Adelaar

(Former Concord Hotel and Resort)

SULLIVAN COUNTY
TOWN OF THOMPSON, NEW YORK

Site Management Plan

NYSDEC Site Number: C353014

Prepared for:

EPR Concord II, L.P.
909 Walnut Street, Suite 200
Kansas City, MO 64106

Prepared by:

AKRF, Inc.
34 South Broadway, Suite 401
White Plains, NY 10601
914-949-7336

Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

---

DECEMBER 2017

CERTIFICATION

I, Michelle Lapin, certify that I am currently a NYS registered Professional Engineer as defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Professional Engineer

12/12/17

Date Signature

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

TABLE OF CONTENTS

ATTACHED TABLES

FIGURES

APPENDICES

LIST OF ACRONYMS

Acronym	Description
AGV	Air Guidance Value
AOC	Area of Concern
AS	Air Sparging
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
COC	Certificate of Completion
CO2	Carbon Dioxide
CP	Commissioner Policy
DD	Decision Document
DER	Division of Environmental Remediation
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
GHG	Green House Gas
GWE&T	Groundwater Extraction and Treatment
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PID	Photoionization Detector
PRP	Potentially Responsible Party
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act

Acronym	Description
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Remedial Party
RSO	Remedial System Optimization
SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SOW	Statement of Work
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program

EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for Operating Unit (OU)-2 and OU-3 at the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan (SMP):

Site Identification:	C353014 – Adelaar Site, Town of Thompson, Sullivan County – OU-2 and OU-3.
Institutional Controls:	1. The property may be used for commercial use.

	2. Institutional controls include:
	• OU-2 and OU-3 may be used for commercial use;
	• The Engineering Control (EC) at OU-2 must be operated and maintained as specified in this SMP;
	• The EC at OU-2 must be inspected at a frequency and in a manner defined in the SMP;
	• The use of groundwater underlying the property is prohibited without necessary water quality treatment, as determined by the New York State Department of Health (NYSDOH) or the Sullivan County Health Department, to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from NYSDEC;
	• Groundwater and other environmental or public health monitoring must be performed at OU-2 an OU-3 as defined in this SMP; and
	• Data and information pertinent to site management must be reported at the frequency and in a manner defined in this SMP, including:
	  • All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
	  • Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
	  • Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
	  • Vegetable gardens and farming on the Site are prohibited; and
	  • Access to the Site must be provided to agents, employees, or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.

	3. All ECs must be inspected at a frequency and in a manner defined in this SMP.
Engineering Controls:	1. A site cover system that encompasses the landfill area within OU-2 is composed of one foot of soil that meets the Site-specific Soil Cleanup Objectives.

Inspections:	Frequency
1. Cover inspection at Landfill Area within OU-2	Annually
Monitoring:	
1. OU-2: Groundwater Monitoring Wells OU2-MW1, OU2-MW15, and OU2-MW32.	Annually
1. OU-3: Groundwater Monitoring Wells OU-3MW2, OU-3MW4, OU-3MW14, and OU-3MW18	Annually
Maintenance:	
1. Cover System Over at OU-2	As needed
Reporting:	
1. Periodic Review Report	Annually

Further descriptions of the above requirements are provided in detail in the latter sections of this SMP.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the Adelaar Site located in the Town of Thompson, New York (hereinafter referred to as the "Site"). See Figure 1 for the Site location. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP), Site No. 353014, which is administered by New York State Department of Environmental Conservation (NYSDEC).

EPR Concord II, LP entered into a Brownfield Cleanup Agreement (BCA) on August 19, 2015 with NYSDEC to remediate four separate areas or Operating Units (OUs) totaling approximately 12.5 acres within the Site. A figure showing the location of the Adelaar property, and the location of each OU, is provided in Figure 1. A Decision Document (DD) was prepared by NYSDEC at the start of the project to document the approved remedy for each OU. The DD required that an SMP be developed and implemented at OU-2 and OU-3. The boundaries of OU-2 and OU-3 are included on Figures 2A and 2B, respectively, and are more fully described in the metes and bounds site description that is part of the Environmental Easement provided in Appendix A. The remediation of OU-1B and OU-1C did not rely on the use of ECs and ICs, and therefore, are not subject to this SMP.

After completion of the remedial work, some contamination was left at OU-2 and OU-3, which is hereafter referred to as "remaining contamination." Institutional and Engineering Controls (ICs and ECs) have been incorporated into the Site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to NYSDEC, and recorded with the Sullivan County Clerk, requires compliance with this SMP and all ECs and ICs placed on the parcel areas included within the borders of OU-2 and OU-3.

This SMP was prepared to manage remaining contamination at the Site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may be revised only with the approval of NYSDEC.

It is important to note that:

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

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

This SMP was prepared by AKRF, Inc., on behalf of EPR Concord II L.P., in accordance with the requirements of NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated October 2017, and the guidelines provided by NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the Site.

1.2 Revisions

Revisions to this plan will be proposed in writing to NYSDEC's project manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, post-remedial removal of contaminated sediment or soil, or other significant changes to the site conditions. In accordance with the Environmental Easement for the Site, NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

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

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

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

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

The notification table in the following page includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of Site-related contact information is provided in Appendix B.

NYSDEC Notification Contacts*

Alexandra M. Servis NYSDEC Project Manager	518-402-9809 alexandra.servis@dec.ny.gov
Ed Moore NYSDEC Regional HW Engineer	845-256-3137 edward.moore@dec.ny.gov
Kelly Lewandowski NYSDEC Site Control	518-402-9553 kelly.lewandowski@dec.ny.gov

* Note: Notification contacts are subject to change and will be updated as necessary.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The 1,700-acre Adelaar site is centered on Chalet Road in the Town of Thompson, Sullivan County, a rural setting in the Catskill region of New York State. The Adelaar site includes a casino development site, a waterpark development site, golf courses, buildings associated with golf and development management (e.g., club house, general contractor building), and undeveloped land. The location of the remediation area OUs are depicted on Figure 1, and are described as the following:

OU-1B – Former Gas Station

OU-1C – International Club House Disposal Area

OU-2 – Golf Maintenance Building and Disposal Area

OU-3 – International Golf Course Disposal Area

Areas around the Site are a mix of commercial, recreational, residential, and undeveloped land. The largest nearby municipality is the Village of Monticello, approximately five miles northwest of the Site. This SMP was prepared to address the remaining contamination at OU-2 and OU-3. The boundaries of OU-2 and OU-3 are shown on Figures 2A and 2B, respectively, and are more fully described in Appendix A, Environmental Easement. The owner of the Site parcel at the time of issuance of this SMP is: EPR Concord, LP.

2.2 Physical Setting

2.2.1 Current Land Use

The Site is currently being developed as an approximately 1,700-acre market driven, master planned, destination resort community that will include the Montreign Casino Resort, a waterpark, golf course, entertainment village, hotels, recreational facilities and spas, a conference center, and a residential village, with a trail system connecting all components. OU-2 includes the re-aligned Chalet Road and natural structures that were constructed as part of the upgraded stormwater management system, and OU-3 covers a portion of the northern end of the waterpark development site. The Adelaar site currently includes several construction sites as well as the Adelaar field office.

The Adelaar site includes the former Concord resort complex, which was developed in stages beginning in the 1920s on the shore of Kiamesha Lake. Prior to the development of the Concord Resort, the area was farmland and forest. The complex continued to expand through the 1960s to include two 18-hole golf courses, a club house, maintenance building, and gas station. The gas station and the international clubhouse were abandoned and remediated as OU-1B and OU-1C, respectively. OU-2 included use of underground

storage tanks (USTs) for fuel and waste storage, and both OU-2 and OU-3 were the location for unregulated landfills. Deposition of material into the landfill areas was reported to take place after 1990. The properties adjoining the Site and in the neighborhood surrounding the Site primarily include residential properties. The Concord Hotel development property is north-adjacent to the Adelaar site.

2.2.2 Geology

The Adelaar site's topography ranges from approximately 1,340 feet to 1,560 feet above mean sea level, and is characterized by the lowland valley of Kiamesha Creek that generally runs from north to south through the center of the Site. The higher elevation uplands, ranging in elevation from 1,460 to 1,560 feet above mean sea level, are located to the east and west. Steep slopes (>20 percent) are minimal and primarily located within the northeastern forested area of the Adelaar site where the elevation rises to two distinct high points.

Geologic maps indicate that the Site is underlain by bedrock of the Upper and Lower Walton formations of the West Fall Group. This group characterizes the geology of the entire Neversink watershed, and largely consists of sedimentary rocks, including shale, sandstones, and conglomerate covered by glacial till. Previous excavation work in each OU identified sandstone as the prevailing bedrock type. Bedrock was encountered at OU-2 at depths ranging from 5 feet below grade near Chalet Road to greater than 20 feet below grade below the landfill area on the southern end of OU-2. Bedrock was not encountered during the excavation work at OU-3, but was reported at depths greater than 20 feet below grade. The bedrock was overlain by a dense glacial till consisting of varying amounts of silt, gravel, cobbles, and boulders. At OU-2, the glacial till contained more fine sediments along the southwestern and western end of the Site that was adjacent to mapped Kiamesha Creek and wetland sediments. At OU-3, the excavation was completed within the backfilled material, and native till was not encountered.

2.2.3 Hydrogeology

Groundwater on the northern end of OU-2, in the tank excavation area, was encountered just above bedrock at approximately four to five feet below grade. The groundwater table was observed to fluctuate in elevation to near the ground surface during heavy precipitation events, which was influenced by the shallow bedrock. This was consistent with the petroleum contamination smear zone encountered in the former tank area on the northern end of the former maintenance building. Groundwater elevation data was not provided in the investigation reports that were prepared by others, but groundwater is expected to flow west from OU-2 toward Kiamesha Creek. Groundwater was not encountered during the excavation work at OU-3. Groundwater elevation data and contour maps for OU-2 and OU-3 will be provided as part of the annual reporting described in this SMP.

2.3 Investigation and Remedial History

Between 1998 and 2004, Phase I and Phase II Environmental Site Assessments (ESAs) were performed for an area of over 1,700 acres that included the Adelaar site; the former Concord hotel complex property (northwest-adjacent to the Site), which is owned by Concord Associates, L.P. (CALP); and additional land area that expanded beyond the Adelaar property. The ESAs identified 24 Areas of Concern (AOCs). A summary of the AOCs are included in the Phase I ESA completed by AKRF in October 2014. Reports and references to NYSDEC correspondence indicated that environmental issues associated with several AOCs, including four locations on the Adelaar property (the chalet dump site, the casino dump site, Breezy Corners Bungalows dump

area, and the cemetery dump site), were addressed through additional investigation and remedial efforts. After completion of the preliminary assessments, AOCs with contamination that required additional work included the CALP property, and four locations on the Adelaar property, including the former gas station, the international club house disposal area, the golf maintenance building and disposal area, and the international golf course disposal area. In May 2005, CALP entered into a BCA with NYSDEC to investigate and remediate the contamination areas on the CALP and the Adelaar properties that required additional work. CALP amended their Brownfield Cleanup Agreement (BCA) in August 2014 to remove OU-1B, OU-1C, OU-2, and OU-3 from its BCA.

Between October and August 2008, SESI Consulting Engineers, P.C. (SESI) completed a Remedial Investigation (RI) to define the nature and extent of contamination in each of four OUs. Soil and groundwater contamination identified in each OU was related to primarily Underground Storage Tanks (USTs) and/or previous landfilling activities.

In April 2016, AKRF prepared a Remedial Action Work Plan (RAWP) to address the documented contamination on the Adelaar site. The RAWP included an exposure assessment, Remedial Action Objectives (RAOs), and proposed measures to achieve the RAOs. NYSDEC approved the RAWP in April 2016.

The specific contamination areas relevant for this SMP for OU-2 and OU-3 are described in Sections 2.3.1 and 2.3.2, respectively.

2.3.1 OU-2 (Golf Maintenance Building)

AOCs identified in OU-2 included USTs and aboveground storage tanks (ASTs), pesticide and herbicide storage, a disposal area, a septic field, and waste storage associated with vehicle maintenance. Seven tanks located near the golf maintenance building included five USTs and two ASTs. The USTs identified include: a 550-gallon waste oil tank, a 2,000-gallon gasoline tank, a 1,000-gallon diesel tank, a 1,000-gallon No. 2 fuel oil tank, and a 300-gallon tank with unknown contents. Two AST with unknown contents were identified, including a 750-gallon tank and a 275-gallon tank located in the golf maintenance building. A disposal area was located near the golf maintenance building. In 2001 and 2002, a partial surface cleanup of the disposal area was completed under NYSDEC oversight. The septic field was located between the golf maintenance building and the Kiamesha Creek. A barn formerly used to store pesticides, herbicides, and fertilizers was located east of the golf maintenance shop. An electrical transformer and a 550-gallon fuel oil AST were located near the barn.

Contamination in the northern end of OU-2 is associated with releases from USTs adjacent to the maintenance building, pesticide storage, and discharges through the septic field. Analytical results for soil samples at three locations in the UST areas indicated that xylenes [2.6 to 3.0 miligrams per kilogram {mg/kg)] exceeded the Unrestricted Use Soil Cleanup Objectives (SCOs). Five soil samples (OU2-9 to OU2-13) collected from the vicinity of the barn used to store pesticides and herbicides indicated that 4,4'-DDD (0.00366 to 0.088 mg/kg), 4,4'-DDE (0.0184 mg/kg), and 4,4'-DDT (0.033 mg/kg) exceeded the Unrestricted Use SCOs.

Contamination in the southeastern portion of OU-2 is associated with a former landfilling area used to dispose of general waste and construction and demolition (C & D) debris. The disposal area ranged from 1.5 to 9 feet below grade and the volume of disposed material was approximately 2,000 cubic yards. Analytical results for soil collected from 11 test pits (OU2–TP21 to OU2–TP31) in AOC 21 indicated volatile organic compounds (VOCs), pesticides, polychlorinated biphenyls (PCBs), and metals concentrations

exceeding Unrestricted Use SCOs. Acetone (0.068 to 0.24 mg/kg), arsenic (22 to 36 mg/kg), cadmium (5.3 to 34 mg/kg), lead (220 to 11,000 mg/kg), manganese (2,100 mg/kg), selenium (96 mg/kg), and nickel (98 to 180 mg/kg) exceeded 6 NYCRR Part 375-6 Restricted Use-Protection of Groundwater SCOs. PCBs and metals compounds detected in test pits OU-2-23, OU-2-31, and OU-2-31—including Aroclor-1254 (0.12 to 1.4 mg/kg), arsenic (22 to 36 mg/kg), barium (570 mg/kg), copper (75 to 740 mg/kg), and lead (220 to 11,000 mg/kg)—exceeded the NYSDEC Part 375-6 Restricted Use-Commercial SCOs.

Analytical results for groundwater samples from monitoring wells OU2–MW1, OU2–MW15, OU2–MW32, and OU2–MW38 indicated naturally occurring metals at concentrations that exceeded the NYSDEC Ambient Water Quality Standards (AWQS) for iron [735 to 2,640 micrograms per liter (µg/L)], manganese (6,580 to 15,600 µg/L), and sodium (25,700 to 46,200 µg/L).

Analytical results for soil vapor samples indicated that benzene was detected at a maximum concentration of 16 micrograms per cubic meter ($\mu g/m^3$). Several additional compounds were detected at concentrations typical of background conditions.

Analytical results for sediment samples collected from Kiamesha Creek in AOC 23 indicated metals in sample SED36 at concentrations exceeding the Lowest Effects Level for antimony (2.62 mg/kg) and manganese (694 mg/kg). None of the targeted compounds exceeded the human/benthic/wildlife bioaccumulation/toxicity sediment criteria or the severe effects level criteria.

2.3.2 OU-3 (International Golf Course Disposal Area)

Contamination in OU-3 is associated with a former landfilling area formerly used to dispose of C&D debris and general refuse. The former landfilling area is approximately one acre. Analytical results for soil samples collected from 11 test pits (OU3–TP1, OU3–TP3, and OU3–TP5 to OU3–TP13) in OU-3 indicated that PCBs, pesticides, and metals concentrations exceeded the Unrestricted Use SCOs. The concentration of mercury in sample OU3-TP-11 exceeded the Restricted Use-Protection of Groundwater and Restricted Use-Commercial SCOs.

Analytical results for groundwater samples from monitoring wells OU3–MW2, OU3–MW4, OU3–MW14, and OU3–MW18 indicated naturally occurring manganese (941 to 2,770 µg/L) at concentrations that exceeded the NYSDEC AWQS.

Analytical results for sediment samples collected from Kiamesha Creek in AOC 23 indicated lead (33.5 mg/kg) in sample SED16 at concentrations exceeding the Lowest Effects Level and manganese (829 to 1,870 mg/kg) at concentrations exceeding the severe effects level criteria. None of the targeted compounds exceeded criteria for protection of wildlife in a Class C stream (Type W).

A complete summary of the site investigation history is summarized in the RAWP.

2.4 Remedial Action Objectives

The RAO's for the Site as listed in the RAWP dated April 2016 are as follows:

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

- Prevent inhalation of, or exposure from, contaminants present in airborne dust or volatilizing from contaminants in soil.

RAOs for Environmental Protection

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

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Remove the contaminated source of groundwater.

Soil Vapor

RAOs for Public Health Protection

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

2.5 Remaining Contamination

Sections 2.3.1 and 2.3.2 documented the soil contamination for OU-2 and OU-3, respectively, that was identified during previous investigations. After completion of the remedy to remove petroleum contamination and the soil hot spots that exceeded the Restricted Use-Commercial SCOs, the remaining contamination was confirmed by soil endpoint sampling. The soil endpoint sampling results are summarized in Tables 2 through 10, and are described below.

2.5.1 Soil

OU-2

After completion of the remedy to remove tanks, gross contamination, and soil hot spots, soil excavation endpoints documented that VOCs and semivolatile organic compounds (SVOCs) in the tank area met the Unrestricted Use SCOs, and SVOCs and metals compounds were present in the landfill area at concentrations that exceeded the Unrestricted Use SCOs, but were below the Restricted Use-Commercial SCOs. Based on the sampling results documented by the remedial investigation and the soil endpoint sampling during the remedy, the remaining soil is below the Restricted Use-Commercial SCOs.

OU-3

Soil endpoint samples collected after completing the remedy indicated that lead was present at a concentration that exceeded the Unrestricted Use SCO. Based on the sampling results documented by the remedial investigation and the soil endpoint sampling during the remedy, the remaining soil is below the Restricted Use-Commercial SCOs.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at OU-2 and OU-3, Institutional Controls (ICs) and Engineering Controls (ECs) were implemented at OU-2 and OU-3 to protect human health and the environment. This IC/EC Plan describes the procedures for management of all IC/ECs at the Site. The IC/EC Plan is one component of the SMP and is subject to revision by NYSDEC.

This plan provides:

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

3.2 Institutional Controls

A series of ICs is required by the Decision Document to: (1) implement, maintain and monitor the Engineering Control system at OU-2; (2) prevent future exposure to remaining contamination at OU-2 and OU-3; and, (3) limit the use and development of OU-2 and OU-3 to commercial uses only. Adherence to these ICs on the Site is required by the Environmental Easement for OU-2 and OU-3, and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on Figure 2A for OU-2 and Figure 2B for OU-3. These ICs for OU-2 and OU-3 are:

- OU-2 and OU-3 may be used for commercial use;
- The EC at OU-2 must be operated and maintained as specified in this SMP;
- The EC at OU-2 must be inspected at a frequency and in a manner defined in the SMP;
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by NYSDOH or the Sullivan County Health Department to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from NYSDEC;
- Groundwater and other environmental or public health monitoring must be performed at OU-2 an OU-3 as defined in this SMP;
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
- Complete a full evaluation for soil vapor intrusion, should new buildings be constructed on OU-2 or OU-3, or the use of the existing storage structure changes. The evaluation will include a provision for implementing actions recommended to address exposures related to soil vapor intrusion;

- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- Vegetable gardens and farming on the Site are prohibited; and
- Access to the Site must be provided to agents, employees, or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.

3.3 Engineering Control

3.3.1 Cover (or Cap)

Exposure to remaining contamination in the former disposal area at OU-2 is prevented by a cover system placed over the disposal area. This cover system is comprised of a minimum of 12 inches of clean soil underlain by a geotextile demarcation layer. Figure 2A presents the location of the cover system and demarcation layer. The EWP provided in Appendix C outlines the procedures required to be implemented in the event the cover system is breached, penetrated, or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and associated Community Air Monitoring Plan (CAMP) prepared for the Site and provided in Appendix D.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may be revised only with the approval of NYSDEC. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management for the Site are included in the Quality Assurance Project Plan (QAPP) provided in Appendix E.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of groundwater samples;
- Assessing compliance with applicable NYSDEC standards, criteria, and guidance (SCGs), particularly groundwater standards; and
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment.

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol, and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;

- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Monitoring and Sampling Plan Schedule

Monitoring of the performance of the remedy will be conducted in accordance with the following schedule:

Monitoring Program	Frequency*	Purpose	Analysis
Site-wide Inspection	Annually. First Inspection no more than 18 months after COC, then at least annually thereafter	Site Conditions at OU-2 and OU-3, and Cover System Integrity at OU-2	Visual Inspection of Conditions
Groundwater Monitoring at OU-2 and OU-3	Annual Basis for two years after COC, and as necessary/determined in consultation with NYSDEC thereafter	Groundwater Monitoring at OU-2 and OU-3	OU-2: VOCs, SVOCs, PCBs, Pesticides, and Metals by EPA Methods 8260, 8270, 8082, 8081, and 6020, respectively OU-3: Metals by EPA Method 6020

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC and NYSDOH

COC – Certificate of Completion issued by NYSDEC
VOCs – Volatile Organic Compounds
SVOCs – Semi-Volatile Organic Compounds
PCBs – Polychlorinated Biphenyls

4.3 Site-Wide Inspection

A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report (PRR). Site-wide inspections will be performed annually or at a minimum of once per calendar year. Modification to the frequency or duration of the inspections will require approval from NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect the EC or monitoring devices.

The inspections will determine and document the following:

- Whether the EC continues to perform as designed;
- If the IC/EC controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria;
- If site records are complete and up to date; and

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

During these inspections, an inspection form will be completed as provided in Appendix F, Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of the EC (site cover system) at OU-2;
- General site conditions at the time of the inspection;
- The site management activities being conducted, including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of the EC, occurs that reduces or has the potential to reduce the effectiveness of the EC in place at OU-2, verbal notice to NYSDEC must be given by noon of the following day. In addition, an inspection of the Site will be conducted within 5 days of the event to verify the effectiveness of the ICs/EC implemented at the Site by a qualified environmental professional, as determined by NYSDEC. Written confirmation must be provided to NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

4.4 Groundwater Monitoring

Groundwater monitoring will be performed annually to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from NYSDEC. The existing network of monitoring wells installed during previous investigations will be utilized to complete the groundwater monitoring requirements. The network of monitoring wells installed during the remedial investigation to determine the nature and extent of contamination was preserved during the remedy phase and will be utilized for monitoring under this SMP.

The following table includes the monitoring wells within OU-2 and OU-3 installed during the remedial investigation, and identified in the original RAWP as the monitoring points for post remediation monitoring.

Location (OU)	**Monitoring Well ID**	**Analytes**
OU2	OU2-MW1	VOCs, SVOCs, PCBs, Pesticides, and Metals by EPA Methods 8260, 8270, 8082, 8081, and 6020
OU2	OU2-MW15	VOCs, SVOCs, PCBs, Pesticides, and Metals by EPA Methods 8260, 8270, 8082, 8081, and 6020
OU2	OU2-MW32	VOCs, SVOCs, PCBs, Pesticides, and Metals by EPA Methods 8260, 8270, 8082, 8081, and 6020
OU3	OU3-MW2	Metals by EPA Method 6020
OU3	OU3-MW4	Metals by EPA Method 6020
OU3	OU3-MW14	Metals by EPA Method 6020
OU3	OU3-MW18	Metals by EPA Method 6020

The location of each well is shown on Figure 2A for OU-2, and Figure 2B for OU-3. Construction was underway at OU-2 and OU-3 at the time this SMP was prepared. A monitoring well inspection will be completed after construction to confirm the viability of each well. Replacement wells would be installed for any monitoring wells damaged during construction.

All monitoring well sampling activities will be recorded by taking applicable notes in a field book and by collecting the readings listed on the groundwater sampling field log, which is included as part of the Site Management Forms presented in Appendix F. Pertinent observations or Site conditions at the time of the sampling (e.g., well integrity, etc.) will be noted on the well sampling log. One well sampling log will be filled out for each monitoring well and serve as the inspection form associated with the groundwater monitoring well network.

Groundwater samples will be collected using low flow sampling techniques consistent with the U.S. EPA's Ground-Water Sampling Guidelines for the collection of groundwater samples from monitoring wells. Sampling will be conducted according to the following procedure, and as detailed in the QAPP, included as Appendix E:

- Slowly remove the access manhole and locking cap and immediately measure the vapor concentrations in the well with a photoionization detector (PID) calibrated to the manufacturer's specifications.
- Measure the depth to water and total well depth of all seven wells prior to conducting any purging, and check for the presence of non-aqueous phase liquid (NAPL) using an oil/water interface probe. Measure the thickness of NAPL, if any, and record in the field book and the well sampling field log. Collect a sample of NAPL (if present) using a disposable plastic weighted bailer or similar collection device. Groundwater samples will not be collected from wells containing measurable NAPL.
- Use the water level and total well depth measurements to calculate the length of the mid-point of the water column within the screened interval. For example, for a well where the total depth is 30 feet, screened interval is 20 to 30 feet, and depth to water is 24 feet, the mid-point of the water column within the screened interval would be 27 feet.
- Connect dedicated tubing to either a submersible or bladder pump and lower the pump such that the intake of the pump is set at the mid-point of the water column within the screened interval of the well. Connect the discharge end of the tubing to the flow-through cell of a Horiba Quanta multi-parameter (or equivalent) meter. Connect tubing to the output of the cell and place the discharge end of the tubing into a five-gallon bucket.
- Activate the applicable pump at the lowest flow rate setting of the pump.
- Measure the depth to water within the well. The pump flow rate may be increased such that the water level measurements do not change by more than 0.3 feet as compared to the initial static reading. The well-purging rate should be adjusted so as to produce a smooth, constant (laminar) flow rate and so as not to produce excessive turbulence in the well. The expected targeted purge rate will be approximately 100 milliliters/minute and will be no greater than 300 milliliters/minute.
- Transfer discharged water from the 5-gallon buckets to 55-gallon drums designated for well-purge water.
- During purging, collect periodic samples and analyze for water quality indicators (e.g., turbidity, pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity) with measurements collected approximately every five minutes.

- Continue purging the well until turbidity is less than 50 NTU and water quality indicators have stabilized to the extent practicable. The criteria for stabilization will be three successive readings for the following parameters and criteria:

Parameter	Stabilization Criteria
PH	+/- 0.1 pH units
Specific Conductance	+/- 3% mS/cm
ORP/Eh	+/- 10mV
Turbidity	<50 NTU
Dissolved Oxygen	+/- 0.3 mg/l
Notes: mS/cm = millisievert per centimeter mV = millivolts NTU = nephthalometric turbidity units mg/l = milligrams per liter	

- If the water quality parameters do not stabilize and/or turbidity is greater than 50 NTU within two hours, purging may be discontinued. Efforts to stabilize the water quality for the well must be recorded in the field book, and samples may then be collected as described herein.
- After purging, disconnect the tubing to the inlet of the flow-through cell. Collect groundwater samples directly from the discharge end of the tubing and place into the required sample containers as described in Section 4.1 of the QAPP. Label the containers as described in Section 4.1 of the QAPP and place in a chilled cooler. Samples should be collected for VOCs.
- Collect one final field sample and analyze for turbidity and water quality parameters (pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity).
- Once sampling is complete, remove the pump and tubing from the well. Dispose of the sample tubing and any associated PPE used for sampling in a 55-gallon drum designated for disposable sampling materials and PPE. The purge water will be managed as described in Section 3.5 of the QAPP, included as Appendix E.
- Decontaminate the pump, oil/water interface probe, and flow-through cell, as described in Section 3.4 of the QAPP, included as Appendix E.
- Record all measurements (depth to water, depth to NAPL, water quality parameters, turbidity), calculations (well volume), and observations in the project field book and the well sampling field log included in Appendix F.

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced if an event renders the wells unusable. Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent PRR. Well decommissioning without replacement will be done only with the prior approval of NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by NYSDEC.

The sampling frequency may be modified only with the approval of NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by NYSDEC. Deliverables for the groundwater monitoring program are specified in Section 7.0, Reporting Requirements.

