
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 384 deg C @ 760.00mmHg
Freezing/Melting Point:107.00 - 110.00 deg C
Decomposition Temperature: Not available.
Solubility: insoluble
Specific Gravity/Density:1.252 g/cm3
Molecular Formula:$C_{16}H_{10}$
Molecular Weight:202.25

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, strong oxidants.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, acrid smoke and fumes.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 206-44-0: LL4025000
LD50/LC50:
CAS# 206-44-0:
Oral, rat: LD50 = 2 gm/kg;

Skin, rabbit: LD50 = 3180 mg/kg;

.

Carcinogenicity:

CAS# 206-44-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: IARC Group 3: Limited or insufficient evidence for carcinogenicity in both animals and humans.Experimental tumorigenic data has been reported.

Teratogenicity: No information found

Reproductive Effects: No information found

Mutagenicity: Mutation in microorganisms: Salmonella typhimurium = 5ug/plate.Mutation in mammalian somatic cells: Human Lymphocyte = 2 umol/L.

Neurotoxicity: No information found

Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Bluegill/Sunfish: 3980 um/L; 96 H; (not specified) No data available.

Environmental: Remains in the upper few cm of soil, but can be transported to groundwater. Biodegrades from soil in a few years. Will not volatilize from soil or water. Rapidly absorbed to sediment and particulates and will readily bioconcentrate. Unadsorbed substance in water will degrade by photolysis in a days to weeks. Stable in sediment for decades or more. In the atmostphere, photodegrades with half life of 4 - 5 days, but may transport long distances without settling or raining out.

Physical: No information available.

Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series:

CAS# 206-44-0: waste number U120.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 206-44-0 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 206-44-0: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 206-44-0: immediate.
Section 313
This material contains Fluoranthene (CAS# 206-44-0, 98%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
CAS# 206-44-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 206-44-0 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 206-44-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols:
XN
Risk Phrases:
R 21/22 Harmful in contact with skin and if swallowed.

Safety Phrases:
S 22 Do not breathe dust.
S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)
CAS# 206-44-0: No information available.
Canada - DSL/NDSL
CAS# 206-44-0 is listed on Canada's NDSL List.
Canada - WHMIS

This product has a WHMIS classification of D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

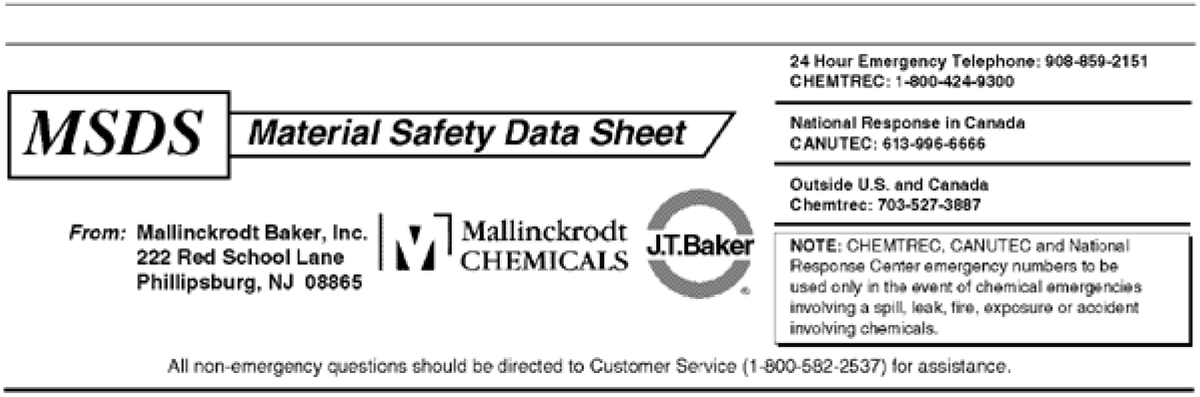
Canadian Ingredient Disclosure List

CAS# 206-44-0 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #5 Date: 10/03/2005

MSDS Number: **L2347** * * * * * *Effective Date:* ***08/10/04*** * * * * * *Supercedes:* ***11/02/01***



MSDS *Material Safety Data Sheet*

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS

J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

LEAD METAL

1. Product Identification

Synonyms: Granular lead, pigment metal; C.I. 77575
CAS No.: 7439-92-1
Molecular Weight: 207.19
Chemical Formula: Pb
Product Codes:
J.T. Baker: 2256, 2266
Mallinckrodt: 5668

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Lead	7439-92-1	95 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

J.T. Baker SAF-T-DATA$^{(tm)}$ Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Life)
Flammability Rating: 0 - None
Reactivity Rating: 0 - None
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:

Lead can be absorbed through the respiratory system. Local irritation of bronchia and lungs can occur and, in cases of acute exposure, symptoms such as metallic taste, chest and abdominal pain, and increased lead blood levels may follow. See also Ingestion.

Ingestion:
POISON! The symptoms of lead poisoning include abdominal pain and spasms, nausea, vomiting, headache. Acute poisoning can lead to muscle weakness, "lead line" on the gums, metallic taste, definite loss of appetite, insomnia, dizziness, high lead levels in blood and urine with shock, coma and death in extreme cases.

Skin Contact:
Lead and lead compounds may be absorbed through the skin on prolonged exposure; the symptoms of lead poisoning described for ingestion exposure may occur. Contact over short periods may cause local irritation, redness and pain.

Eye Contact:
Absorption can occur through eye tissues but the more common hazards are local irritation or abrasion.

Chronic Exposure:
Lead is a cumulative poison and exposure even to small amounts can raise the body's content to toxic levels. The symptoms of chronic exposure are like those of ingestion poisoning; restlessness, irritability, visual disturbances, hypertension and gray facial color may also be noted.

Aggravation of Pre-existing Conditions:
Persons with pre-existing kidney, nerve or circulatory disorders or with skin or eye problems may be more susceptible to the effects of this substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. Powder/dust is flammable when heated or exposed to flame.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Can produce toxic lead fumes at elevated temperatures and also react with oxidizing materials.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Areas in which exposure to lead metal or lead compounds may occur should be identified by signs or appropriate means, and access to the area should be limited to authorized persons. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For lead, metal and inorganic dusts and fumes, as Pb:
-OSHA Permissible Exposure Limit (PEL): 0.05 mg/m3 (TWA)
For lead, elemental and inorganic compounds, as Pb:
-ACGIH Threshold Limit Value (TLV): 0.05 mg/m3 (TWA), A3 animal carcinogen
ACGIH Biological Exposure Indices (BEI): 30 ug/100ml, notation B (see actual Indices for more information).
For lead, inorganic:
-NIOSH Recommended Exposure Limit (REL): 0.1 mg/m3 (TWA)
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face high efficiency particulate respirator (NIOSH type N100 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency particulate respirator (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.
Other Control Measures:
Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing lead compounds are handled, processed, or stored. See OSHA substance-specific standard for more information on personal protective equipment, engineering and work practice controls, medical surveillance, record keeping, and reporting requirements. (29 CFR 1910.1025).

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9. Physical and Chemical Properties

Appearance:
Small, white to blue-gray metallic shot or granules.
Odor:
Odorless.
Solubility:
Insoluble in water.
Density:
11.34
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1740C (3164F)
Melting Point:
327.5C (622F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
1.77 @ 1000C (1832F)
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Does not decompose but toxic lead or lead oxide fumes may form at elevated temperatures.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Ammonium nitrate, chlorine trifluoride, hydrogen peroxide, sodium azide, zirconium, disodium acetylide, sodium acetylide and oxidants.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

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11. Toxicological Information

Toxicological Data:
Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Lead and other smelter emissions are human reproductive hazards. (Chemical Council on

Environmental Quality; Chemical Hazards to Human Reproduction, 1981).

Carcinogenicity:

EPA / IRIS classification: Group B2 - Probable human carcinogen, sufficient animal evidence.

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--------\Cancer Lists\------------------------------------------------------
                                       ---NTP Carcinogen---
Ingredient                             Known    Anticipated    IARC Category
------------------------------------   -----    -----------    -------------
Lead (7439-92-1)                        No          No              2B
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12. Ecological Information

Environmental Fate:

When released into the soil, this material is not expected to leach into groundwater. This material may bioaccumulate to some extent.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

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--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                       TSCA  EC   Japan  Australia
-----------------------------------------------  ----  ---  -----  ---------
Lead (7439-92-1)                                  Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                        --Canada--
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  Ingredient                                     Korea  DSL   NDSL  Phil.
  -----------------------------------------------  -----  ---   ----  -----
  Lead (7439-92-1)                                  Yes   Yes   No     Yes

  --------\Federal, State & International Regulations - Part 1\----------------
                                            -SARA 302-    ------SARA 313------
  Ingredient                                RQ    TPQ     List  Chemical Catg.
  -----------------------------------------  ---   -----   ----  --------------
  Lead (7439-92-1)                          No    No      Yes        No

  --------\Federal, State & International Regulations - Part 2\----------------
                                                       -RCRA-    -TSCA-
  Ingredient                                CERCLA     261.33     8(d)
  -----------------------------------------  ------     ------    ------
  Lead (7439-92-1)                          10         No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

WARNING:
THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: None allocated.
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **3** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not

breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **M1599** * * * * * *Effective Date:* ***12/19/05*** * * * * * *Supercedes:* ***08/10/04***

MSDS *Material Safety Data Sheet*

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS
J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

MERCURY

1. Product Identification

Synonyms: Quicksilver; hydrargyrum; Liquid Silver
CAS No.: 7439-97-6
Molecular Weight: 200.59
Chemical Formula: Hg
Product Codes:
J.T. Baker: 2564, 2567, 2569
Mallinckrodt: 1278, 1280, 1288

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Mercury	7439-97-6	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! CORROSIVE. CAUSES BURNS TO SKIN, EYES, AND RESPIRATORY TRACT. MAY BE FATAL IF SWALLOWED OR INHALED. HARMFUL IF ABSORBED THROUGH SKIN. AFFECTS THE KIDNEYS AND CENTRAL NERVOUS SYSTEM. MAY CAUSE ALLERGIC SKIN REACTION.

SAF-T-DATA$^{(tm)}$ Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Life)
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Inhalation:
Mercury vapor is highly toxic via this route. Causes severe respiratory tract damage. Symptoms include sore throat, coughing, pain, tightness in chest, breathing difficulties, shortness of breath, headache, muscle weakness, anorexia, gastrointestinal disturbance, ringing in the ear, liver changes, fever, bronchitis and pneumonitis. Can be absorbed through inhalation with symptoms similar to ingestion.

Ingestion:
May cause burning of the mouth and pharynx, abdominal pain, vomiting, corrosive ulceration, bloody diarrhea. May be followed by a rapid and weak pulse, shallow breathing, paleness, exhaustion, tremors and collapse. Delayed death may occur from renal failure. Gastrointenstinal uptake of mercury is less than 5% but its ability to penetrate tissues presents some hazard. Initial symptoms may be thirst, possible abdominal discomfort.

Skin Contact:
Causes irritaton and burns to skin. Symptoms include redness and pain. May cause skin allergy and sensitization. Can be absorbed through the skin with symptoms to parallel ingestion.

Eye Contact:
Causes irritation and burns to eyes. Symptoms include redness, pain, blurred vision; may cause serious and permanent eye damage.

Chronic Exposure:
Chronic exposure through any route can produce central nervous system damage. May cause muscle tremors, personality and behavior changes, memory loss, metallic taste, loosening of the teeth, digestive disorders, skin rashes, brain damage and kidney damage. Can cause skin allergies and accumulate in the body. Repeated skin contact can cause the skin to turn gray in color. A suspected reproductive hazard; may damage the developing fetus and decrease fertility in males and females.

Aggravation of Pre-existing Conditions:
Persons with nervous disorders, or impaired kidney or respiratory function, or a history of allergies or a known sensitization to mercury may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Undergoes hazardous reactions in the presence of heat and sparks or ignition. Smoke may contain toxic mercury or mercuric oxide. Smoke may contain toxic mercury or mercuric oxide.

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6. Accidental Release Measures

Ventilate area of leak or spill. Clean-up personnel require protective clothing and respiratory protection from vapor.

Spills: Pick up and place in a suitable container for reclamation or disposal in a method that does not generate misting. Sprinkle area with sulfur or calcium polysulfide to suppress mercury. Do not flush to sewer. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker CINNASORB® and RESISORB® are recommended for spills of this product.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Do not use or store on porous work surfaces (wood, unsealed concrete, etc.). Follow strict hygiene practices. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- OSHA Acceptable Ceiling Concentration:
mercury and mercury compounds: 0.1 mg/m3 (TWA), skin
- ACGIH Threshold Limit Value (TLV):
inorganic and metallic mercury, as Hg: 0.025 mg/m3 (TWA) skin, A4 Not classifiable as a human carcinogen.
- ACGIH Biological Exposure Indices:
total inorganic mercury in urine (preshift): 35 ug/g creatinine;
total inorganic mercury in blood (end of shift): 15 ug/l.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face respirator with a mercury vapor or chlorine gas cartridge may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with a mercury vapor or chlorine gas cartridge may be worn up to 50 times the exposure limit, or the maximum use concentraiton specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Silver-white, heavy, mobile, liquid metal.
Odor:
Odorless.
Solubility:
Insoluble in water.
Density:
13.55
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
356.7C (675F)
Melting Point:
-38.87C (-38F)
Vapor Density (Air=1):
7.0
Vapor Pressure (mm Hg):
0.0018 @ 25C (77F)
Evaporation Rate (BuAc=1):
4

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
At high temperatures, vaporizes to form extremely toxic fumes.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Acetylenes, ammonia, ethylene oxide, chlorine dioxide, azides, metal oxides, methyl silane, lithium, rubidium, oxygen, strong oxidants, metal carbonyls.
Conditions to Avoid:
Heat, flames, ignition sources, metal surfaces and incompatibles.

---

11. Toxicological Information

Toxicological Data:
Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
All forms of mercury can cross the placenta to the fetus, but most of what is known has

been learned from experimental animals. See Chronic Health Hazards.
Carcinogenicity:
EPA / IRIS classification: Group D1 - Not classifiable as a human carcinogen.

--------\Cancer Lists\--

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Mercury (7439-97-6)	No	No	3

12. Ecological Information

Environmental Fate:
This material has an experimentally-determined bioconcentration factor (BCF) of greater than 100. This material is expected to significantly bioaccumulate.
Environmental Toxicity:
This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are less than 1 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, MERCURY
Hazard Class: 8
UN/NA: UN2809
Packing Group: III
Information reported for product/size: 1LB

International (Water, I.M.O.)

Proper Shipping Name: MERCURY
Hazard Class: 8
UN/NA: UN2809
Packing Group: III
Information reported for product/size: 1LB

International (Air, I.C.A.O.)

Proper Shipping Name: MERCURY
Hazard Class: 8
UN/NA: UN2809
Packing Group: III
Information reported for product/size: 1LB

15. Regulatory Information

```
  --------\Chemical Inventory Status - Part 1\---------------------------------
  Ingredient                                       TSCA  EC   Japan  Australia
  -----------------------------------------------  ----  ---  -----  ---------
  Mercury (7439-97-6)                               Yes  Yes   No       Yes

  --------\Chemical Inventory Status - Part 2\---------------------------------
                                                          --Canada--
  Ingredient                                       Korea  DSL   NDSL  Phil.
  -----------------------------------------------  -----  ---   ----  -----
  Mercury (7439-97-6)                               Yes   Yes   No     Yes

  --------\Federal, State & International Regulations - Part 1\----------------
                                             -SARA 302-    ------SARA 313------
  Ingredient                                 RQ    TPQ     List  Chemical Catg.
  -----------------------------------------  ---   -----   ----  --------------
  Mercury (7439-97-6)                        No    No      Yes        No

  --------\Federal, State & International Regulations - Part 2\----------------
                                                        -RCRA-    -TSCA-
  Ingredient                                 CERCLA     261.33     8(d)
  -----------------------------------------  ------     ------    ------
  Mercury (7439-97-6)                        1          U151       No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Pure / Liquid)
```

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 2Z
Poison Schedule: S7
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
DANGER! CORROSIVE. CAUSES BURNS TO SKIN, EYES, AND RESPIRATORY TRACT. MAY BE FATAL IF SWALLOWED OR INHALED. HARMFUL IF ABSORBED THROUGH SKIN. AFFECTS THE KIDNEYS AND CENTRAL NERVOUS SYSTEM. MAY CAUSE ALLERGIC SKIN REACTION.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Material Safety Data Sheet

Phenanthrene, 90%

ACC# 59921

Section 1 - Chemical Product and Company Identification

MSDS Name: Phenanthrene, 90%
Catalog Numbers: AC130100000, AC130100010, AC130102500
Synonyms:
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
85-01-8	Phenanthrene	90.0	201-581-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: brown solid.

Caution! Powdered material may form explosive dust-air mixtures. May cause allergic skin reaction. May cause eye and skin irritation. May cause respiratory tract irritation. Cancer suspect agent.

Target Organs: None.

Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause skin irritation. May cause photosensitive skin reactions in certain individuals.
Ingestion: May cause irritation of the digestive tract.
Inhalation: Inhalation of dust may cause respiratory tract irritation.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid imme diately.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Dusts at sufficient concentrations can form explosive mixtures with air. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use water spray or dry chemical.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Phenanthrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).

OSHA Vacated PELs: Phenanthrene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: brown
Odor: none reported
pH: Not available.
Vapor Pressure: 1 mm Hg @116c
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 340 deg C
Freezing/Melting Point:101 deg C
Decomposition Temperature: Not available.
Solubility: insoluble
Specific Gravity/Density:1.0630g/cm3
Molecular Formula:$C_{14}H_{10}$
Molecular Weight:178.23

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, dust generation, strong oxidants.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 85-01-8: SF7175000
LD50/LC50:
CAS# 85-01-8:
  Oral, mouse: LD50 = 700 mg/kg;
  Oral, rat: LD50 = 1.8 gm/kg;
.

Carcinogenicity:
CAS# 85-01-8:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 85-01-8 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 85-01-8: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 85-01-8: immediate.

Section 313

This material contains Phenanthrene (CAS# 85-01-8, 90.0%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
CAS# 85-01-8 is listed as a Priority Pollutant under the Clean Water Act.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 85-01-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 45 May cause cancer.

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 85-01-8: No information available.

Canada - DSL/NDSL

CAS# 85-01-8 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.

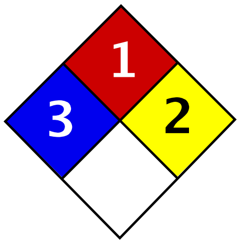
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 85-01-8 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 7/14/1998
Revision #3 Date: 10/03/2005



Health	3
Fire	1
Reactivity	2
Personal Protection	E

Material Safety Data Sheet
Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to kidneys, lungs, the nervous system, mucous membranes.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not

present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.01 from ACGIH (TLV) [United States] [1995]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH.
Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion, of inhalation.
Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic
Pennsylvania RTK: Arsenic
Massachusetts RTK: Arsenic
TSCA 8(b) inventory: Arsenic

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R22- Harmful if swallowed.
R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 2

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Safety glasses.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
-Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec.
-Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec.
-SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II.
-Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

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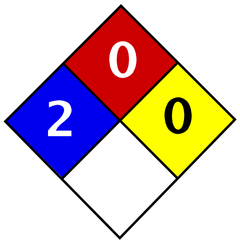

Health	2
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Nickel metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Nickel metal

Catalog Codes: SLN2296, SLN1342, SLN1954

CAS#: 7440-02-0

RTECS: QR5950000

TSCA: TSCA 8(b) inventory: Nickel metal

CI#: Not applicable.

Synonym: Nickel Metal shot; Nickel metal foil.

Chemical Name: Nickel

Chemical Formula: Ni

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Nickel metal	7440-02-0	100

Toxicological Data on Ingredients: Nickel metal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (sensitizer), of ingestion, of inhalation (lung sensitizer).
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to skin.
The substance may be toxic to kidneys, lungs, liver, upper respiratory tract.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable solid.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Material in powder form, capable of creating a dust explosion. This material is flammable in powder form only.

Special Remarks on Explosion Hazards:
Material in powder form, capable of creating a dust explosion.
Mixtures containing Potassium Perchlorate with Nickel & Titanium powders & infusorial earth can explode.
Adding 2 or 3 drops of approximately 90% peroxyformic acid to powdered nickel will result in explosion.
Powdered nickel reacts explosively upon contact with fused ammonium nitrate at temperatures below 200 deg. C.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Keep away from incompatibles such as oxidizing agents, combustible materials, metals, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 1 (mg/m3) from ACGIH (TLV) [United States] Inhalation Respirable.
TWA: 0.5 (mg/m3) [United Kingdom (UK)]
TWA: 1 (mg/m3) from OSHA (PEL) [United States] InhalationConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid. Lustrous solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 58.71 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 2730°C (4946°F)

Melting Point: 1455°C (2651°F)

Critical Temperature: Not available.

Specific Gravity: Density: 8.908 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water.
Insoluble in Ammonia.
Soluble in dilute Nitric Acid.
Slightly soluble in Hydrochloric Acid, Sulfuric Acid.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, combustible materials, metals, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with strong acids, selenium, sulfur, wood and other combustibles, nickel nitrate, aluminum, aluminum trichloride, ethylene, p-dioxan, hydrogen, methanol, non-metals, oxidants, sulfur compounds, aniline, hydrogen sulfide, flammable solvents, hydrazine, and metal powders (especially zinc, aluminum, and magnesium), ammonium nitrate, nitryl fluoride, bromine pentafluoride, potassium perchlorate + titanium powder + indusorial earth.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available.
LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP.
Causes damage to the following organs: skin.
May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:

Hazardous in case of inhalation.
Slightly hazardous in case of skin contact (irritant, sensitizer), of ingestion.