5.0 OPERATION AND MAINTENANCE PLAN

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

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns, and wide temperature fluctuation resulting from global climactic change and instability have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the Site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

A comprehensive assessment was completed for the Adelaar site as part of the Master Plan for the 1,700-acre site. The assessment was completed to satisfy the New York State Environmental Quality Review Act (SEQRA) requirements to obtain approval on the Master Plan. Specific investigations included updated flood plain and wetlands mapping, and the results were incorporated into the engineering design. The results of the assessment were used to develop a Sustainability Plan for the Adelaar site. The owner committed to the usage of green materials and good design practices throughout the design and implementation of the project. Specific practices being incorporated into the development area include:

- Usage of propane gas: The combination of propane gas and low emissions boilers will limit the amount of pollutants created by this facility and minimize air quality impacts.
- Usage of window/glass glazing: The project will utilize advanced glazing systems with increased R values to reduce solar heat gain, preventing unnecessary energy use.
- Provision of significant additional landscaping: The project will retain the maximum number of mature trees as is practicable and augment with significant additional landscaping.
- Usage of green materials in building interiors: Interior finishes will incorporate numerous materials that are green by design, including: low VOC paints for the interior walls, ceilings which are made from partially recycled materials, and the use of wood species, which are harvested as recoverable species.
- Use of efficient LED lighting at specialty fixtures and exterior site lighting fixtures.
- Use of pervious asphalt and paver materials to reduce the amount of stormwater runoff in parking areas.
- Implementation of a stormwater management plan to limit the pollutants generated from run off and assist in controlling excessive discharge.
- Usage of efficient bathroom and faucet fixtures.

- Implementation of ongoing operational initiatives including recycling of cans, bottles, grease recovery, etc., and water saving methods including two or three day cycles for the hotel laundry.

On-site development for a portion of OU-2 included the construction of the waterpark, which incorporated the design measures listed above. The eastern portion of OU-3 included the re-alignment of Chalet Road and construction of a stormwater collection and management system. All non-aggregate soil import for the road reconstruction was generated on the 1,700-acre site to reuse on-site excavated soil and minimize truck trips from off-site suppliers. The stormwater collection management system was designed to incorporate the latest storm resilience and green technologies, and ties into the existing surface water and wetland features to maximize the design features.

An inspection of the soil features is included as part of the site-wide inspection described in Section 4.2.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of any green remediation evaluations to be completed for the Site during site management, and as reported in the PRR.

Since the remedy for the Adelaar site included soil excavation and off-site disposal, there are no active remediation components being utilized as part of site management. During site management, low flow sampling is utilized for the collection of groundwater samples to minimize energy requirements and the amount of waste generated during post remediation groundwater monitoring. Rechargeable batteries are utilized to power all equipment associated with low flow sampling.

There is currently no additional waste generation, energy usage, or water usage associated with site remediation or inspection.

6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the project manager feels appropriate, e.g. during significant maintenance events or in conjunction with storm recovery activities.

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities. Reporting of these modifications will be presented in the PRR.

6.2.2 Building Operations

As described in Section 6.1, structures including buildings and sheds will be operated and maintained to provide for the most efficient operation of the remedy, while minimizing energy, waste generation, and water consumption.

6.2.3 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site, use of consumables in relation to visiting the Site in order to conduct system checks and/or collect samples, and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or

means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources. The site inspections are combined with the post-remediation groundwater sampling events to minimize the amount of labor and trips needed to complete the requirements of this SMP.

6.3 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that NYSDEC or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; or
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information, and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focuses on overall site cleanup strategy, process optimization, and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness, and remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

7.0 REPORTING REQUIREMENTS

7.1 Site Management Reports

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

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the Site during the reporting period will be provided in electronic format to NYSDEC in accordance with the requirements of this SMP.

Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Periodic Review Report	Annually, or as otherwise determined by NYSDEC

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

7.2 Periodic Review Report

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

- Identification, assessment, and certification of all ECs/ICs required by the remedy for the Site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the Site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphic representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period. These results will be submitted in digital format as determined by NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS^{TM} database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.
- A site evaluation, which includes the following:
    - The compliance of the remedy with the requirements of the Site-specific Decision Document;
    - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
    - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
    - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan;
    - Trends in contaminant levels in the affected media, which will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document; and
    - The overall performance and effectiveness of the remedy.

7.2.1 Certification of Institutional and Engineering Controls

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

"For each Institutional and/or Engineering Control identified for the Site, I certify that all of the following statements are true:

- *The inspection of the Site to confirm the effectiveness of the Institutional and Engineering Controls required by the remedial program was performed under my direction;*
- *The Institutional Control and/or Engineering Control employed at this Site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any Site Management Plan for this control;*
- *Access to the Site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the Site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the Site is compliant with the Environmental Easement;*
- *The Engineering Control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*
- *No new information has come to my attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and*
- *The assumptions made in the qualitative exposure assessment remain valid.*
- *I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Michelle Lapin, of AKRF, Inc., am certifying as Owner's/Remedial Party's Designated Site Representative.*

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

7.3 Corrective Measures Work Plan

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

7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3), an RSO report must be submitted to the NYSDEC for approval upon completion. The RSO report will document the research/ investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model, and present recommendations. RSO recommendations are to be implemented upon approval from NYSDEC. Additional work plans, design documents, HASPs, etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A Final Engineering Report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC Central Office, the Regional Office in which the Site is located, NYSDEC Site Control, and the NYSDOH Bureau of Environmental Exposure Investigation.

8.0 REFERENCES

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

SESI Consulting Engineers, P.C., Remedial Action Work Plan for Operable Units 1B, 1C, 2, and 3; Concord Hotel and Resort, Brownfield Cleanup Program site #C353008, December 5, 2008.

AKRF, Inc., Remedial Action Work Plan; Adelaar (Former Concord hotel and Resort), Brownfield Cleanup Program site #C353014, April 2016.

New York State Department of Environmental Conservation Brownfield Cleanup Program Decision Document, Concord Hotel and Resort Site, Town of Thompson, Sullivan County, New York site No. C353008, January 2010 (Updated for C353014 in May 2014).

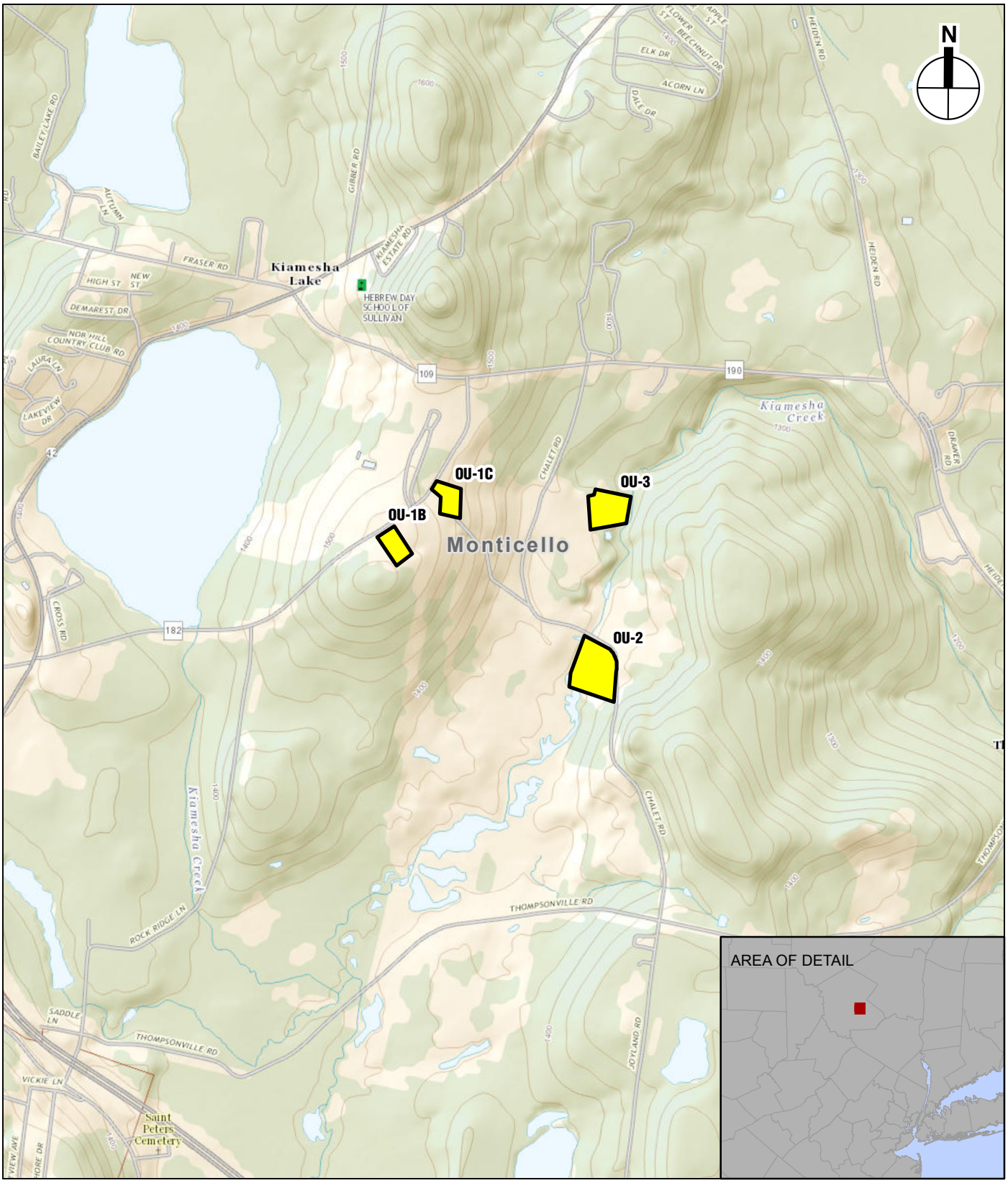
New York State Department of Environmental Conservation, Division of Environmental Remediation, Draft DER-10/Technical Guidance for site Investigation and Remediation, December 2002.

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

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

FIGURES

3/10/2015



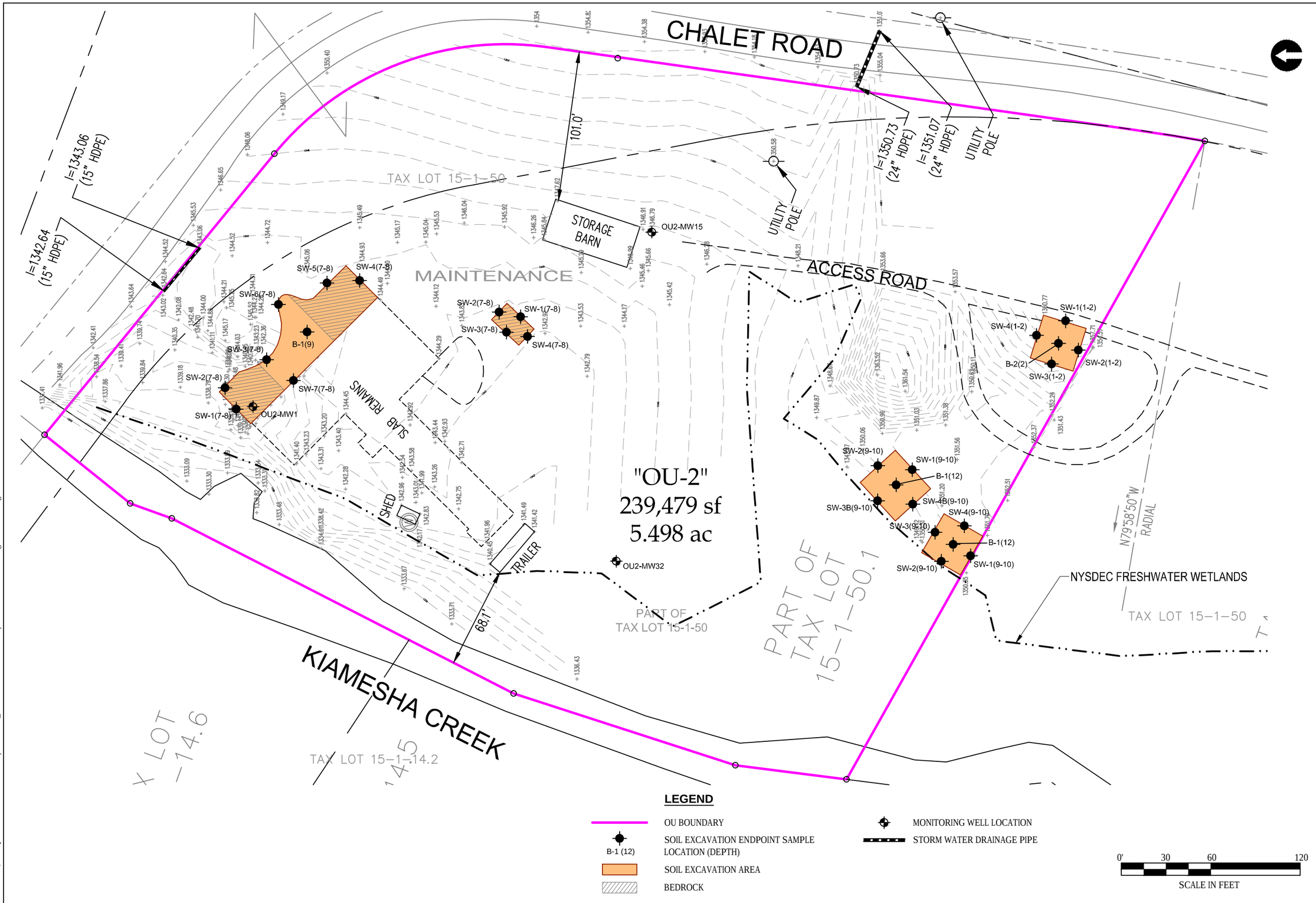
Operational Unit

0 2,000 FEET

Approximate coordinates of Operational Units:
OU-1B: 41° 40’ 28" N, 74° 39’ 22" W
OU-1C: 41° 40’ 34" N, 74° 39’ 14" W
OU-2: 41° 40’ 14" N, 74° 38’ 51" W
OU-3: 41° 40’ 33" N, 74° 38’ 49" W

ADELAAR
NYSDEC Site No. C353014

USGS 7.5 Minute Topographic Map
Monticello Quad
Figure 1



LEGEND

- OU BOUNDARY
- B-1 (12) — SOIL EXCAVATION ENDPOINT SAMPLE LOCATION (DEPTH)
- SOIL EXCAVATION AREA
- BEDROCK
- MONITORING WELL LOCATION
- STORM WATER DRAINAGE PIPE

0' 30 60 120

SCALE IN FEET

AKRF
440 Park Avenue South, New York, NY 10016

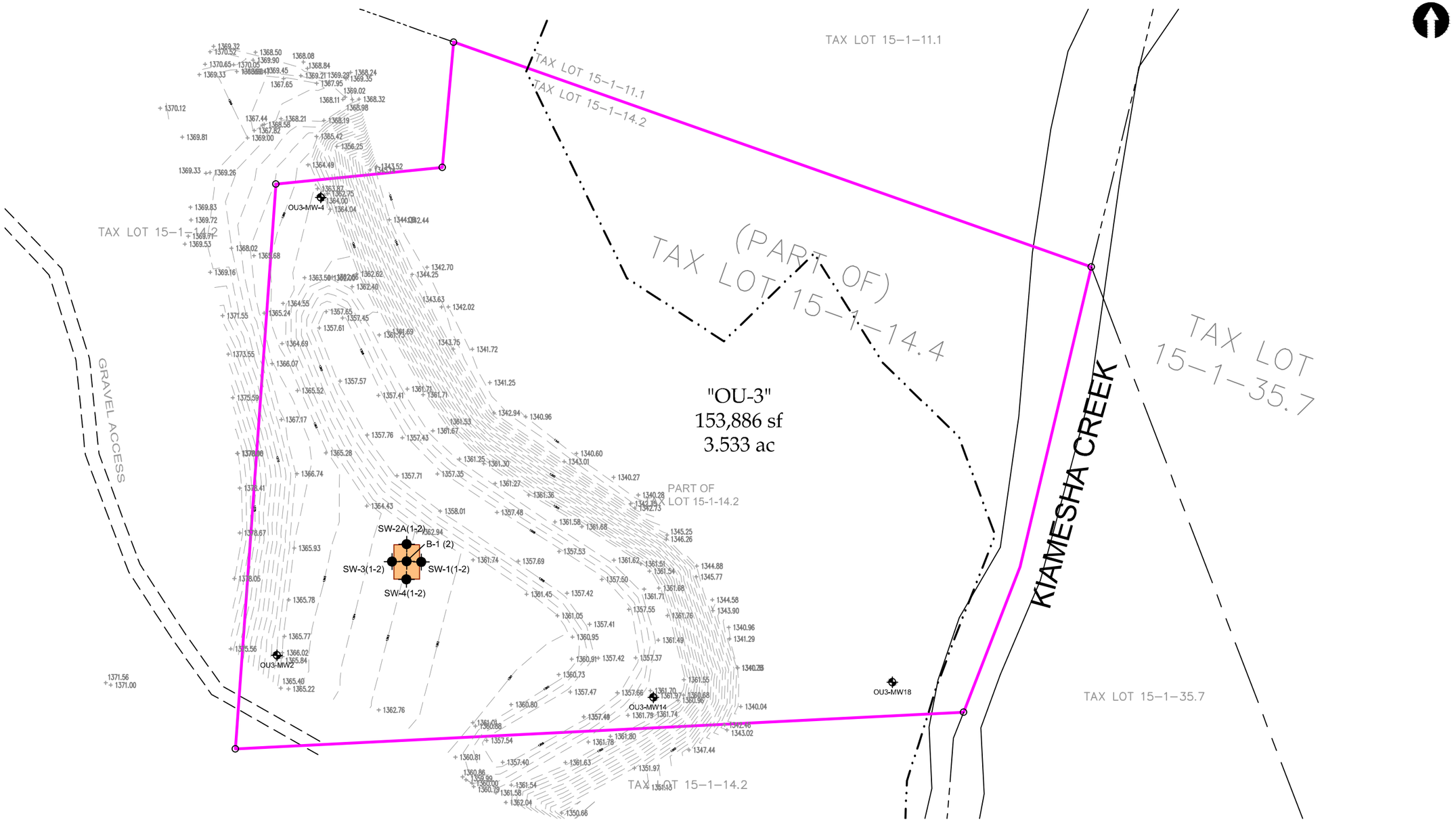
Adelaar Site
Town of Thompson, New York

OU-2 SITE SURVEY

DATE
12/12/2017

PROJECT NO.
40376

FIGURE
2A



LEGEND

- OU BOUNDARY
- B-1 (2) — SOIL EXCAVATION ENDPOINT SAMPLE LOCATION (DEPTH)
- SOIL EXCAVATION AREA
- MONITORING WELL LOCATION

0' 30 60 120

SCALE IN FEET

AKRF
440 Park Avenue South, New York, NY 10016

Adelaar Site
Town of Thompson, New York

OU-3 SITE SURVEY

DATE
12/12/2017

PROJECT NO.
40376

FIGURE
2B

TABLES

Table 1
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
Commercial Use Soil Cleanup Objectives and Import Criteria for OU-2 and OU-3

Client ID Lab Sample ID Date Sampled Dilution	NYSDEC Part 375 Restricted Use Commercial SCO mg/kg
Volatile Organic Compounds	
1,1,1-Trichloroethane	500
1,1-Dichloroethane	240
1,1-Dichloroethene	500
1,2,4-Trimethylbenzene	190
1,2-Dichlorobenzene	500
1,2-Dichloroethane	30
1,3,5-Trimethylbenzene	190
1,3-Dichlorobenzene	280
1,4-Dichlorobenzene	130
1,4-Dioxane	130
2-Butanone (MEK)	500
Acetone	500
Benzene	44
Carbon tetrachloride	22
Chlorobenzene	500
Chloroform	350
cis-1,2-Dichloroethene	500
Ethylbenzene	390
Methyl tert-butyl ether	500
Methylene Chloride	500
n-Butylbenzene	500
N-Propylbenzene	500
sec-Butylbenzene	500
tert-Butylbenzene	500
Tetrachloroethene	150
Toluene	500
trans-1,2-Dichloroethene	500
Trichloroethene	200
Vinyl chloride	13
Xylenes, Total	500
Metals	
Arsenic	16
Barium	400
Beryllium	590.0
Cadmium	9.3
Chromium	400
Copper	270
Lead	1,000
Manganese	10,000
Mercury	28
Nickel	310
Selenium	1,500
Silver	1,500
Zinc	10,000
PCBs	
Aroclor 1016	NS
Aroclor 1221	NS
Aroclor 1232	NS
Aroclor 1242	NS
Aroclor 1248	NS
Aroclor 1254	NS
Aroclor 1260	NS
Aroclor 1262	NS
Aroclor 1268	NS
Polychlorinated biphenyls, Total	1

Table 1
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
Commercial Use Soil Cleanup Objectives and Import Criteria for OU-2 and OU-3

Client ID Lab Sample ID Date Sampled Dilution	NYSDEC Part 375 Restricted Use Commercial SCO mg/kg
Semivolatile Organic Compounds	
1,2-Dichlorobenzene	1.1
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
2,4,5-Trichlorophenol	NS
2,4-Dimethylphenol	NS
2,4-Dinitrophenol	NS
2,6-Dinitrotoluene	NS
2-Methylnaphthalene	NS
2-Methylphenol	0.33
2-Nitroaniline	NS
2-Nitrophenol	NS
3-Nitroaniline	NS
4-Chloroaniline	NS
4-Nitrophenol	NS
Acenaphthene	500
Acenaphthylene	500
Anthracene	500
Benzidine	NS
Benzo[a]anthracene	5.6
Benzo[a]pyrene	1
Benzo[b]fluoranthene	5.6
Benzo[g,h,i]perylene	500
Benzo[k]fluoranthene	56.0
Bis(2-ethylhexyl) phthalate	NS
Butyl benzyl phthalate	NS
Carbazole	NS
Chrysene	56
Dibenz(a,h)anthracene	0.56
Dibenzofuran	NS
Diethyl phthalate	NS
Dimethyl phthalate	NS
Di-n-butyl phthalate	NS
Di-n-octyl phthalate	NS
Fluoranthene	500
Fluorene	500
Hexachlorobenzene	NS
Indeno[1,2,3-cd]pyrene	5.6
Isophorone	NS
Naphthalene	500
Nitrobenzene	NS
Pentachlorophenol	6.7
Phenanthrene	500
Phenol	500.00
Pyrene	500
Pesticides	
4,4'-DDD	92
4,4'-DDE	62
4,4'-DDT	47
Aldrin	0.68
alpha-BHC	3
alpha-Chlordane	24
beta-BHC	3
Chlordane (technical)	NS
delta-BHC	500
Dieldrin	1
Endosulfan I	200
Endosulfan II	200
Endosulfan sulfate	200
Endrin	200
Endrin aldehyde	NS
Endrin ketone	NS
gamma-BHC (Lindane)	9
Heptachlor	15
Heptachlor epoxide	NS
Methoxychlor	NS
Toxaphene	NS

NS - No Soil Cleanup Objective Listed
SCOs - Soil Cleanup Objectives
mg/kg - milligrams per kilogram or parts per million
NYSDEC - New York State Department of Environmental Conservation

Table 2
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU-2 - Soil Endpoint Analytical Results for USTs
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled Analyte	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-UST1-SW1(7-8) 460-125141-1 12/9/2016	OU-2-UST1-SW2(7-8) 460-125141-2 12/9/2016	OU-2-UST1-SW3 (7-8) 460-125318-1 12/13/2016	OU-2-UST1-SW4 (7-8) 460-125605-1 12/16/2016	OU-2-UST1-SW5(7-8) 460-125757-1 12/20/2016	OU-2-UST1-SW6(7-8) 460-125757-2 12/20/2016	OU-2-UST1-SW7(9-10) 460-126516-1 1/6/2017
1,1,1-Trichloroethane	500,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
1,1-Dichloroethane	240,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
1,1-Dichloroethene	500,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
1,2,4-Trimethylbenzene	190,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	2.7
1,2-Dichlorobenzene	500,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
1,2-Dichloroethane	30,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
1,3,5-Trimethylbenzene	190,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	1
1,3-Dichlorobenzene	280,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
1,4-Dichlorobenzene	130,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
1,4-Dioxane	130,000	19 U	18 U	17 U	19 U	22 U	20 U	18 U
2-Butanone (MEK)	500,000	6.8	2.4 J	4.3 U	4.7 U	5.1 J	5 U	4.6 U
Acetone	500,000	25	11	4.3 U	3 J	29	6.1	5.6
Benzene	44,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
Carbon tetrachloride	22,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
Chlorobenzene	500,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
Chloroform	350,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
cis-1,2-Dichloroethene	500,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
Ethylbenzene	390,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
Methyl tert-butyl ether	500,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
Methylene Chloride	500,000	0.44 J	0.99	0.53 J	0.94 U	1.6	1.2	1.6
n-Butylbenzene	500,000	0.93 U	0.25 J	0.86 U	0.94 U	1.1 U	0.99 U	0.9 J
N-Propylbenzene	500,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.76 J
sec-Butylbenzene	500,000	0.93 U	2	0.86 U	0.94 U	1.1 U	0.99 U	0.32 J
tert-Butylbenzene	500,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
Tetrachloroethene	150,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
Toluene	500,000	0.21 J	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
trans-1,2-Dichloroethene	500,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
Trichloroethene	200,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
Vinyl chloride	13,000	0.93 U	0.9 U	0.86 U	0.94 U	1.1 U	0.99 U	0.92 U
Xylenes, Total	500,000	1.9 U	1.8 U	1.7 U	1.9 U	2.2 U	2 U	0.27 J
Total Conc	NS	32.45	16.64	0.53	3	35.7	7.3	13.15

Table 2
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU-2 - Soil Endpoint Analytical Results for USTs
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled Analyte	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-UST1-SWD(7-8) 460-125757-3 12/20/2016	OU-2-UST1-B1 (9) 460-125605-2 12/16/2016	OU-2-UST 2-SW1 (7-8) 460-126253-1 1/3/2017	OU-2-UST 2-SW2 (7-8) 460-126253-2 1/3/2017	OU-2-UST 2-SW3 (7-8) 460-126253-3 1/3/2017	OU-2-UST 2-SW4 (7-8) 460-126253-4 1/3/2017
1,1,1-Trichloroethane	**500,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
1,1-Dichloroethane	**240,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
1,1-Dichloroethene	**500,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
1,2,4-Trimethylbenzene	**190,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.82 J
1,2-Dichlorobenzene	**500,000**	1.2 U	0.98 U	0.43 J	5	0.21 J	0.85 J
1,2-Dichloroethane	**30,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
1,3,5-Trimethylbenzene	**190,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.31 J
1,3-Dichlorobenzene	**280,000**	1.2 U	0.98 U	0.97 U	0.56 J	0.9 U	0.96 U
1,4-Dichlorobenzene	**130,000**	1.2 U	0.98 U	0.97 U	1.6	0.9 U	0.96 U
1,4-Dioxane	**130,000**	24 U	20 U	19 U	21 U	18 U	19 U
2-Butanone (MEK)	**500,000**	3.9 J	4.9 U	4.8 U	5.1 U	4.5 U	1.3 J
Acetone	**500,000**	36	4.4 J	4.8 U	17	4.5 U	7.5
Benzene	**44,000**	1.2 U	0.98 U	0.97 U	2.4	0.9 U	0.96 U
Carbon tetrachloride	**22,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
Chlorobenzene	**500,000**	1.2 U	0.98 U	0.17 J	21	0.9 U	0.21 J
Chloroform	**350,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
cis-1,2-Dichloroethene	**500,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
Ethylbenzene	**390,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
Methyl tert-butyl ether	**500,000**	1.2 U	0.98 U	0.23 J	1.7	0.3 J	0.18 J
Methylene Chloride	**500,000**	2.1	0.98 U	0.71 J B	0.34 J B	0.56 J B	0.62 J B
n-Butylbenzene	**500,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
N-Propylbenzene	**500,000**	1.2 U	0.98 U	0.97 U	0.22 J	0.9 U	0.96 U
sec-Butylbenzene	**500,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
tert-Butylbenzene	**500,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
Tetrachloroethene	**150,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
Toluene	**500,000**	1.2 U	0.98 U	0.2 J	0.3 J	0.9 U	0.23 J
trans-1,2-Dichloroethene	**500,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
Trichloroethene	**200,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
Vinyl chloride	**13,000**	1.2 U	0.98 U	0.97 U	1 U	0.9 U	0.96 U
Xylenes, Total	**500,000**	2.4 U	2 U	1.9 U	0.27 J	1.8 U	0.85 J
Total Conc	**NS**	42	4.4	1.74	50.39	1.07	12.87

Table 3
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for USTs
Semivolatile Organic Compounds

Client ID Lab Sample ID Date Sampled Analyte	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-UST1-SW1(7-8) 460-125141-1 12/9/2016	OU-2-UST1-SW2(7-8) 460-125141-2 12/9/2016	OU-2-UST1-SW3 (7-8) 460-125318-1 12/13/2016	OU-2-UST1-SW4 (7-8) 460-125605-1 12/16/2016	OU-2-UST1-SW5(7-8) 460-125757-1 12/20/2016	OU-2-UST1-SW6(7-8) 460-125757-2 12/20/2016	OU-2-UST1-SW7(9-10) 460-126516-1 1/6/2017
2-Methylphenol	**500,000**	380 U	360 U	370 U	360 U	360 U	360 U	370 U
3 & 4 Methylphenol	**500,000**	380 U	360 U	370 U	360 U	360 U	360 U	370 U
Acenaphthene	**500,000**	380 U	360 U	370 U	360 U	360 U	360 U	370 U
Acenaphthylene	**500,000**	380 U	360 U	370 U	360 U	360 U	360 U	370 U
Anthracene	**500,000**	380 U	360 U	370 U	360 U	360 U	360 U	370 U
Benzo[a]anthracene	**5,600**	54	36 U	37 U	36 U	36 U	36 U	37 U
Benzo[a]pyrene	**1,000**	37 J	36 U	37 U	36 U	36 U	36 U	37 U
Benzo[b]fluoranthene	**5,600**	42	36 U	37 U	36 U	36 U	36 U	37 U
Benzo[g,h,i]perylene	**500,000**	380 U	360 U	370 U	360 U	360 U	360 U	370 U
Benzo[k]fluoranthene	**56,000**	20 J	36 U	37 U	36 U	36 U	36 U	37 U
Chrysene	**56,000**	66 J	360 U	370 U	360 U	360 U	360 U	370 U
Dibenz(a,h)anthracene	**560**	38 U	36 U	37 U	36 U	36 U	36 U	37 U
Dibenzofuran	**350,000**	380 U	360 U	370 U	360 U	360 U	360 U	370 U
Fluoranthene	**500,000**	64 J	360 U	370 U	360 U	360 U	360 U	15 J
Fluorene	**500,000**	380 U	46 J	23 J	360 U	360 U	360 U	9.4 J
Hexachlorobenzene	**6,000**	38 U	36 U	37 U	36 U	36 U	36 U	37 U
Indeno[1,2,3-cd]pyrene	**5,600**	38 U	36 U	37 U	36 U	36 U	36 U	37 U
Naphthalene	**500,000**	16 J	22 J	290 J	360 U	200 J	220 J	51 J
Pentachlorophenol	**6,700**	310 U	290 U	300 U	290 U	290 U	290 U	290 U
Phenanthrene	**500,000**	380 U	76 J	25 J	360 U	360 U	360 U	22 J
Phenol	**500,000**	380 U	360 U	370 U	360 U	360 U	360 U	370 U
Pyrene	**500,000**	64 J	360 U	370 U	360 U	360 U	360 U	18 J
Total Conc	**NS**	363	144	338	0	200	220	115.4

Table 3
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for USTs
Semivolatile Organic Compounds

Client ID Lab Sample ID Date Sampled Analyte	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-UST1-SWD(7-8) 460-125757-3 12/20/2016	OU-2-UST1-B1 (9) 460-125605-2 12/16/2016	OU-2-UST 2-SW1 (7-8) 460-126253-1 1/3/2017	OU-2-UST 2-SW2 (7-8) 460-126253-2 1/3/2017	OU-2-UST 2-SW3 (7-8) 460-126253-3 1/3/2017	OU-2-UST 2-SW4 (7-8) 460-126253-4 1/3/2017
2-Methylphenol	**500,000**	360 U	360 U	380 U	380 U	370 U	370 U
3 & 4 Methylphenol	**500,000**	360 U	360 U	380 U *	380 U *	370 U *	370 U *
Acenaphthene	**500,000**	360 U	360 U	380 U	380 U	370 U	370 U
Acenaphthylene	**500,000**	360 U	360 U	380 U	380 U	370 U	370 U
Anthracene	**500,000**	360 U	360 U	380 U	380 U	370 U	370 U
Benzo[a]anthracene	**5,600**	36 U	36 U	38 U	38 U	37 U	37 U
Benzo[a]pyrene	**1,000**	36 U	36 U	38 U	38 U	37 U	37 U
Benzo[b]fluoranthene	**5,600**	36 U	36 U	38 U	38 U	37 U	37 U
Benzo[g,h,i]perylene	**500,000**	360 U	360 U	380 U	380 U	370 U	370 U
Benzo[k]fluoranthene	**56,000**	36 U	36 U	38 U	38 U	37 U	37 U
Chrysene	**56,000**	360 U	360 U	380 U	380 U	370 U	370 U
Dibenz(a,h)anthracene	**560**	36 U	36 U	38 U	38 U	37 U	37 U
Dibenzofuran	**350,000**	360 U	360 U	380 U	380 U	370 U	370 U
Fluoranthene	**500,000**	360 U	360 U	380 U	380 U	370 U	370 U
Fluorene	**500,000**	360 U	360 U	380 U	380 U	370 U	370 U
Hexachlorobenzene	**6,000**	36 U	36 U	38 U	38 U	37 U	37 U
Indeno[1,2,3-cd]pyrene	**5,600**	36 U	36 U	38 U	38 U	37 U	37 U
Naphthalene	**500,000**	250 J	360 U	380 U	380 U	370 U	370 U
Pentachlorophenol	**6,700**	290 U	290 U	310 U	310 U	300 U	300 U
Phenanthrene	**500,000**	360 U	360 U	380 U	380 U	370 U	370 U
Phenol	**500,000**	360 U	360 U	380 U	380 U	370 U	370 U
Pyrene	**500,000**	360 U	360 U	380 U	380 U	370 U	370 U
Total Conc	**NS**	250	0	0	0	0	0

Table 4
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for USTs
Polychlorinated Biphenyls and Pesticides

Client ID Lab Sample ID Date Sampled PCBs	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-UST1-SW1(7-8) 460-125141-1 12/9/2016	OU-2-UST1-SW2(7-8) 460-125141-2 12/9/2016	OU-2-UST1-SW3 (7-8) 460-125318-1 12/13/2016	OU-2-UST1-SW4 (7-8) 460-125605-1 12/16/2016	OU-2-UST1-SW5(7-8) 460-125757-1 12/20/2016	OU-2-UST1-SW6(7-8) 460-125757-2 12/20/2016	OU-2-UST1-SW7(9-10) 460-126516-1 1/6/2017
Aroclor 1016	**NS**	77 U	74 U	75 U	73 U	74 U	74 U	74 U
Aroclor 1221	**NS**	77 U	74 U	75 U	73 U	74 U	74 U	74 U
Aroclor 1232	**NS**	77 U	74 U	75 U	73 U	74 U	74 U	74 U
Aroclor 1242	**NS**	77 U	74 U	75 U	73 U	74 U	74 U	74 U
Aroclor 1248	**NS**	77 U	74 U	75 U	73 U	74 U	74 U	74 U
Aroclor 1254	**NS**	77 U	74 U	75 U	73 U	74 U	74 U	74 U
Aroclor 1260	**NS**	77 U	74 U	75 U	73 U	74 U	74 U	74 U
Aroclor 1262	**NS**	77 U	74 U	75 U	73 U	74 U	74 U	74 U
Aroclor 1268	**NS**	77 U	74 U	75 U	73 U	74 U	74 U	74 U
Polychlorinated biphenyls, Total	**1,000**	77 U	74 U	75 U	73 U	74 U	74 U	74 U

Pesticides	**µg/kg**							
4,4'-DDD	**92,000**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
4,4'-DDE	**62,000**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
4,4'-DDT	**47,000**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
Aldrin	**680**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
alpha-BHC	**3,400**	2.3 U	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U
alpha-Chlordane	**24,000**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
beta-BHC	**3,000**	2.3 U	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U
Chlordane (technical)	**NS**	77 U	74 U	75 U	73 U	74 U	74 U	74 U
delta-BHC	**500,000**	2.3 U	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U
Dieldrin	**1,400**	2.3 U	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U
Endosulfan I	**200,000 TS**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
Endosulfan II	**200,000 TS**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
Endosulfan sulfate	**200,000 TS**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
Endrin	**89,000**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
Endrin aldehyde	**NS**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
Endrin ketone	**NS**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
gamma-BHC (Lindane)	**9,200**	2.3 U	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U
Heptachlor	**15,000**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
Heptachlor epoxide	**NS**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
Methoxychlor	**NS**	7.7 U	7.4 U	7.5 U	7.3 U	7.4 U	7.4 U	7.4 U
Toxaphene	**NS**	77 U	74 U	75 U	73 U	74 U	74 U	74 U

Table 4
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for USTs
Polychlorinated Biphenyls and Pesticides

Client ID Lab Sample ID Date Sampled PCBs	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-UST1-SWD(7-8) 460-125757-3 12/20/2016	OU-2-UST1-B1 (9) 460-125605-2 12/16/2016	OU-2-UST 2-SW1 (7-8) 460-126253-1 1/3/2017	OU-2-UST 2-SW2 (7-8) 460-126253-2 1/3/2017	OU-2-UST 2-SW3 (7-8) 460-126253-3 1/3/2017	OU-2-UST 2-SW4 (7-8) 460-126253-4 1/3/2017
Aroclor 1016	NS	73 U	74 U	77 U	78 U	76 U	75 U
Aroclor 1221	NS	73 U	74 U	77 U	78 U	76 U	75 U
Aroclor 1232	NS	73 U	74 U	77 U	78 U	76 U	75 U
Aroclor 1242	NS	73 U	74 U	77 U	78 U	76 U	75 U
Aroclor 1248	NS	73 U	74 U	77 U	78 U	76 U	75 U
Aroclor 1254	NS	73 U	74 U	77 U	78 U	76 U	75 U
Aroclor 1260	NS	73 U	74 U	77 U	78 U	76 U	75 U
Aroclor 1262	NS	73 U	74 U	77 U	78 U	76 U	75 U
Aroclor 1268	NS	73 U	74 U	77 U	78 U	76 U	75 U
Polychlorinated biphenyls, Total	1,000	73 U	74 U	77 U	78 U	76 U	75 U

Pesticides	µg/kg						
4,4'-DDD	92,000	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
4,4'-DDE	62,000	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
4,4'-DDT	47,000	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
Aldrin	680	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
alpha-BHC	3,400	2.2 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
alpha-Chlordane	24,000	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
beta-BHC	3,000	2.2 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
Chlordane (technical)	NS	73 U	74 U	77 U	78 U	76 U	75 U
delta-BHC	500,000	2.2 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
Dieldrin	1,400	2.2 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
Endosulfan I	200,000 TS	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
Endosulfan II	200,000 TS	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
Endosulfan sulfate	200,000 TS	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
Endrin	89,000	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
Endrin aldehyde	NS	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
Endrin ketone	NS	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
gamma-BHC (Lindane)	9,200	2.2 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
Heptachlor	15,000	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
Heptachlor epoxide	NS	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
Methoxychlor	NS	7.3 U	7.4 U	7.7 U	7.8 U	7.6 U	7.5 U
Toxaphene	NS	73 U	74 U	77 U	78 U	76 U	75 U

Table 5
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU-2 - Soil Endpoint Analytical Results for USTs
Metals

Client ID	NYSDEC	OU-2-UST1-SW1(7-8)	OU-2-UST1-SW2(7-8)	OU-2-UST1-SW3 (7-8)	OU-2-UST1-SW4 (7-8)	OU-2-UST1-SW5(7-8)	OU-2-UST1-SW6(7-8)	OU-2-UST1-SW7(9-10)
Lab Sample ID	Part 375	460-125141-1	460-125141-2	460-125318-1	460-125605-1	460-125757-1	460-125757-2	460-126516-1
Date Sampled	Commercial	12/9/2016	12/9/2016	12/13/2016	12/16/2016	12/20/2016	12/20/2016	1/6/2017
Dilution	SCO	1/4 †	1/4 †	1/4 †	1/4 †	1/4 †	1/4 †	1/4 †
Analyte	mg/kg							
Arsenic	16	2.8 J	2.7 J	7.8	3.5	2.4 J	3.3	4.6
Barium	400	35.5 J	37.8 J	116	61.5	37	30 J	85.4
Beryllium	590	0.47	0.41 J	1.1	0.52	0.44	0.42	0.56
Cadmium	9.3	0.92 U	0.85 U	0.7 U	0.81 U	0.69 U	0.72 U	0.81 U
Chromium	1,500***	6.5	6.5	12.2	6.5	5.6	6.8	8.3
Copper	270	10.3	8.5	13.5	14	9.6	11	14.4
Cr (III)	1,500	6.5	6.5	12.2	6.5	5.6	6.8	8.3
Cr (VI)	400	2.2 U	2.2 U	2.2 U	2.2 U	2.3 U	2.3 U	2.2 U
Cyanide, Total	27	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.046 J
Lead	1,000	9.4	13.5	30.3	14	12.3	8.1	17.6
Manganese	10,000	271	339	445	361	204	330	263
Mercury	2.8	0.029	0.14	0.016 J	0.017 U	0.027	0.016 J	0.018 U
Nickel	310	14.7	15.5	17.7	15.3	13.8	15.5	15.6
Selenium	1,500	4.6 U	4.3 U	3.5 U	4 U	3.4 U	3.6 U	4 U
Silver	1,500	2.3 U	2.1 U	1.7 U	2 U	1.7 U	1.8 U	2 U
Zinc	10,000	51.5	51.7	63.1	41.9	30	42	45.3

† ***Dilution factor varies***

Table 5
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU-2 - Soil Endpoint Analytical Results for USTs
Metals

Client ID	NYSDEC	OU-2-UST1-SWD(7-8)	OU-2-UST1-B1 (9)	OU-2-UST 2-SW1 (7-8)	OU-2-UST 2-SW2 (7-8)	OU-2-UST 2-SW3 (7-8)	OU-2-UST 2-SW4 (7-8)
Lab Sample ID	Part 375	460-125757-3	460-125605-2	460-126253-1	460-126253-2	460-126253-3	460-126253-4
Date Sampled	Commercial	12/20/2016	12/16/2016	1/3/2017	1/3/2017	1/3/2017	1/3/2017
Dilution	SCO	1/4 †	1/4 †	1/4 †	1/4 †	1/4 †	1/4 †
Analyte	mg/kg						
Arsenic	**16**	2 J	4.6	2.3 J	3.9	2.4 J	2.4 J
Barium	**400**	23.5 J	89.1	28.8 J	54.1	29.9 J	27.4 J
Beryllium	**590**	0.34 U	0.68	0.38 J	0.58	0.44	0.35
Cadmium	**9.3**	0.68 U	0.82 U	0.9 U	0.74 U	0.66 U	0.67 U
Chromium	**1,500*** **	5	7.8	7	7.9	6.9	7.4
Copper	**270**	8.8	13.7	9.1	12.3	11.2	11.5
Cr (III)	**1,500**	5	7.8	7	7.9	6.9	7.4
Cr (VI)	**400**	2.2 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
Cyanide, Total	**27**	0.11 U	0.11 U	0.11 U	0.12 U	0.11 U	0.11 U
Lead	**1,000**	6.3	15.4	10.5	11.5	10.9	10.5
Manganese	**10,000**	222	460	304	419	278	245
Mercury	**2.8**	0.017 J	0.011 J	0.024	0.019 U	0.018 U	0.019 U
Nickel	**310**	10.5	18.7	12.3	16.2	13.7	13.1
Selenium	**1,500**	3.4 U	4.1 U	4.5 U	3.7 U	3.3 U	3.4 U
Silver	**1,500**	1.7 U	2 U	2.3 U	1.8 U	1.6 U	1.7 U
Zinc	**10,000**	29.5	50.7	39.2	47.1	39.9	38.9

† ***Dilution factor varies***

Table 6
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU-2 - Soil Endpoint Analytical Results for Landfill Area
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled Analyte	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-23-SW1(1-2) 460-126008-6 12/23/2016	OU-2-23-SW2(1-2) 460-126008-7 12/23/2016	OU-2-23-SW3(1-2) 460-126008-8 12/23/2016	OU-2-23-SW4(1-2) 460-126008-9 12/23/2016	OU-2-23-SWB(2) 460-126008-10 12/23/2016	OU-2-23-SWD 460-126008-11 12/23/2016
1,1,1-Trichloroethane	500,000	1.0 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
1,1-Dichloroethane	240,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
1,1-Dichloroethene	500,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
1,2,4-Trimethylbenzene	190,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
1,2-Dichlorobenzene	500,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
1,2-Dichloroethane	30,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
1,3,5-Trimethylbenzene	190,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
1,3-Dichlorobenzene	280,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
1,4-Dichlorobenzene	130,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
1,4-Dioxane	130,000	21 U	21 U	20 U	23 U	19 U	19 U
2-Butanone (MEK)	500,000	5.2 U	1.2 J	4.9 U	5.6 U	4.7 U	4.7 U
Acetone	500,000	5.2 U	8.6	4.9 U	5.6 U	3.4 J	4.9
Benzene	44,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
Carbon tetrachloride	22,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
Chlorobenzene	500,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
Chloroform	350,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
cis-1,2-Dichloroethene	500,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
Ethylbenzene	390,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
Methyl tert-butyl ether	500,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
Methylene Chloride	500,000	0.34 J	0.67 J	0.63 J	0.81 J	0.37 J	0.34 J
n-Butylbenzene	500,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
N-Propylbenzene	500,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
sec-Butylbenzene	500,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
tert-Butylbenzene	500,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
Tetrachloroethene	150,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
Toluene	500,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
trans-1,2-Dichloroethene	500,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
Trichloroethene	200,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
Vinyl chloride	13,000	1 U	1.1 U	0.99 U	1.1 U	0.95 U	0.94 U
Xylenes, Total	500,000	2.1 U	2.1 U	2 U	2.3 U	1.9 U	1.9 U
Total Conc	NS	0.34	10.47	0.63	0.81	3.77	5.24

Table 6
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU-2 - Soil Endpoint Analytical Results for Landfill Area
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled Analyte	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-30-SW1(9-10) 460-126008-1 12/23/2016	OU-2-30-SW2(9-10) 460-126008-2 12/23/2016	OU-2-30-SW3(9-10) 460-126008-3 12/23/2016	OU-2-30-SW4(9-10) 460-126008-5 12/23/2016	OU-2-30-SWB(12) 460-126008-4 12/23/2016	OU-2-31-SW1(9-10) 460-126208-1 12/30/2016
1,1,1-Trichloroethane	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
1,1-Dichloroethane	240,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
1,1-Dichloroethene	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
1,2,4-Trimethylbenzene	190,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
1,2-Dichlorobenzene	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
1,2-Dichloroethane	30,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
1,3,5-Trimethylbenzene	190,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
1,3-Dichlorobenzene	280,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
1,4-Dichlorobenzene	130,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
1,4-Dioxane	130,000	22 U	19 U	24 U	20 U	26 U	22 U
2-Butanone (MEK)	500,000	5.4 U	4.9 U	6.1 U	5.1 U	6.6 U	5.6 U
Acetone	500,000	5.4 U	4.9 U	6.1 U	5.1 U	6.6 U	5.6 U
Benzene	44,000	1.1 U	0.97 U	1.2 U	1 U	0.28 J	1.1 U
Carbon tetrachloride	22,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
Chlorobenzene	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
Chloroform	350,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
cis-1,2-Dichloroethene	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
Ethylbenzene	390,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
Methyl tert-butyl ether	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
Methylene Chloride	500,000	0.68 J	0.97 U	1.2 U	0.66 J	2.7	1.5
n-Butylbenzene	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
N-Propylbenzene	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
sec-Butylbenzene	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
tert-Butylbenzene	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
Tetrachloroethene	150,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
Toluene	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
trans-1,2-Dichloroethene	500,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
Trichloroethene	200,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
Vinyl chloride	13,000	1.1 U	0.97 U	1.2 U	1 U	1.3 U	1.1 U
Xylenes, Total	500,000	2.2 U	1.9 U	2.4 U	2 U	2.6 U	2.2 U
Total Conc	NS	0.68	0	0	0.66	2.98	1.5

Table 6
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU-2 - Soil Endpoint Analytical Results for Landfill Area
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled Analyte	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-31-SW2(9-10) 460-126208-2 12/30/2016	OU-2-31-SW3(9-10) 460-126208-3 12/30/2016	OU-2-31-SW3B(9-10) 460-126979-1 1/17/2017	OU-2-31-SW4(9-10) 460-126208-4 12/30/2016	OU-2-31-SW4B(9-10) 460-126979-2 1/17/2017	OU-2-31-SWB(12) 460-126208-5 12/30/2016
1,1,1-Trichloroethane	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
1,1-Dichloroethane	240,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
1,1-Dichloroethene	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
1,2,4-Trimethylbenzene	190,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
1,2-Dichlorobenzene	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
1,2-Dichloroethane	30,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
1,3,5-Trimethylbenzene	190,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
1,3-Dichlorobenzene	280,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
1,4-Dichlorobenzene	130,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
1,4-Dioxane	130,000	17 U	21 U	23 U	25 U	21 U	22 U
2-Butanone (MEK)	500,000	4.3 U	5.2 U	5.9 U	6.1 U	5.4 U	5.4 U
Acetone	500,000	4.3 U	5.2 U	5.9 U	6.1 U	5.4 U	5.4 U
Benzene	44,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
Carbon tetrachloride	22,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
Chlorobenzene	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
Chloroform	350,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
cis-1,2-Dichloroethene	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
Ethylbenzene	390,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
Methyl tert-butyl ether	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
Methylene Chloride	500,000	0.79 J	1 U	1.2 U	1.9	0.37 J	0.46 J
n-Butylbenzene	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
N-Propylbenzene	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
sec-Butylbenzene	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
tert-Butylbenzene	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
Tetrachloroethene	150,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
Toluene	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
trans-1,2-Dichloroethene	500,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
Trichloroethene	200,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
Vinyl chloride	13,000	0.86 U	1 U	1.2 U	1.2 U	1.1 U	1.1 U
Xylenes, Total	500,000	1.7 U	2.1 U	2.3 U	2.5 U	2.1 U	2.2 U
Total Conc	NS	0.79	0	0	1.9	0.37	0.46

Table 7
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for Landfill Area
Semivolatile Organic Compounds

Client ID Lab Sample ID Date Sampled Analyte	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-23-SW1(1-2) 460-126008-6 12/23/2016	OU-2-23-SW2(1-2) 460-126008-7 12/23/2016	OU-2-23-SW3(1-2) 460-126008-8 12/23/2016	OU-2-23-SW4(1-2) 460-126008-9 12/23/2016	OU-2-23-SWB(2) 460-126008-10 12/23/2016	OU-2-23-SWD 460-126008-11 12/23/2016	OU-2-30-SW1(9-10) 460-126008-1 12/23/2016	OU-2-30-SW2(9-10) 460-126008-2 12/23/2016
2-Methylphenol	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	390 U	360 U
3 & 4 Methylphenol	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	15 J	360 U
Acenaphthene	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	390 U	360 U
Acenaphthylene	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	12 J	360 U
Anthracene	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	390 U	360 U
Benzo[a]anthracene	**5,600**	37 U	39 U	39 U	37 U	37 U	36 U	73	36 U
Benzo[a]pyrene	**1,000**	37 U	39 U	39 U	37 U	37 U	36 U	61	15 J
Benzo[b]fluoranthene	**5,600**	37 U	39 U	39 U	37 U	37 U	36 U	94	20 J
Benzo[g,h,i]perylene	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	61 J	360 U
Benzo[k]fluoranthene	**56,000**	37 U	39 U	39 U	37 U	37 U	36 U	42	36 U
Chrysene	**56,000**	370 U	390 U	390 U	370 U	370 U	360 U	76 J	21 J
Dibenz(a,h)anthracene	**560**	37 U	39 U	39 U	37 U	37 U	36 U	39 U	36 U
Dibenzofuran	**350,000**	370 U	390 U	390 U	370 U	370 U	360 U	390 U	360 U
Fluoranthene	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	96 J	16 J
Fluorene	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	390 U	360 U
Hexachlorobenzene	**6,000**	37 U	39 U	39 U	37 U	37 U	36 U	39 U	36 U
Indeno[1,2,3-cd]pyrene	**5,600**	37 U	39 U	39 U	37 U	37 U	36 U	82	36 U
Naphthalene	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	11 J	360 U
Pentachlorophenol	**6,700**	300 U	310 U	310 U	300 U	300 U	290 U	310 U	290 U
Phenanthrene	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	47 J	360 U
Phenol	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	390 U	360 U
Pyrene	**500,000**	370 U	390 U	390 U	370 U	370 U	360 U	110 J	17 J
Total Conc	**NS**	0	0	0	0	0	0	780	89

Table 7
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for Landfill Area
Semivolatile Organic Compounds

Client ID Lab Sample ID Date Sampled Analyte	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-30-SW3(9-10) 460-126008-3 12/23/2016	OU-2-30-SW4(9-10) 460-126008-5 12/23/2016	OU-2-30-SWB(12) 460-126008-4 12/23/2016	OU-2-31-SW1(9-10) 460-126208-1 12/30/2016	OU-2-31-SW2(9-10) 460-126208-2 12/30/2016	OU-2-31-SW3(9-10) 460-126208-3 12/30/2016	OU-2-31-SW3B(9-10) 460-126979-1 1/17/2017
2-Methylphenol	**500,000**	420 U	360 U	420 U	390 U	390 U	380 U	370 U
3 & 4 Methylphenol	**500,000**	13 J	360 U	420 U	390 U	390 U	380 U	370 U
Acenaphthene	**500,000**	81 J	360 U	420 U	14 J	390 U	390	370 U
Acenaphthylene	**500,000**	86 J	360 U	420 U	390 U	390 U	380 U	370 U
Anthracene	**500,000**	220 J	360 U	420 U	390 U	390 U	890	370 U
Benzo[a]anthracene	**5,600**	880	41	42 U	77	39 U	3,200	37 U
Benzo[a]pyrene	**1,000**	800	35 J	42 U	76	39 U	2,700	37 U
Benzo[b]fluoranthene	**5,600**	1,100	45	42 U	94	39 U	3,600	37 U
Benzo[g,h,i]perylene	**500,000**	690	32 J	420 U	80 J	390 U	2,100	370 U
Benzo[k]fluoranthene	**56,000**	390	21 J	42 U	38 J	39 U	1,300	37 U
Chrysene	**56,000**	1,000	43 J	420 U	82 J	390 U	2,800	370 U
Dibenz(a,h)anthracene	**560**	180	36 U	42 U	33 J	39 U	**650**	37 U
Dibenzofuran	**350,000**	57 J	360 U	420 U	12 J	390 U	230 J	370 U
Fluoranthene	**500,000**	1,400	61 J	420 U	110 J	390 U	5,600	370 U
Fluorene	**500,000**	97 J	360 U	420 U	13 J	390 U	420	370 U
Hexachlorobenzene	**6,000**	42 U	36 U	42 U	39 U	39 U	38 U	37 U
Indeno[1,2,3-cd]pyrene	**5,600**	850	25 J	42 U	74	39 U	2,400	37 U
Naphthalene	**500,000**	70 J	360 U	420 U	12 J	390 U	200 J	370 U
Pentachlorophenol	**6,700**	340 U	290 U	340 U	310 U	310 U	300 U	300 U
Phenanthrene	**500,000**	910	39 J	420 U	89 J	390 U	3,500	370 U
Phenol	**500,000**	420 U	360 U	420 U	390 U	390 U	380 U	370 U
Pyrene	**500,000**	1,400	62 J	420 U	120 J	390 U	6,000	370 U
Total Conc	**NS**	10,224	404	0	924	0	35,980	0

Table 7
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for Landfill Area
Semivolatile Organic Compounds

Client ID Lab Sample ID Date Sampled Analyte	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-31-SW4(9-10) 460-126208-4 12/30/2016	OU-2-31-SW4B(9-10) 460-126979-2 1/17/2017	OU-2-31-SWB(12) 460-126208-5 12/30/2016
2-Methylphenol	**500,000**	420 U	380 U	390 U
3 & 4 Methylphenol	**500,000**	420 U	380 U	390 U
Acenaphthene	**500,000**	310 J	380 U	30 J
Acenaphthylene	**500,000**	17 J	380 U	110 J
Anthracene	**500,000**	1,100	380 U	160 J
Benzo[a]anthracene	**5,600**	3,700	45	1,000
Benzo[a]pyrene	**1,000**	3,100	36 J	980
Benzo[b]fluoranthene	**5,600**	3,900	51	1,200
Benzo[g,h,i]perylene	**500,000**	2,400	29 J	880
Benzo[k]fluoranthene	**56,000**	1,400	20 J	490
Chrysene	**56,000**	3,100	37 J	1,200
Dibenz(a,h)anthracene	**560**	**720**	38 U	250
Dibenzofuran	**350,000**	250 J	380 U	17 J
Fluoranthene	**500,000**	6,600	58 J	1,600
Fluorene	**500,000**	520	380 U	55 J
Hexachlorobenzene	**6,000**	42 U	38 U	39 U
Indeno[1,2,3-cd]pyrene	**5,600**	2,700	30 J	1,000
Naphthalene	**500,000**	49 J	380 U	33 J
Pentachlorophenol	**6,700**	340 U	310 U	320 U
Phenanthrene	**500,000**	4,700	30 J	770
Phenol	**500,000**	420 U	380 U	390 U
Pyrene	**500,000**	6,600	65 J	1,900
Total Conc	**NS**	41,166	401	11,675

Table 8
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for Landfill Area
Polychlorinated Biphenyls and Pesticides