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose/Conc:
LDL [Rat] - Route: Oral; Dose: 5000 mg/kg
LDL [Guinea Pig] - Route: Oral; Dose: 5000 mg/kg

Special Remarks on Chronic Effects on Humans: May cause cancer based on animal test data

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Nickel dust and fume can irritate skin.
Eyes: Nickel dust and fume can irritate eyes.
Inhalation: Inhalation of dust or fume may cause respiratory tract irritation with non-productive cough, hoarseness, sore throat, headache, vertigo, weakness, chest pain, followed by delayed effects, including tachypnea, dyspnea, and ARDS. Death due to ARDS has been reported following inhalation of high concentrations of respirable metallic nickel dust. Later effects may include pulmonary edema and fibrosis.
Ingestion: Metallic nickel is generally considered not to be acutely toxic if ingested. Ingestion may cause nausea, vomiting, abdominal , and diarrhea. Nickel may damage the kidneys(proteinuria), and may affect liver function. It may also affect behavior (somnolence), and cardiovascular system (increased cornary artery resistance, decreased myocardial contractility, myocardial damage, regional or general arteriolar or venus dilation).
Chronic Potential Health Effects:
Skin: May cause skin allergy. Nickel and nickel compounds are among the most common sensitizers inducing allergic contact dermatitis.
Inhalation: Chronic inhalation nickel dust or fume can cause chronic hypertrophic rhinitis, sinusitis, nasal polyps, perforation of the nasal septum, chronic pulmonary irritation, fibrosis, pulmonary edema, pulmonary eosinophilia, Pneumoconiosis, allergies (asthma-like allergy), and cancer of the nasal sinus cavities, lungs, and possibly other organs. Future exposures can cause asthma attacks with shortness of breath, wheezing, cough, and/or chest tightness. Chronic inhalation of nickel dust or fume may also affect the liver (impaired liver function tests), and blood (changes in red blood cell count).
Ingestion: Prolonged or repeated ingestion of nickel can be a source chronic urticaria and other signs of allergy. Chronic ingestion of NIckel may also affect respiration and cause pneumoconiosis or fibrosis.
Note: In the general population, sensitization occurs from exposure to nickel-containing coins, jewelry, watches,

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Nickel metal
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Nickel metal
Connecticut hazardous material survey.: Nickel metal
Illinois toxic substances disclosure to employee act: Nickel metal
Illinois chemical safety act: Nickel metal
New York release reporting list: Nickel metal
Rhode Island RTK hazardous substances: Nickel metal
Pennsylvania RTK: Nickel metal
Michigan critical material: Nickel metal
Massachusetts RTK: Nickel metal
Massachusetts spill list: Nickel metal
New Jersey: Nickel metal
New Jersey spill list: Nickel metal
Louisiana spill reporting: Nickel metal
California Director's List of Hazardous Substances: Nickel metal
TSCA 8(b) inventory: Nickel metal

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R40- Possible risks of irreversible effects.
R43- May cause sensitization by skin contact.
S22- Do not breathe dust.
S36- Wear suitable protective clothing.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 10/10/2005 08:42 PM

U.S. Environmental Protection Agency

Pesticides: Topical & Chemical Fact Sheets

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EPA Home > Pesticides > About Pesticides > Fact Sheets > Health and Safety > Assessing Health Risks from Pesticides

Health & Safety
Specific Chemicals
Regulatory Actions

Assessing Health Risks from Pesticides

January 1999
735-F-99-002

The Federal Government, in cooperation with the States, carefully regulates pesticides to ensure that they do not pose unreasonable risks to human health or the environment. As part of that effort, the Environmental Protection Agency (EPA) requires extensive test data from pesticide producers that demonstrate pesticide products can be used without posing harm to human health and the environment. EPA scientists and analysts carefully review these data to determine whether to register (license) a pesticide product or a use and whether specific restrictions are necessary. This fact sheet is a brief overview of EPA's process for assessing potential risks to human health when evaluating pesticide products.

Background

There are more than 865 active ingredients registered as pesticides, which are formulated into thousands of pesticide products that are available in the marketplace. About 350 pesticides are used on the foods we eat, and to protect our homes and pets.

EPA plays a critical role in evaluating these chemicals prior to registration, and in reevaluating older pesticides already on the market, to ensure that they can be used with a reasonable certainty of no harm. The process EPA uses for evaluating the health impacts of a pesticide is called risk assessment.

EPA uses the National Research Council's four-step process for human health risk assessment:

Step One: Hazard Identification
Step Two: Dose-Response Assessment
Step Three: Exposure Assessment
Step Four: Risk Characterization

Step One: Hazard Identification (Toxicology)

The first step in the risk assessment process is to identify potential health effects that may occur from different types of pesticide exposure. EPA considers the full spectrum of a pesticide's potential health effects.

Generally, for human health risk assessments, many toxicity studies are conducted on animals by pesticide companies in independent laboratories and evaluated for acceptability by EPA scientists. EPA evaluates pesticides for a wide range of adverse effects, from eye and skin irritation to cancer and birth defects in laboratory animals. EPA may also consult the public literature or other sources of supporting information on any aspect of the chemical.

Step Two: Dose-Response Assessment

Paracelsus, the Swiss physician and alchemist, the "father" of modern toxicology (1493-1541) said,

> "The dose makes the poison."

In other words, **the amount of a substance a person is exposed to** is as important as **how toxic the chemical might be**. For example, small doses of aspirin can be beneficial to people, but at very high doses, this common medicine can be deadly. In some individuals, even at very low doses, aspirin may be deadly.

Dose-response assessment involves considering the dose levels at which adverse effects were observed in test animals, and using these dose levels to calculate an equal dose in humans.

Step Three: Exposure Assessment

People can be exposed to pesticides in three ways:

1. Inhaling pesticides (inhalation exposure),
2. Absorbing pesticides through the skin (dermal exposure), and
3. Getting pesticides in their mouth or digestive tract (oral exposure).

Depending on the situation, pesticides could enter the body by any one or all of these routes. Typical sources of pesticide exposure include:

- **Food**
  Most of the foods we eat have been grown with the use of pesticides. Therefore, pesticide residues may be present inside or on the surfaces of these foods.

- **Home and Personal Use Pesticides**
  You might use pesticides in and around your home to control insects, weeds, mold, mildew, bacteria, lawn and garden pests and to protect your pets from pests such as fleas. Pesticides may also be used as insect repellants which are directly applied to the skin or clothing.

- **Pesticides in Drinking Water**
  Some pesticides that are applied to farmland or other land structures can make their way in small amounts to the ground water or surface water systems that feed drinking water supplies.

- **Worker Exposure to Pesticides**
  Pesticide applicators, vegetable and fruit pickers and others who work around pesticides can be exposed due to the nature of their jobs. To address the unique risks workers face from occupational exposure, EPA evaluates occupational exposure through a separate program. All pesticides registered by EPA have been shown to be safe when used properly.

Step Four: Risk Characterization

Risk characterization is the final step in assessing human health risks from pesticides. It is the process of combining the hazard, dose-response and exposure assessments to describe the overall risk from a pesticide. It explains the assumptions used in assessing exposure as well as the uncertainties that are built into the dose-response assessment. The strength of the overall database is considered, and broad conclusions are made. EPA's role is to evaluate both toxicity and exposure and to determine the risk associated with use of the pesticide.

Simply put,

RISK = TOXICITY x EXPOSURE.

This means that the risk to human health from pesticide exposure depends on both the toxicity of the pesticide and the likelihood of people coming into contact with it. At least *some* exposure and *some* toxicity are required to result in a risk. For example, if the pesticide is very poisonous, but no people are exposed, there is no risk. Likewise, if there is ample exposure but the chemical is non-toxic, there is no risk. However, usually when pesticides are used, there is some toxicity and exposure, which results in a potential risk.

EPA recognizes that effects vary between animals of different species and from person to person. To account for this variability, *uncertainty factors* are built into the risk assessment. These uncertainty factors create an additional margin of safety for protecting people who may be exposed to the pesticides. FQPA requires EPA to use an extra 10-fold safety factor, if necessary, to protect infants and children from effects of the pesticide.

Types of Toxicity Tests EPA Requires for Human Health Risk Assessments

EPA evaluates studies conducted over different periods of time and that measure specific types of effects. These tests are evaluated to screen for potential health effects in infants, children and adults.

Acute Testing: Short-term exposure; a single exposure (dose).

- Oral, dermal (skin), and inhalation exposure
- Eye irritation
- Skin irritation
- Skin sensitization
- Neurotoxicity

Sub-chronic Testing: Intermediate exposure; repeated exposure over a longer period of time (i.e., 30-90 days).

- Oral, dermal (skin), and inhalation
- Neurotoxicity (nerve system damage)

Chronic Toxicity Testing: Long-term exposure; repeated exposure lasting for most of the test animal's life span. Intended to determine the effects of a pesticide after prolonged and repeated exposures.

- Chronic effects (non-cancer)
- Carcinogenicity (cancer)

Developmental and Reproductive Testing: Identify effects in the fetus of an exposed pregnant female (birth defects) and how pesticide exposure affects the ability of a test animal to successfully reproduce.

Mutagenicity Testing: Assess a pesticide's potential to affect the cell's genetic components.

Hormone Disruption: Measure effects for their potential to disrupt the endocrine system. The endocrine system consists of a set of glands and the hormones they produce that help guide the development, growth, reproduction, and behavior of animals including humans.

Risk Management

Once EPA completes the risk assessment process for a pesticide, we use this information to determine if (when used according to label directions), there is a reasonable certainty that the pesticide will not harm a person's health.

Using the conclusions of a risk assessment, EPA can then make a more informed decision regarding whether to approve a pesticide chemical or use, as proposed, or whether additional protective measures are necessary to limit occupational or non-occupational exposure to a pesticide. For example, EPA may prohibit a pesticide from being used on certain crops because consuming too much food treated with the pesticide may result in an unacceptable risk to consumers. Another example of protective measures is requiring workers to wear personal protective equipment (PPE) such as a respirator or chemical resistant gloves, or not allowing workers to enter treated crop fields until a specific period of time has passed.

If, after considering all appropriate risk reduction measures, the pesticide still does not meet EPA's safety standard, the Agency will not allow the proposed chemical or use. Regardless of the specific measures enforced, EPA's primary goal is to ensure that legal uses of the pesticide are protective of human health, especially the health of children, and the environment.

Human Health Risk Assessment and the Law

Federal law requires detailed evaluation of pesticides to protect human health and the environment. In 1996, Congress made significant changes to strengthen pesticide laws through the Food Quality Protection Act (FQPA). Many of these changes are key elements of the current risk assessment process. FQPA required that EPA consider:

- **A New Safety Standard**: FQPA strengthened the safety standard that pesticides must meet before being approved for use. EPA must ensure with a reasonable certainty that no harm will result from the legal uses of the pesticide.
- **Exposure from All Sources**: In evaluating a pesticide, EPA must estimate the combined risk from that pesticide from all non-occupational sources, such as:
    - Food Sources
    - Drinking Water Sources
    - Residential Sources
- **Cumulative Risk**: EPA is required to evaluate pesticides in light of similar toxic effects that different pesticides may share, or "a common mechanism of toxicity." At this time, EPA is developing a methodology for this type of assessment.
- **Special Sensitivity of Children to Pesticides**: EPA must ascertain whether there is an increased susceptibility from exposure to the pesticide to infants and children. EPA must build an additional 10-fold safety factor into risk assessments to ensure the protection of infants and children, unless it is determined that a lesser margin of safety will be safe for infants and children.

For More Information

If you would like more information about EPA's pesticide programs, contact the Communication Service Branch at (703) 305-5017 or visit the Pesticides Web site.

For more information on specific pesticides, or to inquire about the symptoms of pesticide poisoning, call the National Pesticide Information Center (NPIC), a toll-free hotline information at: 1-800-858-7378, or visit their Web site EXIT Disclaimer .

Publications | Glossary | A-Z Index | Jobs

EPA Home | Privacy and Security Notice | Contact Us

Last updated on Tuesday, May 2nd, 2006
URL: http://www.epa.gov/pesticides/factsheets/riskassess.htm

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Search | Index | Home | Glossary | Contact Us

CONTENTS

- Highlights
- What are polychlorinated biphenyls (PCBs)?
- What happens to polychlorinated biphenyls (PCBs) when they enter the environment?
- How might I be exposed to polychlorinated biphenyls (PCBs)?
- How can polychlorinated biphenyls (PCBs) affect my health?
- How likely are polychlorinated biphenyls (PCBs) to cause cancer?
- How do polychlorinated biphenyls (PCBs) affect children?
- How can families reduce the risk of exposure to polychlorinated biphenyls (PCBs)??
- Is there a medical test to show whether I've been exposed to polychlorinated biphenyls (PCBs)?
- Has the federal government made recommendations to protect human health?
- References

February 2001

ToxFAQs™
for
Polychlorinated Biphenyls (PCBs)

(Bifenilos Policlorados (BPCs))

This fact sheet answers the most frequently asked health questions about polychlorinated biphenyls (PCBs). For more information, you may 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: 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 (PCBs)?

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,

Contact Information

RELATED RESOURCES

ToxFAQ™ *35k*

ToxFAQ™ en Español *32k*

Public Health Statement *125k*

Public Health Statement en Español *321k*

Toxicological Profile *13.6MB*

A-Z INDEX

A B C
D E
F G H I
J K
L M N O P
Q R S
T U
V W X Y Z

ATSDR RESOURCES

ToxFAQs™

ToxFAQs™ en Español

Public Health Statements

Toxicological Profiles

Minimum Risk Levels

MMGs

MHMIs

Interaction Profiles

Priority List of Hazardous Substances

Division of Toxicology

and old microscope and hydraulic oils.

back to top

What happens to polychlorinated biphenyls (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.

back to top

How might I be exposed to polychlorinated biphenyls (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.

back to top

How can polychlorinated biphenyls (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.

back to top

How likely are polychlorinated biphenyls (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.

back to top

How do polychlorinated biphenyls (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.

back to top

How can families reduce the risk of exposure to polychlorinated biphenyls (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.

back to top

Is there a medical test to show whether I've been exposed to polychlorinated biphenyls (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.

back to top

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.

back to top

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.

back to top

Where can I get more information?

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.

For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop F-32
Atlanta, GA 30333
Phone: 1-888-42-ATSDR (1-888-422-8737)
FAX: (770)-488-4178
Email: ATSDRIC@cdc.gov

back to top

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This page was updated on January , 2007

ATSDR Home | Search | Index | Glossary | Contact Us
About ATSDR | News Archive | ToxFAQs | HazDat | Public Health Assessments
Privacy Policy | External Links Disclaimer | Accessibility
U.S. Department of Health and Human Services

ATSDR Department of Health and Human Services
Agency for Toxic Substances & Disease Registry

2007 CERCLA Priority List of Hazardous Substances

2007 RANK	SUBSTANCE NAME	TOTAL POINTS	2005 RANK	CAS #
1	ARSENIC	1672.58	1	007440-38-2
2	LEAD	1534.07	2	007439-92-1
3	MERCURY	1504.69	3	007439-97-6
4	VINYL CHLORIDE	1387.75	4	000075-01-4
5	POLYCHLORINATED BIPHENYLS	1365.78	5	001336-36-3
6	BENZENE	1355.96	6	000071-43-2
7	CADMIUM	1324.22	8	007440-43-9
8	POLYCYCLIC AROMATIC HYDROCARBONS	1316.98	7	130498-29-2
9	BENZO(A)PYRENE	1312.45	9	000050-32-8
10	BENZO(B)FLUORANTHENE	1266.55	10	000205-99-2
11	CHLOROFORM	1223.03	11	000067-66-3
12	DDT, P,P'-	1193.36	12	000050-29-3
13	AROCLOR 1254	1182.63	13	011097-69-1
14	AROCLOR 1260	1177.77	14	011096-82-5
15	DIBENZO(A,H)ANTHRACENE	1165.88	15	000053-70-3
16	TRICHLOROETHYLENE	1154.73	16	000079-01-6
17	DIELDRIN	1150.91	17	000060-57-1
18	CHROMIUM, HEXAVALENT	1149.98	18	018540-29-9
19	PHOSPHORUS, WHITE	1144.77	19	007723-14-0
20	CHLORDANE	1133.21	21	000057-74-9
21	DDE, P,P'-	1132.49	20	000072-55-9
22	HEXACHLOROBUTADIENE	1129.63	22	000087-68-3
23	COAL TAR CREOSOTE	1124.32	23	008001-58-9
24	ALDRIN	1117.22	25	000309-00-2
25	DDD, P,P'-	1114.83	24	000072-54-8
26	BENZIDINE	1114.24	26	000092-87-5
27	AROCLOR 1248	1112.20	27	012672-29-6
28	CYANIDE	1099.48	28	000057-12-5
29	AROCLOR 1242	1093.14	29	053469-21-9
30	AROCLOR	1091.52	62	012767-79-2
31	TOXAPHENE	1086.65	30	008001-35-2
32	HEXACHLOROCYCLOHEXANE, GAMMA-	1081.63	32	000058-89-9
33	TETRACHLOROETHYLENE	1080.43	31	000127-18-4
34	HEPTACHLOR	1072.67	33	000076-44-8
35	1,2-DIBROMOETHANE	1064.06	34	000106-93-4
36	HEXACHLOROCYCLOHEXANE, BETA-	1060.22	37	000319-85-7
37	ACROLEIN	1059.07	36	000107-02-8
38	DISULFOTON	1058.85	35	000298-04-4
39	BENZO(A)ANTHRACENE	1057.96	38	000056-55-3
40	3,3'-DICHLOROBENZIDINE	1051.61	39	000091-94-1

41	ENDRIN	1048.57	41	000072-20-8
42	BERYLLIUM	1046.12	40	007440-41-7
43	HEXACHLOROCYCLOHEXANE, DELTA-	1038.27	42	000319-86-8
44	1,2-DIBROMO-3-CHLOROPROPANE	1035.55	43	000096-12-8
45	PENTACHLOROPHENOL	1028.01	45	000087-86-5
46	HEPTACHLOR EPOXIDE	1027.12	44	001024-57-3
47	CARBON TETRACHLORIDE	1023.32	46	000056-23-5
48	AROCLOR 1221	1018.41	47	011104-28-2
49	COBALT	1015.57	50	007440-48-4
50	DDT, O,P'-	1014.71	49	000789-02-6
51	AROCLOR 1016	1014.33	48	012674-11-2
52	DI-N-BUTYL PHTHALATE	1007.49	52	000084-74-2
53	NICKEL	1005.40	55	007440-02-0
54	ENDOSULFAN	1004.65	54	000115-29-7
55	ENDOSULFAN SULFATE	1003.56	53	001031-07-8
56	DIAZINON	1002.08	57	000333-41-5
57	ENDOSULFAN, ALPHA	1001.30	58	000959-98-8
58	XYLENES, TOTAL	996.07	59	001330-20-7
59	CIS-CHLORDANE	995.08	51	005103-71-9
60	DIBROMOCHLOROPROPANE	994.87	60	067708-83-2
61	METHOXYCHLOR	994.47	61	000072-43-5
62	BENZO(K)FLUORANTHENE	981.26	63	000207-08-9
63	ENDRIN KETONE	978.99	64	053494-70-5
64	TRANS-CHLORDANE	973.99	56	005103-74-2
65	CHROMIUM(VI) OXIDE	969.58	66	001333-82-0
66	METHANE	959.78	67	000074-82-8
67	ENDOSULFAN, BETA	959.19	65	033213-65-9
68	AROCLOR 1232	955.64	68	011141-16-5
69	ENDRIN ALDEHYDE	954.86	69	007421-93-4
70	BENZOFLUORANTHENE	951.48	70	056832-73-6
71	TOLUENE	947.50	71	000108-88-3
72	2-HEXANONE	942.02	72	000591-78-6
73	2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN	938.11	73	001746-01-6
74	ZINC	932.89	74	007440-66-6
75	DIMETHYLARSINIC ACID	922.06	75	000075-60-5
76	DI(2-ETHYLHEXYL)PHTHALATE	919.02	76	000117-81-7
77	CHROMIUM	908.52	77	007440-47-3
78	NAPHTHALENE	896.67	78	000091-20-3
79	1,1-DICHLOROETHENE	891.19	79	000075-35-4
80	METHYLENE CHLORIDE	888.96	81	000075-09-2
81	AROCLOR 1240	888.11	80	071328-89-7
82	2,4,6-TRINITROTOLUENE	883.59	82	000118-96-7
83	BROMODICHLOROETHANE	870.00	83	000683-53-4
84	HYDRAZINE	864.41	85	000302-01-2
85	1,2-DICHLOROETHANE	863.99	84	000107-06-2
86	2,4,6-TRICHLOROPHENOL	863.71	86	000088-06-2
87	2,4-DINITROPHENOL	860.45	87	000051-28-5
88	BIS(2-CHLOROETHYL) ETHER	859.88	88	000111-44-4
89	THIOCYANATE	849.21	89	000302-04-5
90	ASBESTOS	841.54	90	001332-21-4
91	CHLORINE	840.37	92	007782-50-5
92	CYCLOTRIMETHYLENETRINITRAMINE (RDX)	840.28	91	000121-82-4
93	HEXACHLOROBENZENE	838.34	93	000118-74-1

94	2,4-DINITROTOLUENE	837.88	96	000121-14-2
95	RADIUM-226	835.93	94	013982-63-3
96	ETHION	834.03	97	000563-12-2
97	1,1,1-TRICHLOROETHANE	833.81	95	000071-55-6
98	URANIUM	833.41	98	007440-61-1
99	ETHYLBENZENE	832.13	99	000100-41-4
100	RADIUM	828.07	100	007440-14-4
101	THORIUM	825.17	101	007440-29-1
102	4,6-DINITRO-O-CRESOL	822.78	102	000534-52-1
103	1,3,5-TRINITROBENZENE	820.17	103	000099-35-4
104	CHLOROBENZENE	819.69	105	000108-90-7
105	RADON	817.89	104	010043-92-2
106	RADIUM-228	816.76	106	015262-20-1
107	THORIUM-230	814.72	107	014269-63-7
107	URANIUM-235	814.72	107	015117-96-1
109	BARIUM	813.46	109	007440-39-3
110	FLUORANTHENE	812.40	113	000206-44-0
111	URANIUM-234	812.11	110	013966-29-5
112	N-NITROSODI-N-PROPYLAMINE	811.05	111	000621-64-7
113	THORIUM-228	810.36	112	014274-82-9
114	RADON-222	809.78	114	014859-67-7
115	HEXACHLOROCYCLOHEXANE, ALPHA-	809.56	116	000319-84-6
116	1,2,3-TRICHLOROBENZENE	808.41	143	000087-61-6
117	MANGANESE	807.90	115	007439-96-5
118	COAL TARS	807.07	117	008007-45-2
119	CHRYSOTILE ASBESTOS	806.68	119	012001-29-5
119	STRONTIUM-90	806.68	119	010098-97-2
121	PLUTONIUM-239	806.67	118	015117-48-3
122	POLONIUM-210	806.39	122	013981-52-7
123	METHYLMERCURY	806.39	121	022967-92-6
124	PLUTONIUM-238	806.01	123	013981-16-3
125	LEAD-210	805.90	124	014255-04-0
126	PLUTONIUM	805.23	125	007440-07-5
127	CHLORPYRIFOS	804.93	125	002921-88-2
128	COPPER	804.86	133	007440-50-8
129	AMERICIUM-241	804.55	128	086954-36-1
130	RADON-220	804.54	127	022481-48-7
131	AMOSITE ASBESTOS	804.07	129	012172-73-5
132	IODINE-131	803.48	130	010043-66-0
133	HYDROGEN CYANIDE	803.08	132	000074-90-8
134	TRIBUTYLTIN	802.61	131	000688-73-3
135	GUTHION	802.32	134	000086-50-0
136	NEPTUNIUM-237	802.13	135	013994-20-2
137	CHRYSENE	802.10	139	000218-01-9
138	CHLORDECONE	801.64	136	000143-50-0
138	IODINE-129	801.64	136	015046-84-1
138	PLUTONIUM-240	801.64	136	014119-33-6
141	S,S,S-TRIBUTYL PHOSPHOROTRITHIOATE	797.88	140	000078-48-8
142	BROMINE	789.15	142	007726-95-6
143	POLYBROMINATED BIPHENYLS	789.11	141	067774-32-7
144	DICOFOL	787.56	144	000115-32-2
145	PARATHION	784.14	145	000056-38-2
146	1,1,2,2-TETRACHLOROETHANE	782.15	146	000079-34-5