Client ID Lab Sample ID Date Sampled PCBs	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-23-SW1(1-2) 460-126008-6 12/23/2016	OU-2-23-SW2(1-2) 460-126008-7 12/23/2016	OU-2-23-SW3(1-2) 460-126008-8 12/23/2016	OU-2-23-SW4(1-2) 460-126008-9 12/23/2016	OU-2-23-SWB(2) 460-126008-10 12/23/2016	OU-2-23-SWD 460-126008-11 12/23/2016	OU-2-30-SW1(9-10) 460-126008-1 12/23/2016
Aroclor 1016	NS	75 U	79 U	79 U	76 U	74 U	74 U	79 U
Aroclor 1221	NS	75 U	79 U	79 U	76 U	74 U	74 U	79 U
Aroclor 1232	NS	75 U	79 U	79 U	76 U	74 U	74 U	79 U
Aroclor 1242	NS	75 U	79 U	79 U	76 U	74 U	74 U	79 U
Aroclor 1248	NS	75 U	79 U	79 U	76 U	74 U	74 U	79 U
Aroclor 1254	NS	75 U	79 U	79 U	76 U	74 U	74 U	79 U
Aroclor 1260	NS	75 U	79 U	79 U	76 U	74 U	74 U	79 U
Aroclor 1262	NS	75 U	79 U	79 U	76 U	74 U	74 U	79 U
Aroclor 1268	NS	75 U	79 U	79 U	76 U	74 U	74 U	79 U
Polychlorinated biphenyls, Total	1,000	75 U	79 U	79 U	76 U	74 U	74 U	79 U
Pesticides	**µg/kg**							
4,4'-DDD	92,000	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
4,4'-DDE	62,000	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
4,4'-DDT	47,000	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
Aldrin	680	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
alpha-BHC	3,400	2.2 U	2.3 U	2.4 U	2.3 U	2.2 U	2.2 U	2.4 U
alpha-Chlordane	24,000	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
beta-BHC	3,000	2.2 U	2.3 U	2.4 U	2.3 U	2.2 U	2.2 U	2.4 U
Chlordane (technical)	NS	75 U	79 U	79 U	76 U	74 U	74 U	79 U
delta-BHC	500,000	2.2 U	2.3 U	2.4 U	2.3 U	2.2 U	2.2 U	2.4 U
Dieldrin	1,400	2.2 U	2.3 U	2.4 U	2.3 U	2.2 U	2.2 U	2.4 U
Endosulfan I	200,000 TS	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
Endosulfan II	200,000 TS	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
Endosulfan sulfate	200,000 TS	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
Endrin	89,000	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
Endrin aldehyde	NS	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
Endrin ketone	NS	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
gamma-BHC (Lindane)	9,200	2.2 U	2.3 U	2.4 U	2.3 U	2.2 U	2.2 U	2.4 U
Heptachlor	15,000	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
Heptachlor epoxide	NS	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
Methoxychlor	NS	7.5 U	7.9 U	7.9 U	7.6 U	7.4 U	7.4 U	7.9 U
Toxaphene	NS	75 U	79 U	79 U	76 U	74 U	74 U	79 U

Table 8
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for Landfill Area
Polychlorinated Biphenyls and Pesticides

Client ID Lab Sample ID Date Sampled PCBs	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-30-SW2(9-10) 460-126008-2 12/23/2016	OU-2-30-SW3(9-10) 460-126008-3 12/23/2016	OU-2-30-SW4(9-10) 460-126008-5 12/23/2016	OU-2-30-SWB(12) 460-126008-4 12/23/2016	OU-2-31-SW1(9-10) 460-126208-1 12/30/2016	OU-2-31-SW2(9-10) 460-126208-2 12/30/2016	OU-2-31-SW3(9-10) 460-126208-3 12/30/2016
Aroclor 1016	NS	73 U	86 U	73 U	85 U	79 U	78 U	76 U
Aroclor 1221	NS	73 U	86 U	73 U	85 U	79 U	78 U	76 U
Aroclor 1232	NS	73 U	86 U	73 U	85 U	79 U	78 U	76 U
Aroclor 1242	NS	73 U	86 U	73 U	85 U	79 U	78 U	76 U
Aroclor 1248	NS	73 U	86 U	73 U	85 U	79 U	78 U	76 U
Aroclor 1254	NS	73 U	86 U	73 U	85 U	79 U	78 U	55 J
Aroclor 1260	NS	73 U	86 U	73 U	85 U	79 U	78 U	76 U
Aroclor 1262	NS	73 U	86 U	73 U	85 U	79 U	78 U	76 U
Aroclor 1268	NS	73 U	86 U	73 U	85 U	79 U	78 U	76 U
Polychlorinated biphenyls, Total	1,000	73 U	86 U	73 U	85 U	79 U	78 U	55 J
Pesticides	**µg/kg**							
4,4'-DDD	92,000	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
4,4'-DDE	62,000	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
4,4'-DDT	47,000	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
Aldrin	680	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
alpha-BHC	3,400	2.2 U	2.6 U	2.2 U	2.5 U	2.4 U	2.3 U	2.3 U
alpha-Chlordane	24,000	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
beta-BHC	3,000	2.2 U	2.6 U	2.2 U	2.5 U	2.4 U	2.3 U	2.3 U
Chlordane (technical)	NS	73 U	86 U	73 U	85 U	79 U	78 U	76 U
delta-BHC	500,000	2.2 U	2.6 U	2.2 U	2.5 U	2.4 U	2.3 U	2.3 U
Dieldrin	1,400	2.2 U	2.6 U	2.2 U	2.5 U	2.4 U	2.3 U	2.3 U
Endosulfan I	200,000 TS	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
Endosulfan II	200,000 TS	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
Endosulfan sulfate	200,000 TS	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U *	7.8 U *	7.6 U *
Endrin	89,000	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
Endrin aldehyde	NS	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
Endrin ketone	NS	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U *	7.8 U *	7.6 U *
gamma-BHC (Lindane)	9,200	2.2 U	2.6 U	2.2 U	2.5 U	2.4 U	2.3 U	2.3 U
Heptachlor	15,000	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
Heptachlor epoxide	NS	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
Methoxychlor	NS	7.3 U	8.6 U	7.3 U	8.5 U	7.9 U	7.8 U	7.6 U
Toxaphene	NS	73 U	86 U	73 U	85 U	79 U	78 U	76 U

Table 8
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for Landfill Area
Polychlorinated Biphenyls and Pesticides

Client ID Lab Sample ID Date Sampled PCBs	NYSDEC Part 375 Commercial SCO µg/kg	OU-2-31-SW3B(9-10) 460-126979-1 1/17/2017	OU-2-31-SW4(9-10) 460-126208-4 12/30/2016	OU-2-31-SW4B(9-10) 460-126979-2 1/17/2017	OU-2-31-SWB(12) 460-126208-5 12/30/2016
Aroclor 1016	NS	75 U	84 U	77 U	80 U
Aroclor 1221	NS	75 U	84 U	77 U	80 U
Aroclor 1232	NS	75 U	84 U	77 U	80 U
Aroclor 1242	NS	75 U	84 U	77 U	80 U
Aroclor 1248	NS	75 U	84 U	77 U	80 U
Aroclor 1254	NS	75 U	84 U	77 U	80 U
Aroclor 1260	NS	75 U	84 U	77 U	80 U
Aroclor 1262	NS	75 U	84 U	77 U	80 U
Aroclor 1268	NS	75 U	84 U	77 U	80 U
Polychlorinated biphenyls, Total	1,000	75 U	84 U	77 U	80 U

Pesticides	µg/kg				
4,4'-DDD	92,000	7.5 U	8.4 U	7.7 U	8 U
4,4'-DDE	62,000	7.5 U	8.4 U	7.7 U	8 U
4,4'-DDT	47,000	7.5 U	8.4 U	7.7 U	8 U
Aldrin	680	7.5 U	8.4 U	7.7 U	8 U
alpha-BHC	3,400	2.2 U	2.5 U	2.3 U	2.4 U
alpha-Chlordane	24,000	7.5 U	8.4 U	7.7 U	8 U
beta-BHC	3,000	2.2 U	2.5 U	2.3 U	2.4 U
Chlordane (technical)	NS	75 U	84 U	77 U	80 U
delta-BHC	500,000	2.2 U	2.5 U	2.3 U	2.4 U
Dieldrin	1,400	2.2 U	2.5 U	2.3 U	2.4 U
Endosulfan I	200,000 TS	7.5 U	8.4 U	7.7 U	8 U
Endosulfan II	200,000 TS	7.5 U	8.4 U	7.7 U	8 U
Endosulfan sulfate	200,000 TS	7.5 U	8.4 U *	7.7 U	8 U *
Endrin	89,000	7.5 U	8.4 U	7.7 U	8 U
Endrin aldehyde	NS	7.5 U	8.4 U	7.7 U	8 U
Endrin ketone	NS	7.5 U	8.4 U *	7.7 U	8 U *
gamma-BHC (Lindane)	9,200	2.2 U	2.5 U	2.3 U	2.4 U
Heptachlor	15,000	7.5 U	8.4 U	7.7 U	8 U
Heptachlor epoxide	NS	7.5 U	8.4 U	7.7 U	8 U
Methoxychlor	NS	7.5 U	8.4 U	7.7 U	8 U
Toxaphene	NS	75 U	84 U	77 U	80 U

Table 9
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for Landfill Area
Metals

Client ID	NYSDEC	OU-2-23-SW1(1-2)	OU-2-23-SW2(1-2)	OU-2-23-SW3(1-2)	OU-2-23-SW4(1-2)	OU-2-23-SWB(2)	OU-2-23-SWD
Lab Sample ID	Part 375	460-126008-6	460-126008-7	460-126008-8	460-126008-9	460-126008-10	460-126008-11
Date Sampled	Commercial	12/23/2016	12/23/2016	12/23/2016	12/23/2016	12/23/2016	12/23/2016
Dilution	SCO	1/4 †	1/4 †	1/4 †	1/4 †	1/4 †	1/4 †
Analyte	mg/kg						
Arsenic	16	1.9 J	9.4	6.8	1.3 J	2.8	5
Barium	400	21.6 J	54.2	58.1	20 J	73	63.1
Beryllium	590	0.35 U	0.46	0.51	0.32 U	0.5	0.6
Cadmium	9.3	0.69 U	0.74 U	0.74 U	0.64 U	0.71 U	0.87 U
Chromium	1,500***	3.9	10.4	10.6	4.1	8.4	7.9
Copper	270	7.4	11.4	18.3	7.5	15.1	14.7
Cr (III)	1,500	3.9	10.4	10.6	4.1	8.4	7.9
Cr (VI)	400	2.2 U	0.62 J	0.74 J	2.2 U	2.2 U	0.64 J
Cyanide, Total	27	0.11 U	0.11 U	0.13 U	0.12 U	0.11 U N	0.11 U N
Lead	1,000	6.1	9.2	7.8	6.9	8.9	9.8
Manganese	10,000	190	141	150	189	209	278
Mercury	2.8	0.017	0.021	0.029	0.021	0.029	0.028
Nickel	310	7.8	11.3	11.6	8.4	11	10.7
Selenium	1,500	3.5 U	3.7 U	3.7 U	3.2 U	3.6 U	4.3 U
Silver	1,500	1.7 U	1.9 U	1.9 U	1.6 U	1.8 U	2.2 U
Zinc	10,000	25.2	35.2	36.9	28.2	35.7	35.7

† ***Dilution factor varies***

Table 9
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for Landfill Area
Metals

Client ID	NYSDEC	OU-2-30-SW1(9-10)	OU-2-30-SW2(9-10)	OU-2-30-SW3(9-10)	OU-2-30-SW4(9-10)	OU-2-30-SWB(12)	OU-2-31-SW1(9-10)
Lab Sample ID	Part 375	460-126008-1	460-126008-2	460-126008-3	460-126008-5	460-126008-4	460-126208-1
Date Sampled	Commercial	12/23/2016	12/23/2016	12/23/2016	12/23/2016	12/23/2016	12/30/2016
Dilution	SCO	1/4 †	1/4 †	1/4 †	1/4 †	1/4 †	1/4 †
Analyte	mg/kg						
Arsenic	16	3.1	3.3	3.8 J	2.4 J	7	3.2 J
Barium	400	94.5	42.4	131	25.8 J	53.9	65.9
Beryllium	590	0.38	0.34	0.47 J	0.28 J	0.55	0.45 J
Cadmium	9.3	0.94	0.66 U	0.61 J	0.66 U	0.81 U	0.92 U
Chromium	1,500***	10.8	6	10.1	5.5	6.5	11
Copper	270	56.7	12.3	27.4	11.2	5.9	39.7
Cr (III)	1,500	10.8	6	8.9	5.5	6.5	11
Cr (VI)	400	2.4 U	2.2 U	1.2 J	2.2 U	2.5 U	2.3 U
Cyanide, Total	27	0.23	0.1 U	0.13	0.11 U	0.12 J	0.05 J
Lead	1,000	107	25.7	146	22.6	20.2	124
Manganese	10,000	368	396	360	239	151	602
Mercury	2.8	0.076	0.026	0.12	0.07	0.064	0.13
Nickel	310	21.5	11.6	12.7	10.4	9.3	18.9
Selenium	1,500	3.6 U	3.3 U	5.1 U	3.3 U	4.1 U	4.6 U
Silver	1,500	0.83 J	1.7 U	2.6 U	1.6 U	2 U	2.3 U
Zinc	10,000	211	48.3	453	58.5	50.6	133

† ***Dilution factor varies***

Table 9
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU2 - Soil Endpoint Analytical Results for Landfill Area
Metals

Client ID	NYSDEC	OU-2-31-SW2(9-10)	OU-2-31-SW3(9-10)	OU-2-31-SW3B(9-10)	OU-2-31-SW4(9-10)	OU-2-31-SW4B(9-10)	OU-2-31-SWB(12)
Lab Sample ID	Part 375	460-126208-2	460-126208-3	460-126979-1	460-126208-4	460-126979-2	460-126208-5
Date Sampled	Commercial	12/30/2016	12/30/2016	1/17/2017	12/30/2016	1/17/2017	12/30/2016
Dilution	SCO	1/4 †	1/4 †	1/4 †	1/4 †	1/4 †	1/4 †
Analyte	mg/kg						
Arsenic	**16**	4.3	5.4	4.4	4.6	3.6	3.9
Barium	**400**	34.1 J	64.3	49	87.7	52.7	109
Beryllium	**590**	0.4 J	0.43 J	0.44 U	0.5 U	0.4 J	0.47 U
Cadmium	**9.3**	0.91 U	0.89 U	0.88 U	0.93 J	0.91 U	0.89 J
Chromium	**1,500*** **	9.4	13.1	17.1	15.3	7.3	20.7
Copper	**270**	11.7	22	35.8	56.7	13.3	56.3
Cr (III)	**1,500**	9.4	13.1	17.1	15.3	7.3	20.7
Cr (VI)	**400**	2.3 U	2.3 U	2.3 U	2.5 U	2.3 U	2.4 U
Cyanide, Total	**27**	0.032 J	0.039 J	0.056 J	0.11 J	0.11 U	0.13
Lead	**1,000**	13.9	35.6	759	76.7	29	105
Manganese	**10,000**	248	219	393	362	325	359
Mercury	**2.8**	0.042	0.057	0.056	0.072	0.023	0.18
Nickel	**310**	14.2	12.1	18.3	23.6	10.8	33.9
Selenium	**1,500**	4.5 U	4.5 U	1.5 J	5 U	4.5 U	4.7 U
Silver	**1,500**	2.3 U	2.2 U	1 J	2.5 U	0.41 J	0.82 J
Zinc	**10,000**	57.3	100	179	239	58.5	349

† ***Dilution factor varies***

Table 10
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
OU3 - Soil Endpoint Analytical Results
Metals

Client ID Lab Sample ID Date Sampled Dilution Analyte	NYSDEC Part 375 Commercial SCO mg/kg	OU3-SW-1(1-2) 460-115658-1 6/16/2016 1/4 †	OU3-SW-2(1-2) 460-115658-2 6/16/2016 1/4 †	OU3-SW-3(1-2) 460-115658-3 6/16/2016 1/4 †	OU3-SW4(1-2) 460-115658-5 6/16/2016 1/4 †	OU3-SWB(1-2) 460-115658-4 6/16/2016 1/4 †	OU3-B-1(2) 460-115658-6 6/16/2016 1/4 †
Arsenic	**16**	3.6 U	2.6 J	2 J	3.2 U	1.2 J	3.2 U
Barium	**400**	13.3 J	560	31.8 J	46.5	24.2 J	19.7 J
Beryllium	**590**	0.48 U	0.47 U	0.43	0.43 U	0.4 U	0.42 U
Cadmium	**9.3**	0.95 U	0.93 U	0.81 U	0.86 U	0.8 U	0.84 U
Chromium	**1,500*** **	2.6	16.7	6.2	5.1	4.4	3.3
Copper	**270**	4.5 J	**59**	13.3	8.7	9.4	6.6
Cr (III)	**1,500**	2.6	16.7	6.2	5.1	4.4	3.3
Cr (VI)	**400**	2.5 U	2.6 U	2.2 U	2.4 U	2.2 U	2.3 U
Cyanide, Total	**27**	0.034 J	0.25	0.018 J	0.11 U	0.1 U	0.12 U
Lead	**1,000**	5.2	**1,460**	10.6	72.7	8.8	5.6
Manganese	**10,000**	99.6	356	329	234	298	193
Mercury	**2.8**	0.019 U	0.12	0.05	0.064	0.017 U	0.02 U
Nickel	**310**	6.1 J	13.3	15.2	11.3	10.1	7.6 J
Selenium	**1,500**	4.8 U	4.7 U	4 U	4.3 U	4 U	4.2 U
Silver	**1,500**	2.4 U	2.3 U	2 U	2.2 U	2 U	2.1 U
Zinc	**10,000**	23.3	402	38.8	53.4	30.5	22.1

† ***Dilution factor varies***

Tables 1 to 10
Adelaar (Former Concord Hotel and Resort)
Sullivan County
Town of Thompson, New York
Soil Analytical Results
Notes

GENERAL

NS : No standard.

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

B : The analyte was found in an associated blank, as well as in the sample.

J : The concentration given is an estimated value.

G : This standard reflects the Supplemental Soil Clean-up Objectives listed in Table 1 of NYSDEC "CP-51/Soil Cleanup Guidance."

SOIL

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

µg/kg : micrograms per kilogram = parts per billion (ppb)

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

Metals

***** :** Standard reflects trivalent, not total, Chromium.

Exceedances of Part 375 Commercial Soil Cleanup Objectives (CSCO) are highlighted in bold font.

APPENDIX A

ENVIRONMENTAL EASEMENT

Schedule A Description
Brownfields OU-2

All that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Town of Thompson, County of Sullivan, State of New York and designated as part of Tax Lot 15-1-50.1 and Tax Lot 15-1-50.2 as shown on the official Tax Maps of the Town of Thompson, being more particularly described as follows;

BEGINNING at a point along the westerly side of Chalet Road, Town Road 45 (assumed 50' ROW), said point marking the division line between Tax Lot 15-1-14.4 and Tax Lot 15-1-50.2;

THENCE through Tax Lot 15-1-50.2 along the westerly side of Chalet Road, Town Road 45 (assumed 50' ROW) the following four-(4) courses and distances;

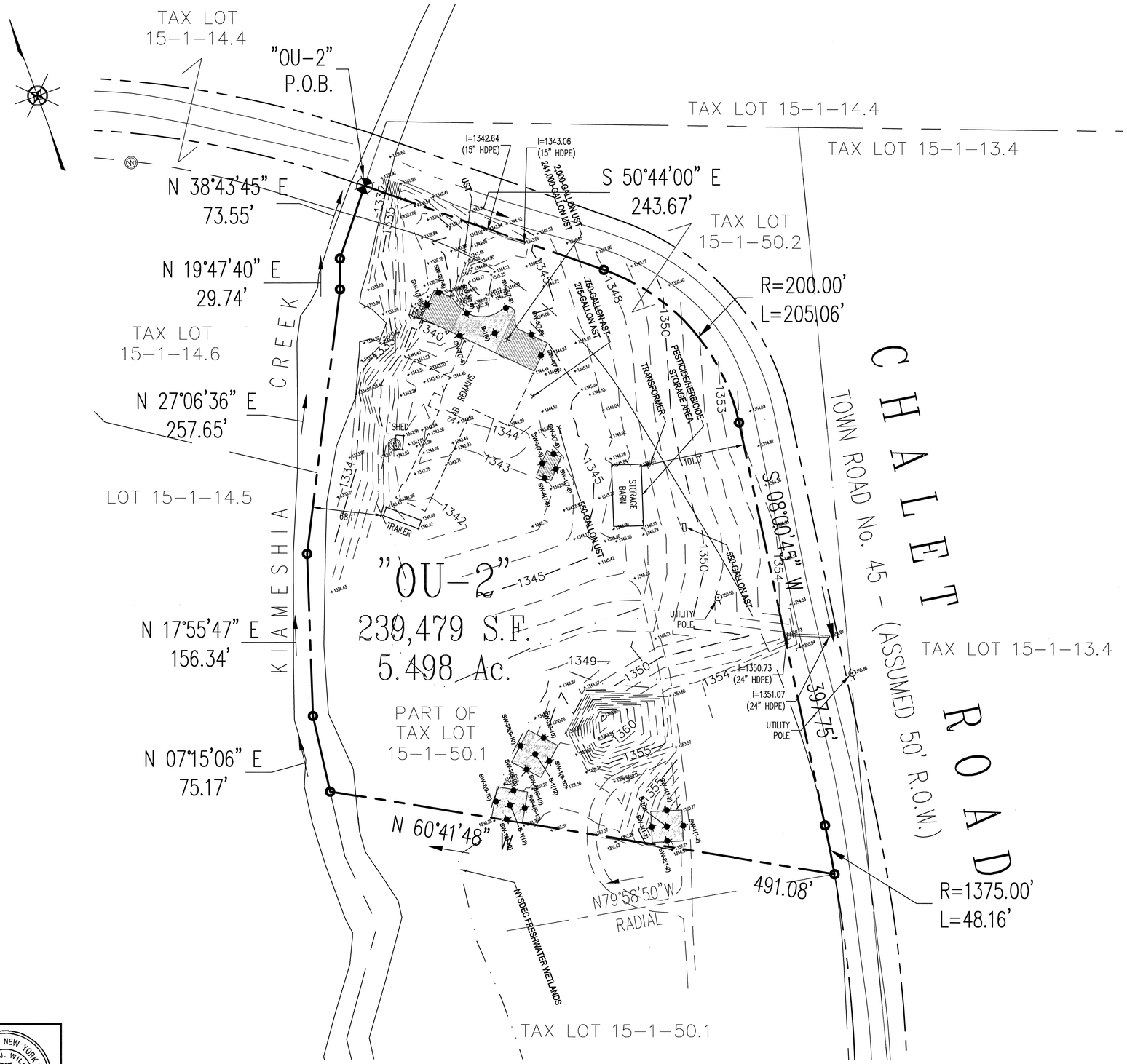
1) South 50°44'00" East a distance of 243.67 feet to a point;
2) Along a tangent curve to the right having a radius of 200 feet and an arc length of 205.06 feet to a point;
3) South 08°00'45" West a distance of 397.75 feet to a point;
4) Along a tangent curve to the right having a radius of 1375.00 feet and an arc length of 48.16 feet to a point;

THENCE through the lands of Tax Lot 15-1-50.1 North 60°41'48" West a distance of 491.08 feet to a point;

THENCE along the easterly boundary of Tax Lot 15-1-14.5 and Tax Lot 15-1-14.6 the following five-(5) courses and distances;

1) North 07°15'06" East a distance of 75.17 feet to a point;
2) North 17°55'47" East a distance of 156.34 feet to a point;
3) North 27°06'36" East a distance of 257.65 feet to a point;
4) North 19°47'40" East a distance of 29.74 feet to a point;
5) North 38°43'45" East a distance of 73.55 feet to the point and place of BEGINNING.

Containing within said bounds, 239,476 sq. ft. (5.498 Ac.) of land more or less.



LEGEND

- SW-1(1-2) — SOIL EXCAVATION ENDPOINT SAMPLE LOCATION (DEPTH)
- SOIL EXCAVATION AREA
- BEDROCK
- + 1342.67 — SPOT ELEVATION
- OU BOUNDARY
- NYSDEC FRESHWATER WETLANDS

THE SURVEYOR'S SEAL, SIGNATURE AND ANY CERTIFICATION APPEARING HEREON SIGNIFY THAT, TO THE BEST OF HIS KNOWLEDGE AND BELIEF, THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE MINIMUM STANDARDS FOR LAND SURVEYS AS SET FORTH IN THE CODE OF PRACTICE ADOPTED BY THE NEW YORK STATE ASSOCIATION OF PROFESSIONAL LAND SURVEYORS, INC.

THE PURPOSE OF THIS MAP IS TO INDICATE THE AREA (BOUNDED BY THE METES AND BOUNDS SHOWN ON THIS MAP) INCLUDED FOR A BROWNSFIELD SUBMISSION. THE METES AND BOUNDS OF THE BOUNDARY SHOWN IN THIS MAP DOES NOT INDICATED OWNERSHIP FOR WHOM THIS MAP IS PREPARED AND IS UNLAWFULL FOR USE IN TRANSFER OF TITLE.

SOIL EXCAVATION AREAS AND SAMPLE LOCATIONS WERE PROVIDED BY AKRF.

TOPOGRAPHIC INFORMATION HEREON WAS INTERPOLATED FROM AN ACTUAL FIELD SURVEY BY THIS OFFICE ON AUGUST 2, 2017. ELEVATIONS ARE RELATIVE TO NAVD-88.

UNDERGROUND IMPROVEMENTS, STRUCTURES, UTILITIES OR ENCROACHMENTS, AND ANY EASEMENTS RELATED THERETO, ARE NOT SHOWN HEREON UNLESS OTHERWISE NOTED. ANY UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS AND IS NOT CERTIFIED TO ACCURACY OR COMPLETENESS.

UNAUTHORIZED ALTERATION OR ADDITION TO A SURVEY MAP BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209, SUB-DIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

CONTRACTORS' LINE & GRADE SOUTH L.L.C.
23 Nepperhan Avenue
Elmsford, New York 10523
Phone: (914) 347-3141 Fax : (914) 347-3120

STATE OF NEW YORK — STEVEN J. WILLARD — 050054 — LICENSED LAND SURVEYOR

"This property is subject to an environmental easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the New York Environmental Conservation Law. The engineering and institutional controls for this Easement are set forth in more detail in the Site Management Plan (SMP). A copy of the SMP must be obtained by any party with an interest in the property. The SMP can be obtained from NYS Department of Environmental Conservation, Division of Environmental Remediation, Site Control Section, 625 Broadway, Albany, NY 12233 or at derweb@dec.ny.gov"

OPERABLE UNIT 2
PREPARED FOR
EPT CONCORD II, LLC
PROPERTY SITUATE IN THE
TOWN OF THOMPSON
COUNTY OF SULLIVAN
STATE OF NEW YORK

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

DATE: AUGUST 25, 2017
Rev: SETPEMBER 19, 2017 (TAX MAP No.s)

CAD File: /LAND4/01-189_CAPPELLI CONCORD/DWG/DEC BROWNFIELDS TOPO 8-22-17.DWG

O:\01-189_Cappelli Concord\dwg\BROWNFIELDS\DEC-Brownfields topo 9-19-17 EMAIL.dwg, 9/19/2017 2:55:09 PM, PDF-XChange Printer 2012

Schedule A Description
Brownfields OU-3

All that certain plot, piece or parcel of land, situate, lying and being in the Town of Thompson, County of Sullivan, State of New York and designated as part of Tax Lot 15-1-14.4 as shown on the official Tax Maps of the Town of Thompson, being more particularly described as follows;

BEGINNING at a point along the westerly boundary of Tax Lot 15-1-35.7, said point marking the division line between Tax Lots 15-1-11.1 and Tax Lot 15-1-14.4;

THENCE along the westerly boundary of Tax Lot 15-1-35.7 the following two-(2) courses and distances;

1) South 13°22'16" West a distance of 180.19 feet to a point;

2) South 21°15'19" West a distance of 91.18 feet to a point;

THENCE through the lands of Tax Lot 15-1-14.4 the following four-(4) courses and distances;

1) South 87°06'34" West a distance of 426.46 feet to a point;

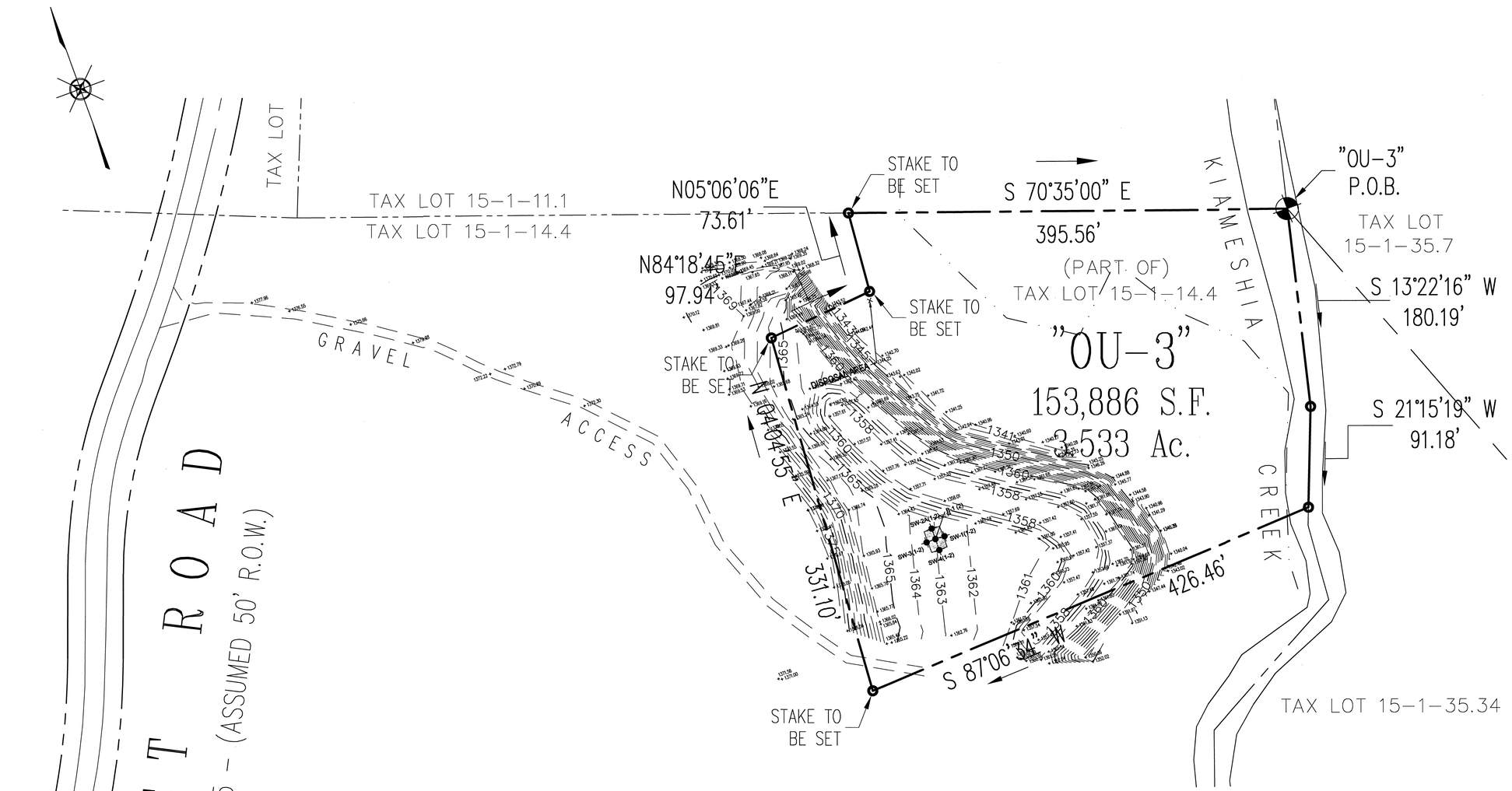
2) North 04°04'55" East a distance of 331.10 feet to a point;

3) North 84°18'45" East a distance of 97.94 feet to a point

4) North 05°06'06" East a distance of 73.61 feet to a point;

THENCE along the lands of Tax Lot 15-1-11.1, South 70°35'00" East a distance of 395.56 feet to the point and place of BEGINNING.

Containing within said bounds, 153,886 sq. ft. (3.533 Ac.) of land more or less.



LEGEND

- SW-1(1-2) — SOIL EXCAVATION ENDPOINT SAMPLE LOCATION (DEPTH)
- SOIL EXCAVATION AREA
- BEDROCK
- + 1342.67 — SPOT ELEVATION
- OU BOUNDARY
- NYSDEC FRESHWATER WETLANDS

THE SURVEYOR'S SEAL, SIGNATURE AND ANY CERTIFICATION APPEARING HEREON SIGNIFY THAT, TO THE BEST OF HIS KNOWLEDGE AND BELIEF, THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE MINIMUM STANDARDS FOR LAND SURVEYS AS SET FORTH IN THE CODE OF PRACTICE ADOPTED BY THE NEW YORK STATE ASSOCIATION OF PROFESSIONAL LAND SURVEYORS, INC.

THE PURPOSE OF THIS MAP IS TO INDICATE THE AREA (BOUNDED BY THE METES AND BOUNDS SHOWN ON THIS MAP) INCLUDED FOR A BROWNSFIELD SUBMISSION. THE METES AND BOUNDS OF THE BOUNDARY SHOWN IN THIS MAP DOES NOT INDICATED OWNERSHIP FOR WHOM THIS MAP IS PREPARED AND IS UNLAWFULL FOR USE IN TRANSFER OF TITLE.

SOIL EXCAVATION AREAS AND SAMPLE LOCATIONS WERE PROVIDED BY AKRF.

TOPOGRAPHIC INFORMATION HEREON WAS INTERPOLATED FROM AN ACTUAL FIELD SURVEY BY THIS OFFICE ON AUGUST 2, 2017. ELEVATIONS ARE RELATIVE TO NAVD-88.

UNDERGROUND IMPROVEMENTS, STRUCTURES, UTILITIES OR ENCROACHMENTS, AND ANY EASEMENTS RELATED THERETO, ARE NOT SHOWN HEREON UNLESS OTHERWISE NOTED. ANY UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS AND IS NOT CERTIFIED TO ACCURACY OR COMPLETENESS.

UNAUTHORIZED ALTERATION OR ADDITION TO A SURVEY MAP BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209, SUB-DIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

CONTRACTORS' LINE & GRADE SOUTH L.L.C.
23 Nepperhan Avenue
Elmsford, New York 10523
Phone: (914) 347-3141 Fax : (914) 347-3120

STATE OF NEW YORK — STEVEN J. WILLARD — 050054 — LICENSED LAND SURVEYOR

"This property is subject to an environmental easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the New York Environmental Conservation Law. The engineering and institutional controls for this Easement are set forth in more detail in the Site Management Plan (SMP). A copy of the SMP must be obtained by any party with an interest in the property. The SMP can be obtained from NYS Department of Environmental Conservation, Division of Environmental Remediation, Site Control Section, 625 Broadway, Albany, NY 12233 or at derweb@dec.ny.gov"

OPERABLE UNIT 3
PREPARED FOR
EPT CONCORD II, LLC
PROPERTY SITUATE IN THE
TOWN OF THOMPSON
COUNTY OF SULLIVAN
STATE OF NEW YORK

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

DATE: AUGUST 25, 2017
Rev: SEPTEMBER 19, 2017 (TAX MAP No.s)

CAD File: /LAND4/01-189_CAPPELLI CONCORD/DWG/DEC BROWNFIELDS TOPO 8-22-17.DWG

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

THIS INDENTURE made this _____day of _____, 20__, between Owner, EPR Concord II, L.P., having an office at 909 Walnut Road, Suite 200, Kansas City, Missouri 64106, (the "Grantor"), and The People of the State of New York (the "Grantee"), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

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

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

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

WHEREAS, Grantor, is the owner of real property located at the address of 143 Chalet Road in the Town of Thompson, County of Sullivan and State of New York, known and designated on the tax map of the County Clerk of Sullivan as tax map parcel numbers: Section 15 Block 1 Lots 50.1 and 50.2, being a portion of the property conveyed to Grantor by deed dated December 20, 2013 and recorded in the Sullivan County Clerk's Office as Instrument No. 2013-9913. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 5.498 +/- acres, and is hereinafter more fully described in the Land Title Survey dated August 25, 2017 and last revised September 19, 2017 prepared by Steven J. Willard, L.L.S. of Contractors' Line & Grade South, LLC, which will be attached to the Site Management Plan. The Controlled Property description identified as "Brownfields OU-2" is set forth in and attached hereto as Schedule A; and

WHEREAS, Grantor, is the owner of real property located at the address of 84 Chalet Road in the Town of Thompson, County of Sullivan and State of New York, known and designated

on the tax map of the County Clerk of Sullivan as tax map parcel numbers: Section 15 Block 1 Lot 14.4, being a portion of the property conveyed to Grantor by deed dated December 20, 2013 and recorded in the Sullivan County Clerk's Office in Liber and Page 2013/9913. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 3.533 +/- acres, and is hereinafter more fully described in the Land Title Survey dated August 25, 2017 and last revised September 19, 2017 prepared by Steven J. Willard, L.L.S. of Contractors' Line & Grade South, LLC, which will be attached to the Site Management Plan. The Controlled Property description identified as "Brownfields OU-3" is set forth in and attached hereto as Schedule A; and

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

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C353014-06-15, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

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

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Sullivan County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

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

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

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

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

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

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

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

Parties shall address correspondence to:

Site Number: C353014
Office of General Counsel
NYSDEC
625 Broadway

Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

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

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

Remainder of Page Intentionally Left Blank

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

EPR Concord II, L.P.:
By: EPR TRS Holdings, Inc., its general partner

By: _____

Print Name: Craig L. Evans
Vice Pres./Secretary

Title: _____ Date: 10/27/2017

Grantor's Acknowledgment

STATE OF ~~NEW YORK~~ Missouri)
) ss:
COUNTY OF JACKSON)

On the 27th day of OCTOBER, in the year 2017, before me, the undersigned, personally appeared CRAIG L. EVANS, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

SARAH E. NEWHAM
Notary Public - Notary Seal
STATE OF MISSOURI
Jackson County
My Commission Expires: 6/14/2021
Commission # 13728582

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

By: _____
Robert W. Schick, Director
Division of Environmental Remediation

Grantee's Acknowledgment

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

On the _____ day of _____, in the year 20__, before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

SCHEDULE "A" PROPERTY DESCRIPTION

Brownfields OU-2

All that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Town of Thompson, County of Sullivan, State of New York and being designated as part of Tax Lot 15-1-50.1 and Tax lot 15-1-50.2 as shown on the official Tax Maps of the Town of the Town of Thompson, being more particularly described as follows;

Beginning at a point on the westerly side of Chalet Road, Town Road 45 (assumed 50' ROW) said point marking the division line between Tax Lot 15-1-14.4 and Tax Lot 15-1-50.2;

Thence through Tax Lot 15-1-50.2 along the westerly side of Chalet Road, Town of Thompson Road 45 (assumed 50' ROW) the following four (4) courses and distances;

1) South 50°44'00" East a distance of 243.67 feet to a point;

2) Along a tangent curve to the right having a radius of 200 feet and an arc length of 205.06 feet to a point;

3) South 08°00'45" West a distance of 397.75 feet to a point;

4) Along a tangent curve to the right having a radius of 1375.00 feet and an arc length of 48.16 feet to a point;

Thence through the lands of Tax Lot 15-1-50.1 North 60°41'48" West a distance of 491.08 feet to a point;

Thence along the easterly boundary of Tax Lot 15-1-14.5 and Tax Lot 15-1-14.6 the following five-(5) courses and distances;

1) North 07°15'06" East a distance of 75.17 feet to a point;

2) North 17°55'47" East a distance of 156.34 feet to a point;

3) North 27°06'36" East a distance of 257.65 feet to a point;

4) North 19°47'40" East a distance of 29.74 feet to a point;

5) North 38°43'45" East a distance of 73.55 feet to the point and place of beginning.

Containing within said bounds, 239,476 sq. ft. (5.498 AC.) of land more or less.

Brownfields OU-3

All that plot, piece or parcel of land, situate, lying and being in the Town of Thompson, County of Sullivan, State of New York and designated as part of Tax Lot 15-1-14.4 as shown on the official Tax Maps of the Town of Thompson, being more particularly described as follows;

Beginning at a point along the westerly boundary of Tax Lot 15-1-35.7, said point marking the division line between Tax Lots 15-1-11.1 and Tax lot 15-1-14.4;

Thence along the westerly boundary of Tax Lot 15-1-35.7 the following two (2) course and distances;

1) South 13°22'16" West a distance of 180.19 feet to a point;

2) South 21°15'19" West a distance of 91.18 feet to a point;

Thence through the lands of Tax Lot 15-1-14.4 the following four courses and distances;

1) South 87°06'34" West a distance of 426.46 feet to a point;

2) North 04°04'55" East a distance of 331.10 feet to a point;

3) North 84°18'45" East a distance of 97.94 feet to a point;

4) North 05°06'06" East a distance of 73.61 feet to a point;

Thence along the lands of Tax lot 15-1-11.1, South 70°35'00" East a distance of 395.56 feet to the point and place of beginning.

Containing within said bounds, 153,886 sq. ft. (3.533 Ac.) of land more or less.

APPENDIX B

LIST OF SITE CONTACTS

APPENDIX B
LIST OF SITE CONTACTS

Name/Entity - Position	Contact Information
EPR Concord II – Site Owner	816-472-1700
Paul Turvey – Vice President and Associate General Counsel – EPR Concord II	816-472-1700 pault@eprkc.com
Paul Roggeman – Adelaar Project Manager – Contact for Site Access	845-794-606 roggemanconsulting@live.com
Michelle Lapin, PE – Senior Vice President, AKRF, Inc. – Certifying Engineer	646-388-9520 mlapin@akrf.com
Bryan Zieroff – Senior Technical Director, AKRF, Inc. – Remediation Project Manager	914-922-2382 bzieroff@akrf.com
Alexandra M. Servis – NYSDEC Project Manager	518-402-9809 alexandra.servis@dec.ny.gov
Ed Moore – NYSDEC Regional HW Engineer	845-256-3137 edward.moore@dec.ny.gov
Kelly Lewandowski – NYSDEC Site Control	518-402-9553 kelly.lewandowski@dec.ny.gov

APPENDIX C

EXCAVATION WORK PLAN (EWP)

APPENDIX C
EXCAVATION WORK PLAN (EWP)

C-1 Notification

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

Table 1: Notifications*

Alexandra M. Servis, NYSDEC Project Manager	518-402-9809
Ed Moore, NYSDEC Regional HW Engineer	845-256-3137, edward.moore@dec.ny.gov
Kelly Lewandowski, NYSDEC Site Control	518-402-9553, kelly.lewandowski@dec.ny.gov

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

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an Engineering Control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix D of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

C-2 Soil Screening Methods

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

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Sections C-6 and C-10 of this Appendix.

C-3 Soil Staging Methods

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters, and other discharge points. Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site, and available for inspection by NYSDEC.

C-4 Materials Excavation and Load-Out

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material. The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan. The presence of utilities and easements on the Site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, Local, and New York State Department of Transportation (NYSDOT) requirements (and all other applicable transportation requirements). A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed, if needed, at the truck wash before leaving the Site until the activities performed under this section are complete. Truck wash waters will be collected and disposed of off-site in an appropriate manner. Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site soil tracking.

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

C-5 Materials Transport Off-Site

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

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

Truck transport routes will be determined upon confirmation of the location of the receiving facility. All trucks loaded with site materials will exit the vicinity of the Site using only approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during site remediation and development. Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

C-6 Materials Disposal Off-Site

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

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

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

C-7 Materials Reuse On-Site

The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Contaminated soil, or any material in direct contact with the contaminated soil, may not be separated for reuse on-site and will be disposed of as described in Section C-6. Organic matter (wood, roots, stumps, etc.) or other solid is prohibited for reuse on-site. Any demolished material from the existing vacant buildings, including the concrete slabs and the existing asphalt, will be disposed of in accordance with all prevailing Federal, State, and Local regulations. Soil that does not exhibit evidence of contamination during field screening, as described in Section C-2 and is free of debris will be stockpiled and tested at a frequency of one sample per 500 cubic yards and characterized for reuse below the site cap. Each sample will be tested for TCL VOCs by EPA Method 8260, TCL SVOCs by EPA Method 8270, PCBs by EPA Method 8082, pesticides by EPA Method 8081, and TAL metals by EPA Method 6000/7000 series. Samples will be shipped to the laboratory with appropriate chain-of-custody documentation. The samples will be analyzed in a laboratory following NYSDOH ASP Category B deliverables. Soil from representative samples that meet the Commercial Use SCOs can be reused on-site and below the site cap as backfill. Soil designated for reuse as part of the site cap will be tested in accordance with the sampling protocol described in Section C-10. All sampling of imported backfill will be conducted in accordance with the Quality Assurance Project Plan (QAPP) included in Appendix E.

C-8 Fluids Management

All liquids to be removed from the Site, including but not limited to excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be

handled, transported and disposed in accordance with applicable Local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the Site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

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

C-9 Cover System Restoration

After the completion of soil removal and any other invasive activities in the OU-2 landfill area, the cover system will be restored in a manner that complies with the SMP and the COC. The existing cover system is comprised of a minimum of 12 inches of clean soil. The demarcation layer, consisting of geotextile material will be replaced to provide a visual reference to the top of the remaining contamination zone; the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this SMP. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP.

C-10 Backfill from Off-Site Sources

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

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

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater, and protection of ecological resources criteria, the resulting soil quality standards are listed in Table 1 of the SMP. Soils that meet ‘exempt’ fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.

Native material from a NYSDOT designated virgin quarry source will not be sampled prior to use as backfill on the Site. Non-DOT designated virgin quarry sources, or non-virgin imported material that does not have an approved NYSDEC Beneficial Use Determination, will be tested at the originating facility in accordance with Section 5.4(e) 10 of NYSDEC DER 10, and at a frequency indicated by the following table:

Table 2: Soil Sampling Requirements for Import/Export

Recommended Number of Soil Samples for Soil Imported To or Exported From a Site			
	VOCs (EPA Method 8260)	SVOCs (EPA Method 8270), Inorganics (EPA Method 600/7000series & PCBs/Pesticides (EPA Methods 8082/8081)	
Soil Quantity (Cubic Yards)	Discrete Samples	Composite Samples	Composite Sample Protocol
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1,000	7	2	
>1,000	Add an additional 2 VOC and 1 composite for each additional 1,000 cubic yards, or consult with NYSDEC		

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

C-11 Stormwater Pollution Prevention

Silt fencing or hay bales will be installed around the entire perimeter of the construction area. Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site, and available for inspection by NYSDEC. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

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

C-12 Excavation Contingency Plan

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

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

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's project manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

C-13 Community Air Monitoring Plan

Work zone monitoring will be performed for the health and safety of workers during interior intrusive work (excavation) in accordance with action levels and guidance outlined in the Site-specific HASP. During intrusive activities, all windows and doors at street level will remain closed to prevent exposure to the public and the existing ventilation system and any additional ventilation fans will vent to the roof.

Community air monitoring will be performed at the perimeter of the Site continuously during intrusive Site activities, including the loading or staging of excavated soil prior to transportation and off-site disposal. In addition, community air monitoring will be performed periodically (at a minimum once per hour) on a roving basis with a concentration on any active exterior work area(s).

VOC and particulate monitoring equipment will consist of a photoionization detector (PID) capable of detecting the VOCs found in the excavated soil and real-time aerosol or particulate monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM_{10}). VOC monitoring equipment will be calibrated, and the particulate monitoring equipment zeroed, on a daily basis and documented in a dedicated field log book. Both VOC and particulate monitoring equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the prescribed action levels.

If VOC monitoring results in the ambient air concentration of total organic vapors in excess of 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 below 5 ppm over background, work activities can resume with measures taken to reduce vapors and continue monitoring. If total organic vapor levels persist at levels in excess of 5 ppm over background, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. If the organic vapor level is repeatedly over 25 ppm above background, activities will be shut down and the Engineering Controls and the Site work plan re-evaluated.

If particulate monitoring results in a 15-minute average concentration measurement that is between 100 micrograms per cubic meter ($\mu g/m^3$) and 150 $\mu g/m^3$ above the background level, additional dust suppression techniques will be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Should dust suppression measures being utilized not lower particulates to an acceptable level (e.g., below 150 $\mu g/m^3$ above the background level, and no visible dust from the work area), work will be suspended until appropriate corrective measures are implemented to remedy the situation.

The air sampling stations will be determined based on the location of the soil disturbance area, including excavations, soil stockpiles, and soil loading areas, and generally prevailing wind conditions at the start of each work day. These locations will be determine on a daily basis, and adjusted on a more frequent basis, based on actual wind directions to provide an upwind and at least two downwind monitoring stations. Details regarding work zone and community air monitoring are outlined in the HASP and Community Air Monitoring Plan (CAMP) attached as Appendix D of the SMP. Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH project managers.

C-14 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis will include (a) through (f), as outlined in the following paragraph. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

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

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

C-15 Dust Control Plan

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

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

C-16 Other Nuisances

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

APPENDIX D

HEALTH AND SAFETY PLAN AND COMMUNITY AIR MONITORING PLAN

Adelaar

CONCORD ROAD

THOMPSON, SULLIVAN COUNTY, NEW YORK

Health and Safety Plan and
Community Air Monitoring Plan

AKRF Project Number: 40376

NYSDEC Brownfield Cleanup Program Site Number: C353008

Prepared for:

EPR Concord II, L.P.
909 Walnut Street, Suite 200
Kansas City, MO 64106

Prepared by:

AKRF, Inc.
34 South Broadway, Suite 401
White Plains, New York 10601
914-949-7336

DECEMBER 2017

TABLE OF CONTENTS

FIGURE

ATTACHMENTS

1.0 INTRODUCTION

This Health and Safety Plan and Community Air Monitoring Plan (HASP and CAMP) has been prepared by AKRF, Inc. (AKRF) on behalf of EPR Concord II, L.P. (EPR) for the Adelaar site located in Thompson, New York.

The project, which is referred to herein as the "Site" or "Property," is located on Concord Road in the Town of Thompson, Sullivan County, a rural setting in the Catskill region of New York State. Areas around the site are a mix of commercial, recreational, residential and undeveloped land. The Site formerly operated as the Concord Resort Complex (the "Complex"), which was developed in stages beginning in the 1920's on the shore of Kiamesha Lake, and continued to expand through the 1960's to include hotel, golf course, and resort services. The resort was abandoned in the early 1990's with the exception of golf course operations, and in 2016 the golf course operations were ended as full site redevelopment began. EPR entered into a Brownfield Cleanup Agreement (BCA) on August 19, 2015 with New York State Department of Environmental Conservation (NYSDEC) to remediate four separate areas or Operating Units (OUs) totaling approximately 12.5 acres within the Site. The OUs were associated with the former Complex operations, and included a former gas station, the golf course maintenance building, and landfill areas containing waste and buried debris associated with resort and golf course maintenance.

From November 2016 through August 2017, EPR completed remediation of the OUs in accordance with an NYSDEC-approved Remedial Action Work Plan (RAWP) and the Remedial Action Objectives (RAOs) documented by the NYSDEC Decision Document. The approved clean-up remedy for OU-2 and OU-3 included methods that allowed contamination at concentrations below the NYSDEC Commercial Use Soil Cleanup Objectives (SCOs) to remain on-site. Use of the Commercial Use SCOs was based on the redevelopment plan that included commercial uses at OU-2 and OU-3 after remediation.

Since remaining contamination exists at OU-2 and OU-3, Institutional Controls (ICs) and Engineering Controls (ECs) were implemented at OU-2 and OU-3 to protect human health and the environment. These controls included the requirement to complete a post remediation inspection and monitoring program in accordance with an NYSDEC-approved Site Management Plan (SMP). This HASP and CAMP are included as an appendix to the SMP, and includes measures to protect site workers and the surrounding community during all future monitoring and required intrusive work associated with OU-2 and OU-3.

HEALTH AND SAFETY GUIDELINES AND PROCEDURES

1.1 Hazard Evaluation

1.1.1 Hazards of Concern

Check all that apply		
(**X**) Organic Chemicals	(**X**) Inorganic Chemicals	( ) Radiological
( ) Biological	( ) Explosive/Flammable	( ) Oxygen Deficient Atm.
(**X**) Heat Stress	(**X**) Cold Stress	( ) Carbon Monoxide
Comments: No personnel are permitted to enter permit confined spaces.		

1.1.2 Physical Characteristics

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

1.1.3 Hazardous Materials

Check all that apply					
Chemicals	**Solids**	**Sludges**	**Solvents**	**Oils**	**Other**
( ) Acids	( ) Ash	( ) Paints	( ) Halogens	( ) Transformer	( ) Lab
( ) Caustics	() Asbestos	( ) Metals	(**X**) Petroleum	( ) Other DF	( ) Pharm
(**X**) Pesticides	( ) Tailings	( ) POTW	( ) Other Chlorinated Organic Solvents	(**X**) Motor or Hydraulic Oil	( ) Hospital
(**X**)Petroleum	(**X**) Other	( ) Other		(**X**) Gasoline	( ) Rad
( ) Inks	Fill material			(**X**) Fuel Oil	( ) MGP
(X) PCBs	Construction and Demolition materials			( ) Waste Soil	( ) Mold
(**X**) Metals					( ) Cyanide
(**X**)Other: SVOCs					

1.1.4 Chemicals of Concern

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Arsenic	REL= 0.002 mg/m^3 PEL= 0.010 mg/m^3	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]
Lead	REL= 0.1 mg/m^3 PEL= 0.05 mg/m^3	Weak, lassitude, insomnia; facial pallor, pale eye, anorexia, low-weight, malnutrition, constipation, abdominal pain, colic; anemia; gingival lead line; tremors, paralysis wrists and ankles; encephalopathy; kidney disease; irritation eyes; hypotension.
Mercury	REL= 0.05 mg/m^3 (Hg vapor) REL=0.1 mg/m^3 (other) PEL= 0.1 mg/m^3	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria
Cadmium	REL= lowest feasible concentration PEL= 0.005 mg/m^3	Fluid accumulation in lungs, difficulty breathing, cough, chest tightness, headache, chills, muscle aches, nausea, vomiting, diarrhea, loss of sense of smell, kidney damage, emphysema, and mild anemia.
Manganese	REL = 1 mg/m^3 PEL= 5 mg/m^3	Asthenia, insomnia, mental confusion, fever, dry throat, cough, chest tightness, breathing difficulty, low back pain, vomiting, malaise, exhaustion, kidney damage.
Zinc	REL = 5 mg/m^3 PEL= 15 mg/m^3	Fever, chills, muscle ache, dry throat, weakness, metallic taste, headache, blurred vision, low back pain, malaise, vomiting, chest tightness, breathing difficulty, decreased pulmonary function.
Benzene	REL = 0.1 ppm PEL = 1 ppm STEL = 5 ppm	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude, dermatitis; bone marrow depression, potential occupational carcinogen.
Toluene	REL = 100 ppm PEL = 200 ppm STEL = 300 ppm	Irritation eyes, nose; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage.
Ethylbenzene	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma.
Xylenes	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, poor coordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.
Polyaromatic Hydrocarbons (PAHs)	REL= 0.1 mg/m^3 PEL= 5 mg/m^3	Harmful effects on the skin, body fluids, and ability to fight disease after both short and long term exposure, birth defects, and potential occupational carcinogen.
Polychlorinated Biphenyls (PCBs)	REL= 0.001 mg/m^3 PEL= 0.5 mg/m^3	Irritation eyes, chloracne; liver damage; reproductive effects; [potential occupational carcinogen]
Naphthalene	REL = 10 ppm PEL = 10 ppm	Irritation eyes; headache, confusion, excitement, malaise; nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical **neuritis**, corneal damage.
Fuel Oil	REL = 350 mg/m^3 PEL = 400 ppm	Nausea, irritation – eyes, hypertension, headache, light-headedness, loss of appetite, poor coordination; kidney damage, blood clotting problems; potential carcinogen.

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Dieldrin (Aldrin)	REL = 0.25 mg/m^3 PEL= 0.25 mg/m^3	Headache, dizziness; nausea, vomiting, malaise; mild erythema of skin; impairment of memory, emotional disturbances; tremors, hyperexcitability, myoclonic jerks of limbs; clonic-tonic convulsions, coma, respiratory failure (carcinogenic).
DDT	REL = 0.5 mg/m^3 PEL= 1 mg/m^3	Irritated eyes and skin, paresthesia tongue, lips and face, tremor, anxiety, dizziness, confusion, malaise, headache, weakness, convulsions, paresis hands, vomiting.
Comments: REL = NIOSH Recommended Exposure Limit PEL = OSHA Permissible Exposure Limit STEL = OSHA Short Term Exposure Limit		

1.2 Designated Personnel

AKRF will appoint one of its on-site personnel as the Site Safety Officer (SSO). This individual will be responsible for the implementation of the HASP. The SSO will have a 4-year college degree in occupational safety or a related science/engineering field, and experience in implementation of air monitoring and hazardous materials sampling programs. Health and safety training required for the SSO and all field personnel is outlined in Section 1.3 of this HASP.

1.3 Training

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

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

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

1.4 Medical Surveillance Program

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

1.5 Site Work Zones

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

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

Appropriate barriers will be set up to secure the area and prevent any unauthorized personnel from approaching within 15 feet of the work area.

Site Work Zones			
Task	**Exclusion Zone**	**CRZ**	**Support Zone**
Any excavation that penetrates the site cap	10 ft from excavation border and excavation equipment or vehicles	25 ft from excavation border and excavation equipment or vehicles	As needed
Borehole drilling	10 ft from Drill Rig	25 ft from Drill Rig	As Needed

1.6 Air Monitoring

The purpose of the air monitoring program is to identify any exposure of the field personnel to potential environmental hazards in the soil and soil vapor. Results of the air monitoring will be used to determine the appropriate response action, if needed.