147	SELENIUM	778.98	147	007782-49-2	
	148	HEXACHLOROCYCLOHEXANE, TECHNICAL GRADE	774.91	148	000608-73-1
149	TRICHLOROFLUOROETHANE	770.74	149	027154-33-2	
150	TRIFLURALIN	770.12	150	001582-09-8	
151	DDD, O,P'-	768.73	151	000053-19-0	
152	4,4'-METHYLENEBIS(2-CHLOROANILINE)	766.66	152	000101-14-4	
153	HEXACHLORODIBENZO-P-DIOXIN	760.42	153	034465-46-8	
154	HEPTACHLORODIBENZO-P-DIOXIN	754.47	154	037871-00-4	
155	PENTACHLOROBENZENE	753.58	155	000608-93-5	
156	1,3-BUTADIENE	747.31	201	000106-99-0	
157	AMMONIA	745.55	156	007664-41-7	
158	2-METHYLNAPHTHALENE	743.24	157	000091-57-6	
159	1,4-DICHLOROBENZENE	737.32	159	000106-46-7	
160	1,1-DICHLOROETHANE	736.23	158	000075-34-3	
161	ACENAPHTHENE	731.25	160	000083-32-9	
162	1,2,3,4,6,7,8,9-OCTACHLORODIBENZOFURAN	726.14	161	039001-02-0	
163	1,1,2-TRICHLOROETHANE	724.96	162	000079-00-5	
164	TRICHLOROETHANE	723.32	163	025323-89-1	
165	HEXACHLOROCYCLOPENTADIENE	719.01	164	000077-47-4	
166	HEPTACHLORODIBENZOFURAN	718.58	165	038998-75-3	
167	1,2-DIPHENYLHYDRAZINE	713.90	166	000122-66-7	
168	2,3,4,7,8-PENTACHLORODIBENZOFURAN	710.71	167	057117-31-4	
169	TETRACHLOROBIPHENYL	709.21	168	026914-33-0	
170	CRESOL, PARA-	707.83	169	000106-44-5	
171	OXYCHLORDANE	706.32	170	027304-13-8	
172	1,2-DICHLOROBENZENE	704.91	171	000095-50-1	
173	1,2-DICHLOROETHENE, TRANS-	704.04	178	000156-60-5	
174	INDENO(1,2,3-CD)PYRENE	703.30	180	000193-39-5	
175	GAMMA-CHLORDENE	702.59	172	056641-38-4	
176	CARBON DISULFIDE	702.55	174	000075-15-0	
177	TETRACHLOROPHENOL	702.54	173	025167-83-3	
178	AMERICIUM	701.62	175	007440-35-9	
178	URANIUM-233	701.62	175	013968-55-3	
180	PALLADIUM	700.66	177	007440-05-3	
181	HEXACHLORODIBENZOFURAN	700.56	179	055684-94-1	
182	PHENOL	696.96	183	000108-95-2	
183	CHLOROETHANE	693.90	182	000075-00-3	
184	ACETONE	693.31	181	000067-64-1	
185	P-XYLENE	690.20	185	000106-42-3	
186	DIBENZOFURAN	689.19	187	000132-64-9	
187	ALUMINUM	688.13	186	007429-90-5	
188	2,4-DIMETHYLPHENOL	685.76	189	000105-67-9	
189	CARBON MONOXIDE	684.49	188	000630-08-0	
190	TETRACHLOROETHANE	677.97	190	025322-20-7	
191	HYDROGEN SULFIDE	676.51	193	007783-06-4	
192	PENTACHLORODIBENZOFURAN	673.21	192	030402-15-4	
193	CHLOROMETHANE	670.19	191	000074-87-3	
194	BIS(2-METHOXYETHYL) PHTHALATE	666.08	194	034006-76-3	
195	BUTYL BENZYL PHTHALATE	659.38	195	000085-68-7	
196	CRESOL, ORTHO-	658.66	196	000095-48-7	
197	HEXACHLOROETHANE	653.10	199	000067-72-1	
198	VANADIUM	651.70	198	007440-62-2	

199	N-NITROSODIMETHYLAMINE	650.71	200	000062-75-9
200	1,2,4-TRICHLOROBENZENE	647.30	203	000120-82-1
201	BROMOFORM	643.53	202	000075-25-2
202	TETRACHLORODIBENZO-P-DIOXIN	635.74	204	041903-57-5
203	1,3-DICHLOROBENZENE	631.41	205	000541-73-1
204	PENTACHLORODIBENZO-P-DIOXIN	625.12	207	036088-22-9
205	N-NITROSODIPHENYLAMINE	624.79	208	000086-30-6
206	1,2-DICHLOROETHYLENE	622.49	206	000540-59-0
207	2,3,7,8-TETRACHLORODIBENZOFURAN	622.15	210	051207-31-9
208	2-BUTANONE	620.01	209	000078-93-3
209	2,4-DICHLOROPHENOL	616.45	212	000120-83-2
210	1,4-DIOXANE	616.29	215	000123-91-1
211	FLUORINE	613.28	214	007782-41-4
212	NITRITE	612.64	216	014797-65-0
213	CESIUM-137	612.50	217	010045-97-3
214	SILVER	612.19	213	007440-22-4
215	CHROMIUM TRIOXIDE	610.85	218	007738-94-5
216	NITRATE	610.66	219	014797-55-8
217	POTASSIUM-40	608.91	220	013966-00-2
218	DINITROTOLUENE	607.65	221	025321-14-6
219	ANTIMONY	605.37	222	007440-36-0
220	COAL TAR PITCH	605.33	224	065996-93-2
221	THORIUM-227	605.32	223	015623-47-9
222	2,4,5-TRICHLOROPHENOL	604.83	225	000095-95-4
223	ARSENIC ACID	604.45	226	007778-39-4
224	ARSENIC TRIOXIDE	604.36	227	001327-53-3
225	PHORATE	603.10	228	000298-02-2
226	BENZOPYRENE	603.00	230	073467-76-2
227	CRESOLS	602.74	229	001319-77-3
228	CHLORDANE, TECHNICAL	602.62	231	012789-03-6
229	DIMETHOATE	602.61	232	000060-51-5
230	ACTINIUM-227	602.57	233	014952-40-0
230	STROBANE	602.57	233	008001-50-1
232	4-AMINOBIPHENYL	602.51	235	000092-67-1
232	PYRETHRUM	602.51	235	008003-34-7
234	ARSINE	602.42	237	007784-42-1
235	NALED	602.32	238	000300-76-5
236	DIBENZOFURANS, CHLORINATED	602.13	239	042934-53-2
236	ETHOPROP	602.13	239	013194-48-4
238	ALPHA-CHLORDENE	601.94	241	056534-02-2
238	CARBOPHENOTHION	601.94	241	000786-19-6
240	DICHLORVOS	601.64	243	000062-73-7
241	CALCIUM ARSENATE	601.45	244	007778-44-1
241	MERCURIC CHLORIDE	601.45	244	007487-94-7
241	SODIUM ARSENITE	601.45	244	007784-46-5
244	FORMALDEHYDE	599.64	247	000050-00-0
245	2-CHLOROPHENOL	599.62	248	000095-57-8
246	PHENANTHRENE	597.68	249	000085-01-8
247	HYDROGEN FLUORIDE	588.03	250	007664-39-3
248	2,4-D ACID	584.47	251	000094-75-7
249	DIBROMOCHLOROMETHANE	580.59	252	000124-48-1
250	DIURON	579.16	253	000330-54-1
251	BUTYLATE	578.43	254	002008-41-5

252	DIMETHYL FORMAMIDE	578.23	255	000068-12-2
253	PYRENE	577.95	256	000129-00-0
254	DICHLOROBENZENE	577.70	211	025321-22-6
255	ETHYL ETHER	572.47	257	000060-29-7
256	DICHLOROETHANE	570.46	258	001300-21-6
257	4-NITROPHENOL	567.79	259	000100-02-7
258	1,3-DICHLOROPROPENE, CIS-	561.82	184	010061-01-5
259	PHOSPHINE	559.74	260	007803-51-2
260	TRICHLOROBENZENE	557.96	261	012002-48-1
261	2,6-DINITROTOLUENE	555.20	262	000606-20-2
262	FLUORIDE ION	549.64	263	016984-48-8
263	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-P-DIOXIN	547.90	264	035822-46-9
264	METHYL PARATHION	545.83	265	000298-00-0
265	PENTAERYTHRITOL TETRANITRATE	545.59	266	000078-11-5
266	1,3-DICHLOROPROPENE, TRANS-	543.37	267	010061-02-6
267	BIS(2-ETHYLHEXYL)ADIPATE	540.20	268	000103-23-1
268	CARBAZOLE	534.52	269	000086-74-8
269	METHYL ISOBUTYL KETONE	533.24	271	000108-10-1
270	1,2-DICHLOROETHENE, CIS-	533.15	270	000156-59-2
271	STYRENE	532.70	272	000100-42-5
272	CARBARYL	530.98	273	000063-25-2
273	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	529.45	274	067562-39-4
274	ACRYLONITRILE	528.28	275	000107-13-1
275	1-METHYLNAPHTHALENE	526.51	NEW	

Substances were assigned the same rank when two (or more) substances received equivalent total point scores.

CAS #= Chemical Abstracts Service Registry Number

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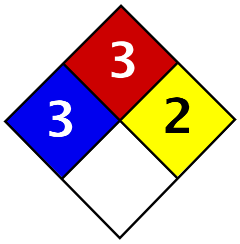

Health	3
Fire	3
Reactivity	2
Personal Protection	J

Material Safety Data Sheet
Calcium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Calcium

Catalog Codes: SLC2782

CAS#: 7440-70-2

RTECS: EV8040000

TSCA: TSCA 8(b) inventory: Calcium

CI#: Not available.

Synonym:

Chemical Formula: Ca

Contact Information:

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Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Calcium	7440-70-2	100

Toxicological Data on Ingredients: Calcium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Corrosive to eyes and skin. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to lungs, mucous membranes.
Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable solid.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Corrosive solid. Flammable solid that, in contact with water, emits flammable gases.
Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Cover with dry earth, sand or other non-combustible material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal.

Section 7: Handling and Storage

Precautions:
Keep under inert atmosphere. Keep container dry. Do not breathe dust. Never add water to this product Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes Keep away from incompatibles such as acids, moisture.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 40.08 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 1484°C (2703.2°F)

Melting Point: 839°C (1542.2°F)

Critical Temperature: Not available.

Specific Gravity: 1.54 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Not available.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances:
Highly reactive with acids.
Reactive with moisture.
The product reacts violently with water to emit flammable but non toxic gases.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available.
LC50: Not available.

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 4.3: Material that emits flammable gases on contact with water.

Identification: : Calcium : UN1401 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Calcium
Massachusetts RTK: Calcium
TSCA 8(b) inventory: Calcium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-6: Reactive and very flammable material.
CLASS E: Corrosive solid.

DSCL (EEC): R36/38- Irritating to eyes and skin.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 3

Reactivity: 2

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 3

Reactivity: 2

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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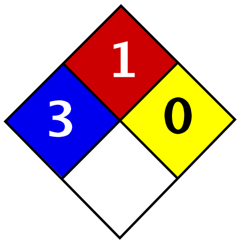
Last Updated: 11/06/2008 12:00 PM



Health	3
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Cadmium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Cadmium

Catalog Codes: SLC3484, SLC5272, SLC2482

CAS#: 7440-43-9

RTECS: EU9800000

TSCA: TSCA 8(b) inventory: Cadmium

CI#: Not applicable.

Synonym:

Chemical Name: Cadmium

Chemical Formula: Cd

Contact Information:

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Section 2: Composition and Information on Ingredients

Composition:

Name	**CAS #**	**% by Weight**
Cadmium	7440-43-9	100

Toxicological Data on Ingredients: Cadmium: ORAL (LD50): Acute: 2330 mg/kg [Rat.]. 890 mg/kg [Mouse]. DUST (LC50): Acute: 50 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant). Severe over-exposure can result in death.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to kidneys, lungs, liver.
Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: No known effect on eye contact, rinse with water for a few minutes.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 570°C (1058°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:
Non-flammable in presence of open flames and sparks, of heat, of oxidizing materials, of reducing materials, of combustible materials, of moisture.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.01 (ppm)
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 112.4 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 765°C (1409°F)

Melting Point: 320.9°C (609.6°F)

Critical Temperature: Not available.

Specific Gravity: 8.64 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity: Reacts violently with potassium.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 890 mg/kg [Mouse].
Acute toxicity of the dust (LC50): 229.9 mg/m3 4 hour(s) [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP.
The substance is toxic to kidneys, lungs, liver.

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation.
Slightly hazardous in case of skin contact (irritant, sensitizer).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: An allergen. 0047 Animal: embryotoxic, passes through the placental barrier.

Special Remarks on other Toxic Effects on Humans: May cause allergic reactions, exzema and/or dehydration of the skin.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport:

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Cadmium
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Cadmium
Pennsylvania RTK: Cadmium
Massachusetts RTK: Cadmium
TSCA 8(b) inventory: Cadmium
SARA 313 toxic chemical notification and release reporting: Cadmium
CERCLA: Hazardous substances.: Cadmium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R26- Very toxic by inhalation.
R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Safety glasses.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
-Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec.
-Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec.
-SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II.
-Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

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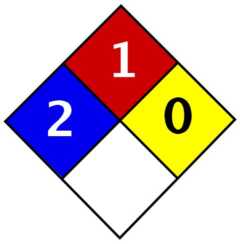

Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Copper MSDS

Section 1: Chemical Product and Company Identification

Product Name: Copper

Catalog Codes: SLC4939, SLC2152, SLC3943, SLC1150, SLC2941, SLC4729, SLC1936, SLC3727, SLC5515

CAS#: 7440-50-8

RTECS: GL5325000

TSCA: TSCA 8(b) inventory: Copper

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Cu

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Copper	7440-50-8	100

Toxicological Data on Ingredients: Copper LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to lungs, mucous membranes.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. Avoid contact with eyes Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If you feel unwell, seek medical attention and show the label when possible.

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 1 (mg/m3) from ACGIH [1990]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 63.54 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 2595°C (4703°F)

Melting Point: 1083°C (1981.4°F)

Critical Temperature: Not available.

Specific Gravity: 8.94 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available.
LC50: Not available.

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion.
Hazardous in case of inhalation.
Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Human: passes through the placenta, excreted in maternal milk.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Copper
Massachusetts RTK: Copper
TSCA 8(b) inventory: Copper
CERCLA: Hazardous substances.: Copper

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Dust respirator. Be sure to use an
approved/certified respirator or
equivalent. Wear appropriate respirator

when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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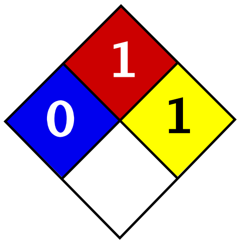

Health	1
Fire	3
Reactivity	2
Personal Protection	E

Material Safety Data Sheet
Magnesium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Magnesium

Catalog Codes: SLM4408, SLM2263, SLM3637

CAS#: 7439-95-4

RTECS: OM2100000

TSCA: TSCA 8(b) inventory: Magnesium

CI#: Not applicable.

Synonym: Magnesium ribbons, turnings or sticks

Chemical Name: Magnesium

Chemical Formula: Mg

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Magnesium	7439-95-4	100

Toxicological Data on Ingredients: Magnesium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at

least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat.
Flammable in presence of acids, of moisture.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Explosive in presence of acids, of moisture.

Fire Fighting Media and Instructions:
Flammable solid.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Magnesium turnings, chips or granules, ribbons, are flammable. They can be easily ignited. They may reignite after fire is extinguished. Produces flammable gases on contact with water and acid. May ignite on contact with water or moist air.
Magnesium fires do not flare up violently unless moisture is present.

Special Remarks on Explosion Hazards: Reacts with acids and water to form hydrogen gas with is highly flammable and eplosive

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Flammable solid.
Stop leak if without risk. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage:
Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Moisture sensitive. Dangerous when wet.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 24.31 g/mole

Color: Silver-white

pH (1% soln/water): Not applicable.

Boiling Point: 1100°C (2012°F)

Melting Point: 651°C (1203.8°F)

Critical Temperature: Not available.

Specific Gravity: 1.74 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Very slightly soluble in hot water.
Insoluble in cold water.
Insoluble in chromium trioxides, and mineral acids, alkalies.
Slightly soluble with decomposition in hot water.
Soluble in concentrated hydrogen fluoride, and ammonium salts.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, incompatible materials, water or moisture, moist air.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Violent chemical reaction with oxidizing agents.
Reacts with water to create hydrogen gas and heat. Must be kept dry.
Reacts with acids to form hydrogen gas which is highly flammable and explosive.
Magnesium forms hazardous or explosive mixtures with aluminum and potassium perchlorate; ammonium nitrate; barium nitrate, barium dioxide and zinc; beryllium oxide; boron phosphodiiodide; bromobenzyl trifluoride; cadmium cyanide; cadmium oxide; calcium carbide; carbonates; carbon tetrachloride; chlorine; chlorine trifluoride; chloroform; cobalt cyanide; copper cyanide; copper sulfate(anhydrous), ammonium nitrate, potassium chlorate and water; cupric oxide; cupric sulfate; fluorine; gold cyanide; hydrogen and calcium carbonate; hydrogen iodide; hydrogen peroxide; iodine; lead cyanide; mercuric oxide; mercury cyanide; methyl chloride; molybdenum trioxide; nickel cyanide; nitric acid; nitrogen dioxide; oxygen (liquid); performic acid; phosphates; potassium chlorate; potassium perchlorate; silver nitrate; silver oxide; sodium perchlorate; sodium peroxide; sodium peroxide and carbon dioxide; stannic oxide; sulfates; trichloroethylene; zinc cyanide; zinc oxide.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available.
LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: May cause skin irritation by mechanical action. May get mechanical injury or embedding of chips/particles in skin. The particles that are embedded in the wounds may retard healing.
Eyes: May cause eye irritation by mechanical action. Mechanical injury may occur. Particles or chips may embed in eye and retard healing.
Inhalation: Low hazard for ususal industrial handling. It may cause respiratory tract irritation. However, it is unlikely due to physical form. When Magnesium metal is heated during welding or smelting process, Metal Fume Fever may result from inhalation of magnesium fumes. Metal Fume Fever is a flu-like condition consisting of fever, chills, sweating, aches, pains, cough, weakness, headache, nausea, vomiting, and breathing difficulty. Other symptoms may include metallic taste, increased white blood cell count. There is no permanent ill-effect.
Ingestion: Low hazard for usual industrial handling. There are no known reports of serious industrial poisonings with Magnesium. Ingeston of large amounts of chips, turnings or ribbons may cause gastrointestinal tract irritation with nausea, vomiting, and diarrhea. Acute ingestion may also result in Hypermagnesia.
Hypermagnesia may cause hypotension, bradycardia, CNS depression, respiratory depression, and impairment of neuromuscular transmission (hyporeflexia, paralysis).

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 4.1: Flammable solid.

Identification: : Magnesium UNNA: 1869 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Magnesium
Rhode Island RTK hazardous substances: Magnesium
Pennsylvania RTK: Magnesium

Massachusetts RTK: Magnesium
Massachusetts spill list: Magnesium
New Jersey: Magnesium
TSCA 8(b) inventory: Magnesium

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-4: Flammable solid.
CLASS B-6: Reactive and very flammable material.

DSCL (EEC):
R11- Highly flammable.
R15- Contact with water liberates extremely flammable gases.
S7/8- Keep container tightly closed and dry.
S43- In case of fire, use dry chemical. Never use water.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 3

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 1

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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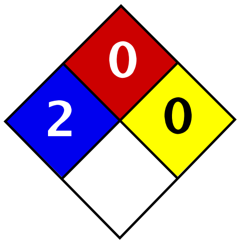

Health	2
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Nickel metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Nickel metal

Catalog Codes: SLN2296, SLN1342, SLN1954

CAS#: 7440-02-0

RTECS: QR5950000

TSCA: TSCA 8(b) inventory: Nickel metal

CI#: Not applicable.

Synonym: Nickel Metal shot; Nickel metal foil.

Chemical Name: Nickel

Chemical Formula: Ni

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Nickel metal	7440-02-0	100

Toxicological Data on Ingredients: Nickel metal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (sensitizer), of ingestion, of inhalation (lung sensitizer).
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to skin.
The substance may be toxic to kidneys, lungs, liver, upper respiratory tract.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable solid.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Material in powder form, capable of creating a dust explosion. This material is flammable in powder form only.

Special Remarks on Explosion Hazards:
Material in powder form, capable of creating a dust explosion.
Mixtures containing Potassium Perchlorate with Nickel & Titanium powders & infusorial earth can explode.
Adding 2 or 3 drops of approximately 90% peroxyformic acid to powdered nickel will result in explosion.
Powdered nickel reacts explosively upon contact with fused ammonium nitrate at temperatures below 200 deg. C.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Keep away from incompatibles such as oxidizing agents, combustible materials, metals, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 1 (mg/m3) from ACGIH (TLV) [United States] Inhalation Respirable.
TWA: 0.5 (mg/m3) [United Kingdom (UK)]
TWA: 1 (mg/m3) from OSHA (PEL) [United States] InhalationConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid. Lustrous solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 58.71 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 2730°C (4946°F)

Melting Point: 1455°C (2651°F)

Critical Temperature: Not available.

Specific Gravity: Density: 8.908 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water.
Insoluble in Ammonia.
Soluble in dilute Nitric Acid.
Slightly soluble in Hydrochloric Acid, Sulfuric Acid.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, combustible materials, metals, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with strong acids, selenium, sulfur, wood and other combustibles, nickel nitrate, aluminum, aluminum trichloride, ethylene, p-dioxan, hydrogen, methanol, non-metals, oxidants, sulfur compounds, aniline, hydrogen sulfide, flammable solvents, hydrazine, and metal powders (especially zinc, aluminum, and magnesium), ammonium nitrate, nitryl fluoride, bromine pentafluoride, potassium perchlorate + titanium powder + indusorial earth.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available.
LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP.
Causes damage to the following organs: skin.
May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:

Hazardous in case of inhalation.
Slightly hazardous in case of skin contact (irritant, sensitizer), of ingestion.

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose/Conc:
LDL [Rat] - Route: Oral; Dose: 5000 mg/kg
LDL [Guinea Pig] - Route: Oral; Dose: 5000 mg/kg

Special Remarks on Chronic Effects on Humans: May cause cancer based on animal test data

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Nickel dust and fume can irritate skin.
Eyes: Nickel dust and fume can irritate eyes.
Inhalation: Inhalation of dust or fume may cause respiratory tract irritation with non-productive cough, hoarseness, sore throat, headache, vertigo, weakness, chest pain, followed by delayed effects, including tachypnea, dyspnea, and ARDS. Death due to ARDS has been reported following inhalation of high concentrations of respirable metallic nickel dust. Later effects may include pulmonary edema and fibrosis.
Ingestion: Metallic nickel is generally considered not to be acutely toxic if ingested. Ingestion may cause nausea, vomiting, abdominal , and diarrhea. Nickel may damage the kidneys(proteinuria), and may affect liver function. It may also affect behavior (somnolence), and cardiovascular system (increased cornary artery resistance, decreased myocardial contractility, myocardial damage, regional or general arteriolar or venus dilation).
Chronic Potential Health Effects:
Skin: May cause skin allergy. Nickel and nickel compounds are among the most common sensitizers inducing allergic contact dermatitis.
Inhalation: Chronic inhalation nickel dust or fume can cause chronic hypertrophic rhinitis, sinusitis, nasal polyps, perforation of the nasal septum, chronic pulmonary irritation, fibrosis, pulmonary edema, pulmonary eosinophilia, Pneumoconiosis, allergies (asthma-like allergy), and cancer of the nasal sinus cavities, lungs, and possibly other organs. Future exposures can cause asthma attacks with shortness of breath, wheezing, cough, and/or chest tightness. Chronic inhalation of nickel dust or fume may also affect the liver (impaired liver function tests), and blood (changes in red blood cell count).
Ingestion: Prolonged or repeated ingestion of nickel can be a source chronic urticaria and other signs of allergy. Chronic ingestion of NIckel may also affect respiration and cause pneumoconiosis or fibrosis.
Note: In the general population, sensitization occurs from exposure to nickel-containing coins, jewelry, watches,

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Nickel metal
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Nickel metal
Connecticut hazardous material survey.: Nickel metal
Illinois toxic substances disclosure to employee act: Nickel metal
Illinois chemical safety act: Nickel metal
New York release reporting list: Nickel metal
Rhode Island RTK hazardous substances: Nickel metal
Pennsylvania RTK: Nickel metal
Michigan critical material: Nickel metal
Massachusetts RTK: Nickel metal
Massachusetts spill list: Nickel metal
New Jersey: Nickel metal
New Jersey spill list: Nickel metal
Louisiana spill reporting: Nickel metal
California Director's List of Hazardous Substances: Nickel metal
TSCA 8(b) inventory: Nickel metal

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R40- Possible risks of irreversible effects.
R43- May cause sensitization by skin contact.
S22- Do not breathe dust.
S36- Wear suitable protective clothing.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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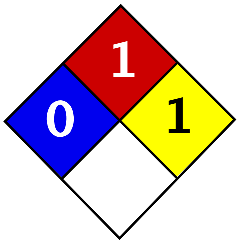

Health	1
Fire	1
Reactivity	1
Personal Protection	E

Material Safety Data Sheet

Zinc Metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Zinc Metal

Catalog Codes: SLZ1054, SLZ1159, SLZ1267, SLZ1099, SLZ1204

CAS#: 7440-66-6

RTECS: ZG8600000

TSCA: TSCA 8(b) inventory: Zinc Metal

CI#: Not applicable.