1.6.1 Work Zone Air Monitoring

Real time air monitoring will be performed with a photoionization detector (PID). Measurements will be taken prior to commencement of work and continuously during the work, as outlined in the following table. Measurements will be made as close to the workers as practicable and at the breathing height of the workers. The SSO shall set up the equipment and confirm that it is working properly. The PID will be calibrated with 100 parts per million (ppm) isobutylene gas in accordance with the manufacturer's instructions at the start of each work day. His/her designee may oversee the air measurements during the day. The initial measurement for the day will be performed before the start of work and will establish the background level for that day. The final measurement for the day will be performed after the end of work. The action levels and required responses are listed in the following table:

Work Zone Air Monitoring Action Levels		
Instrument	**Action Level**	**Response Action**
PID	Less than 10 ppm in breathing zone	Level D or D-Modified
	Between 10 ppm and 50 ppm	Level C
	More than 50 ppm	Stop work. Resume work when readings are less then 50 ppm.

1.6.2 Community Air Monitoring Plan

Community air monitoring will be conducted during all intrusive site activities in compliance with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP). Real-time air monitoring for volatile compounds and dust at the perimeter of the exclusion zone will be performed as described below.

VOC Monitoring

Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of groundwater samples. Periodic monitoring may include obtaining measurements upon arrival at a location, when purging a sampling point, and upon leaving the location.

Continuous monitoring for VOCs will be conducted during all ground intrusive activities, including construction/utility work and monitoring well installation. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations. VOCs will be monitored continuously at the downwind perimeter of the exclusion zone. Monitoring will be conducted with a PID equipped with an 10.6 eV lamp capable of calculating 15-minute running average concentrations. The following actions will be taken based on organic vapor levels measured:

- If total organic vapor levels exceed 5 ppm above background for the 15-minute average at the exclusion zone perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the exclusion zone persist at levels in excess of 5 ppm above background but less than 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 hot zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet – is below 5 ppm above background for the 15-minute average.
- If the total organic vapor level is above 25 ppm at the perimeter of the exclusion zone, activities will be shutdown.

More frequent intervals of monitoring will be conducted if required as determined by the SSO. All PID readings will be recorded and available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, will also be recorded.

Dust Monitoring

Continuous monitoring for particulate will be conducted during all ground intrusive activities, which will involve the measurement of respirable dust. Community air monitoring for dust particulates will be conducted using a MIE 1000 Personal DataRam or equivalent to measure the concentration of airborne respirable particulates less than 10 micrometers in size (PM_{10}). The dust monitor will be capable of calculating 15-minute running average concentrations and equipped with an audible alarm to indicate exceedance of action levels. An inspection of the monitoring stations will be conducted on at least an hourly basis. Background readings and any readings that trigger response actions will be recorded in the project logbook, which will be available on-site for NYSDOH and/or NYSDEC review. If the downwind particulate concentrations are greater than 100 micrograms per cubic meter ($\mu g/m^3$) above background (upwind concentrations), and no other obvious source is apparent, then it will be assumed that the elevated particulate concentrations are a result of site activities. In such instances, dust suppression measures will be implemented and monitoring will be continued. Work will be allowed to continue with dust suppression if downwind particulate levels do not exceed 150 $\mu g/m^3$ above the background (upwind concentration) and provided that no visible dust is migrating from the work area. If particulate levels persist at 150 $\mu g/m^3$ above the background, work must be stopped until dust suppression measures bring particulate levels to below 150 $\mu g/m^3$ above background.

Major Vapor Emission Response Plan

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

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

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

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

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

- The NYSDEC, NYSDOH, and local police authorities will be immediately contacted by the SSO and advised of the situation;

- Frequent air monitoring will be conducted at 30-minute intervals within the 20 foot zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the SSO; and
- All emergency contacts will go into effect as appropriate.

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

1.6.3 Personal Protection Equipment

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

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

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

1.7 General Work Practices

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

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the Site. These areas will be designated by the SSO.
- Workers must wash their hands thoroughly on leaving the work area and before eating, drinking, or any other such activity.

- The workers should shower as soon as possible after leaving the Site. Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat/cold stress.

2.0 EMERGENCY PROCEDURES AND EMERGENCY RESPONSE PLAN

The field crew will be equipped with emergency equipment, such as a first aid kit and disposable eye washes. In the case of a medical emergency, the SSO will determine the nature of the emergency and he/she will have someone call for an ambulance, if needed. If the nature of the injury is not serious, i.e., the person can be moved without expert emergency medical personnel, he/she should be driven to the Catskill Regional Medical Center by on-site personnel. Directions to the hospital are provided below, and a hospital route map is attached.

2.1 Hospital Directions

Hospital Name:	Catskill Regional Medical Center
Phone Number:	(845) 794-3300, X 2245
Address/Location:	68 Harris-Bushville Road Harris, NY 12742
Directions:	Turn left onto Concord Road Turn left onto NY-42 South Take the ramp onto NY-17 West Merge onto NY-17 West Take the exit toward County Road 174 Turn right onto County Road 174 Turn right onto Bushville Road Hospital will be on the right

2.2 Emergency Contacts

Company	Individual Name	Title	Contact Number
AKRF, Inc.	Marc Godick	Project Director	914-922-2356 (office)
	Bryan Zieroff	Project Manager	914-922-2382 (office) 917-583-4924 (cell)
	Stephen Schmid	SSO	914-922-2386 (office) 914-400-9736 (cell)
EPR	Paul Turvey	Owner Representative	888-377-7348 (office)

Company	Individual Name	Title	Contact Number
New York State Department of Environmental Conservation	Alexandra Servis	Project Manager	518-402-9662 (office)
New York State Department of Health	TBD	Public Health Engineer	TBD
Ambulance, Fire Department & Police Department	-	-	911
NYSDEC Spill Hotline	-	-	800-457-7362

3.0 APPROVAL & ACKNOWLEDGMENTS OF HASP

APPROVAL

Signed: _____ Date: _____

AKRF Project Manager

Signed: _____ Date: _____

AKRF Health and Safety Officer

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

AFFIDAVIT

I,_____(name), of_____(company name), have read the Health and Safety Plan (HASP) for the Adelaar site. I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from the site.

Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____

ATTACHMENT A

POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

BENZENE
CAS # 71-43-2

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

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

What is benzene?

(Pronounced bĕn′zēn′)

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

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

What happens to benzene when it enters the environment?

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

How might I be exposed to benzene?

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

How can benzene affect my health?

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

ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html

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

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

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

How likely is benzene to cause cancer?

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

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

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

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

Has the federal government made recommendations to protect human health?

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

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

Glossary

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

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

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

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

TOLUENE
CAS # 108-88-3

Division of Toxicology ToxFAQs™ **February 2001**

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

HIGHLIGHTS: Exposure to toluene occurs from breathing contaminated workplace air, in automobile exhaust, some consumer products paints, paint thinners, fingernail polish, lacquers, and adhesives. Toluene affects the nervous system. Toluene has been found at 959 of the 1,591 National Priority List sites identified by the Environmental Protection Agency

What is toluene?

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

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

What happens to toluene when it enters the environment?

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

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

❑ Toluene does not usually stay in the environment long.

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

How might I be exposed to toluene?

❑ Breathing contaminated workplace air or automobile exhaust.

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

❑ Drinking contaminated well-water.

❑ Living near uncontrolled hazardous waste sites containing toluene products.

How can toluene affect my health?

Toluene may affect the nervous system. Low to moderate levles can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and

hearing and color vision loss. These symptoms usually disappear when exposure is stopped.

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

High levels of toluene may affect your kidneys.

How likely is toluene to cause cancer?

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

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

How can toluene affect children?

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

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

How can families reduce the risk of exposure to toluene?

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

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

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

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

Has the federal government made recommendations to protect human health?

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

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

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

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Toluene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ETHYLBENZENE
CAS # 100-41-4

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

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

HIGHLIGHTS: Ethylbenzene is a colorless liquid found in a number of products including gasoline and paints. Breathing very high levels can cause dizziness and throat and eye irritation. Ethylbenzene has been found in at least 731 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is ethylbenzene?

(Pronounced ĕth′ əl bĕn′ zēn′)

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

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

What happens to ethylbenzene when it enters the environment?

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

How might I be exposed to ethylbenzene?

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

How can ethylbenzene affect my health?

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

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

How likely is ethylbenzene to cause cancer?

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

ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html

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

How can ethylbenzene affect children?

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

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

How can families reduce the risk of exposure to ethylbenzene?

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

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

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

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

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

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

Has the federal government made recommendations to protect human health?

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

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

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

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

XYLENE
CAS # 1330-20-7

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

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

What is xylene?

(Pronounced zī′lēn)

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

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

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

What happens to xylene when it enters the environment?

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

How might I be exposed to xylene?

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

How can xylene affect my health?

Xylene affects the brain. High levels from exposure for short periods (14 days or less) or long periods (more than 1 year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of

people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

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

How likely is xylene to cause cancer?

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

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

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

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

Has the federal government made recommendations to protect human health?

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

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

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

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

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

Glossary

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

Carcinogenic: Having the ability to cause cancer.

CAS: Chemical Abstracts Service.

ppm: Parts per million.

Solvent: A liquid that can dissolve other substances.

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

NAPHTHALENE
CAS # 91-20-3

1-METHYLNAPHTHALENE
CAS # 90-12-0

2-METHYLNAPHTHALENE
CAS # 91-57-6

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

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

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

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

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

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

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

❏ Naphthalene enters the environment from industrial and domestic sources, and from accidental spills.

❏ Naphthalene can dissolve in water to a limited degree and may be present in drinking water from wells close to hazardous waste sites and landfills.

❏ Naphthalene can become weakly attached to soil or pass through soil into underground water.

❏ In air, moisture and sunlight break it down within 1 day. In water, bacteria break it down or it evaporates into the air.

❏ Naphthalene does not accumulate in the flesh of animals or fish that you might eat.

❏ 1-Methylnaphthalene and 2-methylnaphthalene are expected to act like naphthalene in air, water, or soil because they have similar chemical and physical properties.

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

❏ Breathing low levels in outdoor air.

❏ Breathing air contaminated from industrial discharges or smoke from burning wood, tobacco, or fossil fuels.

❏ Using or making moth repellents, coal tar products, dyes or inks could expose you to these chemicals in the air.

❏ Drinking water from contaminated wells.

❏ Touching fabrics that are treated with moth repellents containing naphthalene.

❏ Exposure to naphthalene, 1-methylnaphthalene and 2-methylnaphthalene from eating foods or drinking beverages is unlikely.

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

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

ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html

causes reproductive effects in animals; most evidence says it does not.

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

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

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

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

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

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

Hospitals have reported many cases of hemolytic anemia in children, including newborns and infants, who either ate naphthalene mothballs or deodorants cakes or who were in close contact with clothing or blankets stored in naphthalene mothballs. Naphthalene can move from a pregnant woman's blood to the unborn baby's blood. Naphthalene has been detected in some samples of breast milk from the general U.S. population, but not at levels that are expected to be of concern.

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

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

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

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

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

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

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

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

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

Has the federal government made recommendations to protect human health?

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

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

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

FUEL OILS

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

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

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

What are fuel oils?

(Pronounced fyo͞o′əl oilz)

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

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

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

What happens to fuel oils when they enter the environment?

- Some chemicals found in fuel oils may evaporate into the air from open containers or contaminated soil or water.
- Some chemicals found in fuel oils may dissolve in water after spills to surface waters or leaks from underground storage tanks.
- Some chemicals found in fuel oils may stick to particles in water, which will eventually cause them to settle to the bottom sediment.
- Some of the chemicals found in fuel oils may be broken down slowly in air, water, and soil by sunlight or small organisms.
- Some of the chemicals found in fuel oils may build up significantly in plants and animals.

How might I be exposed to fuel oils?

- Using a home kerosene heater or stove, or using fuel oils at work.
- Breathing air in home or building basements that has been contaminated with fuel oil vapors entering from the soil.
- Drinking or swimming in water that has been contaminated with fuel oils from a spill or a leaking underground storage tank.
- Touching soil contaminated with fuel oils.
- Using fuel oils to wash paint or grease from skin or equipment.

How can fuel oils affect my health?

Little information is available about the health effects that may be caused by fuel oils. People who use kerosene

stoves for cooking do not seem to have any health problems related to their exposure.

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

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

How likely are fuel oils to cause cancer?

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

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

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

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

Has the federal government made recommendations to protect human health?

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

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

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

Glossary

Carcinogenic: Able to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or a gas.

Hydrocarbon: Any compound made up of hydrogen and carbon.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

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

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

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

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

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

What are polycyclic aromatic hydrocarbons?

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

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

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

What happens to PAHs when they enter the environment?

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

How might I be exposed to PAHs?

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

ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html

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

How can PAHs affect my health?

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

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

How likely are PAHs to cause cancer?

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

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

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

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

Has the federal government made recommendations to protect human health?

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

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

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ARSENIC
CAS # 7440-38-2

Division of Toxicology ToxFAQs™ December 2003

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

HIGHLIGHTS: Exposure to higher than average levels of arsenic occurs 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 at 1,014 of the 1,598 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. Organic arsenic compounds are used as pesticides, primarily on cotton plants.

What happens to arsenic when it enters the environment?

❑ Arsenic cannot be destroyed in the environment. It can only change its form.
❑ Arsenic in air will settle to the ground or is washed out of the air by rain.
❑ Many arsenic compounds can dissolve in water.
❑ Fish and shellfish can accumulate arsenic, but the arsenic in fish is mostly in a form that is not harmful.

How might I be exposed to arsenic?

❑ Eating food, drinking water, or breathing air containing arsenic.
❑ Breathing contaminated workplace air.
❑ Breathing sawdust or burning smoke from wood treated with arsenic.
❑ Living near uncontrolled hazardous waste sites containing arsenic.
❑ Living in areas with unusually high natural levels of arsenic in rock.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs. Ingesting high levels of inorganic arsenic can result in death. Lower levels of arsenic 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.

Organic arsenic compounds are less toxic than inorganic arsenic compounds. Exposure to high levels of some organic arsenic compounds may cause similar effects as inorganic arsenic.

How likely is arsenic to cause cancer?

Several studies have shown that inorganic arsenic can increase the risk of lung cancer, skin cancer, bladder cancer, liver cancer, kidney cancer, and prostate cancer. The World Health Organization (WHO), the Department of Health and Human Services (DHHS), and the EPA have determined that inorganic arsenic is a human carcinogen.

How can arsenic affect children?

We do not know if exposure to arsenic will result in birth defects or other developmental effects in people. Birth defects have been observed in animals exposed to inorganic arsenic.

It is likely that health effects seen in children exposed to high amounts of arsenic will be similar to the effects seen in adults.

How can families reduce the risk of 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.

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

There are tests to measure the level of arsenic in blood, urine, hair, or 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 or 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 how the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or canceled many 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 has set limits of 10 μg arsenic per cubic meter of workplace air (10 $\mu g/m^3$) for 8 hour shifts and 40 hour work weeks.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Arsenic. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

LEAD

CAS # 7439-92-1

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

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

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

What is lead?

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

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

What happens to lead when it enters the environment?

- ❏ Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- ❏ When lead is released to the air, it may travel long distances before settling to the ground.
- ❏ Once lead falls onto soil, it usually sticks to soil particles.
- ❏ Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

- ❏ Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.
- ❏ Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.
- ❏ Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.
- ❏ Using health-care products or folk remedies that contain lead.

How can lead affect my health?

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

How likely is lead to cause cancer?

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

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

How can lead affect children?

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

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

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

How can families reduce the risks of exposure to lead?

❏ Avoid exposure to sources of lead.

❏ Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.

❏ If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.

❏ Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children

❏ If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

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

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

Has the federal government made recommendations to protect human health?

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

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

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

MERCURY
CAS # 7439-97-6

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

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

What is mercury?

(Pronounced mŭr′kyə-rē)

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

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

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

What happens to mercury when it enters the environment?

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

How might I be exposed to mercury?

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

How can mercury affect my health?

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

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea,

vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

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

How can mercury affect children?

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

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

How can families reduce the risk of exposure to mercury?

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

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

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

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

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

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

Has the federal government made recommendations to protect human health?

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

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

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

References

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

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

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

POLYCHLORINATED BIPHENYLS

Division of Toxicology ToxFAQs™ **February 2001**

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

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

What are polychlorinated biphenyls?

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

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

What happens to PCBs when they enter the environment?

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

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

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

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

How might I be exposed to PCBs?

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

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

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

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

How can PCBs affect my health?

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

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects

of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are PCBs to cause cancer?

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

How can PCBs affect children?

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

How can families reduce the risk of exposure to PCBs?

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

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

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

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

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

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

Has the federal government made recommendations to protect human health?

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

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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

DDT, DDE, and DDD - ToxFAQs™

CAS # 50-29-3, 72-55-9, 72-54-8

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

HIGHLIGHTS: Exposure to DDT, DDE, and DDD occurs mostly from eating foods containing small amounts of these compounds, particularly meat, fish and poultry. High levels of DDT can affect the nervous system causing excitability, tremors and seizures. In women, DDE can cause a reduction in the duration of lactation and an increased chance of having a premature baby. DDT, DDE, and DDD have been found in at least 442 of the 1,613 National Priorities List (NPL) sites identified by the Environmental Protection Agency (EPA).

What are DDT, DDE, and DDD?

DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT is a white, crystalline solid with no odor or taste. Its use in the U.S. was banned in 1972 because of damage to wildlife, but is still used in some countries.

DDE (dichlorodiphenyldichloroethylene) and DDD (dichlorodiphenyldichloroethane) are chemicals similar to DDT that contaminate commercial DDT preparations. DDE has no commercial use. DDD was also used to kill pests, but its use has also been banned. One form of DDD has been used medically to treat cancer of the adrenal gland.

What happens to DDT, DDE, and DDD when they enter the environment?

- DDT entered the environment when it was used as a pesticide; it still enters the environment due to current use in other countries.
- DDE enters the environment as contaminant or breakdown product of DDT; DDD also enters the environment as a breakdown product of DDT.
- DDT, DDE, and DDD in air are rapidly broken down by sunlight. Half of what's in air breaks down within 2 days.
- They stick strongly to soil; most DDT in soil is broken down slowly to DDE and DDD by microorganisms; half the DDT in soil will break down in 2–15 years, depending on the type of soil.
- Only a small amount will go through the soil into groundwater; they do not dissolve easily in water.
- DDT, and especially DDE, build up in plants and in fatty tissues of fish, birds, and other animals.

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

- Eating contaminated foods, such as root and leafy vegetables, fatty meat, fish, and poultry, but levels are very low.
- Eating contaminated imported foods from countries that still allow the use of DDT to control pests.
- Breathing contaminated air or drinking contaminated water near waste sites and landfills that may contain higher levels of these chemicals.
- Infants fed on breast milk from mothers who have been exposed.
- Breathing or swallowing soil particles near waste sites or landfills that contain these chemicals.

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

DDT affects the nervous system. People who accidentally swallowed large amounts of DDT became excitable and had tremors and seizures. These effects went away after the exposure stopped. No effects were seen in people who took small daily doses of DDT by capsule for 18 months. A study in humans showed that women who had high amounts of a form of DDE in their breast milk were unable to breast feed their babies for as long as women who had little DDE in the breast milk. Another study in humans showed that women who had high amounts of DDE in the blood had an increased chance of having premature babies. In animals, short-term exposure to large amounts of DDT in food affected the nervous system, while long-term exposure to smaller amounts affected the liver. Also in animals, short-term oral exposure to small amounts of DDT or its breakdown products may also have harmful effects on reproduction.

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences

ATSDR

CS249955-O

DDT, DDE, and DDD - ToxFAQs™

CAS # 50-29-3, 72-55-9, 72-54-8

How likely are DDT, DDE, and DDD to cause cancer?

Studies in DDT-exposed workers did not show increases in cancer. Studies in animals given DDT with the food have shown that DDT can cause liver cancer.

The Department of Health and Human Services (DHHS) determined that DDT may reasonable be anticipated to be a human carcinogen.

The International Agency for Research on Cancer (IARC) determined that DDT may possibly cause cancer in humans. The EPA determined that DDT, DDE, and DDD are probable human carcinogens.

How can DDT, DDE, and DDD affect children?

There are no studies on the health effects of children exposed to DDT, DDE, or DDD. We can assume that children exposed to large amounts of DDT will have health effects similar to the effects seen in adults. However, we do not know whether children differ from adults in their susceptibility to these substances.

There is no evidence that DDT, DDE, or DDD cause birth defects in people. A study showed that teenage boys whose mothers had higher DDE amounts in the blood when they were pregnant were taller than those whose mothers had lower DDE levels. However, a different study found the opposite in preteen girls. The reason for the discrepancy between these studies is unknown.

Studies in rats have shown that DDT and DDE can mimic the action of natural hormones and in this way affect the development of the reproductive and nervous systems. Puberty was delayed in male rats given high amounts of DDE as juveniles. This could possibly happen in humans.

A study in mice showed that exposure to DDT during the first weeks of life may cause neurobehavioral problems later in life.

How can families reduce the risk of exposure to DDT,DDE, and DDE?

- Most families will be exposed to DDT by eating food or drinking liquids contaminated with small amounts of DDT.
- Cooking will reduce the amount of DDT in fish.
- Washing fruit and vegetables will remove most DDT from their surface.
- Follow health advisories that tell you about consumption of fish and wildlife caught in contaminated areas.

Is there a medical test to show whether I've been exposed to DDT, DDE, and DDD?

Laboratory tests can detect DDT, DDE, and DDD in fat, blood, urine, semen, and breast milk. These tests may show low, moderate, or excessive exposure to these compounds, but cannot tell the exact amount you were exposed to, or whether you will experience adverse effects. These tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) sets a limit of 1 milligram of DDT per cubic meter of air (1 mg/m^3) in the workplace for an 8-hour shift, 40-hour workweek.

The Food and Drug Administration (FDA) has set limits for DDT, DDE, and DDD in foodstuff at or above which the agency will take legal action to remove the products from the market.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for DDT/DDE/DDD (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30333.

Phone: 1-800-232-4636

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

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ALDRIN and DIELDRIN

CAS # 309-00-2 and 60-57-1

Division of Toxicology ToxFAQs™ **September 2002**

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

HIGHLIGHTS: Exposure to aldrin and dieldrin happens mostly from eating contaminated foods, such as root crops, fish, or seafood. Aldrin and dieldrin build up in the body after years of exposure and can affect the nervous system. Aldrin has been found in at least 207 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA). Dieldrin has been found in at least 287 of the 1,613 sites.

What are aldrin and dieldrin?

Aldrin and dieldrin are insecticides with similar chemical structures. They are discussed together in this fact sheet because aldrin quickly breaks down to dieldrin in the body and in the environment. Pure aldrin and dieldrin are white powders with a mild chemical odor. The less pure commercial powders have a tan color. Neither substance occurs naturally in the environment.

From the 1950s until 1970, aldrin and dieldrin were widely used pesticides for crops like corn and cotton. Because of concerns about damage to the environment and potentially to human health, EPA banned all uses of aldrin and dieldrin in 1974, except to control termites. In 1987, EPA banned all uses.

What happens to aldrin and dieldrin when they enter the environment?

❑ Sunlight and bacteria change aldrin to dieldrin so that we mostly find dieldrin in the environment.
❑ They bind tightly to soil and slowly evaporate to the air.
❑ Dieldrin in soil and water breaks down very slowly.
❑ Plants take in and store aldrin and dieldrin from the soil.
❑ Aldrin rapidly changes to dieldrin in plants and animals.
❑ Dieldrin is stored in the fat and leaves the body very slowly.

How might I be exposed to aldrin or dieldrin?

❑ Dieldrin is everywhere in the environment, but at very low levels.
❑ Eating food like fish or shellfish from lakes or streams contaminated with either chemical, or contaminated root crops, dairy products, or meats.
❑ Air, surface water, or soil near waste sites may contain higher levels.
❑ Living in homes that were once treated with aldrin or dieldrin to control termites.

How can aldrin and dieldrin affect my health?

People who have intentionally or accidentally ingested large amounts of aldrin or dieldrin have suffered convulsions and some died. Health effects may also occur after a longer period of exposure to smaller amounts because these chemicals build up in the body.

Some workers exposed to moderate levels in the air for a long time had headaches, dizziness, irritability, vomiting, and uncontrolled muscle movements. Workers removed from the source of exposure rapidly recovered from most of these effects.

Animals exposed to high amounts of aldrin or dieldrin also had nervous system effects. In animals, oral exposure to lower levels for a long period also affected the liver and decreased their ability to fight infections. We do not know whether aldrin or dieldrin affect the ability of people to fight disease.

Studies in animals have given conflicting results about whether aldrin and dieldrin affect reproduction in male animals and whether these chemicals may damage the sperm.

ALDRIN and DIELDRIN

CAS # 309-00-2 and 60-57-1

We do not know whether aldrin or dieldrin affect reproduction in humans.

How likely are aldrin and dieldrin to cause cancer?

There is no conclusive evidence that aldrin or dieldrin cause cancer in humans. Aldrin and dieldrin have been shown to cause liver cancer in mice. The International Agency for Research on Cancer (IARC) has determined that aldrin and dieldrin are not classifiable as to human carcinogenicity. The EPA has determined that aldrin and dieldrin are probable human carcinogens.

How can aldrin and dieldrin affect children?

Children can be exposed to aldrin and dieldrin in the same way as adults. There are no known unique exposure pathways for children. Children who swallowed amounts of aldrin or dieldrin much larger than those found in the environment suffered convulsions and some died, as occurred in adults. However, we do not know whether children are more susceptible than adults to the effects of aldrin or dieldrin.

We do not know whether aldrin or dieldrin cause birth defects in humans. Pregnant animals that ingested aldrin or dieldrin had some babies with low birth weight and some with alterations in the skeleton. Dieldrin has been found in human breast milk, therefore, it can be passed to suckling infants.

How can families reduce the risk of exposure to aldrin and dieldrin?

❑ Since aldrin and dieldrin are no longer produced or used, exposure to these compounds will occur only from past usage.

❑ Because aldrin and dieldrin were applied to the basement of some homes for termite protection, before buying a home families should investigate what, if any, pesticides have been used within the home.

Is there a medical test to show whether I've been exposed to aldrin and dieldrin?

There are laboratory tests that can measure aldrin and dieldrin in your blood, urine, and body tissues. Because aldrin changes to dieldrin fairly quickly in the body, the test has to be done shortly after you are exposed to aldrin. Since dieldrin can stay in the body for months, measurements of dieldrin can be made much longer after exposure to either aldrin or dieldrin. The tests cannot tell you whether harmful health effects will occur. These tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The EPA limits the amount of aldrin and dieldrin that may be present in drinking water to 0.001 and 0.002 milligrams per liter (mg/L) of water, respectively, for protection against health effects other than cancer. The EPA has determined that a concentration of aldrin and dieldrin of 0.0002 mg/L in drinking water limits the lifetime risk of developing cancer from exposure to each compound to 1 in 10,000.

The Occupational Safety and Health Administration (OSHA) sets a maximum average of 0.25 milligrams of aldrin and dieldrin per cubic meter of air (0.25 mg/m^3) in the workplace during an 8-hour shift, 40 hour week. The National Institute for Occupational Safety and Health (NIOSH) also recommends a limit of 0.25 mg/m^3 for both compounds for up to a 10-hour work day, 40-hour week.

The Food and Drug Administration (FDA) regulates the residues of aldrin and dieldrin in raw foods. The allowable range is from 0 to 0.1 ppm, depending on the type of food product.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Aldrin/Dieldrin (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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

ATTACHMENT B

WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION

WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION

The following section is based upon information provided by the CDC Division of Vector-Borne Infectious Diseases. Symptoms of West Nile Virus include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands, with most infections being mild. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death. Most infections of St. Louis encephalitis are mild without apparent symptoms other than fever with headache. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions (especially infants) and spastic (but rarely flaccid) paralysis. The only way to avoid infection of West Nile Virus and St. Louis encephalitis is to avoid mosquito bites. To reduce the chance of mosquito contact:

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing permethrin or DEET (N, N-diethyl-meta-toluamide), since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET. DEET in high concentrations (greater than 35%) provides no additional protection.
- Repellents may irritate the eyes and mouth.
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's directions for use, as printed on the product.