Synonym: Zinc Metal Sheets; Zinc Metal Shot; Zinc Metal Strips

Chemical Name: Zinc Metal

Chemical Formula: Zn

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Zinc Metal	7440-66-6	100

Toxicological Data on Ingredients: Zinc Metal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of open flames and sparks, of heat, of oxidizing materials, of acids, of alkalis, of moisture.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable solid.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Zinc + NaOH causes ignition.
Oxidation of zinc by potassium proceeds with incandescence.
Residues from zinc dust /acetic acid reduction operations may ignite after long delay if discarded into waste bins with paper.
Incandescent reaction when Zinc and Arsenic or Tellurium, or Selenium are combined.
When hydrazine mononitrate is heated in contact with zinc, a flamming decomposition occurs at temperatures a little above its melting point.
Contact with acids and alkali hydroxides (sodium hydroxide, postasium hydroxide, calcium hydroxide, etc.) results in evolution of hydrogen with sufficient heat of reaction to ignite the hydrogen gas.
Zinc foil ignites if traces of moisture are present.
It is water reactive and produces flammable gases on contact with water. It may ignite on contact with water or

moist air.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Flammable solid that, in contact with water, emits flammable gases.
Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Cover with dry earth, sand or other non-combustible material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents, acids, alkalis, moisture.

Storage:
Keep container tightly closed. Keep container in a cool, well-ventilated area. Keep from any possible contact with water. Do not allow water to get into container because of violent reaction.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 65.39 g/mole

Color: Bluish-grey

pH (1% soln/water): Not applicable.

Boiling Point: 907°C (1664.6°F)

Melting Point: 419°C (786.2°F)

Critical Temperature: Not available.

Specific Gravity: Not available.

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials, moisture

Incompatibility with various substances:
Reactive with oxidizing agents, acids, alkalis.
Slightly reactive to reactive with moisture.
The product may react violently with water to emit flammable but non toxic gases.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with acids, halogenated hydrocarbons, NH_4NO_3, barium oxide, $Ba(NO_3)_2$, Cadmium, CS_2, chlorates, Cl_2, CrO_3, F_2, Hydroxylamine, $Pb(N_3)_2$, $MnCl_2$, HNO_3, performic acid, $KClO_3$, KNO_3, N_2O_2, Selenium, $NaClO_3$, Na_2O_2, Sulfur, Te, water, $(NH_4)_2S$, As_2O_3, CS_2, $CaCl_2$, chlorinated rubber, catalytic metals, halocarbons, o-nitroanisole, nitrobenzene, nonmetals, oxidants, paint primer base, pentacarbonoyliron, transition metal halides, seleninyl bromide, HCl, H_2SO_4, (Mg +$Ba(NO_3)_2$ +BaO_2), (ethyl acetoacetate +tribromoneopentyl alcohol.
Contact with Alkali Hydroxides(Sodium Hydroxide, Potassium Hydroxide, Calcium Hydroxide, etc) results in evolution of hydrogen.
Ammonium nitrate + zinc + water causes a violent reaction with evolution of steam and zinc oxide.
May react with water.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available.
LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: May cause skin irritation. Dermal exposure to zinc may produce leg pains, fatigue, anorexia and weight loss.
Eyes: May cause eye irritation.
Ingestion: May be harmul if swallowed. May cause digestive tract irritation with tightness in throat, nausea, vomiting, diarrhea, loss of appetite, malaise, abdominal pain. fever, and chills. May affect behavior/central nervous system and autonomic nervous system with ataxia, lethargy, staggering gait, mild derrangement in cerebellar function, lightheadness, dizzness, irritability, muscular stiffness, and pain. May also affect blood.
Inhalation: Inhalation of zinc dust or fumes may cause respiratory tract and mucous membrane irritation with cough and chest pain. It can also cause "metal fume fever", a flu-like condition characterized appearance of chills, headached fever, maliase, fatigue, sweating, extreme thirst, aches in the legs and chest, and difficulty in breathing. A sweet taste may also be be present in metal fume fever, as well as a dry throat, aches, nausea, and vomiting, and pale grey cyanosis.
The toxicological properties of this substance have not been fully investisgated.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: Not available.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

New York release reporting list: Zinc Metal
Rhode Island RTK hazardous substances: Zinc Metal
Pennsylvania RTK: Zinc Metal
Florida: Zinc Metal
Michigan critical material: Zinc Metal
Massachusetts RTK: Zinc Metal
New Jersey: Zinc Metal
California Director's List of Hazardous Substances: Zinc Metal
TSCA 8(b) inventory: Zinc Metal
TSCA 12(b) one time export: Zinc Metal
SARA 313 toxic chemical notification and release reporting: Zinc Metal
CERCLA: Hazardous substances.: Zinc Metal: 1000 lbs. (453.6 kg)

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not Available

DSCL (EEC):
R15- Contact with water liberates
extremely flammable gases.
R17- Spontaneously flammable in air.
S7/8- Keep container tightly closed and dry.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 1

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 1

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Dust respirator. Be sure to use an
approved/certified respirator or
equivalent.
Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 11/06/2008 12:00 PM

ATSDR
Department of Health and Human Services
Agency for Toxic Substances & Disease Registry

Home > CABS > Lead

ToxFAQs™: Chemical Agent Briefing Sheets (CABS)

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Lead

January 2006

PDF Version

- What is lead?
- What are the forms of lead?
- What are the common uses of lead?
- What are the routes of exposure for lead?
- Who are the populations most at risk and how are they usually exposed?
- What are the possible toxic effects of lead?
- How can I reduce the risk of exposure to lead?
- What are the safety guidelines for lead exposure?
- What are the most important or common mediating factors?
- Is there a test to see if my child or I have been exposed to lead?
- Future Research Needs
- For more information

What is lead?

Lead is a heavy, bluish-gray metal that has a low melting point. It occurs naturally in the Earth' s crust, but it is not a particularly abundant element. It is rarely found naturally as a metal, but rather in its divalent (2+) oxidative state in ore deposits widely distributed throughout the world. The most important lead containing ores are galena (PbS), anglesite (PbSO$_4$), and cerussite (PbCO$_3$). Natural lead is a mixture of four stable isotopes: ^{208}Pb (51%–53%), ^{206}Pb (23.5%–27%), ^{207}Pb (20.5%–23%), and ^{204}Pb (1.35%–1.5%).

What are the forms of lead?

- Metallic lead
- Inorganic lead and lead compounds (or lead salts)
- Organic lead (containing carbon)

What are the common uses of lead?

The largest use for lead is in storage batteries in cars and other vehicles. Lead may be used as a pure metal, alloyed with other metals, or as chemical compounds.

Lead used by industry comes from mined ores ("primary") or from recycled scrap metal or batteries ("secondary"). However, most lead today is obtained from recovery of recycled scrap, mostly lead-acid batteries.

Human activities, such as lead mining and smelting operations and manufacturing and use of lead products (*e.g.*, leaded gasoline, lead-based paint), have resulted in the contamination of many industrial and residential areas with lead.

Form	Uses
Metallic lead **Lead and lead compounds (or lead salts), such as** • **lead acetate** • **lead chloride** • **lead nitrate** • **lead oxide** • **lead phosphate** • **lead acetate**	Certain uses of lead, such as leaded gasoline, lead-based paints for domestic use, lead-based solder in food cans and water pipes, lead sinkers, and ammunition, have been reduced or banned to minimize lead's harmful effects on people and animals. • **Cosmetics and hair dye** - Some hair dyes and some non-Western cosmetics, such as kohl and surma, contain lead. • **Fishing equipment** - Most fishing weights and sinkers are made from lead. • **Folk remedies** - Many non-Western folk remedies used to treat diarrhea or other ailments may contain substantial amounts of lead. Examples of these include alarcon, ghasard, alkohl, greta, azarcon,

• **lead sulfate** • **lead sulfide**	liga, bali goli, pay-loo-ah, coral, and rueda. • **Glazing** - Applied to some ceramicware can contain lead. • **Lead based paint** - Although the sale of residential lead-based paint was banned in the United States in 1978, it remains a major source of lead exposure for young children residing in older houses. • **Lead batteries** - Production of lead-acid batteries is the major use of lead. • **Lead-based solder** - Has been banned for use in water distribution systems, but many buildings and homes contain lead pipes or lead-based solder. Lead-based solder also is used for electrical circuitry applications. • **Lead-shot** and **ammunition** - It is the second highest production use of lead. • Other uses of lead include the production of lead alloys, soldering materials, shielding for x-ray machines, and manufacturing of corrosion- and acid-resistant materials used in the building industry.
Organic • **tetraethyl lead** • **tetramethyl lead**	The use of lead in gasoline was phased out in the 1980s, and has been banned since January 1, 1996. The use of lead in gasoline has contributed to its dispersion throughout the environment. During the combustion of gasoline containing these alkyllead compounds, significant amounts of inorganic lead can be released to the surrounding areas. **Current Uses** • Gasoline for off-road vehicles, farm equipment, and airplanes **Past Uses** • Gasoline additives (to increase octane rating)

What are the routes of exposure for lead?

People are most likely to be exposed to lead by consuming contaminated food and drinking water. Exposure can also occur by inadvertently ingesting contaminated soil, dust, or lead-based paint.

Form	Routes of Exposure
Metallic lead **Lead and lead compounds (or lead salts), such as** • **lead acetate** • **lead chloride** • **lead nitrate** • **lead oxide** • **lead phosphate** • **lead subacetate** • **lead sulfate** • **lead sulfide**	• Ingestion is the primary source of exposure to the general population. • Lead paint is a major source of environmental exposure for children who ingest flaking paint, paint chips, and weathered powdered paint (mostly from deteriorated housing units in urban areas). Lead paint can also contribute to soil/dust lead which can be inadvertently ingested via hand-to-mouth activity of young children. • Lead can leach into drinking water from lead-based solder used in water pipes. • Lead can leach into foods or liquids stored in ceramic containers made with lead glazing. • Engaging in hobbies such as casting ammunition, making fishing weights, and stained glass can result in exposure to lead. • Exposure by inhalation can result during activities such as soldering with lead solder or sanding or sandblasting lead-based paint.
Organic • **tetraethyl lead** • **tetramethyl lead**	• Inhalation • Dermal studies in animals have shown that organic lead is well absorbed through the skin

Who are the populations most at risk and how are they usually exposed?

People living near hazardous waste sites, lead smelters or refineries, battery recycling or crushing centers, or other industrial lead sources may be exposed to lead and chemicals that contain lead. Workers in occupations that have sources of lead exposure (*e.g.*, plumbers, miners, mechanics, and lead smelter or refinery workers).

Certain hobbies, folk remedies, home activities, and car repairs (*e.g.*, radiator repair) can contribute to lead exposure. Smoking cigarettes or breathing second-hand smoke increases exposure because tobacco smoke contains small amounts of lead.

Pregnant women, the developing fetuses, and young children are particularly vulnerable to the effects of lead. Young children are more likely to play in dirt and to place their hands and other objects in their mouths, thereby increasing the opportunity for exposure via ingestion of lead-contaminated soil and dust.

What are the possible toxic effects of lead?

The most sensitive targets for lead toxicity are the developing nervous system, the hematological and cardiovascular systems, and the kidney. However, because of lead's many modes of action in biological systems, lead could potentially affect any system or organs in the body. The effects are the same whether it is breathed or swallowed.

Blood Lead Concentrations Corresponding to Adverse Health Effects

Life Stage	Effect	Blood lead (µg/dL)
Children	Depressed ALAD* activity	<5
	Neurodevelopmental effects	<10
	Sexual maturation	<10
	Depressed vitamin D	>15
	Elevated EP**	>15
	Depressed NCV***	>30
	Depressed hemoglobin	>40
	Colic	>60
Adults	Depressed GFR****	<10
	Elevated blood pressure	<10
	Elevated EP (females)	>20
	Enzymuria/proteinuria	>30
	Peripheral neuropathy	>40
	Neurobehavioral effects	>40
	Altered thyroid hormone	>40
	Reduced fertility	>40
	Depressed hemoglobin	>50
Elderly adults	Depressed ALAD*	<5
	Neurobehavioral effects	>4

*aminolevulinic acid dehydratase (ALAD)

**erythrocyte porphyrin (EP)

***nerve conduction velocity (NCV)

****glomerular filtration rate (GFR)

Source: ATSDR Toxicological Profile for Lead (Draft for Public Comment), 2005.

How can I reduce the risk of exposure to lead?

- Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint (homes built before 1978).
- If you have a water lead problem, the U.S. Environmental Protection Agency (EPA) recommends that you flush your cold water pipes if they have not been used in over 6 hours by running water until it is cold (5 seconds to 2 minutes) before drinking or cooking with it.
- Avoid some types of paints and pigments that contain lead and are used as make-up or hair coloring; keep these kinds of products away from children.
- Hire a professional contractor, who is required to follow certain health safety requirements for remediation or renovation involving lead-based paint, (www.epa.gov/lead/pubs/leadinfo.htm#remodeling).
- Wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

What are the safety guidelines for lead exposure?

Air

- National Institute for Occupational Safety and Health (NIOSH)

  Recommended exposure limit (REL) time-weighted average (TWA) - 0.05 mg/m^3
  Immediately dangerous to life or health (IDLH) - 100 mg/m^3

- Occupational Safety and Health Administration (OSHA)

  Air - workplace 50 µg/m^3
  Action level - 40 µg/100 g of whole blood

- The American Conference of Governmental Industrial Hygienists (ACGIH)

Threshold limit values (TLV)/(TWA) - 0.05 mg/m^3
TLV/TWA guideline for lead arsenate - 150 µg/m^3
TLV/TWA guideline for other forms of lead - 50 µg lead/m^3

- U.S. Environmental Protection Agency (EPA)

  National Primary and Secondary Ambient Air Quality Standards - 1.5 µg/m^3

- World Health Organization (WHO)

  Air quality guidelines -- 0.5 µg/m^3

Water

- EPA

  Maximum contaminant level (MCL) - action level 0.015 mg/L
  Action level for public supplies - 15 µg/L

- WHO

  Drinking Water Quality Guidelines - 0.01 mg/L

Blood

- Centers for Disease Control and Prevention (CDC)

  Level of concern for children - 10 µg/dL

- OSHA

  Cause for written notification and medical exam - 40 µg/dL
  Cause for medical removal from exposure - 50 µg/dL

- ACGIH

  Advisory; biological exposure index - 30 µg/dL

Food

- Food and Drug Administration (FDA)

  Bottled drinking water - 0.005 mg/L

Other

- ACGIH

  Biological exposure indices (lead in blood) - 30 µg/100 mL

- Consumer Product Safety Commission

  Paint - 600 ppm

- FDA

  Ceramicware (µg/mL leaching solution) - 0.5-3.0 µg/mL

µg/m^3: micrograms per cubic meter
µg/dL: micrograms per deciliter
µg/L: micrograms per liter
g: gram
mg/L: milligrams per liter
mL: milliliter
ppm: parts per million

What are the most important or common mediating factors?

Factors that determine the severity of the health effects from lead exposure include

- Dose
- Age of the person exposed
  - the developing nervous system is the most sensitive system to the effects of lead
  - the efficiency of lead absorption from the gastrointestinal tract is greater in children than in adults
- Life stages of women (childbirth, lactating, menopause)
- Occupational exposures
- Duration of exposure
- Health and lifestyle of the person exposed
- Nutritional status of the person exposed
  - a diet adequate in calcium and iron may decrease lead absorption

The toxic effects of lead exposure may be worse in individuals with inherited genetic diseases or gene polymorphisms such as thalassemia, individuals with glucose-6-phosphate dehydrogenase (G6PD) deficiency, and carriers of certain gene polymorphic forms (*e.g.*, ALAD and vitamin D receptor). Research continues about this topic.

Is there a test to see if my child or I have been exposed to lead?

Blood	• The screening test of choice is blood lead levels. • Blood tests are commonly used to screen children for lead poisoning. • Analysis of lead in whole blood is the most common and accurate method of assessing lead exposure. • 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).
Bone and Teeth	• X-ray fluorescence techniques have been used to determine lead concentration in bones and teeth. It is not widely available and is used mostly in research. • Lead partitions to bone over a lifetime of exposure; therefore, bone lead measurements may be a better indicator of cumulative exposure than blood lead.
Urine	• Measurements of urinary lead levels have been used to assess lead exposure. • The measurement of lead excreted in urine following chelation with calcium disodium EDTA (EDTA provocation) has been used to detect elevated body burden of lead in adults and children.
Hair and Nails	• These are not reliable for testing due to errors external contamination. They are relatively poor predictors of blood lead, particularly at low concentrations.

Future Research Needs

To close current gaps in the scientific database on the health effects of lead, a long–term resear ch program is needed that might include the following:

- Further short-term studies or studies in vitro designed to clarify mechanisms of action for the various toxicities might be useful.
- Studies identifying exposures during different developmental periods can help identify critical periods of vulnerability for immunocompetence, development of sex organs, or neurobehavioral parameters.
- Chronic-duration exposure studies in animals would expand information on the toxicity of lead. Special studies that examine biochemical and morphological effects of lead may provide new information on mechanisms of action of lead, particularly for the effects of greatest concern such as neurobehavioral changes in children.
- Development of new and more sensitive tests of specific neuropsychological functions.
- Further investigation of links between lead and amyotrophic lateral sclerosis, essential tremor, schizophrenia, and Parkinson's disease.
- Epidemiological studies designed in a manner that permits more rigorous assessments of effect modification.
- Studies about the long-term consequences of lead-related neurobehavioral deficits detected in infants and children and the manifestation of chronic neurobehavioral problems in adolescence and adulthood.
- Further characterization of bone lead concentration as a biomarker of exposure for various effect end points (*e.g.*, blood pressure and renal effects).
- Studies of the potential prevalence of elevated bone lead stores in women of reproductive age and the associated risk that this poses to fetal development by mobilization of maternal bone stores during pregnancy.
- Further clarification of the role of some genetic polymorphisms.
- Evaluation of cohorts from prospective studies into adulthood for potential late-appearing effects including cancer.

For more information

- Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profile for Lead

  http://www.atsdr.cdc.gov/toxprofiles/tp13.html

- ATSDR ToxFAQs™ for Lead

  http://www.atsdr.cdc.gov/tfacts13.html

- ATSDR Case Studies in Environmental Medicine Lead Toxicity

  http://www.atsdr.cdc.gov/csem/lead/

- ATSDR Interaction Profile for Chemical Mixtures for Arsenic, Cadmium, Chromium, and Lead

  http://www.atsdr.cdc.gov/interactionprofiles/ip04.html

- ATSDR Interaction Profile for Chemical Mixtures for Lead, Manganese, Zinc, and Copper

  http://www.atsdr.cdc.gov/interactionprofiles/ip06.html

- ATSDR Interaction Profile for Chemical Mixtures for Chlorpyrifos, Lead, Mercury, and Methylmercury

  http://www.atsdr.cdc.gov/interactionprofiles/ip11.html

- Centers for Disease Control and Prevention Lead Web Page

  http://www.cdc.gov/lead/

- U.S. Environmental Protection Agency Lead Web Page

  http://www.epa.gov/lead/

- U.S. Department of Labor, Occupational Safety & Health Administration

  http://www.osha.gov/SLTC/lead/

For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Environmental Medicine
1600 Clifton Road NE, Mailstop F-32
Atlanta, GA 30333
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Mercury

Mercury is a naturally occurring metal found in air, water, and soil. It exists in several forms, including elemental (or metallic) mercury, inorganic mercury compounds, and organic mercury compounds:

- **Elemental mercury** is liquid at room temperature and is used in thermometers, fluorescent light bulbs, some electrical switches, and some industrial processes.
- **Inorganic mercury** compounds are formed when mercury combines with other elements to form salts, which are usually powders or crystals. Inorganic mercury compounds are found naturally in the environment. Some forms of inorganic mercury have been used in antiseptic creams, ointments, and preservatives.
- **Organic mercury** compounds are formed when mercury combines with carbon. Microscopic organisms can produce organic mercury compounds (methylmercury) in contaminated water and soil, which can accumulate in the food chain. Other special types of organomercurials have been used as medical preservatives and medicines.

How People Are Exposed to Mercury

- Eating fish or shellfish that is contaminated with methylmercury, which is the main source of general human exposures to mercury;
- Breathing air contaminated with elemental mercury vapors (e.g., in workplaces such as dental offices and industries that use mercury or in locations where a mercury spill or release has occurred);
- Having dental fillings that contain mercury; and
- Practicing cultural or religious rituals that use mercury.

How Mercury Affects People’s Health

- Short-term exposure to extremely high levels of elemental mercury vapors can result in lung damage, nausea, diarrhea, increases in blood pressure or heart rate, skin rashes, eye irritation, and injury to the nervous system.
- Prolonged exposure to lower levels of elemental mercury can permanently damage the brain and kidneys.
- The developing brain of a fetus can be injured if the mother is exposed to methylmercury.

Levels of Mercury in U.S. Population

Scientists tested levels of mercury in the blood of 16,780 participants who took part in CDC's national study known as the National Health and Nutrition Examination Survey (NHANES). These findings are based on total blood mercury levels in the U.S. general population for persons aged 1 year and older who participated in NHANES during 2003-2006, as well as trends in the total mercury of children aged 1–5 and females aged 16–49 during 1999–2006.

- In the total population during 2003–2006, the total blood mercury levels for non–Hispanic blacks and non–Hispanic whites were higher than those for Mexican Americans.
- Across the age groups in the total population during 2003-2006, total blood mercury levels increased with age, peaked at the fifth or sixth decade, depending on race/ethnicity, and then declined.
- In the most recent survey period of 2005–2006, the 95th percentile levels for total blood mercury in children aged 1-5 years and females aged 16-49 years were 1.43 µg/L and 4.48 µg/L, respectively. The 95th percentile means that 95 percent of the U.S. population's exposure is below this estimated level. Conversely, only 5 percent of the population will have values at this level or higher.
- Over the four survey periods from 1999-2006, blood mercury levels increased slightly for non–Hispanic white children and decreased slightly for non–Hispanic black and Mexican American children. Female children had slightly higher blood mercury levels than male children.