ATTACHMENT C

REPORT FORMS

WEEKLY SAFETY REPORT FORM

Week Ending: _____ Project Name/Number: _____

Report Date: _____ Project Manager Name: _____

Summary of any violations of procedures occurring that week:

_____

_____

_____

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

_____

_____

_____

_____

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

_____

_____

_____

Comments:

_____

_____

_____

Name: _____ Company: _____

Signature: _____ Title: _____

INCIDENT REPORT FORM

Date of Report: _____

Injured: _____

Employer: _____

Site: _____ Site Location: _____

Report Prepared By: _____ _____
Signature Title

ACCIDENT/INCIDENT CATEGORY (check all that applies)

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

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

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

WITNESS TO ACCIDENT/INCIDENT:

Name:	_____	Company:	_____
Address:	_____	Address:	_____
Phone No.:	_____	Phone No.:	_____
Name:	_____	Company:	_____
Address:	_____	Address:	_____
Phone No.:	_____	Phone No.:	_____

INJURED - ILL:

Name: _____ SSN: _____

Address: _____ Age: _____

Length of Service: _____ Time on Present Job: _____

Time/Classification: _____

SEVERITY OF INJURY OR ILLNESS:

____ Disabling ___ Non-disabling ___ Fatality

____ Medical Treatment ___ First Aid Only

ESTIMATED NUMBER OF DAYS AWAY FROM JOB: _____

NATURE OF INJURY OR ILLNESS: _____

_____

_____

_____

CLASSIFICATION OF INJURY:

__ Abrasions _____ Dislocations ____ Punctures

__ Bites _____ Faint/Dizziness ____ Radiation Burns

__ Blisters _____ Fractures ____ Respiratory Allergy

__ Bruises _____ Frostbite ____ Sprains

__ Chemical Burns _____ Heat Burns ____ Toxic Resp. Exposure

__ Cold Exposure _____ Heat Exhaustion ____ Toxic Ingestion

__ Concussion _____ Heat Stroke ____ Dermal Allergy

__ Lacerations

Part of Body Affected: _____

Degree of Disability: _____

Date Medical Care was Received: _____

Where Medical Care was Received: _____

Address (if off-site): _____

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

PROPERTY DAMAGE:

Description of Damage: _____

_____

Cost of Damage: $ _____

ACCIDENT/INCIDENT LOCATION: _____

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

_____

_____

_____

_____

Was weather a factor?:_____

_____

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

_____

_____

_____

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

_____

_____

ON-SITE ACCIDENTS/INCIDENTS:

Level of personal protection equipment required in Site Safety Plan:

_____

_____

Modifications:

_____

Was injured using required equipment?:

_____

_____

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

_____

_____

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

_____

_____

_____

_____

_____

ACCIDENT/INCIDENT REPORT REVIEWED BY:

_____ _____

SSO Name Printed SSO Signature

OTHERS PARTICIPATING IN INVESTIGATION:

_____ _____

Signature Title

_____ _____

Signature Title

_____ _____

Signature Title

ACCIDENT/INCIDENT FOLLOW-UP: Date: _____

Outcome of accident/incident: _____

_____

_____

_____

Physician's recommendations: _____

_____

_____

_____

Date injured returned to work: _____

Follow-up performed by:

_____ _____

Signature Title

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT D

EMERGENCY HAND SIGNALS

EMERGENCY SIGNALS

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

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

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATH!

Hand gripping throat

LEAVE AREA IMMEDIATELY, NO DEBATE!

(No Picture) Grip partner's wrist or place both hands around waist

NEED ASSISTANCE!

Hands on top of head

OKAY! – I'M ALL RIGHT!

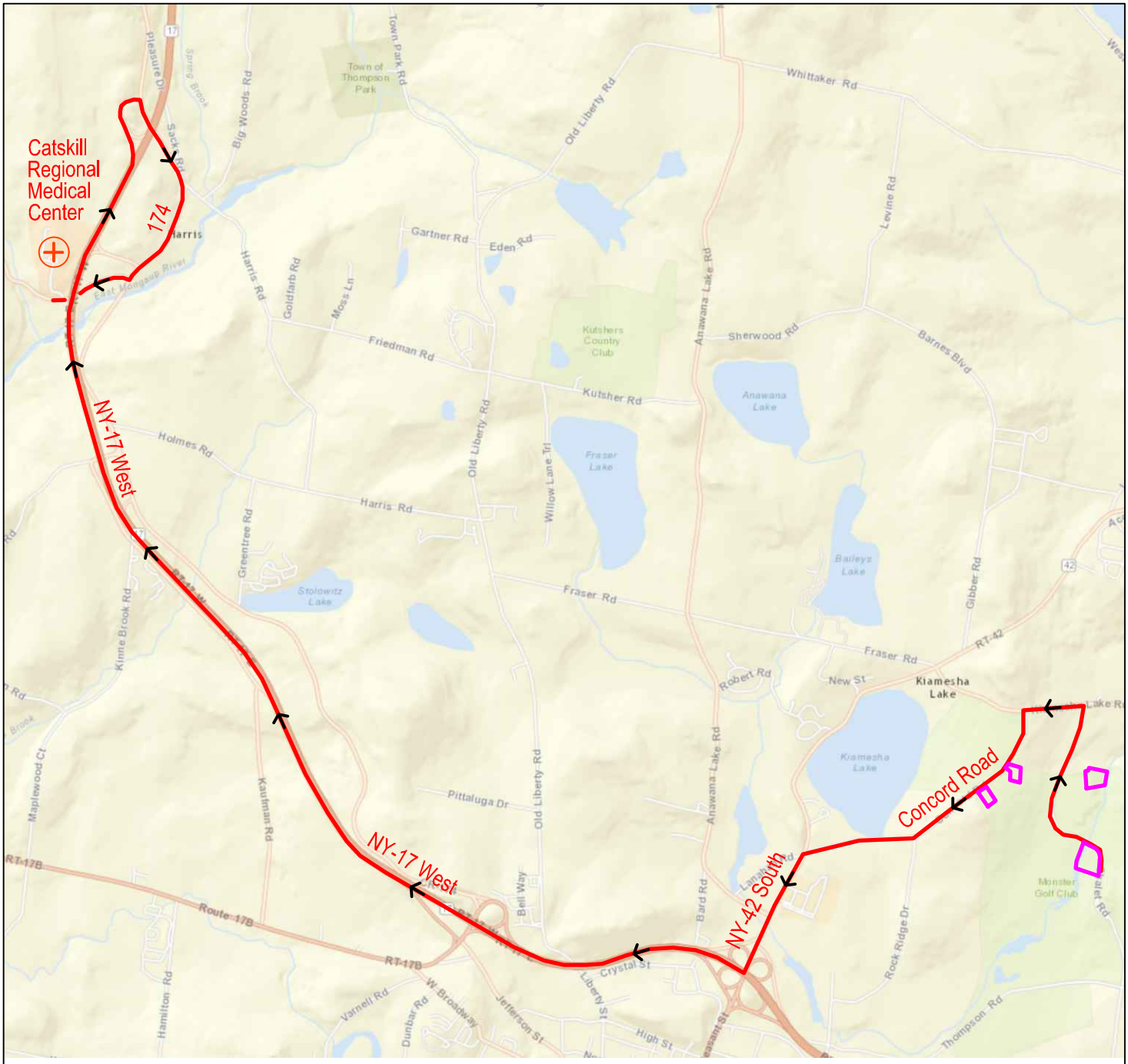
- I UNDERSTAND!

Thumbs up

NO! - NEGATIVE!

Thumbs down

FIGURES



Sources: Esri, HERE, DeLorme, USGS, Intermap P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community.

0' 1750 3500 7000

SCALE IN FEET

LEGEND

HOSPITAL LOCATION

PROJECT SITE LOCATION

AKRF

440 Park Avenue South, New York, NY 10016

Adelaar Site

Town of Thompson, New York

HOSPITAL ROUTE MAP

DATE
11/7/2017

PROJECT NO.
40376

FIGURE
1

APPENDIX E

QUALITY ASSURANCE PROJECT PLAN (QAPP)

Adelaar

CONCORD ROAD

THOMPSON, SULLIVAN COUNTY, NEW YORK

Quality Assurance Project Plan

AKRF Project Number: 40376

NYSDEC Brownfield Cleanup Program Site Number: C353008

Prepared for:

EPR Concord II, L.P.
909 Walnut Street, Suite 200
Kansas City, MO 64106

Prepared by:

AKRF, Inc.
34 South Broadway, Suite 401
White Plains, New York 10601
914-949-7336

DECEMBER 2017

TABLE OF CONTENTS

TABLES

ATTACHMENTS

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) describes the protocols and procedures that will be followed during implementation of the Site Management Plan (SMP) at the Adelaar Site (the "Site" or the "Property"), located in the Town of Thompson, Sullivan County, New York.

The objective of the QAPP is to provide for Quality Assurance (QA) and maintain Quality Control (QC) of environmental investigative, sampling, and remedial activities conducted during site remediation and excavation. Adherence to the QAPP will ensure that defensible data will be obtained while completing the remedial work.

2.0 PROJECT TEAM

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

2.1 PROJECT DIRECTOR

The project director will be responsible for the general oversight of all aspects of the project, including scheduling, budgeting, data management, and decision-making regarding the field program. The project director will communicate regularly with all members of the AKRF project team and the New York State Department of Environmental Conservation (NYSDEC) to ensure a smooth flow of information between involved parties. Marc Godick will serve as the project director for site management. Mr. Godick's resume is included in Attachment A.

2.2 PROJECT MANAGER

The project manager will be responsible for directing and coordinating all elements of the Site Management Plan (SMP). He will prepare reports and participate in meetings with the site owner and/or the NYSDEC. Bryan Zieroff will serve as the project manager for the SMP. Mr. Zieroff's resume is included in Attachment A.

2.3 REMEDIAL ENGINEER

The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program. The Remedial Engineer will certify in the Final Engineering Report (FER) that the remedial activities were observed by qualified environmental professionals under her supervision and that the site management requirements set forth in the SMP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. The Remedial Engineer for this project will be Michelle Lapin, P.E. Ms. Lapin's resume is included in Attachment A.

2.4 FIELD TEAM LEADER

The field team leader will be responsible for supervising the daily sampling and health and safety activities in the field and will ensure adherence to the work plan and HASP. He will report to the Project Manager on a regular basis regarding daily progress and any deviations from the work plan. The field team leader will be a qualified, responsible person, able to act professionally and promptly during soil disturbing activities. Stephen Schmid will be the field team leader for site management. Mr. Schmid's resume is included in Attachment A.

2.5 PROJECT QUALITY ASSURANCE/QUALITY CONTROL OFFICER

The Quality Assurance/Quality Control (QA/QC) Officer will be responsible for adherence to the QAPP. He will review the procedures with all personnel prior to commencing any fieldwork and will assess implementation of the required procedures. Marc Godick will serve as the QA/QC officer for the SMP.

2.6 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL OFFICER

The laboratory QA/QC officer will be responsible for quality control procedures and checks in the laboratory and ensuring adherence to laboratory protocols. He/she will track the movement of samples from the time they are checked in at the laboratory to the time that analytical results are issued. He/she will conduct a final check on the analytical calculations and sign off on the laboratory reports. The laboratory QA/QC officer will be determined upon selection of a contract laboratory(s) for the SMP.

3.0 STANDARD OPERATING PROCEDURES

The following sections describe the standard operating procedures (SOPs) for the monitoring activities included in the SMP. During these operations, safety monitoring will be performed as described in the Site specific Health and Safety Plan (HASP) and all field personnel will wear appropriate personal protective equipment. SMP implementation will include quarterly groundwater monitoring and sampling, and provisions and appropriate actions to be taken in the event that future renovation or redevelopment of the Site requires intrusive work including excavation/removal of underlying soil. The SMP also includes sampling provisions for on-site soil reuse and the import of off-site soil onto the Site.

3.1 WATER TABLE READINGS

Water table readings will be taken in the groundwater monitoring wells using an oil/water interface probe. The gate boxes will be unlocked and opened at each well location. The oil/water interface probe will be turned on and sound tested. The probe of the meter will be inserted into the PVC casing. The probe will be lowered down the casing until the meter alarm indicates the probe is at the water table. A reading of the depth from the top of the top of the PVC casing to the groundwater table will be recorded in the field notebook.

3.2 MONITORING WELL SAMPLING

Groundwater samples are collected on a quarterly basis for a minimum of two years after the Certificate of Completion (COC) as part of the groundwater monitoring program. Low flow sampling techniques will be used, as described in U.S. EPA's Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers [EPA 542-S-02-001, May 2002]. Sampling will be conducted according to the following procedure:

- Prepare the sampling area by placing plastic sheeting over the well. Cut a hole in the sheeting to provide access to the well cover.
- Slowly remove the locking cap and immediately measure the vapor concentrations in the well with a photoionization detector (PID) calibrated to the manufacturer's specifications.
- Measure the depth to water and total well depth, and check for the presence of non-aqueous phase liquid (NAPL) using an oil/water interface probe. Measure the thickness of NAPL, if any, and record in field book and well log. Collect a sample of NAPL using a disposable plastic weighted bailer or similar collection device. Groundwater samples will not be collected from wells containing measurable NAPL.

- Use the water level and total well depth measurements to calculate the length of the mid-point of the water column within the screened interval. For example, for a well where the total depth is 15 feet, screened interval is 5 to 15 feet, and depth to water is 7 feet, the mid-point of the water column within the screened interval would be 11 feet.
- Connect dedicated tubing to either a submersible or bladder pump and lower the pump such that the intake of the pump is set at the mid-point of the water column within the screened interval of the well. Connect the discharge end of the tubing to the flow-through cell of a Horiba multi-parameter (or equivalent) meter. Connect tubing to the output of the cell and place the discharge end of the tubing in a five-gallon bucket.
- Activate the pump at the lowest flow rate setting of the pump.
- Measure the depth to water within the well. The pump flow rate may be increased such that the water level measurements do not change by more than 0.3 feet as compared to the initial static reading. The well-purging rate should be adjusted so as to produce a smooth, constant (laminar) flow rate and so as not to produce excessive turbulence in the well. The expected targeted purge rate will be approximately 0.5 liters and will be no greater than 3.8 liters/minute.
- Transfer discharged water from the 5-gallon buckets to 55-gallon drums designated for well-purge water.
- During purging, collect periodic samples and analyze for water quality indicators (e.g., turbidity, pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity) with measurements collected approximately every five minutes.
- Continue purging the well until turbidity is less than 50 NTU and water quality indicators have stabilized to the extent practicable. The criteria for stabilization will be three successive readings for the following parameters and criteria:

Table 1
Stabilization Criteria

Parameter	Stabilization Criteria
PH	+/- 0.1 pH units
Specific Conductance	+/- 3% mS/cm
ORP/Eh	+/- 10mV
Turbidity	<50 NTU
Dissolved Oxygen	+/- 0.3 mg/l

Notes: mS/cm = millisievert per centimeter
mV = millivolts
NTU = nephthalometric turbidity units
mg/l = milligrams per liter

- If the water quality parameters do not stabilize and/or turbidity is greater than 50 NTU within two hours, purging may be discontinued. Efforts to stabilize the water quality for the well must be recorded in the field book, and samples may then be collected as described herein.
- After purging, disconnect the tubing to the inlet of the flow-through cell. Collect groundwater samples directly from the discharge end of the tubing and place into the required sample containers as described in Section 4.1 of this QAPP. Label the containers as

described in Section 4.3.1 of this QAPP and place in a chilled cooler. Samples should be collected for volatile organic compounds (VOCs).

- Collect one final field sample and analyze for turbidity and water quality parameters (pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity).
- Once sampling is complete, remove the pump and tubing from the well. Disconnect the tubing and place it back in the well for reuse during the next sampling event. Dispose of the sample filter in a 55-gallon drum designated for disposable sampling materials and PPE. The purge water will be managed as described in Section 3.5 of this QAPP.
- Decontaminate the pump, oil/water interface probe, and flow-through cell, as described in Section 3.4 of this QAPP.
- Record all measurements (depth to water, depth to NAPL, water quality parameters, turbidity), calculations (well volume), and observations in the project logbook and field data sheet, if applicable.

3.3 EXCAVATION AND REMOVAL OF SOIL/FILL

Any planned disturbance at OU-2 and OU-3 will comprise the following activities:

1. The location of groundwater monitor wells and engineering controls (ECs).
2. Excavated fill material will be removed using an excavator or hand tools. Fill material excavated that exhibits no evidence of contamination may be characterized for potential reuse as backfill material on-site or handled and disposed of as non-hazardous waste. All soil will be handled in accordance with the Excavation Work Plan (EWP) included as Appendix B of the SMP.
3. All excavated material requiring staging for overnight or longer will follow the procedures in Section 3.3.2.

3.3.1 Soil Screening

During any excavation work below the site cap, the excavated material will be inspected by qualified field personnel for evidence of contamination (i.e., separate phase liquid, staining, sheening and/or odors) and field-screened using a photoionization detector (PID) calibrated at the start of each day in accordance with the manufacturer's instructions.

3.3.2 Stockpiling/Staging Area

Prior to excavation and removal of contaminated material, the stockpiling/staging area will be selected and prepared prior to the commencement of excavation activities to protect building occupants. Staging area(s) will be prepared for staging any contaminated material overnight or longer using the procedures described below:

The material staging area(s) will be prepared by placing 6-mil plastic on the ground and covered with additional 6-mil plastic sheeting. Sealable containers with tight-fitting covers may also be utilized for the staging of VOC-contaminated material overnight or longer, to prevent the migration of VOCs into any Site building.

3.3.3 Backfill/Reuse Sampling

In addition to any proposed soil excavation, prior to reuse as backfill, the excavated soil will be evaluated using the following criteria:

1. Concrete or demolition debris that does not exhibit signs of contamination will be sampled for asbestos prior to reuse on-site.
2. Material proposed for reuse will be sampled at a frequency and for the required parameters as outlined in NYSDEC's DER-10, Table 5.4.
3. Samples will be collected into laboratory-supplied containers.
4. Samples will be kept in an ice-filled cooler or refrigerator until receipt by the laboratory.
5. Decontaminate all sampling equipment between sampling locations as described in Sections 3.4 of this QAPP.

3.3.4 Excavation Backfill Import

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated properties will not be imported to the Site. All imported soil will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Approval will also be based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria. Soil will be considered appropriate for use as on-site imported backfill if contaminant concentrations are below the lesser of the 6 NYCRR Part 375 Restricted Residential and Groundwater Protection SCOs. Soil that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.

Native material from a virgin quarry source will not be sampled prior to use as backfill on the Site. Non-DOT designated virgin quarry sources, or non-virgin imported material that does not have an approved NYSDEC Beneficial Use Determination will be tested at the originating facility in accordance with Section 5.4(e) 10 of NYSDEC DER 10, included in Section C-10 of the EWP.

3.3.5 Materials Reuse On-Site

Contaminated soil, or any material in direct contact with the contaminated soil, may not be separated for reuse on-site and will be disposed of as described in Section C-6 of the EWP. Organic matter (wood, roots, stumps, etc.) or other solid is prohibited for reuse on-site. All demolished material from the existing vacant buildings, including the concrete slabs, and the existing asphalt, will be disposed of in accordance with all prevailing Federal, State, and local regulations. Soil that does not exhibit evidence of contamination during field screening, as described in Section 3.3.1 and is free of debris will be stockpiled and tested at a frequency of one sample per 500 cubic yards and characterized for reuse.

Each sample will be tested for laboratory parameters listed in Section 4.1. Samples will be shipped to the laboratory with appropriate chain of custody documentation. The samples will be analyzed in a laboratory following New York State Department of Health (NYSDOH) Analytical Services Protocol (ASP) Category B deliverables. Soil from representative samples that meet the SSSCOs can be reused on-site as backfill.

3.3.6 Contingency Endpoint Soil Sampling

In the event contamination is observed and removed from the Site, post-excavation endpoint samples will be collected from each excavation for closure purposes. One sample will be collected from each sidewall and the bottom of the excavation. The sidewall samples will be collected from just above the bottom of the excavation. Each sample will be tested for laboratory parameters listed in Section 4.1.

3.4 DECONTAMINATION OF SAMPLING EQUIPMENT

All non-disposable sampling equipment (hand augers, sampling spoons, etc.) will be either dedicated or decontaminated between sampling locations. The decontamination procedure will be as follows:

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

Decontamination will be conducted within five-gallon buckets to capture decontamination water. Decontamination waste will be handled as described in Section 3.5.

3.5 MANAGEMENT OF INVESTIGATION DERIVED WASTE

All excavated soil will be stockpiled and disposed of in accordance with the SMP. When field evidence of gross contamination is identified, decontamination wastewater will be drummed and staged near the point of generation, and will be properly disposed of based on laboratory results. If free of visible contamination, disposable personal protective equipment (PPE) and sampling equipment (scoops, gloves, rope, etc.) will be placed in heavy-duty plastic bags and disposed of properly.

3.6 COVER SYSTEM

The details of the soil cover system that overlies the landfill area within OU-2 are described in the SMP. Monitoring will consist of visual inspection of the cover system, which includes a vegetated top layer to minimize erosion, to evaluate the structural integrity and confirm that the Remedial Action Objectives (RAOs) are being maintained. The inspection will be conducted by traversing the cover area on foot in a grid pattern with approximately 15 foot centers. Results of the inspection will be recorded into the Site Cover System Inspection Form that is included in Appendix F of the SMP.

4.0 LABORATORY PROCEDURES

4.1 LABORATORY METHODS

Table 2 summarizes the laboratory methods that will be used to analyze field samples for soil reuse (Section 3.3.5), soil endpoint sampling (Section 3.3.6), and groundwater sampling at each

OU, as well as the sample container type, preservation, and applicable holding times. An ELAP Certified laboratory will be used for all chemical analyses in accordance with DER-10 2.1(b) and 2.1(f), including Category B Deliverables.

Table 2
Laboratory Analytical Methods for Analysis Groups

Matrix	Analysis	EPA Method	Bottle Type	Preservative	Hold Time
	OU-2				
Soil	TCL VOCs	8260	Encore sampler (3) or Terracore Sampler (1)	≤ 6 °C 0°C within 24 hrs	48 hours to extract 14 days to analyze
	TCL SVOCs	8270	Glass 8 oz. Jar	≤ 6 °C	14 days to extract 40 days to analyze
	TAL Metals	6000/7000	Glass 8 oz. Jar	≤ 6 °C	6 months (28 days for Hg)
	Pesticides	8081	Glass 8 oz. Jar	≤ 6 °C	14 days to extract 40 days to analyze
	PCBs	8082	Glass 8 oz. Jar	≤ 6 °C	14 days to extract 40 days to analyze
	OU-3				
	TAL Metals	6000/7000	Glass 8 oz. Jar	≤ 6 °C	6 months (28 days for Hg)
Groundwater	OU-2				
	TCL VOCs	8260	40 mL vial (3), septa top	≤ 6 °C, HCL	14 days
	TCL SVOCs	8270	2,000 mL Amber Jar	≤ 6 °C	7 days to extract; 40 days to analyze
	TAL Metals	6000/7000	Plastic 500 mL Bottle	≤ 6 °C, HNO_3	180 days
	Pesticides	8081	1 liter amber glass	≤ 6 °C	7days
	PCBs	8082	1 liter amber glass	≤ 6 °C	7days
	OU-3				
	TAL Metals	6000/7000	Plastic 500 mL Bottle	≤ 6 °C, HNO_3	180 days

4.2 QUALITY CONTROL SAMPLING

In addition to the laboratory analysis of the investigative soil samples and characterization soil samples for reuse and off-site disposal, additional analysis will be included for quality control measures, as required by the Category B sampling techniques. These samples will include field blanks, trip blanks, matrix spike/matrix spike duplicates (MS/MSD), and duplicate/blind duplicate samples at a frequency of one sample per 20 field samples collected. Table 3 provides a summary of the field samples and QA/QC samples to be analyzed by the laboratory.

TABLE 3
Field Sample and QC Sample Quantities

Sample Type	Parameters	EPA Method	Field Samples	QC Samples			
				Field Blank	Trip Blank	MS/MSD	Duplicate
Soil and Groundwater	VOCs	EPA 8260	20	1	1	1	1
	TCL SVOCs	EPA 8270	20	--	--	1	1
	TAL Metals	EPA 6000/7000	20	--	--	1	1
	Pesticides	EPA 8081	20	--	--	1	1
	PCBs	EPA 8082	20	--	--	1	1

Note:
MS/MSD - matrix spike/matrix spike duplicate

4.3 SAMPLE HANDLING

4.3.1 Sample Identification

All samples will be consistently identified in all field documentation, chain-of-custody documents and laboratory reports using an alpha-numeric code. Each sample will include the operating unit (OU-2 or OU-3) from which the sample is being collected. Soil and groundwater samples will be identified by the location, collection interval number, followed by the sample depth interval (in parenthesis).

Characterization samples collected from soil stockpiles will be designated with the OU, "ST", and by the designated stockpile number. Characterization samples collected from an off-site source designated for import will be designated "Import" and the stockpile number.

The field duplicate sample will be labeled with a dummy sample location to ensure that it is submitted as blind samples to the laboratory. The dummy identification will consist of the sample type followed by a letter. For duplicate soil boring samples, the sample depth will be the actual sample depth interval. Trip blanks and field blanks will be identified with "TB" and "FB", respectively.

Table 4 provides examples of the sampling identification scheme:

Table 4
Examples of Sample Names

Sample Description	Sample Designation
Characterization soil sample from soil stockpile #3 in OU-3	OU-3/ST-3
Characterization soil sample from stockpile #2 from an off-site source.	Import/ST-2
Endpoint soil sample collected from a sidewall at a depth of 3 to 5 feet below grade in an excavation in OU-2	OU-2/SW1(3-5)
Matrix spike soil sample from a sidewall of the contaminated soil excavation in OU-2	OU-2/SW2(1-2) MS
Duplicate soil characterization sample from soil stockpile #3 in OU-3	OU-3/ST-B
Groundwater sample collected from MW-1 at OU-2	OU-2/MW-1
Matrix spike duplicate sample collected from MW-14 in OU-3	OU-3/MW-14 MSD

4.3.2 Sample Labeling and Shipping

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

- Project identification
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Sampler's initials

Once the samples are collected and labeled, they will be placed in chilled coolers and stored in a cool area away from direct sunlight to await shipment to the laboratory. All samples will be shipped to the laboratory at least twice per week. At the start and end of each workday, field personnel will add ice to the coolers as needed.

The samples will be prepared for shipment by placing each sample in a sealable plastic bag, then wrapping each container in bubble wrap to prevent breakage, adding freezer packs and/or fresh ice in sealable plastic bags and the chain-of-custody (COC) form. Samples will be shipped overnight (e.g., Federal Express) or transported by a laboratory courier. All coolers shipped to the laboratory will be sealed with mailing tape and a COC seal to ensure that the coolers remain sealed during delivery.

4.3.3 Sample Custody

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

4.4 FIELD INSTRUMENTATION

Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the Site for referencing proper operation, maintenance and calibration procedures. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork, if applicable. If an instrument fails calibration, the project manager or QA/QC officer will be contacted immediately to obtain a replacement instrument. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be calibrated each day using 100 parts per million (ppm) isobutylene standard gas.

ATTACHMENT A

RESUMES OF PROJECT QA/QC OFFICER, PROJECT DIRECTOR, AND PROJECT MANAGER

MICHELLE LAPIN, P.E.

SENIOR VICE PRESIDENT

Michelle Lapin is a Senior Vice President with more than 25 years of experience in the assessment and remediation of hazardous waste issues. She leads the firm's Hazardous Materials group and offers extensive experience providing strategic planning and management for clients. Ms. Lapin has been responsible for the administration of technical solutions to contaminated soil, groundwater, air and geotechnical problems. Her other duties have included technical and report review, proposal writing, scheduling, budgeting, and acting as liaison between clients and regulatory agencies, and project coordination with federal, state, and local authorities.

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

BACKGROUND

Education

M.S., Civil Engineering, Syracuse University, 1985

B.S., Civil Engineering, Clarkson University, 1983

Professional Licenses/Certifications

New York State P.E.

State of Connecticut P.E.

Professional Memberships

Member, National Society of Professional Engineers (NSPE), National and CT Chapters

Member, American Society of Civil Engineers (ASCE), National and CT Chapters

Member, Connecticut Business & Industry Association (CBIA), CBIA Environmental Policies Council (EPC)

Board Member, New York City Brownfield Partnership

Years of Experience

Year started in company: 1994

Year started in industry: 1986

RELEVANT EXPERIENCE

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

Ms. Lapin is directing the firm's hazardous materials work for this mixed-use development in Manhattan. The Algin Management Company hired AKRF to prepare an environmental impact statement (EIS) for the proposed rezoning of the western portion of the block between West 60th and 61st Streets, between Amsterdam and West End Avenues. The purpose of the proposed action was to facilitate the development of two 30-story residential towers with accessory parking spaces, and landscaped open space. The EIS examined a "worst case" condition for rezoning the block, which allowed Algin to build a residential building of approximately 375,000 square feet at their site. The building now contains 475 apartments, 200 accessory parking spaces, a health club, and community facility space. This site, with the services of AKRF, entered into New York State's Brownfield Cleanup Program (BCP). On-site issues included underground storage tanks remaining from previous on-site buildings, petroleum contamination from these tanks and possibly from off-site sources, and other soil contaminants (metals, semi-volatile organic compounds, etc.) from fill materials and previous on-site buildings. AKRF oversaw the adherence to the Construction Health and Safety Plan (HASP), which was submitted to and approved by the New York State Department of Environmental Conservation (NYSDEC), and

monitored the waste streams, to ensure that the different types of waste were disposed of at the correct receiving facilities. This oversight also included confirmation and characteristic soil sampling for the receiving facilities and NYSDEC. A "Track 1" Clean up of the majority of the property (the portion including the buildings) was completed and the final Engineering Report was approved by the NYSDEC. AKRF has also completed a smaller portion of the property as a "Track 4" cleanup, which includes a tennis court and landscaped areas.