For More Information

- Agency for Toxic Substances and Disease Registry
  Detailed information about mercury and public health is available at
  http://www.atsdr.cdc.gov/alerts/970626.html and
  http://www.atsdr.cdc.gov/cabs/mercury/index.html
- CDC Emergency Preparedness and Response
  Case definitions of mercury, toxicology FAQs, and toxicological profile at
  http://emergency.cdc.gov/agent/mercury/

May 2009

The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national, and international organizations.

Department of Health and Human Services
Agency for Toxic Substances & Disease Registry

ATSDR Home › ToxFAQs™ Arsenic

ToxFAQs™

ToxFAQs™
for
Arsenic
(*Arsénico*)
August 2007

PDF Version, 92 KB

CAS#: 7440-38-2

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. 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
- What is arsenic?
- What happens to arsenic when it enters the environment?
- How might I be exposed to arsenic?
- How can arsenic affect my health?
- How likely is arsenic to cause cancer?
- How does arsenic affect children?
- How can families reduce their risk for exposure to arsenic?
- Is there a medical test to show whether I've been exposed to arsenic?
- Has the federal government made recommendations to protect human health?
- References
- Contact Information

Highlights

Exposure to higher than average levels of arsenic occur mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. At high levels, inorganic arsenic can cause death. Exposure to lower levels for a long time can cause a discoloration of the skin and the appearance of small corns or warts. Arsenic has been found in at least 1,149 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Copper chromated arsenate (CCA) is used to make "pressure-treated" lumber. CCA is no longer used in the U.S. for residential uses; it is still used in industrial applications. Organic arsenic compounds are used as pesticides, primarily on cotton fields and orchards.

What happens to arsenic when it enters the environment?

- Arsenic occurs naturally in soil and minerals and may enter the air, water, and land from wind-blown dust and may get into water from runoff and leaching.
- Arsenic cannot be destroyed in the environment. It can only change its form.
- Rain and snow remove arsenic dust particles from the air.
- Many common arsenic compounds can dissolve in water. Most of the arsenic in water will ultimately end up in soil or sediment.
- Fish and shellfish can accumulate arsenic; most of this arsenic is in an organic form called arsenobetaine that is much less harmful.

How might I be exposed to arsenic?

- Ingesting small amounts present in your food and water or breathing air containing arsenic.
- Breathing sawdust or burning smoke from wood treated with arsenic.
- Living in areas with unusually high natural levels of arsenic in rock.
- Working in a job that involves arsenic production or use, such as copper or lead smelting, wood treating, or pesticide application.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs.

Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of “pins and needles” in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small “corns” or “warts” on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

Almost nothing is known regarding health effects of organic arsenic compounds in humans. Studies in animals show that some simple organic arsenic compounds are less toxic than inorganic forms. Ingestion of methyl and dimethyl compounds can cause diarrhea and damage to the kidneys.

How likely is arsenic to cause cancer?

Several studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the liver, bladder, and lungs. Inhalation of inorganic arsenic can cause increased risk of lung cancer. The Department of Health and Human Services (DHHS) and the EPA have determined that inorganic arsenic is a known human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic arsenic is carcinogenic to humans.

How does arsenic affect children?

There is some evidence that long-term exposure to arsenic in children may result in lower IQ scores. There is also some evidence that exposure to arsenic in the womb and early childhood may increase mortality in young adults.

There is some evidence that inhaled or ingested arsenic can injure pregnant women or their unborn babies, although the studies are not definitive. Studies in animals show that large doses of arsenic that cause illness in pregnant females, can also cause low birth weight, fetal malformations, and even fetal death. Arsenic can cross the placenta and has been found in fetal tissues. Arsenic is found at low levels in breast milk.

How can families reduce their risk for exposure to arsenic?

- If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust.
- If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil.
- If you work in a job that may expose you to arsenic, be aware that you may carry arsenic home on your clothing, skin, hair, or tools. Be sure to shower and change clothes before going home.

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

There are tests available to measure arsenic in your blood, urine, hair, and fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels of arsenic over the past 6-12 months. These tests can determine if you have been exposed to above-average levels of arsenic. They cannot predict whether the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

The EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or cancelled many of the uses of arsenic in pesticides. EPA has set a limit of 0.01 parts per million (ppm) for arsenic in drinking water.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit (PEL) of 10 micrograms of arsenic per cubic meter of workplace air (10 $\mu g/m^3$) for 8 hour shifts and 40 hour work weeks.

References

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

Where can I get more information?

For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Environmental Medicine
1600 Clifton Road NE, Mailstop F-62
Atlanta, GA 30333
Phone: 1-800-CDC-INFO • 888-232-6348 (TTY)
FAX: 770-488-4178
Email: cdcinfo@cdc.gov

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.

This page was updated on 10/05/2007

APPENDIX C

COMMUNITY AIR MONITORING PLAN (CAMP)

198 East 135th Street
Block 2319; Lot 60
Bronx, New York

NYSDEC BCP Site #C203084

1- Introduction

The Community Air Monitoring Plan (CAMP) has been prepared to monitor the air quality during the intrusive activities proposed as a part of the Supplemental Remedial Investigation (RI) activities at the property located at 198 East 135th Street in the Bronx, New York. Levels of VOCs and dust in the air will be monitored continuously and periodically utilizing a Photo Ionization Detector (PID) and Real-Time Particulate Dust Tracker, respectively. For this investigation, the PID will be calibrated at the beginning of each day to the compound isobutylene, which is published by the manufacturer. The PID has a minimum detection limit of 0.1 parts per million (ppm). The Dust Tracker provides real-time measurement based on 90° light scattering. The Dust Tracker has a minimum detection limit of 0.001 mg/m^3.

Continuous real-time air monitoring for VOCs and particulate levels at the perimeter of the exclusion zone or work area will be performed for all ground intrusive activities. Ground intrusive activities include, but are not limited to the installation of soil borings, monitoring wells and soil/sub-slab vapor probes.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil samples, the collection of groundwater samples from monitoring wells. For instance, periodic monitoring during sample collection will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed 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. Exceedances of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the NYSDEC and recorded in a field daily log. A summary of daily logs/reports will be provided in the Remedial Investigation Report (RIR).

2- VOCs Monitoring, Response Levels And Actions

VOCs will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using a PID, which will be calibrated at least daily for to the compound isobutylene. The PID will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200-feet downwind of the 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.

Activities will be shut down if the organic vapor level at the perimeter of the work area is above 25 ppm.

All 15-minute readings must be recorded in a daily field log. Instantaneous readings, if any, used for decision purposes will also be recorded.

3- PM Monitoring, Response Levels And Actions

Particulate concentrations will be monitored continuously at the downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using a Dust Tracker 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 will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/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 will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels are not 150 mcg/m^3 or greater above the upwind level and provided that no visible dust is migrating from the work area.

If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are 150 mcg/m^3 or greater above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will 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. All readings will be recorded in a daily field log.

APPENDIX D

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NYC Office
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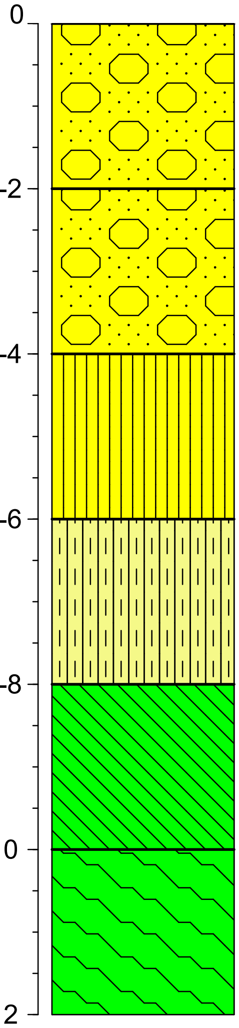
Soil Probe Log

Job No:	150133	Date: 06/10/15	Page: 1 of 1
Location:	200 East 135th Street Bronx, NY	Sampling Interval:	2 Feet
		Sampling Method:	Grab
Boring No.:	SP-1	Depth to Water:	N/A
Drilling Method:	Direct Push	Driller:	DK Drilling of NY
Total Depth:	12 Feet		

USCS SYMBOLS

GW - Well Graded Gravel
GP - Poorly Graded Gravel
GM - Silty Gravel
GC - Clayey Gravel
SW - Well Graded Sand
SP - Poorly Graded Sand
SM - Silty Sand
SC - Clayey Sand
ML - Inorganic Silt / Sandy Silt
CL - Inorganic Clays/Sandy Clay
OL - Inorganic Silts/Organic Silty Clay
MH- Elastic Silts
CH - Inorganic Clay, High Plastic
OH - Organic Silt / Clay
PT - Peat/High Organics

Depth Below Grade and Lithology	PID Reading (ppm)	USCS	Soil Description
	0	SP	Brick fill material. Loose, dark brown, coarse sand with gravels. No odor.
	0	SP	Loose, dark brown, fine, sand with gravels. No odor.
	0	SP	Medium firm, brown, silt. No odor.
	0	ML	Brown, fine silty clay. Plastic. No odor.
	0	OL	Dark gray clay mixed with wood material. Plastic.No odor.
	0	OH	Moist light gray clay. Very plastic. No odor

APPENDIX E

Hydro Tech Environmental, Corp.

Project 5th Street **Well No.** MW-1 **Date** 3/7/2011
Well Depth 22' **Screen Length** 15 feet **Well Diameter** 1" **Casing Type**
Sampling Device YSI-pump **Tubing type** PVC **Water Level** 12.22 feet
Measuring Point 1 **Riser aboveground** manhole Cover

Sampling Personnel Paul

Time	pH	Temp (ºF)	Cond. (S/Cm)	Dis.O2 (mg/L)	Turb.(NTU)	ORP (mV)	Notes
1:20 AM	6.75	52.70	0.707	8.26	101.90	110	
1:25 AM	6.88	54.97	0.687	8.60	340.10	114	
1:30 AM	6.75	54.73	0.730	8.25	560.10	115	
1:35 PM	6.74	54.91	0.721	8.26	301.10	119	
							4 liters bailed

APPENDIX F

QUALITY ASSURANCE PROJECT PLAN

198 East 135th Street
Block 2319; Lot 60
Bronx, New York

NYSDEC BCP Site #C203084

Table of Content

1.0 Introduction 2
2.0 Project Objective and Scope of Work 2
3.0 Sampling Procedures, Decontamination Methods and Data Quality Usability Objectives 2
3.1 Soil sampling 2
3.2 Groundwater Sampling 2
3.3 Decontamination Methods/ Quality Assurance and Quality Usability Objectives 3

Tables

1. Sampling and Analytical Method Requirements for Soil
2. Sampling and Analytical Method Requirements for Groundwater

Attachments

A. USEPA Low Flow Sampling Protocol
B. Groundwater Sampling/Purge Log
C. Resumes of Key Personnel involved in this Project
D. Sample Chain of Custody Form
E. Conventional Laboratory QA/QC

1.0 Introduction

This Quality Assurance Project Plan (QAPP) has been prepared for the samples to be collected in accordance with the Supplemental Remedial Investigation Work Plan (RIWP) developed for the property located at 198 East 135th Street in the Bronx, New York. The intent of the QAPP is to ensure that (1) proper equipment handling and maintenance is followed, (2) cross-contamination between sampling locations does not occur, (3) standard number of quality control replicate environmental samples are obtained, (4) proper procedures for samples custody are performed and (5) data review, validation and verification requirements are complete.

All related portions of the fieldwork will be performed, at a minimum, in accordance with acceptable industry standards. These acceptable industry standards include, but are not limited to, the ASTM Standard Guide for Phase II Environmental Site Assessments (E 1903-97) and the New York State Department of Environmental Conservation (NYSDEC) Bureau of Spill Prevention & Response Sampling Guidelines and Protocols, March 1991 and NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation, May 2010, 6 NYCRR Subpart 360.

2.0 Project Objective and Scope of Work

The objective of the investigation as set forth in the Supplemental RIWP is to characterize the vertical and horizontal delineation of contamination beneath the Site and determine the regional groundwater flow beneath the Site. This investigation will be performed in accordance to the New York State Department of Environmental Conservation (NYSDEC) requirements under the NYS Brownfield Cleanup Program (BCP) and in compliance with the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010) and other acceptable industry standards.

To meet the above objectives a total of eight (8) soil probes will be installed and sampled and three (3) existing on-site monitoring wells will be sampled during this investigation. Soil probes installation shall conform to NYCRR Part 360.

3.0 Sampling Procedures, Decontamination Methods and Data Quality Usability Objectives

3.1 Soil Sampling

Soil samples will be collected from soil probes SP-7 through SP-14. All soil samples will be obtained at 2-foot intervals utilizing a 1½-inch diameter 4-foot long Macro Core sampler fitted with dedicated acetate liners. The location of the soil probes is provided in Figure 3 of the Supplement RIWP.

As discussed with the NYSDEC, soil sample will be obtained at 2-foot increments from the proposed bottom of excavation depth to the groundwater table interface to determine the feasibility of a Track 1 cleanup. In the footprint of the proposed partial cellar, two (2) soil samples are proposed in each soil probe at depths 12 to 14 feet below grade and 14 to 16 feet below grade (in the saturated zone). If necessary, based upon field observation additional soil samples will be collected from soil probes.

Each soil sample will be placed directly into pre-cleaned containers provided by the laboratory samples from select soil probes. Sample containers will be labeled and placed in a cooler filled with ice and maintained at 4 degrees Celsius. Each sample will be transmitted under proper chain of custody procedures to a NYSDOH ELAP-certified laboratory for analysis. Table 1 provides the sample containers, volumes, test methods, preservation techniques, reporting limits and holding times for soil samples.

3.2 Groundwater Sampling

Groundwater samples will be obtained from the three (3) exiting monitoring wells MW-1, MW-2 and MW-3 utilizing a low flow pump fitted with dedicated polyethylene tubing. Initially, each monitoring well will be purged prior to sampling. Purging and sampling of the monitoring wells will be conducted according to USEPA's Low Stress/Flow Groundwater Sampling Protocol (SOP #GW0001, Rev. 1996) utilizing a portable water quality meter YSI-6820, which utilizes an in-line flow cell for water quality indicator measurements (the USEPA low flow sampling protocol and monitoring well purge/sampling form is provided in Attachment A). Groundwater will be purged at a low flow rate of less than 500 milliliter per minute (mL/min) until water quality indicator parameters including pH, temperature, specific conductivity, oxidation reduction potential, dissolved oxygen and turbidity are stabilized. The sampling of each well will be performed once groundwater purging is completed. Attachment B provides a sample Groundwater Sampling/Purge Log. The location of the monitoring wells is provided in Figure 3 of the Supplemental RIWP.

Each groundwater sample will be placed directly into pre-cleaned containers provided by the laboratory. Sample containers will be labeled and placed in a cooler filled with ice and maintained at 4 degrees Celsius. Sample containers will be labeled and placed in a cooler filled with ice and maintained at 4 degrees Celsius. Each sample will be transmitted under proper chain of custody procedures to a NYSDOH ELAP-certified laboratory for analysis. Table 2 provides the sample containers, volumes, test methods, preservation techniques, reporting limits and holding times for the groundwater samples.

3.3 Decontamination Methods/ Quality Assurance and Quality Usability Objectives

A Hydro Tech Quality Assurance (QA) officer (A.J. Infante) will adopt this QAPP during the collection of soil and groundwater samples in order to ensure that (1) proper equipment handling and maintenance is followed, (2) cross-contamination between sampling locations does not occur, (3) standard number of quality control replicate environmental samples are obtained, (4) proper procedures for samples custody are performed and (5) data review, validation and verification requirements are complete. Attachment C provides resumes of key personnel involved with this project.

During the field sampling, Hydro Tech QA officer will be responsible for monitoring the decontamination procedure of every piece of sampling equipment prior to each use by field personnel. The following procedure will be implemented during the decontamination process:

- Wipe clean and wash with Alconox®
- Potable water rinse
- Methanol rinse
- Deionized water rinse
- Air dry

All decontamination procedures will be performed in an area segregated from any sampling areas. Any rinsate from the decontamination area will be contained and placed in 55-gallons drums and properly disposed of. The following Quality Assurance (QA) and Quality Control (QC) samples will also be collected and analyzed.

- One trip blank per trip will be analyzed via EPA Method 8260
- One field blank (rinsate blank) for soil will be analyzed via EPA Method 8260, EPA Method 8270, EPA Method 8081, EPA Method 8151, EPA Method 8082, EPA Method 6010 and EPA Method 7471.
- One field blank (rinsate blank) for groundwater will be analyzed via EPA Method 8260, EPA Method 8270, EPA Method 8081, EPA Method 8151, EPA Method 8082, EPA Method 6010 and EPA Method 7471.

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) samples will also be collected and analyzed.

- One MS soil sample and one MSD soil sample will be analyzed via EPA Method 8260, EPA Method 8270, EPA Method 8081, EPA Method 8151, EPA Method 8082, EPA Method 6010 and EPA Method 7471.
- One MS groundwater sample and one MSD groundwater sample will be analyzed via EPA Method 8260, EPA Method 8270, EPA Method 8081, EPA Method 8151, EPA Method 8082, EPA Method 6010 and EPA Method 7471.

The soil and groundwater samples will be managed and analysis with the following protocol:

- Samples will be labeled and logged in a monitor notebook upon collection.
- In the field, samples will be the responsibility of, and will stay with, the Hydro Tech QA officer.
- Once samples have been collected they are returned to Hydro Tech office and logged in for temporary (i.e. < 48 hrs) storage.
- Samples will be refrigerated to maintain a temperature at a maximum 4 degrees Celsius.
- Hydro Tech QA officer will be then responsible for arranging transport of samples to State-certified (ELAP) laboratory for analysis under a proper Chain of Custody. Attachment D provides a sample chain of custody form.

- Laboratory personnel will record the date and time of samples arrival at the lab and ensure that all holding times for each matrix and analysis will be met.
- After samples are analyzed, laboratory information is added to the label.
- The Sample Chain of Custody Form will be used to record all transport and storage information.
- Samples analytical data report will undergo QA/QC performed by a laboratory officer who checks each data sheet for precision, missing or illegible information, errors in calculation and values outside of the expected range. Attachment E provides a conventional lab QA/QC procedures associated with soil, vapor/air and groundwater methods and analyses.
- As necessary, data uploads will be conducted utilizing EQUIS.
- ASP Protocol, Category B deliverables.

Upon completion of the sampling and analysis, an independent QA Officer will generate a data usability analysis. The analysis shall consist of (1) an assessment to determine if the data quality objectives were met; (2) evaluation of field duplicate results to indicate the samples are representative; (3) comparison of the results of all field blanks, trip blanks and methods blanks with full data sets to provide information concerning contaminants that may have been introduced during sampling, shipping or analyzing; (4) evaluation of matrix effects to assess the performance of the analytical method with respect to sample matrix, and determine whether the data have been biased high or low due to matrix effects. The data usability analysis shall be included in the QA summary of the Field Investigation Report. Tables 1, Table 2 and Table 3 provide the sampling and analytical Method Requirements for soil, groundwater and vapor/air.

ATTACHMENT A
USEPA LOW FLOW SAMPLING PROTOCOL

United States
Environmental Protection
Agency

Office of
Research and
Development

Office of Solid Waste
and Emergency
Response

EPA/540/S-95/504
April 1996

Ground Water Issue

LOW-FLOW (MINIMAL DRAWDOWN) GROUND-WATER SAMPLING PROCEDURES

by Robert W. Puls[1] and Michael J. Barcelona[2]

Background

The Regional Superfund Ground Water Forum is a group of ground-water scientists, representing EPA's Regional Superfund Offices, organized to exchange information related to ground-water remediation at Superfund sites. One of the major concerns of the Forum is the sampling of ground water to support site assessment and remedial performance monitoring objectives. This paper is intended to provide background information on the development of low-flow sampling procedures and its application under a variety of hydrogeologic settings. It is hoped that the paper will support the production of standard operating procedures for use by EPA Regional personnel and other environmental professionals engaged in ground-water sampling.

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I. Introduction

The methods and objectives of ground-water sampling to assess water quality have evolved over time. Initially the emphasis was on the assessment of water quality of aquifers as sources of drinking water. Large water-bearing units were identified and sampled in keeping with that objective. These were highly productive aquifers that supplied drinking water via private wells or through public water supply systems. Gradually, with the increasing awareness of subsurface pollution of these water resources, the understanding of complex hydrogeochemical processes which govern the fate and transport of contaminants in the subsurface increased. This increase in understanding was also due to advances in a number of scientific disciplines and improvements in tools used for site characterization and ground-water sampling. Ground-water quality investigations where pollution was detected initially borrowed ideas, methods, and materials for site characterization from the water supply field and water analysis from public health practices. This included the materials and manner in which monitoring wells were installed and the way in which water was brought to the surface, treated, preserved and analyzed. The prevailing conceptual ideas included convenient generalizations of ground-water resources in terms of large and relatively homogeneous hydrologic *units*. With time it became apparent that conventional water supply generalizations of *homogeneity* did not adequately represent field data regarding pollution of these subsurface resources. The important role of *heterogeneity* became increasingly clear not only in geologic terms, but also in terms of complex physical,

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Walter W. Kovalick, Jr., Ph.D.
Director

chemical and biological subsurface processes. With greater appreciation of the role of heterogeneity, it became evident that subsurface pollution was ubiquitous and encompassed the unsaturated zone to the deep subsurface and included unconsolidated sediments, fractured rock, and *aquitards* or low-yielding or impermeable formations. Small-scale processes and heterogeneities were shown to be important in identifying contaminant distributions and in controlling water and contaminant flow paths.

It is beyond the scope of this paper to summarize all the advances in the field of ground-water quality investigations and remediation, but two particular issues have bearing on ground-water sampling today: aquifer heterogeneity and colloidal transport. Aquifer heterogeneities affect contaminant flow paths and include variations in geology, geochemistry, hydrology and microbiology. As methods and the tools available for subsurface investigations have become increasingly sophisticated and understanding of the subsurface environment has advanced, there is an awareness that in most cases a primary concern for site investigations is characterization of contaminant flow paths rather than entire aquifers. In fact, in many cases, plume thickness can be less than well screen lengths (e.g., 3-6 m) typically installed at hazardous waste sites to detect and monitor plume movement over time. Small-scale differences have increasingly been shown to be important and there is a general trend toward smaller diameter wells and shorter screens.

The hydrogeochemical significance of colloidal-size particles in subsurface systems has been realized during the past several years (Gschwend and Reynolds, 1987; McCarthy and Zachara, 1989; Puls, 1990; Ryan and Gschwend, 1990). This realization resulted from both field and laboratory studies that showed faster contaminant migration over greater distances and at higher concentrations than flow and transport model predictions would suggest (Buddemeier and Hunt, 1988; Enfield and Bengtsson, 1988; Penrose et al., 1990). Such models typically account for interaction between the mobile aqueous and immobile solid phases, but do not allow for a mobile, reactive solid phase. It is recognition of this third *phase* as a possible means of contaminant transport that has brought increasing attention to the manner in which samples are collected and processed for analysis (Puls et al., 1990; McCarthy and Degueldre, 1993; Backhus et al., 1993; U. S. EPA, 1995). If such a phase is present in sufficient mass, possesses high sorption reactivity, large surface area, and remains stable in suspension, it can serve as an important mechanism to facilitate contaminant transport in many types of subsurface systems.

Colloids are particles that are sufficiently small so that the surface free energy of the particle dominates the bulk free energy. Typically, in ground water, this includes particles with diameters between 1 and 1000 nm. The most commonly observed mobile particles include: secondary clay minerals; hydrous iron, aluminum, and manganese oxides; dissolved and particulate organic materials, and viruses and bacteria. These reactive particles have been shown to be mobile under a variety of conditions in both field studies and laboratory column experiments, and as such need to be included in monitoring programs where identification of the *total* mobile contaminant loading (dissolved + naturally suspended particles) at a site is an objective. To that end, sampling methodologies must be used which do not artificially bias *naturally* suspended particle concentrations.

Currently the most common ground-water purging and sampling methodology is to purge a well using bailers or high speed pumps to remove 3 to 5 casing volumes followed by sample collection. This method can cause adverse impacts on sample quality through collection of samples with high levels of turbidity. This results in the inclusion of otherwise immobile artifactual particles which produce an overestimation of certain analytes of interest (e.g., metals or hydrophobic organic compounds). Numerous documented problems associated with filtration (Danielsson, 1982; Laxen and Chandler, 1982; Horowitz et al., 1992) make this an undesirable method of rectifying the turbidity problem, and include the removal of potentially mobile (contaminant-associated) particles during filtration, thus artificially biasing contaminant concentrations low. Sampling-induced turbidity problems can often be mitigated by using low-flow purging and sampling techniques.

Current subsurface conceptual models have undergone considerable refinement due to the recent development and increased use of field screening tools. So-called hydraulic *push* technologies (e.g., cone penetrometer, Geoprobe®, QED HydroPunch®) enable relatively fast screening site characterization which can then be used to design and install a monitoring well network. Indeed, alternatives to conventional monitoring wells are now being considered for some hydrogeologic settings. The ultimate design of any monitoring system should however be based upon adequate site characterization and be consistent with established monitoring objectives.

If the sampling program objectives include accurate assessment of the magnitude and extent of subsurface contamination over time and/or accurate assessment of subsequent remedial performance, then some information regarding plume delineation in three-dimensional space is necessary prior to monitoring well network design and installation. This can be accomplished with a variety of different tools and equipment ranging from hand-operated augers to screening tools mentioned above and large drilling rigs. Detailed information on ground-water flow velocity, direction, and horizontal and vertical variability are essential baseline data requirements. Detailed soil and geologic data are required prior to and during the installation of sampling points. This includes historical as well as detailed soil and geologic logs which accumulate during the site investigation. The use of borehole geophysical techniques is also recommended. With this information (together with other site characterization data) and a clear understanding of sampling objectives, then appropriate location, screen length, well diameter, slot size, etc. for the monitoring well network can be decided. This is especially critical for new in situ remedial approaches or natural attenuation assessments at hazardous waste sites.

In general, the overall goal of any ground-water sampling program is to collect water samples with no alteration in water chemistry; analytical data thus obtained may be used for a variety of specific monitoring programs depending on the regulatory requirements. The sampling methodology described in this paper assumes that the monitoring goal is to sample monitoring wells for the presence of contaminants and it is applicable whether mobile colloids are a concern or not and whether the analytes of concern are metals (and metalloids) or organic compounds.

II. Monitoring Objectives and Design Considerations

The following issues are important to consider prior to the design and implementation of any ground-water monitoring program, including those which anticipate using low-flow purging and sampling procedures.

A. Data Quality Objectives (DQOs)

Monitoring objectives include four main types: detection, assessment, corrective-action evaluation and resource evaluation, along with *hybrid* variations such as site-assessments for property transfers and water availability investigations. Monitoring objectives may change as contamination or water quality problems are discovered. However, there are a number of common components of monitoring programs which should be recognized as important regardless of initial objectives. These components include:

1) Development of a conceptual model that incorporates elements of the regional geology to the local geologic framework. The conceptual model development also includes initial site characterization efforts to identify hydrostratigraphic units and likely flow-paths using a minimum number of borings and well completions;

2) Cost-effective and well documented collection of high quality data utilizing simple, accurate, and reproducible techniques; and

3) Refinement of the conceptual model based on supplementary data collection and analysis.

These fundamental components serve many types of monitoring programs and provide a basis for future efforts that evolve in complexity and level of spatial detail as purposes and objectives expand. High quality, reproducible data collection is a common goal regardless of program objectives.

High quality data collection implies data of sufficient accuracy, precision, and completeness (i.e., ratio of valid analytical results to the minimum sample number called for by the program design) to meet the program objectives. Accuracy depends on the correct choice of monitoring tools and procedures to minimize sample and subsurface disturbance from collection to analysis. Precision depends on the repeatability of sampling and analytical protocols. It can be assured or improved by replication of sample analyses including blanks, field/lab standards and reference standards.

B. Sample Representativeness

An important goal of any monitoring program is collection of data that is truly representative of conditions at the site. The term *representativeness* applies to chemical and hydrogeologic data collected via wells, borings, piezometers, geophysical and soil gas measurements, lysimeters, and temporary sampling points. It involves a recognition of the statistical variability of individual subsurface physical properties, and contaminant or major ion concentration levels, while explaining extreme values. Subsurface temporal and spatial variability are facts. Good professional practice seeks to maximize representativeness by using proven accurate and reproducible techniques to define limits on the distribution of measurements collected at a site. However, measures of representativeness are dynamic and are controlled by evolving site characterization and monitoring objectives. An evolutionary site characterization model, as shown in Figure 1, provides a systematic approach to the goal of consistent data collection.

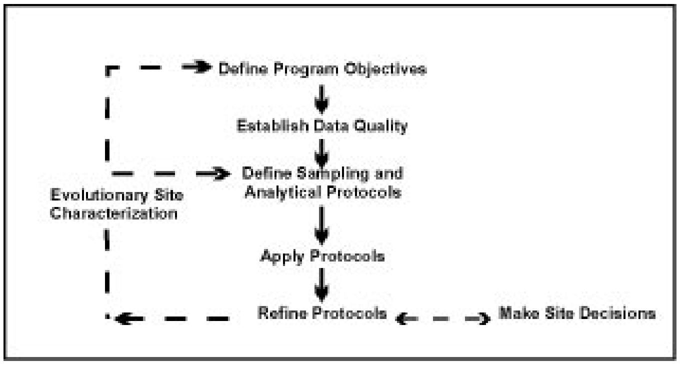

Figure 1. Evolutionary Site Characterization Model

The model emphasizes a recognition of the causes of the variability (e.g., use of inappropriate technology such as using bailers to purge wells; imprecise or operator-dependent methods) and the need to control avoidable errors.

1) Questions of Scale

A sampling plan designed to collect representative samples must take into account the potential scale of changes in site conditions through space and time as well as the chemical associations and behavior of the parameters that are targeted for investigation. In subsurface systems, physical (i.e., aquifer) and chemical properties over time or space are not statistically independent. In fact, samples taken in close proximity (i.e., within distances of a few meters) or within short time periods (i.e., more frequently than monthly) are highly auto-correlated. This means that designs employing high-sampling frequency (e.g., monthly) or dense spatial monitoring designs run the risk of redundant data collection and misleading inferences regarding trends in values that aren't statistically valid. In practice, contaminant detection and assessment monitoring programs rarely suffer these *over-sampling* concerns. In corrective-action evaluation programs, it is also possible that too little data may be collected over space or time. In these cases, false interpretation of the spatial extent of contamination or underestimation of temporal concentration variability may result.

2) Target Parameters

Parameter selection in monitoring program design is most often dictated by the regulatory status of the site. However, background water quality constituents, purging indicator parameters, and contaminants, all represent targets for data collection programs. The tools and procedures used in these programs should be equally rigorous and applicable to all categories of data, since all may be needed to determine or support regulatory action.

C. Sampling Point Design and Construction

Detailed site characterization is central to all decision-making purposes and the basis for this characterization resides in identification of the geologic framework and major hydro-stratigraphic units. Fundamental data for sample point location include: subsurface lithology, head-differences and background geochemical conditions. Each sampling point has a proper use or uses which should be documented at a level which is appropriate for the program's data quality objectives. Individual sampling points may not always be able to fulfill multiple monitoring objectives (e.g., detection, assessment, corrective action).

1) Compatibility with Monitoring Program and Data Quality Objectives

Specifics of sampling point location and design will be dictated by the complexity of subsurface lithology and variability in contaminant and/or geochemical conditions. It should be noted that, regardless of the ground-water sampling approach, few sampling points (e.g., wells, drive-points, screened augers) have zones of influence in excess of a few feet. Therefore, the spatial frequency of sampling points should be carefully selected and designed.

2) Flexibility of Sampling Point Design

In most cases *well-point* diameters in excess of 1 7/8 inches will permit the use of most types of submersible pumping devices for low-flow (minimal drawdown) sampling. It is suggested that *short* (e.g., less than 1.6 m) screens be incorporated into the monitoring design where possible so that comparable results from one device to another might be expected. *Short*, of course, is relative to the degree of vertical water quality variability expected at a site.

3) Equilibration of Sampling Point

Time should be allowed for equilibration of the well or sampling point with the formation after installation. Placement of well or sampling points in the subsurface produces some disturbance of ambient conditions. Drilling techniques (e.g., auger, rotary, etc.) are generally considered to cause more disturbance than *direct-push* technologies. In either case, there may be a period (i.e., days to months) during which water quality near the point may be distinctly different from that in the formation. Proper development of the sampling point and adjacent formation to remove fines created during emplacement will shorten this water quality *recovery* period.

III. Definition of Low-Flow Purging and Sampling

It is generally accepted that water in the well casing is non-representative of the formation water and needs to be purged prior to collection of ground-water samples. However, the water in the screened interval may indeed be representative of the formation, depending upon well construction and site hydrogeology. Wells are purged to some extent for the following reasons: the presence of the air interface at the top of the water column resulting in an oxygen concentration gradient with depth, loss of volatiles up the water column, leaching from or sorption to the casing or filter pack, chemical changes due to clay seals or backfill, and surface infiltration.

Low-flow purging, whether using portable or dedicated systems, should be done using pump-intake located in the middle or slightly above the middle of the screened interval. Placement of the pump too close to the bottom of the well will cause increased entrainment of solids which have collected in the well over time. These particles are present as a result of well development, prior purging and sampling events, and natural colloidal transport and deposition. Therefore, placement of the pump in the middle or toward the top of the screened interval is suggested. Placement of the pump at the top of the water column for sampling is only recommended in unconfined aquifers, screened across the water table, where this is the desired sampling point. Low-flow purging has the advantage of minimizing mixing between the overlying stagnant casing water and water within the screened interval.

A. Low-Flow Purging and Sampling

Low-flow refers to the velocity with which water enters the pump intake and that is imparted to the formation pore water in the immediate vicinity of the well screen. It does not necessarily refer to the flow rate of water discharged at the surface which can be affected by flow regulators or restrictions. Water level drawdown provides the best indication of the stress imparted by a given flow-rate for a given hydrological situation. The objective is to pump in a manner that minimizes stress (drawdown) to the system to the extent practical taking into account established site sampling objectives. Typically, flow rates on the order of 0.1 - 0.5 L/min are used, however this is dependent on site-specific hydrogeology. Some extremely coarse-textured formations have been successfully sampled in this manner at flow rates to 1 L/min. The effectiveness of using low-flow purging is intimately linked with proper screen location, screen length, and well construction and development techniques. The reestablishment of natural flow paths in both the vertical and horizontal directions is important for correct interpretation of the data. For high resolution sampling needs, screens less than 1 m should be used. Most of the need for purging has been found to be due to passing the sampling device through the overlying casing water which causes mixing of these stagnant waters and the dynamic waters within the screened interval. Additionally, there is disturbance to suspended sediment collected in the bottom of the casing and the displacement of water out into the formation immediately adjacent to the well screen. These disturbances and impacts can be avoided using dedicated sampling equipment, which precludes the need to insert the sampling device prior to purging and sampling.

Isolation of the screened interval water from the overlying stagnant casing water may be accomplished using low-flow minimal drawdown techniques. If the pump intake is located within the screened interval, most of the water pumped will be drawn in directly from the formation with little mixing of casing water or disturbance to the sampling zone. However, if the wells are not constructed and developed properly, zones other than those intended may be sampled. At some sites where geologic heterogeneities are sufficiently different within the screened interval, higher conductivity zones may be preferentially sampled. This is another reason to use shorter screened intervals, especially where high spatial resolution is a sampling objective.

B. Water Quality Indicator Parameters

It is recommended that water quality indicator parameters be used to determine purging needs prior to sample collection in each well. Stabilization of parameters such as pH, specific conductance, dissolved oxygen, oxidation-reduction potential, temperature and turbidity should be used to determine when formation water is accessed during purging. In general, the order of stabilization is pH, temperature, and specific conductance, followed by oxidation-reduction potential, dissolved oxygen and turbidity. Temperature and pH, while commonly used as purging indicators, are actually quite insensitive in distinguishing between formation water and stagnant casing water; nevertheless, these are important parameters for data interpretation purposes and should also be measured. Performance criteria for determination of stabilization should be based on water-level drawdown, pumping rate and equipment specifications for measuring indicator parameters. Instruments are available which utilize in-line flow cells to continuously measure the above parameters.

It is important to establish specific well stabilization criteria and then consistently follow the same methods thereafter, particularly with respect to drawdown, flow rate and sampling device. Generally, the time or purge volume required for parameter stabilization is independent of well depth or well volumes. Dependent variables are well diameter, sampling device, hydrogeochemistry, pump flow rate, and whether the devices are used in a portable or dedicated manner. If the sampling device is already in place (i.e., dedicated sampling systems), then the time and purge volume needed for stabilization is much shorter. Other advantages of dedicated equipment include less purge water for waste disposal, much less decontamination of equipment, less time spent in preparation of sampling as well as time in the field, and more consistency in the sampling approach which probably will translate into less variability in sampling results. The use of dedicated equipment is strongly recommended at wells which will undergo routine sampling over time.

If parameter stabilization criteria are too stringent, then minor oscillations in indicator parameters may cause purging operations to become unnecessarily protracted. It should also be noted that turbidity is a very conservative parameter in terms of stabilization. Turbidity is always the last parameter to stabilize. Excessive purge times are invariably related to the establishment of too stringent turbidity stabilization criteria. It should be noted that natural turbidity levels in ground water may exceed 10 nephelometric turbidity units (NTU).

C. Advantages and Disadvantages of Low-Flow (Minimum Drawdown) Purging

In general, the advantages of low-flow purging include:

- samples which are representative of the *mobile* load of contaminants present (dissolved and colloid-associated);
- minimal disturbance of the sampling point thereby minimizing sampling artifacts;
- less operator variability, greater operator control;

- reduced stress on the formation (minimal drawdown);
- less mixing of stagnant casing water with formation water;
- reduced need for filtration and, therefore, less time required for sampling;
- smaller purging volume which decreases waste disposal costs and sampling time;
- better sample consistency; reduced artificial sample variability.

Some disadvantages of low-flow purging are:

- higher initial capital costs,
- greater set-up time in the field,
- need to transport additional equipment to and from the site,
- increased training needs,
- resistance to change on the part of sampling practitioners,
- concern that new data will indicate a *change in conditions* and trigger an *action*.

IV. Low-Flow (Minimal Drawdown) Sampling Protocols

The following ground-water sampling procedure has evolved over many years of experience in ground-water sampling for organic and inorganic compound determinations and as such summarizes the authors' (and others) experiences to date (Barcelona et al., 1984, 1994; Barcelona and Helfrich, 1986; Puls and Barcelona, 1989; Puls et. al. 1990, 1992; Puls and Powell, 1992; Puls and Paul, 1995). High-quality chemical data collection is essential in ground-water monitoring and site characterization. The primary limitations to the collection of *representative* ground-water samples include: mixing of the stagnant casing and *fresh* screen waters during insertion of the sampling device or ground-water level measurement device; disturbance and resuspension of settled solids at the bottom of the well when using high pumping rates or raising and lowering a pump or bailer; introduction of atmospheric gases or degassing from the water during sample handling and transfer, or inappropriate use of vacuum sampling device, etc.

A. Sampling Recommendations

Water samples should not be taken immediately following well development. Sufficient time should be allowed for the ground-water flow regime in the vicinity of the monitoring well to stabilize and to approach chemical equilibrium with the well construction materials. This lag time will depend on site conditions and methods of installation but often exceeds one week.

Well purging is nearly always necessary to obtain samples of water flowing through the geologic formations in the screened interval. Rather than using a general but arbitrary guideline of purging three casing volumes prior to sampling, it is recommended that an in-line water quality measurement device (e.g., flow-through cell) be used to establish the stabilization time for several parameters (e.g. , pH, specific conductance, redox, dissolved oxygen, turbidity) on a well-specific basis. Data on pumping rate, drawdown, and volume required for parameter stabilization can be used as a guide for conducting subsequent sampling activities.

The following are recommendations to be considered before, during and after sampling:

- use low-flow rates (<0.5 L/min), during both purging and sampling to maintain minimal drawdown in the well;
- maximize tubing wall thickness, minimize tubing length;
- place the sampling device intake at the desired sampling point;
- minimize disturbances of the stagnant water column above the screened interval during water level measurement and sampling device insertion;
- make proper adjustments to stabilize the flow rate as soon as possible;
- monitor water quality indicators during purging;
- collect unfiltered samples to estimate contaminant loading and transport potential in the subsurface system.

B. Equipment Calibration

Prior to sampling, all sampling device and monitoring equipment should be calibrated according to manufacturer’s recommendations and the site Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP). Calibration of pH should be performed with at least two buffers which bracket the expected range. Dissolved oxygen calibration must be corrected for local barometric pressure readings and elevation.

C. Water Level Measurement and Monitoring

It is recommended that a device be used which will least disturb the water surface in the casing. Well depth should be obtained from the well logs. Measuring to the bottom of the well casing will only cause resuspension of settled solids from the formation and require longer purging times for turbidity equilibration. Measure well depth after sampling is completed. The water level measurement should be taken from a permanent reference point which is surveyed relative to ground elevation.

D. Pump Type

The use of low-flow (e.g., 0.1-0.5 L/min) pumps is suggested for purging and sampling all types of analytes. All pumps have some limitation and these should be investigated with respect to application at a particular site. Bailers are inappropriate devices for low-flow sampling.

1) General Considerations

There are no unusual requirements for ground-water sampling devices when using low-flow, minimal drawdown techniques. The major concern is that the device give consistent results and minimal disturbance of the sample across a range of *low* flow rates (i.e., < 0.5 L/min). Clearly, pumping rates that cause minimal to no drawdown in one well could easily cause *significant* drawdown in another well finished in a less transmissive formation. In this sense, the pump should not cause undue pressure or temperature changes or physical disturbance on the water sample over a reasonable sampling range. Consistency in operation is critical to meet accuracy and precision goals.

2) Advantages and Disadvantages of Sampling Devices

A variety of sampling devices are available for low-flow (minimal drawdown) purging and sampling and include peristaltic pumps, bladder pumps, electrical submersible pumps, and gas-driven pumps. Devices which lend themselves to both dedication and consistent operation at definable low-flow rates are preferred. It is desirable that the pump be easily adjustable and operate reliably at these lower flow rates. The peristaltic pump is limited to shallow applications and can cause degassing resulting in alteration of pH, alkalinity, and some volatiles loss. Gas-driven pumps should be of a type that does not allow the gas to be in direct contact with the sampled fluid.

Clearly, bailers and other *grab* type samplers are ill-suited for low-flow sampling since they will cause repeated disturbance and mixing of *stagnant* water in the casing and the *dynamic* water in the screened interval. Similarly, the use of inertial lift foot-valve type samplers may cause too much disturbance at the point of sampling. Use of these devices also tends to introduce uncontrolled and unacceptable operator variability.

Summaries of advantages and disadvantages of various sampling devices are listed in Herzog et al. (1991), U. S. EPA (1992), Parker (1994) and Thurnblad (1994).

E. Pump Installation

Dedicated sampling devices (left in the well) capable of pumping and sampling are preferred over <u>any</u> other type of device. Any portable sampling device should be slowly and carefully lowered to the middle of the screened interval or slightly above the middle (e.g., 1-1.5 m below the top of a 3 m screen). This is to minimize excessive mixing of the stagnant water in the casing above the screen with the screened interval zone water, and to minimize resuspension of solids which will have collected at the bottom of the well. These two disturbance effects have been shown to directly affect the time required for purging. There also appears to be a direct correlation between size of portable sampling devices relative to the well bore and resulting purge volumes and times. The key is to minimize disturbance of water and solids in the well casing.

F. Filtration

Decisions to filter samples should be dictated by sampling objectives rather than as a *fix* for poor sampling practices, and field-filtering of certain constituents should not be the default. Consideration should be given as to what the application of field-filtration is trying to accomplish. For assessment of truly dissolved (as opposed to operationally *dissolved* [i.e., samples filtered with 0.45 µm filters]) concentrations of major ions and trace metals, 0.1 µm filters are recommended although 0.45 µm filters are normally used for most regulatory programs. Alkalinity samples must also be filtered if significant particulate calcium carbonate is suspected, since this material is likely to impact alkalinity titration results (although filtration itself may alter the CO_2 composition of the sample and, therefore, affect the results).

Although filtration may be appropriate, filtration of a sample may cause a number of unintended changes to occur (e.g. oxidation, aeration) possibly leading to filtration-induced artifacts during sample analysis and uncertainty in the results. Some of these unintended changes may be unavoidable but the factors leading to them must be recognized. Deleterious effects can be minimized by consistent application of certain filtration guidelines. Guidelines should address selection of filter type, media, pore size, etc. in order to identify and minimize potential sources of uncertainty when filtering samples.

In-line filtration is recommended because it provides better consistency through less sample handling, and minimizes sample exposure to the atmosphere. In-line filters are available in both disposable (barrel filters) and non-disposable (in-line filter holder, flat membrane filters) formats and various filter pore sizes (0.1-5.0 µm). Disposable filter cartridges have the advantage of greater sediment handling capacity when compared to traditional membrane filters. Filters must be pre-rinsed following manufacturer's recommendations. If there are no recommendations for rinsing, pass through a minimum of 1 L of ground water following purging and prior to sampling. Once filtration has begun, a filter cake may develop as particles larger than the pore size accumulate on the filter membrane. The result is that the effective pore diameter of the membrane is reduced and particles smaller than the stated pore size are excluded from the filtrate. Possible corrective measures include prefiltering (with larger pore size filters), minimizing particle loads to begin with, and reducing sample volume.

G. Monitoring of Water Level and Water Quality Indicator Parameters

Check water level periodically to monitor drawdown in the well as a guide to flow rate adjustment. The goal is minimal drawdown (<0.1 m) during purging. This goal may be difficult to achieve under some circumstances due to geologic heterogeneities within the screened interval, and may require adjustment based on site-specific conditions and personal experience. In-line water quality indicator parameters should be continuously monitored during purging. The water quality indicator parameters monitored can include pH, redox potential, conductivity, dissolved oxygen (DO) and turbidity. The last three parameters are often most sensitive. Pumping rate, drawdown, and the time or volume required to obtain stabilization of parameter readings can be used as a future guide to purge the well. Measurements should be taken every three to five minutes if the above suggested rates are used. Stabilization is achieved after all parameters have stabilized for three successive readings. In lieu of measuring all five parameters, a minimum subset would include pH, conductivity, and turbidity or DO. Three successive readings should be within ± 0.1 for pH, ± 3% for conductivity, ± 10 mv for redox potential, and ± 10% for turbidity and DO. Stabilized purge indicator parameter trends are generally obvious and follow either an exponential or asymptotic change to stable values during purging. Dissolved oxygen and turbidity usually require the longest time for stabilization. The above stabilization guidelines are provided for rough estimates based on experience.

H. Sampling, Sample Containers, Preservation and Decontamination

Upon parameter stabilization, sampling can be initiated. If an in-line device is used to monitor water quality parameters, it should be disconnected or bypassed during sample collection. Sampling flow rate may remain at established purge rate or may be adjusted slightly to minimize aeration, bubble formation, turbulent filling of sample bottles, or loss of volatiles due to extended residence time in tubing. Typically, flow rates less than 0.5 L/min are appropriate. The same device should be used for sampling as was used for purging. Sampling should occur in a progression from least to most contaminated well, if this is known. Generally, volatile (e.g., solvents and fuel constituents) and gas sensitive (e.g., Fe^{2+}, CH_4, H_2S/HS^-, alkalinity) parameters should be sampled first. The sequence in which samples for most inorganic parameters are collected is immaterial unless filtered (dissolved) samples are desired. Filtering should be done last and in-line filters should be used as discussed above. During both well purging and sampling, proper protective clothing and equipment must be used based upon the type and level of contaminants present.

The appropriate sample container will be prepared in advance of actual sample collection for the analytes of interest and include sample preservative where necessary. Water samples should be collected directly into this container from the pump tubing.

Immediately after a sample bottle has been filled, it must be preserved as specified in the site (QAPP). Sample preservation requirements are based on the analyses being performed (use site QAPP, FSP, RCRA guidance document [U. S. EPA, 1992] or EPA SW-846 [U. S. EPA, 1982]). It may be advisable to add preservatives to sample bottles in a controlled setting prior to entering the field in order to reduce the chances of improperly preserving sample bottles or introducing field contaminants into a sample bottle while adding the preservatives.

The preservatives should be transferred from the chemical bottle to the sample container using a disposable polyethylene pipet and the disposable pipet should be used only once and then discarded.

After a sample container has been filled with ground water, a Teflon™ (or tin)-lined cap is screwed on tightly to prevent the container from leaking. A sample label is filled out as specified in the FSP. The samples should be stored inverted at 4°C.

Specific decontamination protocols for sampling devices are dependent to some extent on the type of device used and the type of contaminants encountered. Refer to the site QAPP and FSP for specific requirements.

I. Blanks

The following blanks should be collected:

(1) field blank: one field blank should be collected from each source water (distilled/deionized water) used for sampling equipment decontamination or for assisting well development procedures.

(2) equipment blank: one equipment blank should be taken prior to the commencement of field work, from each set of sampling equipment to be used for that day. Refer to site QAPP or FSP for specific requirements.

(3) trip blank: a trip blank is required to accompany each volatile sample shipment. These blanks are prepared in the laboratory by filling a 40-mL volatile organic analysis (VOA) bottle with distilled/deionized water.

V. Low-Permeability Formations and Fractured Rock

The overall sampling program goals or sampling objectives will drive how the sampling points are located, installed, and choice of sampling device. Likewise, site-specific hydrogeologic factors will affect these decisions. Sites with very low permeability formations or fractures causing discrete flow channels may require a unique monitoring approach. Unlike water supply wells, wells installed for ground-water quality assessment and restoration programs are often installed in low water-yielding settings (e.g., clays, silts). Alternative types of sampling points and sampling methods are often needed in these types of environments, because low-permeability settings may require extremely low-flow purging (<0.1 L/min) and may be technology-limited. Where devices are not readily available to pump at such low flow rates, the primary consideration is to avoid dewatering of the well screen. This may require repeated recovery of the water during purging while leaving the pump in place within the well screen.

Use of low-flow techniques may be impractical in these settings, depending upon the water recharge rates. The sampler and the end-user of data collected from such wells need to understand the limitations of the data collected; i.e., a strong potential for underestimation of actual contaminant concentrations for volatile organics, potential false negatives for filtered metals and potential false positives for unfiltered metals. It is suggested that comparisons be made between samples recovered using low-flow purging techniques and samples recovered using passive sampling techniques (i.e., two sets of samples). Passive sample collection would essentially entail acquisition of the sample with no or very little purging using a dedicated sampling system installed within the screened interval or a passive sample collection device.

A. Low-Permeability Formations (<0.1 L/min recharge)

1. Low-Flow Purging and Sampling with Pumps

   a. "portable or non-dedicated mode" - Lower the pump (one capable of pumping at <0.1 L/min) to mid-screen or slightly above and set in place for minimum of 48 hours (to lessen purge volume requirements). After 48 hours, use procedures listed in Part IV above regarding monitoring water quality parameters for stabilization, etc., but do not dewater the screen. If excessive drawdown and slow recovery is a problem, then alternate approaches such as those listed below may be better.

   b. "dedicated mode" - Set the pump as above at least a week prior to sampling; that is, operate in a dedicated pump mode. With this approach significant reductions in purge volume should be realized. Water quality parameters should stabilize quite rapidly due to less disturbance of the sampling zone.

2. Passive Sample Collection

Passive sampling collection requires insertion of the device into the screened interval for a sufficient time period to allow flow and sample equilibration before extraction for analysis. Conceptually, the extraction of water from low yielding formations seems more akin to the collection of water from the unsaturated zone and passive sampling techniques may be more appropriate in terms of obtaining "representative" samples. Satisfying usual sample volume requirements is typically a problem with this approach and some latitude will be needed on the part of regulatory entities to achieve sampling objectives.

B. Fractured Rock

In fractured rock formations, a low-flow to zero purging approach using pumps in conjunction with packers to isolate the sampling zone in the borehole is suggested. Passive multi-layer sampling devices may also provide the most "representative" samples. It is imperative in these settings to identify flow paths or water-producing fractures prior to sampling using tools such as borehole flowmeters and/or other geophysical tools.

After identification of water-bearing fractures, install packer(s) and pump assembly for sample collection using low-flow sampling in "dedicated mode" or use a passive sampling device which can isolate the identified water-bearing fractures.

VI. Documentation

The usual practices for documenting the sampling event should be used for low-flow purging and sampling techniques. This should include, at a minimum: information on the conduct of purging operations (flow-rate, drawdown, water-quality parameter values, volumes extracted and times for measurements), field instrument calibration data, water sampling forms and chain of custody forms. See Figures 2 and 3 and "Ground Water Sampling Workshop -- A Workshop Summary" (U. S. EPA, 1995) for example forms and other documentation suggestions and information. This information coupled with laboratory analytical data and validation data are needed to judge the "useability" of the sampling data.

VII. Notice

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Figure 2. **Ground Water Sampling Log**

Project ________________ **Site** ________________ **Well No.** ______________ **Date** ___________________________
Well Depth _____________ **Screen Length** ___________ **Well Diameter** __________ **Casing Type** _____________
Sampling Device ________________ **Tubing type** _______________________ **Water Level** ___________________
Measuring Point ____________________ **Other Infor** ____
____
Sampling Personnel ____

Time	pH	Temp	Cond.	Dis.O$_2$	Turb.	[ ]Conc			Notes

Type of Samples Collected

____

Information: 2 in = 617 ml/ft, 4 in = 2470 ml/ft: $Vol_{cyl} = \pi r^2 h$, $Vol_{sphere} = 4/3\pi\ r^3$

Figure 3. **Ground Water Sampling Log** (with automatic data logging for most water quality parameters)

Project ________________ **Site** ________________ **Well No.** ______________ **Date** __________________________
Well Depth _____________ **Screen Length** ___________ **Well Diameter** __________ **Casing Type** ____________
Sampling Device ________________ **Tubing type** ______________________ **Water Level** __________________
Measuring Point ____________________ **Other Infor** ____
____
Sampling Personnel ____

Time	Pump Rate	Turbidity	Alkalinity	[ ] Conc	Notes

Type of Samples Collected

____

Information: 2 in = 617 ml/ft, 4 in = 2470 ml/ft: $Vol_{cyl} = \pi r^2 h$, $Vol_{sphere} = 4/3\pi\ r^3$

ATTACHMENT B
GROUNDWATER SAMPLING/PURGE LOG

Hydro Tech Environmental, Corp.

Project 5th Street **Well No.** MW-1 **Date** 3/7/2011
Well Depth 22' **Screen Length** 15 feet **Well Diameter** 1" **Casing Type**
Sampling Device YSI-pump **Tubing type** PVC **Water Level** 12.22 feet
Measuring Point 1 **Riser aboveground** manhole Cover

Sampling Personnel Paul

Time	pH	Temp (ºF)	Cond. (S/Cm)	Dis.O2 (mg/L)	Turb.(NTU)	ORP (mV)	Notes
1:20 AM	6.75	52.70	0.707	8.26	101.90	110	
1:25 AM	6.88	54.97	0.687	8.60	340.10	114	
1:30 AM	6.75	54.73	0.730	8.25	560.10	115	
1:35 PM	6.74	54.91	0.721	8.26	301.10	119	
							4 liters bailed

ATTACHMENT C
RESUMES OF KEY PERSONNEL INVOLVED IN THIS PROJECT

Mark E. Robbins, C.P.G., C.E.I.
Vice President, Senior Geologist

Mr. Robbins has over nine (9) years experience in geology and hydrogeology, involving such activities as Phase I Environmental Site Assessments, Phase II Environmental Site Assessments, Subsurface Investigations, Remedial Actions, data acquisition, evaluation and contouring, and geotechnical investigations. Mr. Robbins has performed over 400 Phase I Assessments involving residential through heavy industrial properties and over 200 Subsurface Investigations throughout the United States. Mr. Robbins has also designed and implemented over 20 remediation systems for both public and private sectors.

Representative Occupational Experience

☐ *Environmental Site Assessments*
Conducted Phase I and II Environmental Site Assessments, analysis of site investigation reports, identifying contamination locations and sources. Soil, soil-vapor and water sampling, analyzing laboratory results for QA/QC, magnetometer and Ground-Penetrating Radar surveys for locating buried drums and underground storage tanks (USTs), estimating UST and other subsurface leaks, monitoring well logging, Project Management, liability assessments and estimating costs to attain compliance.

☐ *Remedial Investigation and Feasibility Studies*
Oversight/planning of site investigations; data analysis, including statistical analysis and geostatistical contouring utilizing SURFER; performance of feasibility studies, including technology evaluations, alternatives development and evaluation and cost estimations.

☐ *Due- Diligence Programs*
Designed and implemented due-diligence programs (ranging from Phase I Assessment to Comprehensive Hydrogeologic Investigations) to assess environmental liabilities for numerous land development clientele.

☐ *Delineation of Chlorinated Organic Plumes*
Supervised the delineation of a dissolved chlorinated organic plume from underground tank loss. Developed a remedial action program in accordance with New York State regulatory guidelines to abate soil and groundwater contamination.

☐ *Remedial Action*
Prepared numerous Remedial Action Plans. Designed and implemented hydrocarbon and chlorinated solvent remediation systems for soil and groundwater.

☐ *Pump Test Aquifer Analysis*
Conducted several pump tests and pump test analysis and field coordination in relation to dewatering permit requirements for Keyspan Energy and the private sector.

Employment

2001 - Present Vice President, Senior Geologist
Hydro Tech Environmental Corp., Commack, New York

2000 – 2001	Assistant Director, Professional Services Fenley & Nicol Environmental, Inc., Deer Park, New York
1999 – 2000	Senior Geologist Fenley & Nicol Environmental, Inc. Deer Park, New York
1995 – 1999	Operations Director Advanced Cleanup Technologies, Inc., Farmingdale, New York
1992 – 1995	Project Geologist Advanced Cleanup Technologies, Inc., Roslyn Heights, New York

Education

B.S. Geology, State University of New York at Oneonta, 1991

Affiliations and Certifications

- American Institute of Professional Geologists
- American Association of Petroleum Geologists
- Long Island Geologist Organization
- Geological Society of America
- American Standards in Testing Materials – E50 Committee Member
- Environmental Assessment Association
- OSHA 40-Hour & 8-Hour, Supervisor

Registrations and Certifications

- Certified Professional Geologist (C.P.G. # 10527)
- Certified Environmental Inspector (C.E.I. # 73383)
- GPR Operator’s Course, Geophysical Survey Systems, Inc., 1993.

Publications/Presentations

- *A Case Study of the Impact of MTBE on the Investigation and Remediation of a Fuel Oil Release,* National Groundwater Focus Conference MTBE in Groundwater: Assessment, Remediation Technologies & Public Policy, Baltimore, MD June 4-5, 2001.
- *Is MTBE in Fuel Oil? Why MTBE Plays a Major Concern on Long Island,* Long Island Business News, February 2001.

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PROFESSIONAL EXPERIENCE

HYDRO TECH ENVIRONMENTAL, CORP., Brooklyn, NY **2015 – Present**

Project Geologist

- Conduct and compose Phase I, Phase II, and Comprehensive Environmental Site Assessments
- Compose and implement Construction Health and Safety Plans (CHASPs), Investigation Work Plans (IWPs), Remedial Investigation Reports (RIRs), Remedial Action Work Plans (RAWPs), and Remedial Closure Reports (RCRs) as per the New York City Mayor's Office of Environmental Remediation (OER) and New York State Department of Environmental Conservation (NYSDEC)
- Manage and implement groundwater monitoring programs for groundwater remedial site initiated due to active spills issued by the NYSDEC in response to groundwater contamination

BRINKERHOFF ENVIRONMENTAL SERVICES, INC., Manasquan, NJ **2013 – 2015**

Geologist

- Apply valuable field experience to effectively manage a workload of more than 10 concurrent projects, including Phase I and Phase II investigations, soil excavations, in-situ remediation, and indoor air quality (IAQ) assessments
- Apply site-specific information to state and federal regulations to identify necessary permits for compliance. Activities include obtainment of research material, permit applications, and evaluation of environmental impact resulting from proposed development
- In depth knowledge of underground storage tank (UST) assessment, removal, and remediation
- Valuable field experience gained in asbestos and PCB-caulk inspections, facility closure lab packing and decontamination, and masonry quality investigations
- Manage the installation, operation, and maintenance of free product recovery, soil vapor extraction (SVE), passive gas venting, and groundwater extraction and treatment systems for industrial facilities throughout the Mid-Atlantic
- Develop standard operating procedures (SOPs) for the design, construction, and installation of remediation system components and trained personnel in the use of tools and equipment. Experienced with collection of soil and groundwater samples via various field sampling equipment and methodologies

EDUCATION / CERTIFICATIONS

Bachelor of Science (BS) Geoscience, University of Rhode Island, Kingston, RI
40-Hour OSHA HAZWOPER and 10-Hour Construction Certified
DOT Hazardous Materials in Transportation Awareness (49 CFR 172.704)
TSA Transportation Worker Identification Credential (TWIC) Certified

DONALD C. ANNÉ
SENIOR CHEMIST

EDUCATION:	M.S., Chemical Oceanography, Florida Institute of Technology, 1981 B.A., Earth Sciences, Millersville University of Pennsylvania, 1975
SPECIAL TRAINING:	Certified 40-Hour OSHA Health and Safety Certified 8-Hour OSHA Supervisory Course Ground Water Geochemistry (NWWA) Ground Water Pollution and Hydrology (Princeton Associates) Quality Assurance Programs for Environmental Monitoring Data (Stat-A-Matrix)
PROFESSIONAL AFFILIATIONS:	American Chemical Society (AFS), 1979-Present

EXPERIENCE SUMMARY:

Mr. Anné has more than 27 years of environmental chemistry experience specializing in data validation, environmental sampling, analytical methodologies, petroleum fingerprinting, laboratory audits, field sampling audits, and preparing Quality Assurance Project Plans and Quality Assurance Manuals. Mr. Anné's experience includes analytical laboratory work with gas chromatography, atomic absorption, infrared spectrometry and wet chemistry methods.

PROJECT EXPERIENCE:

Quality Assurance/Quality Control of Chemical Data

Mr. Anné has more than 20 years experience as a data validator and quality assurance officer. Mr. Anné has validated data for most EPA Regions and under several independent state programs, including the NYSDEC. He has performed laboratory and field audits as well as written Quality Assurance Project Plans. Mr. Anné has written, reviewed, and initiated laboratory Quality Assurance Manuals for laboratories to maintain their regulatory compliance. Typical project experience includes:

- Senior Chemist responsible for data validation. Reviewed chemical data for several projects under the New Jersey ISRA regulations. The clients included industry and utilities.

- Supervising Environmental Scientist responsible for data validation. Reviewed chemical laboratory data for adherence to QA/QC protocols for several key projects, including National Priorities List sites and RCRA Corrective Actions located in EPA Regions I, II, III, IV, V, and IX. Validated analytical data, outlined problems and actions to be taken, and qualified all affected data. Consulted with project managers on data usability, and recommended corrective actions to support project goals. Responded to comments made by regulators regarding data quality.

- Supervising Environmental Scientist recognized by the New York State Department of Environmental Conservation (NYSDEC) to perform third party data validation. Attended NYSDEC workshop on data validation as part of the requirements set forth by NYSDEC. Performed data validation in support of NYSDEC STARS and ASP programs as well as data in support of the NYSDEC Part 360 Regulations for landfills. Validated data for an Albany area municipal landfill.

- Supervising Environmental Scientist responsible for developing and preparing Quality Assurance Project Plans (QAPPs) for several state and federal Superfund sites and federal RCRA corrective action sites. Negotiated with regulators for the acceptance of the QAPPs. The sites were located throughout the eastern United States.

- Environmental Chemist responsible for developing a laboratory QA/QC program which fulfilled requirements of the EPA and agencies from the States of Texas and Louisiana. Implemented and managed the program throughout DOE's SPR Environmental laboratories. Received verbal commendations from EPA and the Texas Water commission on the QA/QC Program.

Environmental Chemistry

Mr. Anné is experienced in sampling soil, water, air, and wastes in accordance with federal and state guidelines. He has performed field sampling audits and prepared sampling plans for numerous projects in accordance with applicable programmatic requirements. Mr. Anné is familiar with the geochemical aspects of fate and transport of contaminants. Mr. Anné's typical project experience includes:

- Data manager for the Pennwalt Corporation's RCRA Corrective Action RFI Phase I program. The project included quantifying and characterizing soil contamination and hydrogeologic flow systems of 12 SWMUs at a flourochemicals plant in Thorofare, New Jersey. Validated and prepared QA/QC reports for data generated during the project. Qualified all data in preparation of the final report. Work was performed under the direction of NJDEP.

- Project Chemist in charge of field sampling activities, including coordinating and scheduling all subcontracted laboratory work for more than 25 sites in Connecticut. Trained field teams in sampling techniques for soil, groundwater, and surface water; chain of custody requirements; sampling QA/QC protocols; and analytical requirements. Work was performed under the scrutiny of ConnDEP.

- Field Team Leader for a major hazardous waste drum excavation project. Supervised all field activities including site safety; excavation; removal, sampling, and over packing of drums; staging and sampling of contaminated soil; and preparation of samples. Coordinated excavation and laboratory subcontractors. Work was performed under the scrutiny of ConnDEP.

- Created an environmental monitoring program for the Bryan Mound site of DOE's Strategic Petroleum Reserve for testing ground water and surface water. Developed sampling protocols, frequency of sampling, and lists of target analytes. This program was designed to provide baseline data for pre-spill conditions in the event of a release. The site was under scrutiny by EPA Region V and the Texas Water commission.

- Project Chemist responsible for developing analytical QA/QC program that included sampling and chemical analyses of surface water, groundwater, soil, and sediment matrices as part of a Remedial Investigation/Feasibility Study (RI/FS). The RI/FS involved more than 25 sites throughout the State of Connecticut. Work was under the guidance of ConnDEP.

Analytical Chemistry

Mr. Anné has experience working in both fixed-base and mobile laboratories. His experience includes the use of gas chromatography, atomic absorption spectrometers, infrared spectrometers, and numerous wet chemistry and preparation equipment methods. He has served in the laboratory as an analyst, laboratory advisor, and QA officer. He has interfaced with regulators in the area of analytical chemistry and has experience in petroleum fingerprinting techniques and methods. Typical projects include:

- Performed bench scale experiments for St. Lawrence Zinc in order to obtain the optimum level of Phlotec necessary to treat discharged water to resolve an N.O.V. for the SPDES outfall. The optimum level of Phlotec would precipitate enough dissolved zinc for the water to meet the discharge requirement. Also performed routine analyses of samples after implementing the treatment, to insure that the proper concentration was being used.

- Environmental Chemist in charge of project to design updates for the DOE's laboratories at its SPR facilities. Evaluated IR and FT-IR instrumentation and personal computers to link with existing and future instrumentation. Wrote procedures for the acceptance of an alternative oil & grease method for NPDES permit monitoring by EPA Region V. Coordinated all site activities necessary for implementing upgrades.

- Environmental Chemist in charge of replacing obsolete total organic carbon (TOC) analyzers for the SPR laboratories. Evaluated state-of-the-art TOC analyzers and recommended replacement TOC analyzer. Negotiated with supplier and wrote technical specification for the bid process required by DOE. Supervised installation and set-up of all new TOC analyzers.

- Analytical Chemist for Berkley Products Company responsible for product development. Analyzed competitor's products and formulated new coatings with equal or better quality. Responsible for solvent operations which included managing the waste solvent recovery operations, solvent formulation, and manufacturing QA/QC. Worked with sales and manufacturing staff to address and resolve client complaints. Received two cash bonuses for suggestions on the manufacture of products which saved the company money.

- Analytical Chemist for the mobile laboratory responsible for sample preparation in support of several projects for a range of clients located in three EPA regions and in conjunction with several state agencies. Extracted, concentrated, and prepared water and soil samples for analyses by GC/FIND, GC/ECD, GC/PID, and GC/MS. Samples were prepared for PCB, pesticide, polynuclear aromatic hydrocarbon, and petroleum hydrocarbon analyses.

EMPLOYMENT:
2005- present, Alpha Geoscience
1998-2005, Alpha Environmental Consultants, Inc.
1990-1998, McLaren/Hart
1986-1990, Fred C. Hart Associates
1985-1986, Boeing Petroleum Services
1982-1985, Petroleum Operations and Support Services
1981-1982, Dravo Utility Constructors
1979-1981, Florida Institute of Technology
1975-1979, Berkley Products Company

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ATTACHMENT D
SAMPLE CHAIN OF CUSTODY FORM

YORK
ANALYTICAL LABORATORIES, INC.
120 RESEARCH DR. STRATFORD, CT 06615
(203) 325-1371 FAX (203) 357-0166

Field Chain-of-Custody Record

Page____ of ____

NOTE: York's Std. Terms & Conditions are listed on the back side of this document. This document serves as your written authorization to York to proceed with the analyses requested and your signature binds you to York's Std. Terms & Conditions unless superseded by written contract.

York Project No.________________

Client Information

Company:____________________
Address:____________________
____
Phone No.____________________
Contact Person:____________________
E-Mail Address:____________________

Report To:

Company:____________________
Address:____________________
____
Phone No.____________________
Attention:____________________
E-Mail Address:____________________

Invoice To:

Company:____________________
Address:____________________
____
Phone No.____________________
Attention:____________________
E-Mail Address:____________________

Client Project ID

Purchase Order No.

Turn-Around Time

24 hr ________
48 hr ________
72 hr ________
5 Day ________
Standard______

Report Type/Deliverbles

Summary Results Only______QA/QC Summary______
RCP Package______ASP B Pkg ________
ASP A Pkg______Excel format________
EDD ________OTHER________________

Print Clearly and Legibly. All Information must be complete. Samples will NOT be logged in and the turn-around time clock will not begin until any questions by York are resolved.

____
Samples Collected/Authorized By (Signature)

____
Name (printed)

Matrix Codes
S - soil
Other - specify(oil, etc.)
WW - wastewater
GW - groundwater
DW - drinking water
Air-A - ambient air
Air-SV - soil vapor

Volatiles		Semi-Vols.	Pest/PCB/Herb	Metals	Misc. Org.	Full Lists	Miscellaneous Parameters		
8260 full	TICs	8270 or 625	8082PCB	RCRA8	TPH GRO	Pri.Poll.	Corrosivity	Nitrate	Color
624	Site Spec.	STARS	8081Pest	PP13	TPH DRO	TCL Organics	Reactivity	Nitrite	Phenols
STARS	SPLP or TCLP	BN Only	8151Herb	TAL	CT ETPH	TAL Met/CN-	Ignitability	TKN	Cyanide-T
BTEX	Benzene	Acids Only	CT RCP	CT15	NY 310-13	Full TCLP	Flash Point	Tot. Nitrogen	Cyanide-A
MTBE	Nassau Co.	PAH	App. IX	Total	TPH 418.1	Full App. IX	Sieve Anal.	Ammonia-N	BOD5
TCL list	Suffolk Co.	TAGM	Site Spec.	Dissolved	Air TO14A	Part 360-Routine	Heterotrophs	Chloride	CBOD5
TAGM	Ketones	CT RCP	SPLP or TCLP	SPLP or TCLP	Air TO15	Part 360-Baseline	TOX	Phosphate	BOD28
CT RCP	Oxygenates	TCL list	TCLP Pest	**Indiv. Metals**	Air STARS	Part 360-Expanded No Dioxins/Furans	BTU/lb.	Tot. Phos.	COD
Arom.	TCLP list	TICs	TCLP Herb	Hg, Pb, As, Cd	Air VPH	Part 360-Expanded Full List	Aquatic Tox.	Oil&Grease	TSS
Halog.	524.2	App. IX	Chlordane	Cr, Ni, Be, Fe,	Air TICs	NYCDEP Sewer	TOC	F.O.G.	Total Solids
App.IX	502.2	SPLP or TCLP	608 Pest	Se, Tl, Sb, Cu,	Methane	NYSDEC Sewer	Asbestos	pH	TDS
8021B list	5035	TCLP BNA	608 PCB	Na, Mn, Ag, etc.	Helium	TAGM	Silica	MBAS	TPH - IR

Special Instructions
Field Filtered ☐
Lab to Filter ☐

Sample Identification	Date Sampled	Sample Matrix	Choose Analyses Needed from the Menu Above and Enter Below							Container Description(s)
Comments		**Preservation** **Check those Applicable**	**4ºC____ Frozen____** **HCl MeOH**	**4ºC____**	**4ºC____**	**HNO$_3$____** **4ºC**	**4ºC____** **H$_2$SO$_4$____**	**4ºC____** **Other**	**4ºC____ H$_2$SO$_4$____ NaOH____** **ZnAc Ascorbic Other**	

Samples Relinquished By ______ Date/Time ______
Samples Received By ______ Date/Time ______
Samples Relinquished By ______ Date/Time ______
Samples Received in **LAB** by ______ Date/Time ______

Temperature on Receipt
______ºC

ATTACHMENT E
CONVENTIONAL LABORATORY QA/QC

FORM I

PREVENTIVE MAINTENANCE – LABORATORY EQUIPMENT

Instrument	Activity	Frequency
Gas Chromatographs	Clean injector for capillary column Replace injector septum Check carrier gas connections/filters Check filter flow controller Inspect / replace capillary columns Replace detector due to excessive signal Replace Injection port liner	Weekly Daily As Required As Required As Required As Required Daily
Mass Spectrometers (MS)	Inspect/replace mass analyzer assembly Clean quadruple mass analyzer Replace electron multiplier Inspect/change oil for vacuum pumps Inspect turbomolecular or Diffusion pump Clean vacuum system filter (if equipped) Clean ion source/Retune	As Required Annually As Rrequired Annually Every 3 months Weekly As Required
Mercury Cold Vapor Analyzer	Replace tubing Replace Purge bottle Replace Cell	Monthly Monthly As-needed
Ion Chromatographs (anions)	Replace or flush guard column Replace Analytical Column Perform annual PM servicing of parts	Every 6 months Every 6 months Every 12 months
ICP (Inductively Coupled Plasma), and ICP/MS	Check tubing, waste and gas flow Replace tubing/Empty waste container Change coolant water Check air filters/Change air filters Clean/replace torch Check and clean filters Clean nebulizer chamber area/Replace	Daily Daily Daily Every 2/6 months As needed Every 6 months As needed

FORM J

CALIBRATION AND CORRECTIVE ACTION – LABORATORY INSTRUMENTATION

Instrument/Analysis	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref. *
GC/MS-Volatiles Including Air	BFB Tuning	Every 12 hours, if necessary	Per Method 8260 and EPA TO-15 for AIR	Perform instrument maintenance, retune instrument	1a, 1b
	Initial Calibration (minimum of 5 standards)	Startup, CCC failure, LCS failure, major maintenance	Low STD @ 0.5 ppb for water, 5.0 ppb for soil $\leq$15% Average RSD or “r”$\geq$0.99 CCC $\leq$30% and RSD or “r”$\geq$0.99 Contains all target analytes, min. $R_f \geq 0.05$ If regression used curve must not be forced through origin	Recalibrate as required by method (1) if any of CCC %RSDs or if any one of CCC “r” <0.990 or (2) if >20% of remaining analytes have %RSD >30 or “r” < 0.990.	
	Initial Calib. Verification	After initial calibration	All compounds 80-120%; 20% of compounds can be outside of range; no compounds <65>135%.	Recalibrate	
	Continuing Calibration Check (CCC)	Every 12 hours prior to analysis of samples	Concentration level near midpoint of curve Contain all target analytes Percent difference must be $\leq$20% for CCC and $\leq$30% for other compounds.	Recalibrate as required by method (1) If %D of any CCC>20% (2) If %D of >10% of other analytes >30%	
	Method Blanks	Every 20 samples prior to running samples and after calibration STDs	Matrix and preservative specific Target analytes should be <RL except common contaminants laboratory contaminants. If not, note in narrative.	Locate the source of contamination, correct problem, reanalyze method blank	

Instrument/Analysis	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref. *
GC/MS-Volatiles	Laboratory Control Samples (LCS)	Every 20 field samples	Prepared using a std source different than initial calibration Concentration level near midpoint of curve Contain representative target analytes Matrix specific Laboratory determined recoveries must be between 70-130% for all compounds-narrative for outliers Can also be used as Cont. Cal. Verification. Up to 10% outside of range acceptable as long as within 40-160%.	Recalculate the percent recoveries, reanalyze the LCS, locate source of problem, reanalyze associated sample	1a
	Surrogates	Minimum of three at retention times across the GC run	Response must be 70-130% of the initial calibration response.Retention times must be +/- 30 seconds of initial calibration retention time	If surrogate outside lab control limits, rerun except when: (1) obvious interference documented by re-run (2) No targets detected	
	Internal Stds	3 must be used	Response must be > ½ the corres. Area in the CCC or 2x that area.		

Instrument/Analysis	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref. *
GC/MS- Semi-Volatiles	DFTPP Tune	Every 12 hours	Per SW-846 Method 8270C	Perform instrument maintenance, retune instrument	2a, 2b, 2c, 2d
	Initial Calibration (minimum of 5 standards)	Startup, CCC failure, LCS failure, major maintenance	Low STD @ 5.0 ug/ml SCAN; 0.05 ug/ml SIM 1) Minimum of 5 standards. 2)Full Scan % RSD ≤ 15 or “r” ≥ 0.990 for all compounds except CCC’s, which must be ≤ 30% RSD or “r” ≥ 0.990.; SIM % RSD ≤30 or “r” ≥ 0.990. 3) Must contain all target analytes 4) If SIM is used, laboratory must monitor at least two ions/analyte for all targets, surrogates, and IS’s. 5) Minimum RF for all compounds > 0.05.	Recalibrate as required by method. (1) If any CCC RSD>20% or “r”<0.99 (2) If >20% of remaining analytes have a RSD>30% or “r”<0.99	
	Initial Calib. Verification	After Initial Calib.	1) Compounds must recover within 80-120% 2) Laboratories are allowed to have 20% of compounds out, as long as all compounds within recover 65-135%	Recalibrate system	
	Continuing Calibration Check (CCC)	Every 12 hours prior to analysis of samples	1)Contain all target analytes 2)Percent difference must be ≤20% for CCC and ≤30% for other compounds.	Recalibrate system	
	Method Blanks	Every 20 samples prior to running samples and after calibration STDs	Matrix specific Target analytes should be <RL except common phthalates, which cab be ≤ 3x RL	Locate the source of contamination, correct problem, reextract and reanalyze method blank	
	Lab Control Sample (LCS) and MS/MSD	One per Extraction batch of ≤ 20 samples Per matrix	1) Every 20 samples or each batch, whichever is more frequent. 2) Concentration level must be near or at the mid-point of the initial calibration. 3) Must contain all target analytes 4) Matrix and preservative specific 5) Laboratory determined percent recovery limits must be between 40-140% for base-neutrals and 30-130% for acid compounds. RPD ≤ 20 for waters and ≤30 for soils	Re-extract LCS and samples if >20% compounds outside acceptance criteria For Site Specific MS/MSD note outliers in narrative.	

Instrument/Analysis	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref. *
GC/ECD Pesticides	Endrin/DDT Breakdown	At beginning of each 12 hour clock	≤ 15% breakdown for each	Perform corrective action on injection port	3a, 2b, 2c, 2d
	Initial Calibration	Startup, CCC failure, LCS failure, major maintenance	1) Minimum of 5 stds for single response pesticides. 2) Low std at RL 3) % RSD must be ≤20% or if linear regression used "r" ≥ 0.990 4) For multi-response pesticides analysis of single std at mid-point of calibration range. 5) If curves are used, curve must NOT be forced through origin. Section 7.5 6) Curves must be verified with independent ICV prior to sample analysis.	Recalibrate after corrective action on injection port or column	
	Continuing Calibration Verification	Prior to samples, every 12-hours or 20 samples, whichever is more frequent, and at the end of the analytical sequence.	Percent difference or drift ≤15%. Verify all analytes fall in retention time windows.	1) Perform instrument maintenance, reanalyze CCAL and/or recalibrate. 2) Reanalyze associated samples if beginning or closing CCAL exhibited low response and associated pesticides not detected in samples. 3) Reanalyze associated samples if beginning or closing CCAL high and associated pesticides were detected in samples.	
	Method Blank	1) Extracted every 20 samples or every batch, whichever is greater. 2) Matrix specific	All target analytes < RL	Locate source of contamination and correct problem. Reanalyze method blank. Re-extract samples if method blank contamination found.	

Instrument/Analysis	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref. *
GC/ECD Pesticides	Laboratory Control Sample (LCS)	1) Extracted every 20 samples or every batch, whichever is greater. 2) Matrix specific 3) Standard source different from initial calibration source. 4) Concentration level must be near or at the mid-point of the initial calibration. 5) Must contain all single response pesticides.	Laboratory determined percent recovery limits must be between 40-140% except for difficult analytes, which must be between 30-140% recovery.	Reanalyze the LCS If MS/MSD in same batch compare to determine if problem isolated to LCS Re-extract LCS and samples if >10% compounds outside acceptance criteria and no MS/MSD with acceptable criteria Locate & correct problem, reanalyze associated samples	3a, 2b, 2c, 2d
	Site Specific Matrix Spike/Matrix Spike Duplicate	1) Every 20 samples per matrix* 2) Spike concentration in lower part of calibration curve. 3) Must contain all single response pesticides.	Laboratory determined percent recovery limits must be between 30-150% RPD's ≤ 30% for single response pesticides.	If compounds out compare to LCS; if LCS recoveries in note in narrative.	
	Surrogates	Minimum of two compounds across retention times of GC run. Recommended compounds Tetrachloro-m-xylene and decachlorobiphenyl.	Recovery limits lab generated and within 30-150% for both compounds on both columns.	1)Note exceedances in narrative. 2) If re-extraction or reanalysis confirms matrix interference or if re-extraction outside holding times report all results. 3) If re-extraction or reanalysis results in criteria and in holding time, report only compliant data.	

Instrument/Analysis	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref. *
GC/ECD PCBs	Initial Calibration	Startup, CCC failure, LCS failure, major maintenance	1) Minimum of 5 stds (Note 1) 2) Low std at or below reporting limit 3) % RSD must be ≤20% or if linear regression used "r" ≥ 0.990 4) 5-point cal for PCB-1016/1260. Single point for other Aroclors at mid-point within 12-hrs of sample analysis. If congeners are determined, must use 5-point for each congener. 5) If curves are used, curve must NOT be forced through origin. 6) Curves must be verified with independent ICV prior to sample analysis.	Recalibrate after corrective action on injection port or column	4a, 2b, 2c, 2d
	Continuing Calibration Verification	1) Prior to samples, every 12-hours or 20 samples, whichever is more frequent, and at the end of the analytical sequence. 2) Concentration near mid-point of curve using AR-1016/1260. Congeners; CCAL must include all congeners	Percent difference or drift ≤15%. Verify all analytes fall in retention time windows.	1) Perform instrument maintenance, reanalyze CCAL and/or recalibrate. 2) Reanalyze associated samples if beginning or closing CCAL exhibited low response and associated pesticides not detected in samples. 3) Reanalyze associated samples if beginning or closing CCAL high and associated pesticides were detected in samples.	
	Method Blank	1) Extracted every 20 samples or every batch, whichever is greater. 2) Matrix specific	All target PCBs < RL	Locate source of contamination and correct problem. Reanalyze method blank. Re-extract samples if method blank contamination found.	

Instrument/Analysis	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref. *
GC/ECD PCBs	Laboratory Control Sample (LCS)	1) Extracted every 20 samples or every batch, whichever is greater. 2) Matrix specific 3) Standard source different from initial calibration source. 4) Concentration level must be near or at the mid-point of the initial calibration. 5) Must contain all single response pesticides.	Laboratory determined percent recovery limits must be between 40-140%	1) Report non-conformances in case narrative. 2) If re-extraction performed within holding time, report only compliant data. If re-extraction performed outside holding time report all data.	4a, 2b, 2c, 2d
	Site Specific Matrix Spike/Matrix Spike Duplicate	1) Every 20 samples per matrix* 2) Spike concentration in middle of calibration curve. 3) Must contain PCB 1016/1260	Laboratory determined percent recovery limits must be between 40-140% RPD’s ≤ 50% for PCB.	If compounds out compare to LCS; if LCS recoveries in note in narrative.	
	Surrogates	Minimum of two compounds across retention times of GC run. Recommended compounds Tetrachloro-m-xylene and decachlorobiphenyl.	Recovery limits lab generated and within 30-150% for both compounds on both columns.	1)Note exceedances in narrative. 2) If re-extraction or reanalysis confirms matrix interference or if re-extraction outside holding times report all results. 3) If re-extraction or reanalysis results in criteria and in holding time, report only compliant data.	

Instrument/Analysis	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref. *
ICP or ICP/MS Metals	Initial Calibration	1) Daily following instrument profiling and prior to sample analysis. 2) Minimum of calibration blank plus one standard.	Per instrument manufacturer's specification	Recalibrate system	5a,5c
	Initial Calibration Verification (ICV)	1) Daily immediately after calibration and prior to sample analysis. 2) 2nd source standard	ICV ±10% of true value. Must use at least two replicates with RPD <5%	Re-calibrate/Re-analyze ICV as required by method.	
	Initial Calibration Blank (ICB)	1) Daily immediately after ICV. 2) Matrix matched with standards and samples.	< Reporting Limit	Re-calibrate/Re-analyze ICB as required by method.	
	Low Level Calibration Check Standard	1) Daily prior to sample analysis 2) Std concentration ≤ RL for all analytes	Recovery ±30% of true value except for antimony, arsenic, cobalt, and thallium which have a ± 50% limit	Recalibrate/Explain in Narrative	
	Continuing Calibration Verification (CCV)	1) Every 10 samples and at end of analytical sequence. 2) Can be same source or second source.	Recovery ±10% of true value, Must use at least two replicates with RPD <5%	Recalibrate and rerun all samples run after non-compliant CCV	
	Continuing Calibration Blank (CCB)	1) Every 10 samples immediately after CCV. 2)) Matrix matched with standards and samples.	< Reporting limit	Recalibrate/Re-analyze all samples since last compliant CCV	

Instrument/Analysis	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref. *
ICP or ICP/MS Metals	Interference Check Standards (ICSA & ICSAB)	1) Daily prior to sample analysis and at the end of the analytical sequence. 2) ICSA and ICSAB containing known amounts of analytes and/or interferents per method.	Recoveries for all analytes ±20% of true value or 2x the RL, whichever is greater. If analyte not present, its true value is zero.	May require adjustment of interelement,, correction factors, background correction and/or linear ranges	5a,5c
	Method Blanks	1) Digested every 20 or every batch, whichever is greater. If no digestion, ICB = blank 2) Matrix specific and matrix matched	Target analytes must be <RL	Locate source of contamination and correct problem. Reanalyze method blank. Reprepare samples unless all analyte concentration >10x method blank level	
	Laboratory Control Sample (LCS)	1) Every 20 samples or each batch, whichever is more frequent. If samples not digested, ICV = LCS 2) Matrix specific (solid, aqueous, etc)	LCS recoveries ±20% for aqueous media and within vendor control (95% confidence limits) for solids.	Redigest and reanalyze all samples.	
	Site Specific Matrix Spike	Every 20 samples or batch per matrix	Percent recovery limits must be between 75-125%.	If recoveries >30% and LCS in limits note in narrative If MS recoveries <30%, reprepare and reanalyze samples	
	Site Specific Matrix Duplicate	Every 20 samples or batch per matrix*	For aqueous samples, if concentration >5x the RL, RPD <20%. If concentration <5x RL, difference ±RL. 3) For solids if conc >5x RL, RPD <35%. If conc. < 5x RL, difference ± 2x RL	If LCS in criteria, narrate outliers	

Instrument/Analysis	**Activity**	**Frequency**	**Acceptance Criteria**	**Corrective Action**	**SOP Ref. ***
Cold Vapor Mercury	Initial Calibration	1) Daily prior to sample analysis. 2) Minimum of calibration blank plus five calibration standards.	Linear curve with “r” ≥ 0.995. Can use second order fit if “r “ ≥ 0.995.	Re-optimize instrument and recalibrate as necessary.	6a
	Initial Calibration Verification (ICV)	1) Daily immediately after calibration and prior to sample analysis. 2) 2nd source std	ICV ±10% of true value.	Re-calibrate/Re-analyze ICV as required by method.	
	Initial Calibration Blank (ICB)	1) Daily immediately after ICV. 2) Matrix matched with standards and samples.	ICB must be < RL	Recalibrate/Narrate	
	Continuing Calibration Verification (CCV)	1) Every 10 samples and at end of analytical sequence. 2) Can be same source or second source.	± 20% of true value	Recalibrate/Re-analyze all samples since last compliant CCV	
	Continuing Calibration Blank (CCB)	1) Every 10 samples immediately after CCV. 2)) Matrix matched with standards and samples.	CCB must be < RL	Recalibrate/Re-analyze all samples since last compliant CCV, Narrate outliers	
	Method Blanks	1) Digested every 20 or every batch, whichever is greater. 2) Matrix specific and matrix matched	Mercury < RL	Report non-conformances in case narrative. Reprepare samples unless all analyte concentration >10x method blank level	

Instrument/Analysis	**Activity**	**Frequency**	**Acceptance Criteria**	**Corrective Action**	**SOP Ref. ***
Cold Vapor Mercury	Laboratory Control Sample (LCS)	1) Every 20 samples or each batch, whichever is more frequent 2) Standard source can be initial calibration source. 3) Matrix specific (solid, aqueous, etc).	1) Every 20 samples or each batch, whichever is more frequent 2) Standard source can be initial calibration source. 3) Matrix specific (solid, aqueous, etc).	Redigest and reanalyze all samples	6a
	Site Specific Matrix Spike	Every 20 samples or batch per matrix	Percent recovery limits must be between 75-125%.	If recoveries >30% and LCS in limits note in narrative If MS recoveries <30%, reprepare and reanalyze samples	
	Site Specific Matrix Duplicate	Every 20 samples or batch per matrix	1) For aqueous samples RPD ± 20% if conc. >5x the RL. If conc. < 5x RL, the limit is ± RL 2) For solids RPD ±35% if conc >5x the RL. If conc. < 5x the RL, limit is ± the RL.	If LCS in criteria, narrate outliers.	

Instrument/Analysis	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref. *
Ion Chromatograph Anions (Nitrite/Nitrate)	Initial Calibration	1) As needed when operation dictates 2) Minimum of five calibration standards.	Linear curve with “r” ≥ 0.990 and RSD < 15	Re-optimize instrument and recalibrate as necessary.	7a
	Initial Calibration Verification (ICV)	1) Daily immediately after calibration and prior to sample analysis. 2) 2nd source std	ICV ±10% of true value.	Re-calibrate/Re-analyze ICV as required by method.	
	Initial Calibration Blank (ICB)	1) Daily immediately after ICV.	ICB must be < RL	Recalibrate/Narrate	
	Continuing Calibration Verification (CCV)	1) Every 10 samples and at end of analytical sequence. 2) Can be same source or second source.	± 10% of true value	Recalibrate/Re-analyze all samples since last compliant CCV	
	Continuing Calibration Blank (CCB)	1) Every 10 samples immediately after CCV.	CCB must be < RL	Recalibrate/Re-analyze all samples since last compliant CCV, Narrate outliers	
	Lab Control Sample(LCS)	One per 20 samples	Must revocer within mfg. limits	Rerun, if still out, recalibrate.	
	Matrix Spikes	One per 20 samples	Recovery 90-110%	Narrate outliers	
	Matrix Duplicates	One per 20 samples	RPD < 15% for results > 10x RL	Narrate outliers	

Standard Operating Procedure Cross Reference

Analysis/Method	YORK SOP Number-AQUEOUS/Air	YORK SOP Number-SOILS	Table Reference
Volatile Organics 8260	GCMSVOC011700 Rev 1.9 091107	GCMSVOC011700 Rev 1.9 091107	1a
Volatile Organics by EPA TO-15	GCMSAIR111692 Rev.6.0 111709	NA	1b
Semi-Volatile Organics 8270 Scan and SIM	GCMSSVOC011700 Rev 1.9 091107	GCMSSVOC011700 Rev 1.9 091107	2a
Extraction for SVOCs/Pest/PCB- 3545A		EXTSVOCSASE083106 Rev 1.3 102406	2b
Extraction for SVOCs/Pest/PCB- 3550C		EXTSVOCS052600 Rev 1.7 010307	2c
Extraction for SVOCs/Pest/PCB- 3510C	EXTAQSVOC052600 Rev 1.9 022608		2d
Pesticides 8081	GCPEST011700 Rev 1.2 091107	GCPEST011700 Rev 1.2 091107	3a
PCBs 8082	GCPCB011700 Rev 1.3 091107	GCPCB011700 Rev 1.3 091107	4a
Metals 6010B	ICP031195 Rev 1.3 091107	ICP031195 Rev 1.3 091107	5a
Metals 6020B	ICPMS6020 080106 Rev 1.2 11/25/08	ICPMS6020 080106 Rev 1.2 11/25/08	5b
Digestion of Samples for Metals -3010A and 3050B	MetalsPrep030695 Rev 1.2 091207	MetalsPrep030695 Rev 1.2 091207	5c
Mercury 7470A, 7471B	Hg120998 Rev 1.3 091107	Hg120998 Rev 1.3 091107	6a
Anions 300.0/9056	IC011400 Rtev 1.6 101107	IC011400 Rtev 1.6 101107	7a