Hudson River Park, New York, NY

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

Fiterman Hall Deconstruction and Decontamination Project, New York, NY

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

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

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

Yonkers Waterfront Redevelopment Project, Yonkers, NY

For this redevelopment along Yonkers' Hudson River waterfront, Ms. Lapin headed the remedial investigation and remediation work that included Phase I assessments of 12 parcels, investigations of underground storage tank removals and

associated soil remediation, remedial alternatives reports, and remedial work plans for multiple parcels. Several of the city-owned parcels were remediated under a Voluntary Cleanup Agreement; others were administered with state Brownfields grants. Hazardous waste remediation was completed on both brownfield and voluntary clean-up parcels, which enabled construction of mixed-use retail, residential development, and parking.

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

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

Avalon on the Sound, New Rochelle, NY

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

East River Science Park, New York, NY

Originally, New York University School of Medicine (NYUSOM) retained the firm to prepare a full Environmental Impact Statement (EIS) for its proposed East River Science Park (ERSP). As originally contemplated, the proposed complex was to occupy a portion of the Bellevue Hospital campus between East 30th Street and approximately East 28th Street and would have included a clinical practice, research, and biotech facilities, housing units, a child care center, and a conference center and parking.

Ms. Lapin managed the Phase I Environmental Site Assessment and other hazardous materials-related issues. Events relating to September 11, 2001 delayed the project for several years. When it resurfaced with a new developer and a diminished scope, Ms. Lapin updated the hazardous materials issues and consulted with the new developer regarding remediation strategies and involvement of regulatory agencies. For the actual remediation/development, the city requested oversight by AKRF to represent its interests (the city is retaining ownership of the land). Ms. Lapin completed directing the remediation oversight on behalf of the City of New York for the remediation of this former psychiatric hospital building, laundry building and parking areas. The new 550,000 square-foot development includes a biotechnology center, street level retail, and an elevated plaza.

MARC S. GODICK, LEP

SR. VICE PRESIDENT

Marc S. Godick, a Senior Vice President of the firm, has over 20 years of experience in the environmental consulting industry. Mr. Godick will serve as Principal-in-Charge for this effort and has broad-based environmental experience includes expertise in brownfield redevelopment, site assessment, remedial investigation, design and implementation of remedial measures, compliance assessment, litigation support, and storage tank management.

Education

M.E., Engineering Science/Environmental Engineering, Pennsylvania State University, 1998

B.S., Chemical Engineering, Carnegie Mellon University, 1989

Licenses/Certifications

Licensed Environmental Professional (License # 396) – State of Connecticut – 2003 - Present

40 Hour HAZWOPER and Annual Refresher Training, 1990 - Present

Supervisors of Hazardous Waste Operations (8 Hour), 1990

Professional Memberships

Chairman, Village of Larchmont/Town of Mamaroneck Coastal Zone Management Commission, 1997 - Present

Chairman/Member, Westchester County Soil and Water Conservation District, 2005 - 2010

Board of Directors, Sheldrake Environmental Center, Larchmont, New York, 2006 - 2008

Member, NYSDEC Risk-Based Corrective Action (RBCA) Advisory Group for Petroleum-Impacted Sites, 1997

Community Leadership Alliance, Pace University School of Law, 2001

Years of Experience

Year started in company: 2002

Year started in industry: 1990

RELEVANT EXPERIENCE

Queens West Development Project, Avalon Bay Communities, Queens, NY

For over 20 years, AKRF has played a key role in advancing the Queens West development, which promises to transform an underused industrial waterfront property into one of largest and most vibrant mixed-use communities just across the East River from the United Nations. AKRF has prepared an **E**nvironmental Impact Statement (EIS) that examines issues pertaining to air quality, land use and community character, economic impacts, historic and archaeological resources, and infrastructure. Mr. Godick managed one of the largest remediation projects completed to date under the New York State Department of Environmental Conservation (NYSDEC) Brownfields Cleanup Program (BCP) that was contaminated by coal tar and petroleum. The remedy included the installation of a hydraulic barrier (sheet pile cut off wall), excavation of contaminated soil under a temporary structure to control odors during remediation, a vapor mitigation system below the buildings, and implementation of institution controls. The investigation, remediation design, and remedy implementation, and final sign-off (issuance of Certificate of Completion) were completed in two years. Total remediation costs were in excess of $13 million.

On-Call Environmental Consulting (Various Locations), New York City School Construction Authority

Mr. Godick is managing a $4 million, 2 year on-call contract with the SCA for environmental assessment, remedial design, and plumbing disinfection. For new school sites, initial due diligence involves conducting Phase I

environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school and remediation requirements and associated costs. Once design for a school is underway, AKRF would prepare remediation plans and construction specifications and oversee the construction activities. For existing school sites, the work can involve conducting Phase I ESAs and indoor air quality testing, preparation of specifications, supervision of storage tank removals, and investigation and remediation of spills. AKRF also oversees plumbing disinfection work, which is required prior to new plumbing being placed into service. The assignments involve reviewing and commenting on disinfection plans, supervision of the disinfection and confirmation testing, and preparation of a report documenting the work was conducted in accordance with the specifications and applicable requirements. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours.

Brownfield Opportunity Area (BOA) Grant Program Services for the Town of Babylon, Wyandanch, NY

AKRF was retained by the Town of Babylon to prepare a blight study, market study, NYS BOA Step 2 Nomination, an Urban Renewal Plan, and a Generic Environmental Impact Statement (GEIS) as part of a revitalization and redevelopment effort for downtown Wyandanch. Mr. Godick was responsible for overseeing the environmental data collection effort for the 226 brownfields identified in the 105-acre project area, and for identifying strategic sites for which site assessment funding should be sought. He also prepared the Hazardous Materials section of the Wyandanch Downtown Revitalization Plan (which incorporates the Nomination, Urban Renewal Plan, and GEIS), involving a summary of available environmental reports, a review of regulatory records, and limited street-level site inspections.

Alexander Street Urban Renewal Plan, Master Plan, Brownfield Opportunity Area Plan, Yonkers, NY

AKRF was retained by the City of Yonkers to prepare an Urban Renewal Plan, Master Plan, Brownfield Opportunity Area Plan, and **a** Generic Environmental Impact Statement (GEIS) for a 153 acre industrial area along Alexander Street on the Yonkers Waterfront. Mr. Godick is coordinating the preparation of BOA documents and was responsible for the Hazardous Materials sections of the GEIS and Urban Renewal Plan. Mr. Godick managed the environmental data collection effort for the entire study area which involved review and summary of existing environmental reports, a review of regulatory records, and field inspections. The collected information was used to prioritize individual parcels for funding and remediation. The Master Plan for the area calls for the development of a mixed-use neighborhood consisting of residential, neighborhood retail, and office space uses with substantial public open space, access to the Hudson River, and marina facilities.

Williamsburg Waterfront Redevelopment, RD Management/L&M Equities/Toll Brothers, Brooklyn, NY

The project is one of the largest development projects in the Greenpoint/Williamsburg Rezoning Area, which includes the construction of nearly 1 million square feet of residential and retail space along the Williamsburg waterfront. The site had a variety of industrial uses, including a railyard, junk yard, and waste transfer station. As part of the City's rezoning, the site was assigned an E-designation for hazardous materials. Mr. Godick managed the preparation of the Phase I and II environmental site assessments, remedial action plan (RAP), and construction health and safety plan (CHASP). Mr. Godick obtained NYSDEC closure of an open spill associated with former underground storage tanks at the site. The NYCDEP-approved RAP and CHASP included provisions for reuse of the existing fill material, with the excess being disposed off-site, installation of a vapor barrier below the new buildings, installation of a site cap, and environmental monitoring during the construction activities. Mr. Godick managed the environmental monitoring work. A Notice of Satisfaction has been issued by NYCDEP and NYCOER for the first two phases of the development.

West 37th Street Redevelopment, Rockrose, New York, NY

The project is a redevelopment in the Hudson Yards Rezoning Area, which includes the construction of a 250,000 square foot residential/retail building in Manhattan. The site had several motor vehicle service operations, which resulted in a petroleum release to the underlying soil, bedrock, and groundwater. As part of the City's rezoning,

the site was assigned an E-designation for hazardous materials. Mr. Godick managed the preparation of the Phase I and II environmental site assessments, remedial action plan (RAP), and construction health and safety plan (CHASP). Mr. Godick obtained approval for the RAP and CHASP by both the NYSDEC and NYCDEP. The RAP and CHASP included provisions for excavation of contaminated soil and bedrock, installation of waterproofing that will also serve as a vapor barrier for the new building, environmental monitoring during the construction activities, and post-development groundwater monitoring. Construction of the building was completed in 2009, and a Notice of Satisfaction was issued by NYCOER.

Underground Storage Tank Closure and Site Remediation–Program Management, Con Edison, New York, NY

Mr. Godick provided technical assistance to Con Edison in developing technical submittals and budgets associated with tank closures at over 50 facilities. Technical summaries were prepared for submittal of contractor-prepared closure reports to the NYSDEC. The summaries included a review of historic pre-closure assessments, tank closure data, and provided recommendations for additional assessment, remediation or closure. Subsequently, a three-year program budget was developed for implementation of the UST investigation/remedial program, which Con Edison utilized for internal budgeting purposes.

Site Investigation–Over 20 Facilities, Con Edison, New York, NY

Mr. Godick managed site investigations associated with petroleum, dielectric fluid, and PCB releases at over 20 Con Edison facilities including service centers, substations, generating stations, and underground transmission and distribution systems. Site investigations have included due diligence site reviews, soil boring installation, monitoring well installation, hydrogeologic testing, and water quality sampling. Risk-based closures were proposed for several sites.

Site Investigation–7 World Trade Center Substation, Con Edison, New York, NY

Mr. Godick managed the site investigation at the former 7 World Trade Center Substation in an effort to delineate and recover approximately 140,000 gallons of transformer and feeder oil following the collapse of the building. The project involved coordination with several crews, Con Edison, and other site personnel.

Landfill Closure & Compost Facility Application, White Plains, NY

Mr. Godick is currently managing the closure of a formal ash landfill, which is currently being utilized as a leaf and yard waste compost facility by the City of White Plains. The landfill closure required additional assessment to define the extent of methane and solvent contamination. The closure will involve remediation of a chlorinated solvent plume, placement of landfill cap, and methane recovery. Mr. Godick also managed the preparation of the compost facility permit application, which required modification to the facility's operations necessary to close the landfill and address other regulatory requirements.

Landfill Redevelopment – RD Management, Orangeburg, NY

Mr. Godick is managing the remediation of the former Orangeburg Pipe site under the Voluntary Cleanup Program. The site contains widespread fill material, which has fragments of Orangeburg pipe that is impregnated with asbestos and coal tar. The site is currently being redeveloped for retail use. The closure plan for the site provides for reuse of all fill material on-site. The fill management activities will include dust and sediment control measures and air monitoring to prevent airborne dust in accordance with a closure plan, stormwater pollution prevention plan (SWPPP), and construction health and safety plan (CHASP). In pervious areas, the site cap will consist of 2 feet of clean fill and a liner in larger areas. The site will be redeveloped for retail use.

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

Mr. Godick managed the remedial design and engineering work associated with remediation of National Grid's former manufactured gas plant (MGP) located in the Town of Huntington. The site is situated in a sensitive

location along the waterfront, surrounded by commercial and residential properties, and half the property where the remediation was conducted was a steep slope. The remedy consisted of soil removal, oxygen injection, and non-aqueous phase liquid recovery. Mr. Godick was responsible for the development of the remedial work plans, design/construction documents, landscape architecture, confirmatory sampling, air monitoring, supervision, and preparation of close-out documentation in accordance with NYSDEC requirements.

Site Investigation–Former Manufactured Gas Plant (MGP) Facilities, Con Edison, New York, NY

Mr. Godick managed site investigations at four former MGP facilities. The investigations at three of the four sites were completed at a Con Edison substation, flush pit facility, and service center, respectively. The details associated with the fourth site are confidential. Site characterizations at the substation and flush pit facility were conducted in preparation of expansion at these locations. The findings from these characterizations were used by Con Edison to make appropriate changes to the design specifications and to plan for appropriate handling of impacted materials and health and safety protocols during future construction activities.

Storage Tank Management, Citibank, N.A., New York, NY

Mr. Godick managed a storage tank replacement project for a facility located on Wall Street in New York City. The existing underground storage tank was closed in place and replaced with a field-constructed AST system within the building. The project required zero tolerance for service interruptions, disruptions to building operations, or disturbance to occupants of the office space neighboring the new tank location. Responsibilities included the management of design, preparation of specifications, contractor bidding, construction inspections, site assessment for closed-in-place UST, SPCC plan preparation, and responsibility for project budget and documentation.

Storage Tank Management, Verizon, Various Locations, NY, PA, DE, and MA

Mr. Godick managed the removal and replacement of underground and aboveground storage tank systems for Verizon in New York, Pennsylvania, Delaware, and Massachusetts. Responsibilities included the management of design, preparation of specifications, contractor bidding, construction oversight, project budget, and documentation. For selected AST sites, managed the development of Spill Control, Contingency and Countermeasures (SPCC) plans.

Multimedia Compliance and Remediation, Greenburgh Central School District No. 7, Hartsdale, NY

Mr. Godick implemented a multimedia program to address regulatory compliance and remediation at the transportation yard and other facilities. The compliance program included development of an environmental management system including periodic auditing, standard operating procedures, release reporting, and training. Designed and implemented engineering controls and monitoring to satisfy stormwater requirements. Remediation was conducted to address petroleum and solvent contamination from former underground storage tanks and dry wells, which included source removal and natural attenuation of groundwater. Provided support in connection with litigation from the adjoining property owner.

Litigation Support & Remediation, Former Service Station, Brooklyn, New York

Mr. Godick took over management of remediation of an inactive service station (formerly conducted by another firm). His approach outlined additional characterization and remediation efforts which resulted in successful closure of the spill by NYSDEC within two years. Mr. Godick testified as an expert witness at a hearing in the New York State Supreme Court of Kings County to determine the adequacy of the remediation efforts.

Litigation Support & Remediation, Residential Heating Oil Spill, Cranford, New Jersey

Mr. Godick took over management of remediation of a heating oil spill in the basement of a single family residence on behalf of the insurance company. Up until Mr. Godick taking over the remediation, several hundred thousand dollars had been spent on remediation with no resolution of the spill with the NJDEP and homeowners. His

approach outlined additional characterization and remediation efforts to expeditiously and cost-effectively resolve the spill.

Litigation Support, Cost Recovery Action, Town of Carmel, New York

Mr. Godick served as an expert witness representing the owner of a property in a landlord-tenant dispute, which was used as a gasoline station and oil change facility. Mr. Godick prepared exhibits, testified, and participated in meetings with NYSDEC to support the landlord's claim that the oil change tenant's practices were poor and were adversely affecting the environment and the overall facility systems at the site.

Litigation Support, Cost Recovery Action, New York State Superfund Site

Mr. Godick provided technical support for the former owner of a New York State Superfund site in upstate New York. Current owner of the property brought a cost recovery action against client as a potential responsibility party. Completed technical review of draft Remedial Investigation/Feasibility Study prepared by opposing party's consultant to develop more cost effective remedial strategy and to better position the client for liability allocation as part of future settlement negotiations. Developed cost allocation paper and model for settlement negotiations. Participated in mediation process.

Litigation Support, Cost Recovery Action, New York State Petroleum Spill Site, New York, NY

Mr. Godick provided technical support for the former owner of a New York City multi-unit residential apartment building. The State of New York brought a cost recovery action against our client as a result of a previous spill from a former underground storage tank. Reviewed invoices and project documentation to dispute work performed by the NYSDEC, which provided the basis for settlement at a fraction of the initial claim.

Cost Analysis, Environmental Insurance Claims, Various Locations

Mr. Godick provided technical support for cost analyses completed for a large national insurance company related to several former MGP and other industrial sites. Responsibilities included evaluation and development of cost-effective remedial strategies, as well as compilation of detailed costs for remedial action implementation and closure.

Litigation Support, Class Action Lawsuit, Confidential Client, NJ

Mr. Godick provided technical support for a class action suit involving a petroleum-impacted community water supply in southern New Jersey. The technical assistance included analysis of expert testimony and coordination with legal counsel in preparing for cross-examination of the opposing party's lead expert witness.

BRYAN ZIEROFF

TECHNICAL DIRECTOR

Bryan Zieroff has 16 years of experience in the environmental consulting industry. Mr. Zieroff's experience includes the conceptual design, implementation and reporting of detailed field investigations including assessments of ground-water supplies for residential, municipal and industrial users, and evaluation, monitoring and remediation of soil and ground-water contamination for sites regulated by CERCLA, RCRA, Connecticut's Remediation Standard Regulations, and the New York State Department of Environmental Conservation cleanup Programs. These studies include investigations at sites impacted by petroleum products, chlorinated solvents, metals and landfill leachate. The scopes of study include characterization of the extent of contamination in soil, ground water, and soil vapor, evaluation of compliance with the established regulatory criteria, and operation and maintenance of remediation systems. His management skills are enhanced by comprehensive hands of familiarity with all forms of field investigation techniques.

Prior to his employment with AKRF, Mr. Zieroff was a Senior Hydrogeologist with Leggette, Brashears and Graham, Inc. in Shelton, Connecticut, where his responsibilities included overseeing fieldwork, preparing and reviewing technical reports, computer modeling, and conceptual design/implementation of investigation programs to characterize contamination release areas.

BACKGROUND

Education

B.S., Geological Sciences, The Ohio State University, 1994

Licenses/Certifications

Certified Professional Geologist-American Institute of Professional Geologists, License # CPG-11197

Connecticut Licensed Environmental Professional, License #532

40 Hour HAZWOPER and Annual Refresher Training

Supervisors of Hazardous Waste Operations (8 Hour)

Professional Memberships

American Institute of Professional Geologists

Association of Ground-Water Scientists and Engineers (National Ground Water Association)

Environmental Professionals' Organization of Connecticut (EPOC)

Years of Experience

Year started in company: 2006

Year started in industry: 1995

RELEVANT EXPERIENCE

Gedney Way Leaf and Yard Waste Composting Facility, White Plains, NY

Mr. Zieroff is Project Manager for a remediation and landfill closure project at an existing composting facility. The project included documenting the complete disposal history and completion of a site-wide investigation to confirm the extent of a solvent release and to provide data necessary to complete landfill closure. The investigation was

completed satisfy the requirements in NYSDEC DER-10 and 6NYCRR Part 360. After receiving State approval of the Site Investigation Report the project has moved into the remediation and landfill closure design phase. The remedial design includes the testing and implementation of a chemical oxidation injection program, and landfill closure includes design, State approval, and construction of a landfill cap.

New City Plaza, New City, NY

Mr. Zieroff is Project Manager for an investigation and remediation project at a former dry cleaning facility. Investigation and remediation at the site is currently being conducted under review of the NYSDEC Brownfield's Cleanup Program. Tasks have included preparation and state approval of a Site Investigation Work Plan Site, Quality Assurance Project Plan, Health and Safety Plan, a Community Participation Plan, and completion of the investigation phase of the Brownfield's program. Interim Remedial activities include contamination source removal from soil and installation of a sub-slab depressurization system to address soil vapor. A feasibility study is currently being completed to determine the optimal remedial approach for site-wide remediation.

Orangeburg Pipe Site, Orangeburg, NY

Mr. Zieroff completed a subsurface investigation to determine the extent of soil and groundwater contamination at the former Orangeburg Pipe facility. The investigation results were used to develop a Remedial Action Plan to address solid waste, petroleum contamination, worker safety during site development, and capping requirements to satisfy the NYSDEC Voluntary Remediation Program.. The Remedial Action Plan included a Heath and Safety Plan, Community Air Monitoring Plan, and specifications for soil management, a vapor mitigation system and dewatering procedures during the construction of multiple commercial buildings.

Magna Metals Facility, Cortlandt, NY

Mr. Zieroff managed a soil-gas investigation project at an existing commercial warehouse and office building. The project included installation of permanent soil gas sampling points and completion of a sampling program that met the requirements of the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Site activities included a pre-sampling investigation with the NYSDOH to document materials storage, air flow specifications, historical uses, site uses and areas of concern for sub-slab and ambient air sampling. The investigation work was being conducted to satisfy an NYSDEC consent order.

Zerega – Federal Jeans Site, Bronx, NY

Mr. Zieroff was the project completed a Construction Health and Safety Plan and a Soil Management Plan for a former materials storage facility associated with Manhattan College. The plans were completed to provide worker safety and soil handling guidelines during the construction of a large retail facility and parking garage. Development activities at the site are being conducted under oversight of the NYCDEP.

Paragon Paint Company Facility, Long Island City, NY

Mr. Zieroff was Project Manager for an investigation and remediation project at a former paint manufacturing facility. The project has included a multiple subsurface investigations to determine the extent of solvent and petroleum contamination at the site. All phases of remediation at the site are being completed under review of the NYSDEC Brownfield's Cleanup Program. Tasks include completion and state approval of a Site Investigation Work Plan, Quality Assurance Project Plan, Health and Safety Plan, Community Participation Plan, Remedial Action Plan, and Final Remediation Report.

Pathmark Stores Site, Bronx, NY

Mr. Zieroff completed a Remedial Action Plan, Construction Health and Safety Plan and a Soil Management Plan for a former materials storage facility associated with Manhattan College. The plans were completed to provide worker safety and soil handling guidelines during the construction of a large retail facility and parking garage.

Development activities at the site were conducted under oversight of the NYCDEP. A Notice of Satisfaction was received after project completion.

Yale and Towne Site, Stamford, CT

Mr. Zieroff provided oversight services for a remediation project at a former industrial site. The site included over 35 buildings and 87 areas of environmental concern that required investigation and remediation. Tasks included providing technical support in understanding the Connecticut regulatory requirements, investigation and remediation costs, and confirmation of appropriate schedules to address the environmental issues during redevelopment of the project site.

Aluminum Company of America (ALCOA) Facility, Guilford, CT

Mr. Zieroff managed a ground-water remediation project at an existing aluminum manufacturing facility. The project included soil, vapor and ground-water sampling to confirm the extent of a solvent release, determination of ground water and aquifer characteristics, operation and maintenance of a ground-water pump-and-treat system and compliance sampling in association with a CTDEP consent order.

Coats North America Facility, Watertown, CT

Mr. Zieroff was the Project Manager for site compliance work at an existing synthetic treads facility. The project included an evaluation of activities, chemical uses and waste handling practices to determine areas of environmental concern. Investigations to determine the status of these areas included installation of monitoring wells, soil and ground-water sampling, soil-vapor sampling, liquid storage tank removal and RCRA closure of waste storage areas. The project activities were completed in compliance with the CTDEP property transfer program.

United Parcel Service, Storm Water Management, 9 Connecticut Facilities

Mr. Zieroff managed the design and implementation of a storm water pollution prevention project at 9 United Parcel Service facilities. The project included analysis of drainage areas, determination of sheet flow characteristics and the collection of storm-water discharge samples and SMR reporting in accordance with the CTDEP General Permit for the Discharge of Storm Water.

Elite Development Investigation, Norwalk, CT

Mr. Zieroff managed an investigation and remediation project related to a release of gasoline from an underground storage tank system. The project included a multi-phase Subsurface (Phase III) Investigation to determine the nature and extent of gasoline in the soil and ground water and a feasibility study to determine the appropriate remedial action plan. The project was being conducted to satisfy a Stipulation of Judgment issued by the Attorney General for the State of Connecticut.

Applera Corporation, Wilton, CT

Mr. Zieroff oversaw the site compliance program associated with the ownership transfer of five adjacent commercial office properties. The project included monitor well installation, design and execution of a remedial action plan to address a petroleum release area, a bus maintenance garage, multiple underground storage tank areas, a lead and mercury release area and ground-water compliance monitoring.

Chubb Group of Insurance Companies, Remediation Oversight, 7 Connecticut Properties

Mr. Zieroff was the Project Manager for the oversight of emergency response and remediation of heating-oil releases from residential underground storage tank systems. The projects included investigations to determine the nature and extent of the release areas and design and implementation of a remedial action plan. The oversight activities were performed as a representative of the insurance carrier to confirm all aspects of project were being conducted in compliance with all applicable Connecticut regulations.

Bank of New York, Southport, CT

Mr. Zieroff managed a ground-water remediation project at a former gasoline station. An investigation and remediation project related to a release of gasoline from an underground storage tank system. The project included a multi-phase Subsurface (Phase III) Investigation to determine the nature and extent of gasoline in the soil and ground water and a feasibility study to determine the appropriate remedial action plan. The project was being conducted to satisfy a Stipulation of Judgment issued by the Attorney General for the State of Connecticut.

Meriden Enterprise Center, Meriden, CT

Mr. Zieroff developed and directed a subsurface investigation to determine the nature and extent of contamination related to releases from multiple underground storage tank farms, silverware plating, machining and furniture stripping operations. Activities included ground-penetrating radar, drilling of test borings, installation of monitoring wells, developing a conceptual site model for the established releases and preparation of a report detailing remedial alternatives for the property and owner requirements under the Connecticut Department of Environmental Protection Property Transfer Act.

Harris Brothers Industrial Complex, New Britain, CT

Mr. Zieroff developed and directed a subsurface investigation to determine the status of recognized areas of environmental concern related to business operations. Activities included drilling of test borings, installation of monitoring wells, collection of soil and ground-water samples, developing a conceptual site model and preparation of a report detailing remedial alternatives for the property and owner requirements under the Connecticut Department of Environmental Protection Property Transfer Act.

Development properties in Kent, Ridgefield, and Greenwich, CT and Mahopac and Brewster, NY

Mr. Zieroff directed an evaluation and testing program of bedrock water-supply wells to determine long-term yield, impact on local users, and water quality results. The project included compilation of data, construction of hydrographs, determination of aquifer characteristics and reporting.

Bettsville Quarry, Bettsville, OH

Mr. Zieroff directed a pumping test of dewatering wells to determine yield requirements for dewatering a carbonate rock quarry. The dewatering program included a determination of offsite impacts to local ground-water users. Mr. Zieroff developed an offsite monitoring program to document and protect local users during the quarry dewatering process.

Mahopac Country Club, Town of Lewisborough, NY

Mr. Zieroff managed an in-situ percolation test in large test pit trenches to determine ground-water recharge rates. The project was conducted to support the proposed upgrade to the facility septic system. Data compilation and reporting included a ground-water recharge model to determine the area mounding potential.

Burning Tree Country Club, Greenwich, CT

Mr. Zieroff directed an in-situ percolation test to determine recharge rates for a proposed upgrade to the facility septic system. The project included compilation of slug test data and software analysis to determine K values.

APPENDIX F

SITE MANAGEMENT FORMS

ADELAAR
OU-2 AND OU3 SITE INSPECTION FORM
TOWN OF THOMPSON, NEW YORK

Inspector Name:	**Date:**
Reviewed By:	**Date:**

OU-2 Soil Cap over Landfill Area

Site Cap - Soil Cover	**Condition Observed**			**Comments**
	Good	**Maintenance Required [1/]**	**Contingency Action Required [2/]**	
Subsidence/Settling				
Erosion/ Soil Deposition				
Vegetative cover				
Seeps				
Ponding				

1/ - Contact the Adelaar Project Manager to coordinate maintenance activities. Document completed maintenance activities on this form.

2/ - Immediately contact the Adelaar and AKRF Project Manager for contingency requirements. Notifiy NYSDEC within 24 hours and refer to Site Management Plan for contingency requirements.

Emergency Contact Information

Name	**Title**	**Contact Numbers**
Marc Godick	AKRF Project Director	914-922-2356
Bryan Zieroff	AKRF Project Manager	914-922-2382
Paul Roggeman	Adelaar Project Manager	845-794-6060
Paul Turvey	EPR Concord II	816-472-1700

Adelaar Site - Well Sampling Log

Job No:		**Client: EPR Concord II**	**Well No:**
Project Location:	**OU-2 and OU-3, Adelaar, Town of Thompson, New york**	**Sampled By:**	
Date:		**Sampling Time:**	
LEL at surface:			
PID at surface:			
Total Depth:	ft. below top of casing	**Water Column (WC):** feet	*= 0.163 * WC for 2" wells
Depth to Water:	ft. below top of casing	**Well Volume*:** gallons	*= 0.653 * WC for 4" wells
Depth to Product:	ft. below top of casing	**Volume Purged:** gallons	*= 1.469 * WC for 6" wells
Depth to top of screen:	ft. below top of casing	**Well Diam.:** inches	Target maximum flow rate is 100 ml/min
Depth to bottom of screen:	ft. below top of casing	**Purging Device (pump type):**	
Approx. Pump Intake:	ft. below top of casing		

Time	**Depth to Water** (Ft.)	**Purge Rate** (ml/min)	**Temp** (^{o}C)	**Conductivity** (mS/cm)	**DO** (mg/L)	**pH**	**ORP** (mV)	**Turbidity** (NTU)	**Comments** (problems, odor, sheen)
Stabilization Criteria:				**+/- 3 mS/cm**	**+/- 0.3 mg/L**	**+/- 0.1 pH units**	**+/- 10 mV**	**<50 NTU**	If water quality parameters do not stabilize and/or turbidity is greater than 50 NTU within two hours, discontinue purging and collect sample.

Groundwater samples analyzed for: