May 27, 2005

FINAL
OPERABLE UNIT 3
REMEDIAL INVESTIGATION REPORT

Sunnyside Yard
Queens, New York

Volume I

Prepared for:

NATIONAL RAILROAD PASSENGER CORPORATION
Washington, D.C. 20002

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ACRONYM AND UNIT DEFINITIONS

AMTRAK	National Railroad Passenger Corporation
API	American Petroleum Institute
Area	Area of Concern
ARARs	Applicable or relevant and appropriate requirements
ASP	Analytical Services Protocols
AWQSGV	Ambient Water Quality Standards and Guidance Values
bls	Below land surface
BTEX	Benzene, toluene, ethylbenzene and xylenes
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CPT	Cone Penetrometer Testing
COCs	Compounds of Concern
Conrail	Consolidated Rail Corporation
COPCs	Chemicals of Potential Concern
cPAH	Seven specific PAHs that the NYSDEC considers carcinogenic
cSts	Centistokes
CY	Cubic Yards
EA	Exposure Assessment
Eh	Redox potential
FOIA	Freedom of Information Act
FS	Feasibility Study
ft/d	Feet per day
ft/ft	Feet per foot
H2M	Holzmacher, McLendon & Murrell, P.C.
HFFD	Heavy Fuel Fluorescence Detector
HST	High Speed Trainset
HSTF S&I	High Speed Trainset Facility Service & Inspection
IRM	Interim remedial measures
Kd	Distribution coefficient
K_H	Horizontal hydraulic conductivity

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K_{oc}	Organic carbon partition coefficient
K_{ow}	Octanol-water partition coefficient
LFFD	Light Fuel Fluorescence Detector
LIRR	Long Island Rail Road
mg/kg	Milligrams per kilogram, equal to 1000 µg/kg
µg/kg	Micrograms per kilogram, equal to 0.001 mg/kg
mg/L	Milligrams per liter
µg/L	Micrograms per liter
µg/100 cm^2	Micrograms per 100 square centimeters
msl	Mean sea level
NAPL	Non-Aqueous Phase Liquid
NCP	National Contingency Plan
ND	Not detected
NIOSH	National Institute for Occupational Safety & Health
NJTC	New Jersey Transit Corporation
NYCRR	New York Code of Rules and Regulations
NYCTA	New York City Transit Authority
NYCDOT	New York City Department of Transportation
NYSDEC	New York State Department of Environmental Conservation
OOC	Order On Consent
ORS	Oil Recovery Systems
OU	Operable Unit
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PCE	Tetrachloroethene
PID	Photoionization detector
ppb	Parts per billion, equivalent to µg/kg
ppm	Parts per million, equivalent to mg/kg
QA/QC	Quality assurance/quality control
RBCs	Risk-Based Concentrations

ACRONYM AND UNIT DEFINITIONS

RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RMEI	Reasonable maximum exposed individual
ROD	Record of Decision
RSCOs	Recommended Soil Cleanup Objectives
SCGs	Standards, criteria and guidance
SMP	Standard Motor Products, Inc.
SPH	Separate Phase Hydrocarbon
SQL	Sample Quantitation Limit
SVOCs	Semivolatile organic compounds
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target Analyte List
TBC	To Be Considered
TCE	Trichloroethene
TCL	Target Compound List
TDS	Total Dissolved Solids
TICs	Tentatively identified compounds
TSCA	Toxic Substance Control Act
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UVIF	Ultraviolet Induced Fluorescence
VOCs	Volatile organic compounds
Yard	Sunnyside Yard, Queens, New York

EXECUTIVE SUMMARY

On behalf of the National Railroad Passenger Corporation (Amtrak) and the New Jersey Transit Corporation (NJTC), Roux Associates, Inc. (Roux Associates) has prepared this Final Operable Unit 3 (OU-3) Remedial Investigation (RI) Report for the Sunnyside Yard in Queens, New York (Yard). The purpose of this report is to present the findings of the Supplemental OU-3 RI (completed in December 2003), which was conducted to fill in data gaps from several previous investigations so that a final remedy can be evaluated and selected as part of the OU-3 Feasibility Study (FS) and then implemented to clean up the contamination. At the request of the New York State Department of Environmental Conservation (NYSDEC), this report also summarizes the findings of these previous investigations, and together with the findings of the Supplemental OU-3 RI, provides a comprehensive understanding of the nature and extent of the contamination found in OU-3. In addition, this report provides a discussion of the Interim Remedial Measures (IRMs) that have been implemented to recover separate phase hydrocarbons (SPH) floating on the water table and soil IRMs. Based on the findings in this report, Roux Associates will prepare an FS to evaluate potential remedial alternatives for contamination in OU-3, as mentioned above.

In 1997 the NYSDEC formulated six operable units for the Yard and also identified the three compounds of concern (COCs) for soil at the Yard: polychlorinated biphenyls (PCBs), seven specific species of polycyclic aromatic hydrocarbons (PAHs) that the NYSDEC considers carcinogenic (cPAHs) and lead. The seven cPAH species that were identified as a COC by the NYSDEC are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene; these are the cPAHs discussed in this report. The NYSDEC also issued cleanup levels for each of the three COCs in soil, as given below.

- PCBs (total) – 25,000 micrograms per kilogram (µg/kg);
- cPAHs (total) – 25,000 µg/kg; and
- Lead – 1,000 milligrams per kilogram (mg/kg).

Interim Remedial Measures

Several IRMs have been implemented to remediate contamination in OU-3 (SPH IRMs and soil IRMs), which have resulted in the recovery of a significant volume of SPH (more than

11,500 gallons), hydrocarbon-impacted soil, and COC-impacted soil (estimated to be 1,625 cubic yards [CY]).

SPH IRMs

IRMs to recover SPH in OU-3 have proceeded in three phases. The IRM locations are shown on Figure 6-1. The Phase I SPH IRM implemented in early 1990, consisted of three SPH recovery trenches to mitigate the flow of SPH into the service pit located in the former Metro Shed and recover SPH in the general Metro Shed area. The Phase II SPH IRM was implemented in June 1991 to augment the Phase I SPH IRM and consisted of three 4-inch diameter recovery wells in the area immediately northeast of the former Engine House where the SPH plume was thickest.

The Phase III SPH IRM commenced in February 1999 and consisted of the construction of a 340-foot long Interceptor Trench installed along the northern property boundary and through the thickest part of the SPH plume. The interceptor trench is the only remaining SPH IRM in operation. The combined SPH IRM systems have recovered more than 11,500 gallons of SPH to date.

Soil IRMs

Three soil IRMs have been implemented in OU-3 since 1985. The first soil IRM was implemented between 1985 and 1986 by Amtrak and consisted of excavation of an estimated 140 CY of soil saturated with SPH at the east end of the former Engine House. A soil sample was collected from the excavation and was found to contain total PCBs at a concentration of 43,400 µg/kg. The excavated soil was disposed offsite in accordance with applicable Federal, State, and local regulations. The second soil IRM was implemented in 1998, and consisted of the excavation of soil at two locations where cPAHs and lead concentrations exceeded their respective cleanup levels in soil. This IRM took place during construction of tracks associated with the HSTF S&I Building. Excavation was completed to an extent where cPAHs and lead were below NYSDEC-recommended soil cleanup levels. An estimated 650 CY were removed. The excavated soil was disposed offsite in accordance with applicable Federal, State, and local regulations.

The third soil IRM was implemented by Amtrak in 1999 and consisted of the removal of an estimated 835 CY of hydrocarbon-impacted soil encountered in an area that straddles the OU-3/OU-4 boundary. The excavated soil was disposed offsite in accordance with applicable Federal, State, and local regulations. The portion of the IRM performed in OU-4 is included in this report for completeness and will not be discussed in the OU-4 RI.

Nature and Extent of Contamination

Based on the data collected during the Supplemental OU-3 RI together with other investigations in OU-3, a comprehensive understanding of the nature and extent of contamination in soil and SPH has been achieved. PCB impacts in sewer water and sediment found at specific manhole locations in OU-3, and VOC impacts in OU-3 groundwater monitoring wells will be addressed during the OU-5 and OU-6 RI/FSs, respectively.

SPH Plume

The SPH plume has been fully delineated both horizontally and vertically and is located entirely within the boundaries of OU-3. The outer boundary of the plume (historic zero-foot SPH contour), which is very conservatively defined by the absence of a visible sheen on the water table, surrounds an area of approximately three acres in the central part of OU-3. The core of the plume, as defined by the 0.5-foot (apparent as measured in the well) SPH contour, currently occupies approximately 0.5 acres. The SPH plume core may also be defined as the extent of mobile SPH. Based on the Brooks–Corey model findings, the extent of mobile SPH in OU-3 lies within the 0.5-foot SPH thickness contour. As mentioned above, the combined operation of the OU-3 SPH IRMs has resulted in the recovery of more than 11,500 gallons of SPH and has caused a significant reduction of the extent of the SPH plume horizontally and vertically (thickness).

The migration of the SPH plume is prevented by a variety of conditions in OU-3. Migration of the SPH plume is prevented to the south and west by existing building foundations, and it is being passively captured by the Interceptor Trench (located at the northern property boundary and northern extent of the plume core) where the SPH is being recovered. In addition, tight (low permeability) soil units are preventing migration to the north and west. Migration of the plume to the east is prevented by the west/northwest groundwater flow direction.

Soil

In total, 122 PCB samples, 54 cPAH samples, and 88 lead samples were collected and analyzed during the various investigations in OU-3. The NYSDEC-recommended soil cleanup levels for any of the three COCs (PCBs, cPAHs, and lead) were exceeded in soil samples from seven boring locations: PCBs in 821-E and CS-76; cPAHs in HST-22A and HST-22B; and lead in HST-28, MW-58, and S-62. The soil at five of these locations was remediated as part of the soil IRMs discussed above. The other two locations are located within the SPH plume and will be addressed in the Feasibility Study.

In addition to the soil described above, an area of approximately 0.5 acre of hydrocarbon-impacted surface soil was delineated visually and the impacts were found to be limited to the unsaturated zone (see Plate 3-1). Based on observations from soil borings completed within this 0.5 acre area, the average depth of the hydrocarbon impacts is approximately one foot below land surface (bls).

Exposure Assessment

An Exposure Assessment was conducted to evaluate the potential for exposure to chemicals that remain in soil in OU-3. EAs describe the type and magnitude of exposures to chemicals of potential concern (COPCs) present at a site. Workers in OU-3 engaged in routine work involving soil-moving activities are not expected to experience exposure to unacceptable levels of chemicals in soil in OU-3. Secondary exposure to groundwater or the SPH plume was recognized, but the likelihood of any extensive exposure is considered highly unlikely because of the anticipated use of protective clothing (boots and gloves) and the need to pump out any accumulation of liquids in a construction excavation.

Planned Feasibility Study

An FS will be conducted to determine the most appropriate alternatives to address the mobile SPH (plume core), residual SPH and associated hydrocarbon-impacted soil, visual hydrocarbon-impacted surface soil, the two locations where soil exceeds the NYSDEC-recommended soil cleanup levels for COCs, and areas associated with remaining subsurface structures in OU-3.

1.0 INTRODUCTION

On behalf of the National Railroad Passenger Corporation (Amtrak) and the New Jersey Transit Corporation (NJTC), Roux Associates, Inc. (Roux Associates) has prepared this Final Operable Unit 3 (OU-3) Remedial Investigation (RI) Report for the Sunnyside Yard in Queens, New York (Yard). The purpose of this report is to present the findings of the Supplemental OU-3 RI (completed in December 2003), which was conducted to augment data from several previous investigations so that a final remedy can be evaluated and implemented for OU-3. At the request of the New York State Department of Environmental Conservation (NYSDEC), this report also summarizes the findings of these previous investigations, and together with the findings of the Supplemental OU-3 RI, provides a comprehensive understanding of the nature and extent of the contamination found in OU-3. In addition, this report provides a discussion of the Interim Remedial Measures (IRMs) that have been implemented to recover separate phase hydrocarbons (SPH) floating on the water table and soil IRMs. Based on the findings in this report, Roux Associates will prepare a Feasibility Study (FS) to evaluate potential remedial alternatives for contamination in OU-3.

The Supplemental OU-3 RI was completed in accordance with the August 1, 2003 Addendum to the June 23, 1997 (Revised January 13, 1999) Work Plan for the OU-3 RI (Work Plan, Roux Associates, 1997b) as amended by a Roux Associates' letter dated November 7, 2003 (Roux Associates, 2003). The Work Plan was prepared in accordance with the provisions of the Order on Consent (OOC), Index #W2-0081-87-06 as modified, between the NYSDEC, Amtrak, and the NJTC and was approved by the NYSDEC prior to implementation. The location of the Yard is shown on Figure 1-1. The location of OU-3 is shown on Figure 1-2.

In accordance with the OOC, a number of investigations have been performed at the Yard including a Phase I RI, a Phase II RI and Phase II RI Addendum, and the OU-3 RI and Supplemental OU-3 RI, as well as a health-based Risk Assessment. Based on these investigations, several areas of the Yard were identified that required remedial actions. Based on the results of Yard inspections, discussions with Amtrak personnel, and previous investigations, initially 16 Areas of Concern (Areas) were identified at the Yard. During the Phase I RI, one additional Area was identified giving a total of 17 Areas for the Yard; three of these Areas (Areas 1, 6, and 7) are located within OU-3. Areas 1, 6, and 7 are located entirely within the

boundary of OU-3. Prior to the creation of OUs in 1997 (see discussion below), the environmental investigations were site-wide (i.e., for the entire Yard, including what is now OU-3), but only the investigations conducted within these three Areas (Areas 1, 6, and 7) will be discussed in this Final OU-3 RI Report. Earlier studies predating the creation of OUs reference what we now call OU-3 as Area 1; thus, for accuracy, this designation will be retained but, for clarity, OU-3 will be in parentheses following each reference to Area 1. A description of the three Areas within OU-3 is given below:

Area		Description
Area 1:	Underground Storage Tank (UST) and Fueling Area	Nine USTs, former locomotive fueling station, former Engine House, former Metro Shed.
Area 6:	Drum Storage Area (former Oil House)	Drum and equipment storage area; formerly the Yard receiving area.
Area 7:	Storage Area	Reported to be a former empty drum storage area.

To accommodate a rigid construction schedule for Amtrak's High Speed Trainset (HST) program and still address site-wide remedial efforts in a timely and orderly manner, with the NYSDEC's concurrence, in 1997, the Yard was subdivided into six OUs shown on Figure 1-2, and described below.

- OU-1: Soil above the water table within the footprint of the proposed HST Facility Service and Inspection (HSTF S&I) Building.
- OU-2: Soil above the water table within the footprint of the HSTF S&I Building ancillary structures (i.e., the access road and utilities route, the parking area, the construction easement area which surrounds the building, and the construction laydown area).
- OU-3: Originally the soil and SPH accumulation (herein referred to as SPH plume) above the water table in the area previously referred to as Area 1 of the Yard; however, it has expanded to include Areas 6 and 7 of the Yard, and saturated and unsaturated soil. The portion of the sewer system that passes through OU-3 and groundwater beneath OU-3 will be addressed under OU-5 and OU-6 RIs, respectively.
- OU-4: Soil above the water table (unsaturated zone) in the remainder of the Yard.

- OU-5: Sewer system (water and sediment) beneath the Yard.
- OU-6: Saturated soil and the groundwater beneath the Yard (delineation of soil to be conducted as appropriate).

At the time of the creation of the OUs (1997), the NYSDEC also identified the three compounds of concern (COCs) for soil at the Yard: polychlorinated biphenyls (PCBs), seven specific species of polycyclic aromatic hydrocarbons (PAHs) that the NYSDEC considers carcinogenic (cPAHs) and lead. PAHs (and cPAHs) are semi-volatile organic compounds (SVOCs) that are included in the same laboratory reports. However, because cPAHs are one of the three COCs, the data are presented separately, yet also included in the SVOC data table. The seven cPAH species that were identified as a COC by the NYSDEC are benzo(a)anthracene, benzo(a)pyrene, benzo(a)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene; these are the cPAHs discussed in this report. The NYSDEC issued cleanup levels for each of the three COCs in soil, are as given below.

- PCBs (total) – 25,000 micrograms per kilogram (µg/kg);
- cPAHs (total) – 25,000 µg/kg; and
- Lead – 1,000 milligrams per kilogram (mg/kg)[1].

Prior to the establishment of the NYSDEC cleanup levels for the three COCs listed above, the New York State recommended soil cleanup objectives (RSCOs) were used to evaluate PCBs, SVOCs (including PAHs and cPAHs), and metals. RSCOs are provided in the Technical and Administrative Guidance Memorandum (TAGM) 4046 – Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, 1994). Metals not having a RSCO were evaluated in terms of Eastern United States Background concentrations provided in the same guidance document as the RSCOs (NYSDEC, 1994). It should be noted that metals are natural components of the earth's crust and therefore, are expected to be present in soil and water. Groundwater quality is evaluated in terms of NYSDEC Ambient Water Quality Standards and Guidance Values (AWQSGVs) (NYSDEC, 1998)

[1] The NYSDEC-recommended soil cleanup levels were provided by the NYSDEC in µg/kg for PCBs and cPAHs, and in mg/kg for lead. Concentrations discussed in the text are in the units they were provided by the laboratory. Likewise, the tables and figures in this report are presented in the units provided by the laboratory for consistency. For reference, 1 mg/kg is equal to 1,000 µg/kg.

With regard to the HST project, portions of what was formerly considered Area 1 have been addressed during the Remedial Investigation/Feasibility Study (RI/FS) process for OU-1 and OU-2, and a Record of Decision (ROD) for each of these units has been issued by the NYSDEC. Additionally, further work was performed in the portion of OU-3 previously addressed in the NYSDEC-approved document titled "Work Plan for the Delineation and Further Characterization of Soil in the HSTF-Related Work Area Located in OU-3" (Roux Associates, 1997c). The results of the investigations in this portion of OU-3 were submitted to the NYSDEC in documents titled "Results of Soil Sampling in Selected Work Areas Located in OU-3" (Roux Associates, 1998c), "Results of the Additional Soil Samples Collected in the Subject Area of Operable Unit-3" (Roux Associates, 1998e), and are discussed in this Final OU-3 RI report.

This Final OU-3 RI Report has been divided into the following 15 sections with a brief description of each provided below.

- Section 1.0: Introduction
  This section introduces the reader to what this report is about and provides an overview of what is contained in the report.

- Section 2.0: Environmental Setting
  This section provides a summary of the Yard operating history, general Yard description, a detailed description of OU-3, including geology and hydrogeology, and other relevant information pertaining to the Yard and OU-3.

- Section 3.0: Previous Investigations
  This section presents a summary and results for previous investigations completed at the Yard by Roux Associates and other parties with a focus on the results for work performed in OU-3.

- Section 4.0: Supplemental OU-3 RI
  This section provides a detailed summary of the methods and results of the most recent investigation conducted in OU-3, the Supplemental OU-3 RI, and serves as the completion report for that investigation.

- Section 5.0: Subsurface Structures Investigations
  This section provides a description of the subsurface structures located in OU-3 and also provides a background summary for each structure, previous investigations performed, as well as a summary of any remedial efforts performed for each subsurface structure.

- Section 6.0: Interim Remedial Measures
  This section describes the interim remedial measures (IRMs) implemented in OU-3: former and existing SPH IRMs and soil IRMs.

- Section 7.0: Pre-Design Study Work in OU-3
  This section discusses the work that was performed to provide additional information for the FS.

- Section 8.0: Nature and Extent of Contamination
  This section presents a summary of the nature and extent of the contamination in OU-3 including the soil, groundwater, SPH plume, and sewer (water and sediments).

- Section 9.0: Planned Feasibility Study
  The FS will address mobile SPH (plume core), residual SPH and associated hydrocarbon-impacted soil, visual hydrocarbon-impacted surface soil, the two locations where soil exceeds the NYSDEC-recommended soil cleanup levels for COCs, and areas associated with remaining subsurface structures in OU-3.

- Section 10.0: Preliminarily Identified ARARs
  This section discusses the applicable or relevant and appropriate requirements (ARARs).

- Section 11.0: Contaminant Fate and Transport
  This section discusses the contaminant fate and transport of contamination in OU-3.

- Section 12.0: Exposure Assessment
  This section provides an analysis of potential health-based risks associated with contaminated soil and groundwater in OU-3.

- Section 13.0: Conclusions

- Section 14.0: Recommendations
  The recommendations section provides for a logical course of action to be followed to complete all investigatory, monitoring and remedial activities within OU-3.

- Section 15.0: References

2.0 ENVIRONMENTAL SETTING

This section includes a description of Yard operational history, including a general and detailed description of OU-3. In addition, surface features (i.e., topography and drainage, regional and site-specific geology, and regional and site-specific hydrogeology) are also included in this section.

2.1 Yard Operating History

The Pennsylvania Tunnel and Terminal Company, a subsidiary of the Pennsylvania Railroad (later known as the Penn Central Transportation Company), originally constructed the Yard in the early 1900s. The Yard officially opened on November 27, 1910. On April 1, 1976, the Consolidated Rail Corporation (Conrail) acquired the Yard, and the same day conveyed it to Amtrak, which has continued to operate it as a storage and maintenance facility for railroad rolling stock. Up until 2002, locomotive fueling was performed in OU-3.

2.2 General Yard Description

The Yard is located in an urban area in northwestern Queens County (Figure 1-1). The East River is located approximately one mile to the west while Newtown Creek, which defines the border between Queens and Kings counties, is located less than 0.5 mile south of the western portion of the Yard. The Yard consists of a railroad maintenance and storage facility that currently encompasses approximately 133 acres. The Yard functions as a maintenance facility for electric locomotives and railroad cars for Amtrak and a train layover storage yard for NJTC. The land use surrounding the Yard is a combination of commercial, light industrial, and residential areas. The Long Island Rail Road (LIRR) currently owns a portion of the original Yard along the northern boundary (including a portion of OU-3) and maintains rights of way through the Yard.

2.3 OU-3 Description

OU-3 encompasses approximately eight acres in the north central portion of the Yard, and, as mentioned above, includes property owned by the LIRR. There is only one aboveground structure currently present in OU-3, the partially demolished former Oil House. The Oil House, which was used for storage of drummed hydrocarbon products, was taken out of service in 1972.

Several additional former structures/features were present in OU-3, but have since been demolished to land surface, removed, closed or rendered inoperable including:

- Engine House (including both indoor and outdoor service pits), which was used for locomotive servicing and was demolished in 1996.
- Engine House Boiler Room, which was used to supply heat to the former Engine House and was demolished in 1987.
- Petroleum tanker car unloading track where fuel was transferred to the USTs from tanker cars, was removed when the Metro Shed was built in the early 1970s.
- UST Areas where nine USTs, which were emptied of fuel and filled with sand or water, were used for hydrocarbon storage.
- Locomotive fueling area where fuel was transferred from the USTs to locomotives.
- Metro Shed, which served as the inspection and service facility prior to being demolished in 1997.
- Turntable, which was used to turn locomotives around was closed and filled with soil in the early 1990s.

OU-3 originally included the soil and SPH above the water table in the area previously referred to as Area 1 (now OU-3) at the Yard. During a meeting with the NYSDEC on July 10, 2002, the definition of OU-3 was expanded to include groundwater and saturated soils within OU-3. Subsequent to that meeting, the NYSDEC indicated a further expansion of OU-3 to include former Areas 6 and 7 of the Yard, and later agreed that groundwater for the entire Yard will be addressed during the OU-6 RI. For purposes of this document, OU-3 encompasses Area 1 (including SPH and associated soil, soils [saturated and unsaturated], the nine USTs and the associated subsurface structures and remnants listed above), the Oil House in Area 6, and the storage area for empty drums in Area 7. The portion of the sewer that lies within the extent of the OU-3 boundary will be addressed as part of OU-5. As stated previously, groundwater within OU-3 will be addressed as part of OU-6.

2.4 Topography and Drainage

The Yard encompasses approximately 133 acres and lies in a topographically depressed area with ground surface elevations that range from approximately 10 to 25 feet below the surrounding land surface, thus forming a basin-like area. The Yard topography is generally flat and slopes

gently to the west. The Yard topography and drainage patterns are strongly influenced by the large number of railroad tracks and bulkheaded areas. Surface runoff from the Yard does not appear to be a source of contamination to adjacent properties.

A portion of the primary combined sanitary/storm sewer drainage system serving the Yard underlies the Site. The primary subsystem (one of two subsystems that serves the Yard) connects catch basins located throughout approximately 90 percent of the Yard. Stormwater from the primary subsystem leaves the Yard to the north, approximately 360 feet west of Honeywell Street.

OU-3 stormwater runoff discharges into the primary sewer drainage system from catch basins located throughout OU-3, and service bays (Engine House Inspection Pits Nos. 3 and 4) located outside of and directly north of the former Engine House (Plate 3-1). Much of the sewer system within OU-3 appears to be located at or below the water table. During previous investigations, stormwater runoff containing sheens was observed flowing into some of the catch basins during periods of precipitation.

2.5 Regional Geology

The Yard is located within the Atlantic Coastal Plain Physiographic Province. The regional subsurface geology consists of unconsolidated sand, silt, clay and gravel deposits that overlie crystalline bedrock. The unconsolidated strata in the area dip gently to the southeast, following the topography of the bedrock surface (Soren, 1978). Boreholes drilled within northwestern Queens County indicate that the unconsolidated deposits consist predominantly of Upper Pleistocene glacial deposits that range from approximately 30 to 150 feet in thickness. These borehole logs also indicate that Lower Pleistocene deposits, consisting of the Jameco Gravel overlain by the Gardiner's Clay unit, may be discontinuously present beneath the Yard. These Lower Pleistocene deposits unconformably overlie bedrock.

Unconsolidated Upper Pleistocene glacial (ground moraine) deposits of unstratified, poorly sorted mixtures of sand and silt with some gravel and cobbles (Buxton, et al., 1981) overlie the Lower Pleistocene deposits (where present), which overlie crystalline bedrock. The saturated portion of the Upper Pleistocene deposits form the Upper Glacial aquifer of Long Island.

2.6 Yard Geology

The geologic logs of soil borings drilled throughout the Yard indicate that the Yard is underlain by the following units (in order of increasing depth): fill (including ballast, cinders/ash), wetland deposits, Upper Pleistocene glacial deposits, and crystalline bedrock. Fill activities, which were part of major topographic changes engineered at the Yard and site bedrock geology, are summarized below.

A thin veneer of manmade (madeland) and Holocene deposits overlies the Upper Pleistocene deposits at the yard. In the southwestern portion of the Yard, a Holocene wetland deposit was encountered below the fill (recent deposits) and above the Upper Pleistocene formation. This deposit, which is the buried tidal Dutch Kills Creek and swamp, consists of organic silty clay and meadow mat, and overlies the Upper Pleistocene deposits. As a result of filling the tidal Dutch Kills, the Dutch Kills drainage was culverted beneath the northwest corner of the Yard, through a 48-inch diameter sewer line. This sewer line is charted on the Amtrak-supplied 1910 Yard map (Roux Associates, 1999b).

2.6.1 Fill and Historical Topographic Changes

The fill is predominantly comprised of reworked glacial deposits (unstratified sand, silt, clay and gravel) and railroad ballast (including cinders/ash), with lesser amounts of ash, cinders and construction debris. With the exception of paved areas and land occupied by buildings (only the former Oil House in OU-3), the railroad ballast is ubiquitous at land surface throughout the Yard. As discussed below, additional information has been obtained that indicates that between 1906 and 1910 Upper Pleistocene glacial deposits were excavated from topographically high areas of the Yard and re-deposited as fill in lower lying areas of the Yard including wetlands. Reworked glacial deposits (made land) are often visually indistinguishable from the underlying unstratified glacial deposits. The factors discussed below indicate that large volumes of fill were used at the Yard (including early reports that the Yard was a reclaimed marshland) for the construction of the elevated LIRR right-of-way, and several extensive bulk-headed areas throughout the Yard. Documentation describing the origin of the current topography is summarized below.

During evaluation of the geologic and hydrogeologic data for the Yard, two historical topographic maps were obtained for reference: the first covering western Queens dated 1890

(Julius Bien & Co., 1890), and the second covering the Yard and surrounding area dated December 1906 (Pennsylvania Tunnel and Terminal Railroad Company, 1906). In addition, a Chief Engineering Report (Pennsylvania Tunnel and Terminal Railroad Company, 1910) and associated cross-sections of the Yard (dated August 16, 1907) describe the topographic changes implemented at the Yard between December 1906 and August 1909. Utilizing the engineering report, topographic maps, Amtrak-supplied 1910 and 1917 Yard maps, and recent area maps, a comparison was made between the historical and current topographic features of the Yard. This comparison indicated that:

- The majority of topographic changes that occurred at the Yard took place between December 1906 and August 1909.
- Current land surface elevation throughout much of the eastern half of the Yard (i.e., east of Honeywell Street) is lower than pre-development elevation.
- Current land surface elevation throughout much of the western half of the Yard (i.e., west of Honeywell Street) is higher than pre-development elevation.
- Two former surface-water bodies at the Yard (the wetland in the northeast corner of the Yard and Dutch Kills Creek) have been filled (Roux Associates, 1999b).
- Current elevation of the LIRR main line is higher than the pre-development (1890) elevation.

The topography shown on the 1890 map for the land now occupied by the Yard is much different than present topographic conditions. A wetland existed along Northern Boulevard (formerly Jackson Avenue) near the northeast corner of the Yard. The 1890 map also indicates that Dutch Kills Creek flowed through the western portion of the Yard, flowing southwest to Newtown Creek. Approximately 750 feet east from Dutch Kills Creek, land surface begins a rapid increase from less than 10 to greater than 60 feet above mean sea level west of Honeywell Street. Although this topographic high is still present south of the Yard, the mound no longer exists across the Yard. West of Honeywell Street land surface gradually sloped downward to the north, from a high elevation of approximately 80 feet above mean sea level along Skillman Avenue to a low of about 30 feet above mean sea level at the wetland along Northern Boulevard.

A Chief Engineering Report (Pennsylvania Tunnel and Terminal Railroad Company, 1910) describes the topography (and acreage) of the Yard prior to December 1906, when major

construction began at the Yard. A 40-acre wetland was located west of Honeywell Street, with the remaining 93 acres of the Yard consisting of "rolling ground" with elevations from "10 to 70 feet above the swamp [wetland]." Existing data indicate that major topographic changes took place at the Yard between 1906 and 1910, bringing the Yard and OU-3 close to its present, topographic condition. These changes are discussed below.

Cross-sections of the Yard dated August 1907 show both pre-construction and post-construction profiles of the Yard. The construction consisted of moving railroad tracks, grading the Yard, and constructing bridges, roads and buildings. Natural Upper Pleistocene glacial deposits were excavated from parts of the Yard and deposited as fill in other parts of the Yard to create the current, generally flat topography. Part of the construction involved moving the LIRR passenger tracks to extend across the wetland (filling the wetland) and connect with the old passenger tracks west of Hunter's Point Avenue.

During Yard construction the following areas were excavated:

- The loop track under LIRR main line and south of LIRR main line.
- The north portion of the Yard both east and west of 39th Street (formerly Harold Avenue).
- Beneath the 39th Street Bridge (approximately from the LIRR main line to Skillman Avenue) to accommodate the main line and loop tracks.
- The north part of the Yard (east of Queens Boulevard) to create the Multiple Unit Yard.
- From the retaining wall between the north and south yards south to the LIRR main line, to accommodate the body tracks and buildings and to create the Pullman and Coach Yard.

The following areas were filled with the excavated Upper Pleistocene glacial deposits:

- The LIRR main line east of the Yard to bridge 43rd Street (formerly Laurel Hill Avenue).
- 39th Street (formerly Harold Avenue) to create the 39th Street Bridge between Northern Boulevard (formerly Jackson Avenue) and Skillman Avenue, and the 39th Street ramp into the Yard.
- The north part of the Yard (west of Queens Boulevard) to create the Multiple Unit Yard.
- The wetland associated with Dutch Kills Creek to accommodate the Multiple Unit Yard, Pullman and Coach Yard, and the LIRR main line.
- Meadow Street to create the Thompson Avenue Bridge.

2.6.2 Yard Bedrock Geology

Based on published data, crystalline bedrock beneath the Site is Precambrian folded and faulted gneisses and schists that were eroded to a peneplain prior to deposition of the overlying glacial deposits (Soren, 1978). Based on information obtained from a file and well search at the NYSDEC, the bedrock surface appears to be highly irregular in this area. Boreholes drilled adjacent to the Yard indicate that the depth to bedrock ranges from approximately 30 to 150 feet below land surface (bls) (i.e., 10 to 130 feet below mean sea level [msl]). As part of the New York City Department of Transportation (NYCDOT) reconstruction of Queens Boulevard Bridge over Sunnyside Yard, eight boreholes were drilled to the bedrock surface. The depth to bedrock ranged from 50 to 86 feet bls (Environmental Planning & Management, Inc., 1997). These depths are estimated to correspond to 40 to 70 feet below msl, with bedrock deepening to the south. As part of Roux Associates' work at the Yard, one borehole (P-3D), located in OU-1 (formerly a portion of Area 1), was drilled to the bedrock surface. Bedrock was encountered at a depth of 74 feet (53 feet below msl). The circa 1910 Chief Engineering Report (Pennsylvania Tunnel and Terminal Railroad Company, 1910) stated that bedrock was exposed in the stream bed of Dutch Kills Creek, near the south abutment of the Thompson Avenue Bridge and under the LIRR freight tracks on the north side of the Yard. This report also states that bedrock was generally located 30 to 50 feet beneath the wetland (approximately in 1907).

2.7 Hydrogeology

Published hydrogeologic data and Yard-specific water-level elevation and aquifer test data collected during previous investigations were evaluated to define the current hydrogeologic conditions observed at the Yard. These data were used to prepare water-level elevation maps and hydrographs, calculate horizontal and vertical hydraulic gradients, estimate the hydraulic coefficients, and calculate groundwater flow rates. Discussion of these parameters are given below in the following sections.

2.7.1 Regional Hydrogeology

Groundwater in the area occurs under water-table (unconfined) conditions in the Upper Glacial aquifer. Regional groundwater flow in the area is to the northwest, eventually discharging to the East River approximately one mile northwest of the Yard (McClymonds and Franke, 1972). Vertical flow within the aquifer changes from a downward flow in central Queens to an upward

flow nearing the East River, where groundwater discharges. The published horizontal hydraulic conductivity (K_H) of the Upper Glacial aquifer in Queens County ranges from 214 feet per day (McClymonds and Franke, 1972) to 270 feet per day (Franke and Cohen, 1972).

Published water-level data for Long Island from the early 1930s to about 1960 indicated that significant salt-water intrusion was occurring into the Upper Glacial and confined aquifers beneath western Queens County and as far inland as the center of Kings County. Historical data for wells near the Yard indicate that salt-water intrusion also affected the aquifers beneath the Yard (Smolensky, 1983). In documentation obtained from a public records (Freedom of Information Act-FOIA) search, two bedrock wells located northeast of the Yard (one within 500 feet) are noted as having brackish water conditions in the 1920s and 1930s. The effects of the historical salt-water intrusion can still be detected in groundwater quality, which exhibits elevated concentrations of sodium, chloride and total dissolved solids (TDS) (Soren, 1971).

Regional groundwater quality of the Upper Glacial aquifer is characterized as having a wide range of iron and manganese concentrations (Buxton, et al., 1981). Concentrations of iron and manganese increase as conditions become anoxic (i.e., as the dissolved oxygen content is depleted). Anoxic conditions are typically associated with swamp or wetland deposits, such as those buried in the northeastern and western portions of the Yard.

2.7.2 Site Hydrogeology

Groundwater beneath the Yard including OU-3 occurs under water-table (unconfined) conditions in either fill deposits, wetlands, or the Upper Pleistocene glacial deposits. The saturated Upper Pleistocene deposits comprise the Upper Glacial aquifer. Beneath the Yard, the saturated fill deposits (excluding ballast, ash/cinders, and construction debris) and the shallow Upper Glacial aquifer were not always distinguishable, and are, therefore, collectively referred to as shallow deposits (that contain the water table).

During previous investigations, multiple rounds of water-level measurements were collected in OU-3, including the well clusters, to determine vertical hydraulic gradients, groundwater flow patterns within the Upper Glacial aquifer, and the hydraulic relationship between the water table and the deeper Upper Glacial aquifer. Deeper wells in OU-3 (designated by a "D") are screened

approximately 25 to 35 feet below the water table, but are still within the Upper Glacial aquifer. Three well clusters currently exist in OU-3, MW-19/MW-39D, MW-16/MW-23D, and MW-49/MW-38D. Measurements obtained from Monitoring Well MW-16 were not used for vertical hydraulic gradient calculations because the well contained a significant SPH thickness.

As shown on Plate 2-1, shallow groundwater beneath OU-3 flows predominantly in a west/northwesterly direction (consistent with the regional groundwater flow direction [Section 2.71]), and apparently is influenced by historical flow patterns of the former Dutch Kills Creek and associated wetlands that were filled in the early 1900s (see Section 2.6.1). Based on water levels from monitoring wells throughout OU-6, deeper groundwater predominantly flows west across the Yard. The northwesterly flow observed in the shallow groundwater measurements is not evident on the deep groundwater flow map (Plate 2-2); however, this may be due to limited distribution of deep monitoring wells, rather than actual flow conditions. The average horizontal flow gradients for the shallow and deeper deposits in the Yard are 0.004 and 0.003 feet/foot, respectively. These values are indicative of a relatively flat water-table surface. The vertical gradients at each well cluster were calculated according to the following formula:

$$\frac{[Water-Level\ Elevation\ (shallow\ well)]-[Water-Level\ Elevation\ (deep\ well)]}{[Elevation\ of\ Screen\ Center\ (shallow\ well)]-[Elevation\ of\ Screen\ Center\ (deep\ well)]}$$

Based on this formula, a negative number represents an upward gradient, and a positive number represents a downward gradient. As previously stated, vertical gradients were not calculated for cluster MW-16/MW-23D due to the significant SPH thickness within Monitoring Well MW-16 at the time. Data collected in June 1994 indicate that at OU-3 clusters MW-19/MW-39D and MW-49/MW-38D, groundwater is flowing upward with approximate vertical gradients of -0.0274 and -0.0270 feet/foot, respectively. Vertical gradients calculated using data collected in June 1997 indicate similar findings to those listed above for clusters MW-19/MW-39D (-0.0272 feet/foot, upward) and MW-49/MW-38D (-0.0254 feet/foot, upward) (Roux Associates, 1999b).

The upward flow observed beneath OU-3 reduces or prevents the downward migration of contaminants within the aquifer, if present. Specifically, the upward gradients beneath OU-3

assist in minimizing the impacts of the SPH plume by reducing or preventing the SPH impact on underlying groundwater quality.

K_H for the saturated fill deposits and Upper Glacial aquifer at the Yard were determined during the Phase I RI. The horizontal K_H values were calculated from slug tests conducted in shallow monitoring wells that were screened across the water table. These K_H values are representative of the varied geologic unit characteristics found at the water table in OU-3 (i.e., tight clayey silt to coarse sands and gravel (Figure 7-1) and are much lower than the regional K_H values cited in Section 2.7.1. These data indicate a horizontal K_H range of 0.59 to 60 feet per day (ft/d) at the Yard. The slug test data is provided in Appendix A.

3.0 PREVIOUS INVESTIGATIONS IN AREA 1 (OU-3)

This section provides a summary of all previous investigations conducted in Area 1 (OU-3), and it includes a brief summary of investigations conducted prior to Roux Associates' involvement at the Yard. The results of all of these investigations were provided to NYSDEC in the OU-3 RI Report (Roux Associates, 2001a), and are summarized below. The Supplemental OU-3 RI, which was completed after submittal of the OU-3 RI Report, is discussed in detail in Section 4.0 of this report, and the baseline SPH monitoring data is discussed in Section 7.2 of this report. A summary of all soil samples that were collected in OU-3 during the previous investigations conducted by Roux Associates discussed in this section is provided in Table 3-1 and includes the following information: sample location/designation; sample depth; sample date; and analytes.

The following investigations, for which Amtrak has records (i.e., prior to Roux Associates' involvement), were conducted in Area 1 (OU-3).

- On August 21 and 22, 1985, three soil samples were collected by Atlantic Environmental, Dover, New Jersey, from the area surrounding the former Engine House. All three samples were determined to have PCB concentrations below 50 ppm.

- On November 12, 1985, RMC Environmental Services, Pottstown, Pennsylvania, collected two wall scrapings from the former Engine House. The test results indicated both samples to have PCB concentrations below 50 ppm.

- On November 21, 22, 23, 25, and 26, 1985, all 49 stationary transformers located in the Yard were analyzed for PCBs by RMC Environmental Services. Of the 49 transformers, 14 were determined to have PCB levels above 50 ppm. Four of these were located in OU-3.

- Geraghty & Miller, Inc., Plainview, New York, was retained by Amtrak in February 1986 to conduct an investigation of the former UST area, the former Engine House, the former Oil House, and the former fuel transfer area to determine if leakage of hydrocarbon compounds had occurred and, if so, to determine the extent of contamination in both soil and groundwater. A June 1986 report, titled "Results of Hydrogeologic Investigation at the Amtrak, Sunnyside, Queens, New York Train Yard" (Geraghty & Miller, Inc., 1986) concluded that a plume of SPH exists in the area east of the Engine House, and that this plume appears to have originated at the underground storage tanks of the former fuel storage area and has migrated beyond the Amtrak's northern property boundary. PCB concentrations in the SPH plume ranged from 5 to 360 ppm, with the highest concentrations being detected in samples collected immediately east of the Engine House. PCBs were also detected in soil samples, with concentrations ranging from 0.19 to 24 ppm in the 0 to 2 feet bls interval, but no PCBs were detected in groundwater.

Investigations conducted by Roux Associates (i.e., preceding the Supplemental OU-3 RI) where work was performed in OU-3 are listed below with references to the corresponding reports or documentation provided in parentheses.

- Phase I RI (Roux Associates, 1992a);
- Delineation of the Offsite Extent of the Separate-Phase Petroleum Accumulation in Area 1, (documented in the Phase I RI);
- Delineation of the Separate-Phase Petroleum Accumulation in Area 1, (documented in the Phase II RI/Phase II RI Addendum);
- Phase II RI/Phase II RI Addendum (Roux Associates, 1995);
- Results of Soil Sampling in Selected Work Areas Located in OU-3, (Roux Associates, 1998c);
- Results of Additional Soil Samples Collected in the Subject Area of OU-3, (Roux Associates, 1998e);
- OU-6 RI Baseline Groundwater Sampling in Area 1 (OU-3) (Roux Associates, 1999b);
- Results of the Additional Delineation of the Separate-Phase Petroleum Accumulation in OU-3, (Roux Associates, 1999d); and
- OU-3 RI (Roux Associates, 2001a).

Details for these investigations (i.e., those parts of the investigations occurring within OU-3) are discussed in the sections below in the order given above (i.e., chronologically). Analytical results for PCBs and cPAHs are discussed in terms of total concentrations because the NYSDEC-recommended soil cleanup levels are for total concentrations. All soil sampling results for both the previous investigations and the Supplemental RI are presented in Tables 3-2 to 3-9, and all groundwater sampling results, and sewer sediment and water sampling results, are included in Appendix A in Tables A-1 to A-7. Soil boring and well construction logs are provided in Appendix C.

3.1 Phase I RI

The Phase I RI work in Area 1 (OU-3) was conducted from October 1990 to March 1991 and included the collection of 28 soil samples from 24 soil or well borings and the collection of groundwater samples from 13 monitoring wells. The purpose of the Phase I Investigation was to accomplish the following: develop data necessary to evaluate the nature, extent and potential

migration pathways of SPH containing concentrations of PCBs that had previously been identified; determine the nature and extent of hydrocarbon constituents and PCBs in soil; further define the extent of the SPH plume; determine groundwater quality; and determine hydrogeologic characteristics. In addition, the Phase I SPH IRM system was expanded to enhance remediation of the SPH plume (see Section 6.1). A discussion of the results of the Phase I RI soil and groundwater sampling is discussed below.

3.1.1 Phase I RI Soil Sampling Results

As mentioned above, 28 soil samples were collected from 24 soil or well borings (Monitoring Well Borings MW-13 [installed to replace the Geraghty & Miller Monitoring Well MW-13 – see Section 3.3], MW-16, MW-17, MW-19, MW-20, MW-21, and MW-22, and Soil Borings S-1 to S-5, S-7 to S-10, S-61 to S-64, S-66, S-67, S-68, and S-76). The soil samples were submitted for laboratory analysis for the target compound list/target analyte list (TCL/TAL) parameters (i.e., volatile organic compounds [VOCs], SVOCs, [includes PAHs and cPAHs], PCBs, and metals). The analyses performed on each soil sample are listed in Table 3-1. The analytical results are presented in Tables 3-2 to 3-6 and are briefly discussed below.

Three of the 28 soil samples (S-61 [5 to 7 feet bls], S-62 [0 to 2 feet bls], and S-64 [2 to 3 feet bls]) were analyzed for VOCs. Four VOC species were detected in the three samples (acetone, carbon disulfide, toluene, and methylene chloride), all well below the NYSDEC-recommended soil cleanup objectives (RSCOs) and are all common laboratory contaminants. These same three samples were also analyzed for SVOCs, but none were detected.

Lead was detected just above the NYSDEC-recommended soil cleanup level of 1,000 mg/kg in only one of the seven samples analyzed for lead: 1,080 mg/kg in S-62 (Plate 3-4). All other results for lead were below the NYSDEC-recommended soil cleanup level. In Borings S-61, S-62, and S-64, several other metals were detected at concentrations above the NYSDEC RSCO (arsenic in S-64 [8.1 mg/kg]; barium in S-61 [418 mg/kg]; beryllium in S-61 [0.46 mg/kg]; cadmium in S-64 [2.1 mg/kg]; chromium in S-62 [14 mg/kg] and S-64 [19 mg/kg]; copper in S-61 [96 mg/kg], S-62 [76 mg/kg], and S-64 [279 mg/kg]; iron in S-61 [13,000 mg/kg], S-62 [10,100 mg/kg], and S-64 [38,700 mg/kg]; mercury in S-61 [0.17 mg/kg], S-62 [0.31 mg/kg],

and S-64 [0.29 mg/kg]; nickel in S-61 [14 mg/kg] and S-64 [23 mg/kg]; and zinc in S-61 [100 mg/kg], S-62 [58 mg/kg], and S-64 [303 mg/kg]).

PCB concentrations ranged from non detect (S-3 [3 to 5 feet bls]; S-61 [5 to 7 feet bls]; S-62 [0 to 2 feet bls]; and S-66 [3 to 5 feet bls]) to 13,652 µg/kg in S-76 [0 to 0.7 feet bls] (Plate 3-2). All detected PCB concentrations were well below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg.

3.1.2 Phase I RI Groundwater Sampling Results

Groundwater samples were collected from eight monitoring wells (MW-1, MW-3, MW-9, MW-13, MW-19, MW-21, MW-22, and MW-23D). Samples collected from Monitoring Wells MW-1, MW-9, MW-13, MW-19, and MW-23D were analyzed for TAL metals. Samples collected from monitoring wells MW-1, MW-9, MS-13, MW-19, and MW-23D were analyzed for the complete TCL VOCs, TCL SVOCs, pesticides, PCBs, and TAL metals. Samples from Monitoring Wells MW-3, MW-21, and MW-22 were analyzed for PCBs only. The analytical results for these samples are evaluated below in terms of GA groundwater standards.

- Water level and product thickness monitoring indicate that the SPH plume in Area 1 (OU-3) extends northward from the Metro Shed to the northern LIRR property boundary. Apparent SPH thickness measurements in monitoring wells within this area exceeded four feet. PCB concentrations in SPH samples collected from Monitoring Wells MW-5 and MW-16 were 3,600 and 122,673 micrograms per liter (µg/L), respectively.

- No VOCs were detected above GA standards in shallow groundwater samples collected along the perimeter of the SPH plume. In addition, low concentrations of only a limited number of SVOCs were detected, with only bis(2-ethylhexyl)phthalate (a common laboratory contaminant) detected above GA standards at MW-13. PCBs, however, were detected above GA standards in two perimeter-monitoring wells (MW-13 and MW-22), both of which contained an observable sheen.

- Iron, lead, manganese and sodium exceed GA groundwater standards in most of the shallow monitoring wells sampled in Area 1 (OU-3).

- Ethylbenzene and total xylenes were detected above GA standards in groundwater samples collected from the one deeper Upper Glacial aquifer monitoring well (MW-23D). Bis(2-ethylhexyl)phthalate (a common laboratory contaminant) was detected above GA standards in MW-23D. In addition, low concentrations of 2-methylnaphthalene were detected.

Overall, groundwater quality appears to have been only minimally affected by the SPH plume in Area 1 (OU-3) and by OU-3 operations.

3.2 Phase I Delineation of the Offsite Extent of the SPH Plume

The offsite SPH plume delineation work was performed as an extension of the Phase I RI in October 1991 with oversight provided by the NYSDEC. The purpose of this work was to further visually delineate the horizontal and vertical extent of the SPH plume floating on the water table beyond the Amtrak property boundary (i.e., the LIRR property and buildings north of the LIRR property). This investigation included the following work:

- Completion of soil borings and installation of monitoring wells (MW-35 and MW-36) between the sewer and the offsite buildings north of OU-3 (Plate 3-1);
- Inspection of sumps located in offsite buildings;
- Completion of eight hand-borings (HB-1 through HB-8) around the perimeter of the known SPH plume (Plate 3-1); and
- Collection of sewer water samples from Manholes MH-3 and MH-5.

The results of the offsite SPH plume delineation work indicated that the plume had not migrated northward beyond the sewer, was not present beneath the buildings located along Northern Boulevard, and was not migrating offsite in the sewer. The sewer, which parallels the northern boundary of the LIRR property, is apparently acting as a physical barrier to the northward migration of groundwater and the SPH floating on it. The results of the investigation were originally presented in an October 13, 1992 letter report from Roux Associates to Mr. James Quinn of the NYSDEC (Roux Associates, 1992c).

3.3 Phase II RI/Phase II RI Addendum

The Phase II RI and Phase II RI Addendum (August 1992 to August 1994) were conducted to fill in data gaps remaining from the Phase I RI and previous investigations at the Yard. The media that were investigated during the Phase II RI included soil, SPH, groundwater (shallow and deep), sewer water and sewer sediment. The Phase II RIs were designed to do the following: confirm analytical results of soil samples discussed in the Phase I RI report, further delineate the SPH plume, determine the nature and extent of contamination in soil, groundwater, and the sewer system, and develop additional information regarding the hydraulic relationship between the

groundwater in shallow deposits and the groundwater in the deeper deposits of the Upper Glacial aquifer underlying the Yard.

As mentioned in the Introduction (Section 1.0), because OU-3 includes only three of the 17 Areas identified in the Phase I RI (Areas 1, 6 and 7), only the results of these three Areas are discussed in this Final OU-3 RI Report. Sampling locations in the three Areas are presented on Plate 3-1 and analytical results are presented in Tables 3-2 (PCBs), 3-3 (cPAHs), 3-4 (SVOCs), 3-5 (Metals), and 3-6 (VOCs).

3.3.1 Phase II RI/Phase II RI Addendum Additional On-Site Delineation of the SPH Plume

The additional on-site investigation to delineate the SPH plume (especially the southeast part of the plume) was completed in four phases from January 1993 through April 1993. In addition, the data from the delineation investigations were used to modify the locations of permanent monitoring wells proposed for the Phase II RI and to determine locations of additionally required monitoring wells.

The four phases of the SPH plume delineation investigations included the completion of a total of 52 hand borings to the water table. These borings were used to determine the visual presence or absence of SPH. Samples for SPH analysis were not collected during the delineation investigations. Additional details of the hand borings were provided in the Phase II RI (Roux Associates, 1995). A summary of each of the four phases of the SPH delineation investigation is provided below. The locations of the hand borings are provided on Plate 3-5.

During Phase 1 of the SPH plume delineation investigation, Roux Associates completed nine hand borings (GM-2, GM-2A, GM-2B, GM-2C, GM-3 and GM-9 through GM-12) adjacent to existing monitoring wells previously installed by Geraghty & Miller (MW-2, MW-3, MW-9, MW-10, MW-11, and MW-12). The locations of these borings are provided on Plate 3-5. The visual results of these borings were compared to observations from the adjacent Geraghty & Miller monitoring wells.

The 11 remaining Geraghty & Miller monitoring wells were subsequently abandoned and, therefore, the locations are not shown on groundwater figures or plates in this Final OU-3 RI Report. The former locations of the Geraghty & Miller monitoring wells were provided on Plate 5 of the Phase II RI (Roux Associates, 1995)

During the Phase 2 SPH plume delineation investigation, Roux Associates completed 19 hand borings (PD-1, PD-4 through PD-19, PD-22 and PD-23). Locations of these borings are provided on Plate 3-5. No SPH or sheen was observed on the water table within Borings PD-1, PD-13 through PD-15, PD-17 and PD-18, confirming the previous delineation results along the western and southwestern boundaries of the SPH plume. SPH was observed on the water table within Borings PD-10, PD-16, and PD-23, confirming the presence of the previously identified SPH at those locations. With the exception of PD-19 (which is located west of the plume), all remaining borings (PD-4 through PD-9, PD-11, PD-12 and PD-22) contained either SPH or a sheen on the water table, extending the former eastern boundary of the SPH plume further east toward the Turntable and further southeast. A sheen was also observed in Boring PD-19, and appeared to be an isolated occurrence. However, at the request of NYSDEC, further delineation was required.

During the Phase 3 SPH plume delineation investigation, Roux Associates completed 15 hand borings (PD-24 through PD-30, PD-32 and PD-34 through PD-40). Locations of these borings are provided on Plate 3-5. No SPH or sheen was present on the water table in Borings PD-25 and PD-26, located east of the Turntable. However, SPH or a sheen was observed in Borings PD-24 and PD-27 through PD-29, extending the SPH plume boundary further east and southeast. No SPH or sheen was noted in PD-30 and, therefore, the southwest corner of the SPH plume was delineated. Borings PD-32 and PD-34 were installed to delineate the SPH observed in Boring GM-10 (installed adjacent to MW-10 during the Phase 1 delineation investigation by Roux Associates). No sheen or SPH were observed on the water table within either boring, confirming that the SPH observed in Boring GM-10 was an isolated occurrence. Borings PD-35 through PD-40 were installed to delineate the SPH observed on the water table within Boring GM-12 (adjacent to MW-12). Results show that either SPH or a sheen was present in each upgradient boring (PD-35, PD-36 and PD-38), and absent in the cross gradient (PD-37) and each

downgradient boring (PD-39 and PD-40). Therefore, the SPH observed on the water table at Boring GM-12 also appears to have been an isolated occurrence.

The Phase 4 SPH plume delineation investigation was based on the results of Phase 3, and consisted of the completion of nine hand borings (PD-41 through PD-48 and PD-53). Locations of these borings are provided on Plate 3-5. No SPH or sheen was observed on the water table in Borings PD-44 and PD-46, located south of the Metro Shed and east of the Locker Room/Shop. However, SPH was observed in Boring PD-45 and a sheen was observed in Boring PD-47, prompting completion of an additional boring to the east (PD-53). No SPH or sheen was observed in PD-53, thus delineating the southeastern extent of the SPH plume. No SPH or sheen was observed in two of the borings located downgradient to the northwest of the Turntable (PD-42 and PD-43), and only a sheen was observed in Boring PD-41. These data complete the delineation of the northeast edge of the SPH plume in Area 1 (OU-3). No sheen or SPH was observed on the water table in Boring PD-48. These data delineated the SPH detected near Monitoring Well MW-12 (GM-12), confirming that this is an isolated occurrence of SPH and not part of the larger SPH plume.

The results of the additional SPH plume delineation investigations, Phases 1 through 4, indicated that the previously delineated northern, western and southwestern boundaries of the SPH plume were generally accurate, and the plume was found to extend further to the south and southeast, but needing additional work for better delineation (see Section 3.3.3).

3.3.2 Phase II RI/Phase II RI Addendum Soil Investigation

During the Phase II RI, soil samples were collected from soil borings, test pits, and monitoring well boring(s) in the following four areas within Area 1 (OU-3):

- Northwest and west of the Turntable.
- South of the Metro Shed.
- Adjacent to Monitoring Well MW-10.
- Adjacent to Monitoring Well MW-12.

The findings of these investigations are discussed below (Sections 3.3.2.1 to 3.3.2.5).

3.3.2.1 Turntable Area Soil Borings

Two soil borings (S-129 and the boring for Monitoring Well MW-54) were completed in the Turntable Area: one soil sample was collected from Boring S-129 (3 to 5 feet bls), and one soil sample was collected from the pilot boring for Monitoring Well MW-54 (3 to 5 feet bls) (Plate 3-1). Both samples were analyzed for the TCL/TAL parameters. No COCs were detected above the NYSDEC-recommended soil cleanup levels in either boring.

Although a sheen was observed on the water table in Boring S-129, VOCs were not detected in the soil sample. Ethylbenzene was detected in the soil sample from MW-54 at 640 µg/kg (Table 3-6). Fourteen SVOCs, including five cPAHs, were detected in Boring S-129, but none above the NYSDEC-recommended soil cleanup level (Tables 3-3 and 3-4). Five SVOCs (all PAHs, but no cPAHs) were detected in the sample from the MW-54 pilot boring. In the MW-54 sample, iron (6,810 mg/kg) and zinc (37.4 mg/kg) were detected above the RSCO, whereas in S-129 chromium (17 mg/kg), copper (106 mg/kg), iron (17,700 mg/kg), nickel (14 mg/kg), and zinc (50.2 mg/kg) exceeded the respective RSCO. Lead was detected below the NYSDEC-recommended soil cleanup level of 1,000 mg/kg in both S-129 (46.9 mg/kg) and MW-54 (18.5 mg/kg) (Table 3-5). PCBs were detected at a total concentration of 190 µg/kg in S-129, and 173 µg/kg in the MW-54 boring; both below the 25,000 µg/kg NYSDEC-recommended soil cleanup level.

3.3.2.2 Test Pits in Area South of the Former Metro Shed

In April 1994, Roux Associates supervised the excavation of three backhoe-dug test pits (S-122, S-123, and S-124) for visual inspection of the subsurface soil to determine if the SPH plume extended south of the retaining wall i.e., (south of the former Metro Shed and Locker Room/Shop) and between Tracks 4 and 5, adjacent to the south OU-3 boundary (Plate 3-1). Soil samples were only submitted for analysis from Test Pit S-122.

Originally, three soil borings bearing the same identification as the test pits (i.e., S-122, S-123, and S-124), and a monitoring well were planned, but they could not be installed due to the difficult drilling conditions that were encountered. Installation of these borings and monitoring well were attempted a second time using a tripod rig without success.

The results of the test pit sampling were evaluated to determine the need for additional delineation south of the retaining wall (Plate 3-1). The soil sample from Test Pit S-122 (7.5 to 8.5 feet bls) was selected for laboratory analyses for TCL/TAL parameters (Tables 3-2 to 3-6). No VOCs were detected. Eight SVOCs (4 cPAHs) were detected below the RSCOs and NYSDEC-recommended soil cleanup level for cPAHs. Beryllium (0.63 mg/kg), chromium (16.1 mg/kg), copper (33.7 mg/kg), iron (16,900 mg/kg), nickel (13.2 mg/kg), and zinc (66 mg/kg) exceeded the respective RSCO. PCBs were detected at a total concentration of 37 µg/kg, below the NYSDEC-recommended soil cleanup level. Since no SPH was encountered in the test pits, additional work was not required (i.e., the monitoring well originally proposed as designation MW-60, and proposed Soil Borings S-125 through S-128 were not installed).

3.3.2.3 Soil Borings in Area Adjacent to Former Geraghty & Miller Monitoring Well MW-10

To determine the extent of the isolated occurrence of SPH detected adjacent to former Geraghty & Miller Monitoring Well MW-10, five soil borings (S-130 to S-134) were drilled to the water table in this area (see Plate 3-1). The only soil sample that was collected (November 8, 1993) for analysis (TCL/TAL parameters) was from Boring S-134 (2 to 4 feet bls). No COCs were detected above NYSDEC-recommended soil cleanup levels in the sample. The analytical results are presented in Tables 3-2 to 3-6 and are discussed below.

No VOCs were detected in this sample. However, eleven SVOCs were detected, including two PAHs, phenanthrene and pyrene, both known constituents of No. 2 fuel oil. Five cPAHs were detected but at a total concentration (2,830 µg/kg) well below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg. Metals detected above RSCOs included arsenic (8.9 mg/kg), chromium (66.3 mg/kg), copper (168 mg/kg), iron (25,200 mg/kg), mercury (0.37 mg/kg), nickel (23 mg/kg) and zinc (223 mg/kg). Lead (591 mg/kg) was detected at a concentration below the NYSDEC-recommended soil cleanup level for this metal (1,000 mg/kg). PCBs were detected in S-134 at a total concentration of 390 µg/kg and below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg.

As proposed in a December 22, 1993 letter to the NYSDEC, three additional borings (SB-143 through SB-145) were drilled downgradient to the northwest of MW-10 (Plate 3-1) for

observation purposes only. No samples were collected and submitted for analysis from these additional borings. A sheen was noted at S-143 and SPH was observed at S-144. However, no SPH was observed at S-145, located approximately 15 feet west of S-144.

3.3.2.4 Soil Borings Adjacent to Former Geraghty & Miller Monitoring Well MW-12

To determine the nature and extent of the isolated occurrence of SPH detected west of the Engine House (and away from the main SPH plume) near former Geraghty & Miller Monitoring Well MW-12, five soil borings (S-135 to S-139) were installed (see Plate 3-1). Indications of SPH (i.e., odors, staining, etc.) were observed in all borings. Samples were collected from soil borings S-135 (3 to 3.5 feet bls) and S-139 (3 to 3.1 feet bls) for analysis (TCL/TAL parameters). Although originally not proposed, the S-135 sample was collected for analysis because a clear, oily substance was observed. No COCs were detected above NYSDEC-recommended soil cleanup levels in any of the samples. The analytical results are presented in Tables 3-2 to 3-6 and are discussed below.

Low levels of one VOC and two SVOCs were detected in Boring S-135: 1 µg/kg xylenes (total); 17 µg/kg dibenzofuran; and 31 µg/kg fluorene. Only two metals were detected above the RSCO in S-135: iron (3,910 mg/kg) and zinc (38.8 mg/kg). Lead was detected at a concentration of 5.4 mg/kg, well below the NYSDEC-recommended soil cleanup level of 1,000 mg/kg. PCBs were detected at a total concentration of 12 µg/kg, well below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg.

In soil sample S-139 (3 to 3.1 feet bls), no VOCs were detected, but nine SVOCs (predominantly PAHs [including cPAHs]) were detected; cPAHs were detected at a total concentration of 191 µg/kg, well below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg. Four metals were detected above the RSCO in S-139: chromium (11.6 mg/kg), copper (54.2 mg/kg), iron (10,400 mg/kg), and zinc (38.3 mg/kg). Lead (27.1 mg/kg) was detected at a concentration well below the NYSDEC-recommended soil cleanup level. In addition, PCBs (140 µg/kg) were not detected above the established NYSDEC-recommended soil cleanup level of 25,000 µg/kg. The analytical results for the MW-12 area investigation confirm that the

previous detection of SPH adjacent to this monitoring well was an isolated occurrence and not part of a larger area of SPH contamination.

3.3.2.5 PCB Confirmatory Soil Sampling

In 1993 (January/February and November), ten soil samples (CS-1, CS-3, CS-5, CS-10, CS-61, CS-64, CS-67, CS-76, CMW-20 and CMW-22) were collected at a variety of locations in OU-3 to confirm the concentrations of PCBs previously detected during the Phase I RI. The analytical results (Table 3-2 and Plate 3-2) confirm the earlier detections of PCBs with only one sample (73,000 µg/kg total PCBs in CS-76) above the 25,000 µg/kg NYSDEC-recommended soil cleanup level. Details are provided in the following paragraph.

PCBs were detected in the following 10 confirmatory soil samples at the total concentrations (and depths) indicated: CS-1 (8,600 µg/kg [0 to 2 feet bls]); CS-3 (2,250 µg/kg [3 to 5 feet bls]); CS-5 (2,140 µg/kg, [0 to 2 feet bls]), CS-10 (370 µg/kg [0 to 2 feet bls]); CS-61 (97 µg/kg [5 to 7 feet bls]); CS-64 (1,500 µg/kg [2 to 3 feet bls]); CS-67 (430 µg/kg [0 to 2 feet bls]); CS-76 (73,000 µg/kg [0 to 0.5 feet bls]); CMW-20 (550 µg/kg [0 to 2 feet bls]); and CMW-22 (1,500 µg/kg [0 to 2 feet bls]). As mentioned above, only the CS-76 sample exceeded the NYSDEC-recommended soil cleanup level of 25,000 µg/kg.

3.3.3 Phase II RI/Phase II RI Addendum SPH Plume Delineation in Southeast Part of OU-3

As part of the continuing SPH plume delineation investigation, three additional monitoring wells (MW-56, MW-58, MW-59) were installed in the southeast part of OU-3 to fill in data gaps from the previous SPH plume delineation investigations (e.g., Phases 1 to 4) (Section 3.3.1) in Area 1 (OU-3). Details on the installation of these three additional monitoring wells are provided in the next section (Section 3.3.3.1), where the installation of other monitoring wells also installed during the Phase II RI/Phase II RI Addendum will be discussed. Two comprehensive rounds of water level and SPH-thickness measurements were collected from all existing monitoring wells in Area 1 (OU-3), including the three additional SPH plume monitoring wells, and other monitoring wells installed during the Phase II RI and Phase II RI Addendum. A discussion of the results of the SPH plume monitoring will be discussed in Section 3.3.3.2.

3.3.3.1 Phase II RI/Phase II RI Addendum Monitoring Well Installation

During the Phase II RI and Phase II RI Addendum, in addition to the three monitoring wells installed south of the Metro Shed for SPH plume delineation (MW-56, MW-58, and MW-59), 14 other monitoring wells were installed for different purposes giving a total of 17 additional monitoring wells installed in Area 1 (OU-3): nine shallow wells to replace Geraghty & Miller monitoring wells removed from the monitoring network (MW-49 through MW-55, MW-57 and MW-63); and five wells to provide additional information (MW-37 and MW-60 [shallow], MW-38D, MW-39D, and MW-40D) (Plate 3-1).

The three shallow monitoring wells, MW-56, MW-58, and MW-59, were installed south of the Metro Shed at locations chosen based on the results of additional SPH delineation via hand-dug borings completed during the SPH plume delineation investigation (Section 3.3.1, Plate 3-1). Monitoring Well MW-60, which was originally proposed to be designated MW-64, was installed downgradient of the Turntable and re-designated as MW-60 to remain numerically sequential with the other existing monitoring well identifications. Locations for Monitoring Wells MW-49 through MW-55, MW-57 and MW-63 were chosen based on a review of previous monitoring data from Geraghty & Miller, and data derived from existing monitoring wells in Area 1 (OU-3) installed under supervision by Roux Associates.

Shallow Monitoring Well MW-37, and deep Monitoring Wells MW-38D, MW-39D and MW-40D, were installed as part of the Phase II RI Addendum work. Monitoring Wells MW-38D, MW-39D and MW-40D were installed as clusters to shallow wells MW-49, MW-19, and MW-57, respectively. In addition, MW-37 was relocated to a position downgradient of Areas 1, 6 and 7 to evaluate groundwater quality downgradient of these Areas.

Soil samples were collected from two borings for two new monitoring wells (MW-54 and MW-58). The locations of these two monitoring well borings were selected to confirm the results of hand borings PD-46 and PD-53 from the SPH delineation investigation (Section 3.3.1). Observations from PD-46 and PD-53 indicated that the SPH plume did not extend significantly beyond the northwest corner of the former inspection pit. During the well installation, soil samples were collected from Monitoring Wells MW-54 (3 to 5 feet bls) and MW-58 (2 to 3 feet bls) for TCL/TAL analyses. No COCs were detected above NYSDEC-recommended soil

cleanup levels in any of the samples. The analytical results are presented in Tables 3-2 to 3-6 and are discussed below.

No VOCs were detected in the MW-58 soil sample. Ethylbenzene (640 µg/kg) was detected in the MW-54 soil sample. Ten SVOCs were detected including two cPAHs having a total combined concentration of less than the NYSDEC-recommended soil cleanup level of 25,000 µg/kg in the MW-58 soil sample. No cPAHs were detected in the MW-54 soil sample. Five of the SVOCs (naphthalene, 2-methylnaphthalene, fluorene, phenanthrene and pyrene) detected in the MW-54 and MW-58 soil samples are known constituents of No. 2 fuel oil. PCBs were detected in the MW-54 soil sample (173 µg/kg) and MW-58 soil sample (730 µg/kg) below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg.

Iron (6,810 mg/kg) and zinc (37.4 mg/kg) were the only exceedances of the RSCOs in the soil sample from MW-54. RSCOs were exceeded in the MW-58 soil sample for beryllium (0.31 mg/kg), cadmium (2.5 mg/kg), chromium (17.7 mg/kg), copper (406 mg/kg), iron (16,900 mg/kg), mercury (0.12 mg/kg), nickel (24.5 mg/kg), and zinc (763 mg/kg). Lead was not detected above the NYSDEC-recommended soil cleanup level of 1,000 mg/kg in soil samples from MW-54 (18.5 mg/kg) and MW-58 (529 mg/kg).

3.3.3.2 Phase II RI/Phase II RI Addendum Apparent SPH Thickness Measurements

On February 1 and 2, and June 14, 1994, water-level and apparent SPH thickness measurements were collected from all existing monitoring wells in Area 1 (OU-3), including the wells installed during the Phase II RI/Phase II RI Addendum (see Section 3.3.3.1). Measured (i.e., apparent) SPH thickness ranged from a sheen in Monitoring Well MW-13 and monitoring wells near the periphery of the SPH plume to 4.56 feet in Monitoring Well MW-50. No SPH or sheen was observed in Monitoring Wells MW-49, MW-57, MW-59, or MW-63 during either round of measurements. Monitoring Wells MW-21, MW-52, MW-55, MW-56, and MW-58 each contained an immeasurable (less than 0.01-foot) sheen on the water table during one or both of the February and June 1994 measurement rounds. The SPH measurements were used to refine the northwestern and western limits of the SPH plume and to define the maximum areal extent of the "historical" SPH plume.

3.3.4 Phase II RI/Phase II RI Addendum Groundwater Sampling

Groundwater samples were collected from shallow and deep monitoring wells during the Phase II RI (February 9, 1993) and Phase II RI Addendum (February 17, 1994). The shallow monitoring wells sampled include: MW-35 (Phase II RI), and MW-37, MW-49, MW-57, MW-59, and MW-63 (Phase II RI Addendum). During the Phase II RI Addendum work, Monitoring Well MW-35 was also re-sampled for PCBs. The deep monitoring wells sampled include: MW-23D (Phase I RI), and MW-38D, MW-39D, and MW-40D (Phase II RI Addendum). The locations of the monitoring wells are shown on Plate 3-1 and the results of the two sampling events are summarized in Tables A-1 (VOCs), A-2 (SVOCs), A-3 (PCBs), and A-4 (metals), and are explained below.

Prior to collecting groundwater samples, the Area 1 (OU-3) monitoring wells were screened for the presence of SPH, including sheens, and thickness measurements were collected in all the wells that contained measurable SPH or sheen. Groundwater samples were not collected from monitoring wells that contained SPH (i.e., MW-50 through MW-56, MW-58 and MW-60). SPH samples were collected from four of the monitoring wells containing SPH for laboratory analysis. The results of the SPH thickness measurements and SPH analysis are presented in Section 3.3.5.

3.3.4.1 Phase II RI/Phase II RI Addendum Shallow Groundwater Quality

The groundwater sample from Monitoring Well MW-35 (the Phase II RI) was analyzed for TCL/TAL parameters (Tables A-1 to A-4). No VOCs were detected. Five SVOCs (all PAHs, no cPAHs) were detected in concentrations ranging from 0.9 µg/L to only 5 µg/L, all below GA groundwater standards. Four metals were detected above the GA standards in MW-35: iron (45,200 µg/L), lead (207 µg/L), manganese (1,280 µg/L), and sodium (131,000 µg/L). PCBs were detected at a concentration of 0.089 µg/L in this sample, thus prompting a recommendation for re-sampling to determine if the PCBs were representative of groundwater quality or of suspended particles that were observed within the groundwater sample. The well was redeveloped and re-sampled as part of the Phase II RI Addendum (see following paragraph).

The groundwater samples collected from the five shallow monitoring wells (MW-37, MW-49, MW-57, MW-59 and MW-63) during the Phase II RI Addendum were analyzed for TCL/TAL

parameters (Tables A-1 to A-4). In addition, Monitoring Well MW-35 was re-sampled for PCB analyses. VOCs (Table A-1) were only detected in MW-63: 23 µg/L of tetrachloroethene (PCE), 24 µg/L of trichloroethene (TCE), 14 µg/L of 1,2-dichloroethene (total), and 3 µg/L of 1,1-dichloroethane. All four of these VOCs are chlorinated solvents and the GA groundwater standard was exceeded for PCE, TCE, and 1,2-dichloroethene.

Based on groundwater flow patterns determined for the Yard (west/northwest) and a knowledge of the compounds used at the Yard, the detections of VOCs discussed above may not be attributable to Yard operations (Holzmacher, McLendon & Murrell [H2M], P.C., 1992); at least one offsite, upgradient location (i.e., Standard Motor Products, Inc. [SMP]) may be a contributing source of VOCs detected in OU-3 monitoring wells (Plate 3-1). SMP is located between Northern Boulevard and the Yard, hydraulically upgradient/sidegradient (east) of on-site Monitoring Wells MW-63 and MW-19 (Plate 3-1). As documented in the RI Report for SMP (Holzmacher, McLendon & Murrell, P.C., 1992), both soil and groundwater beneath the site have been contaminated with chlorinated solvents (VOCs – methylene chloride, 1,1-dichloroethene, 1,1-dichloroethane, 1,2-dichloroethene, 1,1,1-trichloroethane, TCE and PCE). The source of this contamination may be the SMP loading dock area, where drum washing took place. VOCs were present in soil at a depth of greater than 20 feet bls at this location. Additional upgradient sources of VOCs from other nearby industries may be possible.

SVOCs were detected in three shallow wells, MW-37, MW-49, and MW-63. Three SVOCs (all PAHs) were detected in MW-37, nine SVOCs (all PAHs) were detected in MW-49, and MW-63 contained one PAH and one phthalate compound (Table A-2). These SVOCs were detected at estimated concentrations ranging from 0.1 µg/L to only 3 µg/L, and none were cPAHs. No SVOCs were detected in MW-57 and MW-59.

The GA groundwater standards were exceeded for iron (MW-37, MW-49, MW-57, MW-59, and MW-63), manganese (MW-37, MW-49, MW-57, and MW-63), and sodium (MW-37, MW-57, MW-59, and MW-63).

Analytical data in the H2M report (Holzmacher, McLendon & Murrell, P.C., 1992) indicate that ten metals exceeded GA groundwater standards beneath the upgradient SMP site. Iron,

manganese, and sodium exceeded standards most often at the SMP site and by the largest margins (Holzmacher, McLendon & Murrell, P.C., 1992). Metals were detected at higher concentrations in the groundwater beneath the SMP site, with the exception of two sodium occurrences. These data confirm that elevated concentrations of iron, manganese, and sodium are indicative of natural groundwater quality within the shallow deposits, and are supported by published data (Buxton, et al, 1981).

According to the Buxton report, published data for Queens County (Buxton, et al., 1981), manganese concentrations vary within the Upper Glacial aquifer from less than 100 µg/L to greater than 10,000 µg/L, increasing as conditions become more anoxic (i.e., lacking oxygen). Published data also indicate that high manganese concentrations are associated with high iron concentrations. As previously discussed, sodium occurrences are possibly attributable to historical salt-water intrusion of the aquifer beneath the Yard, rather than related to Yard activities (Soren, 1971). In addition, the detections of the remaining metals detected within Area 1 (OU-3) may be attributed to the SMP site and possibly other upgradient sources.

During the Phase II RI Addendum, no PCBs were detected in the six monitoring wells sampled within Area 1 (OU-3), including Monitoring Wells MW-35, MW-37, and MW-49, which are downgradient of the SPH plume. Although PCBs were detected in a turbid groundwater sample from MW-35 collected during the Phase II RI, the well was redeveloped and re-sampled as part of the Addendum work. No PCBs were detected in the second, non-turbid sample, nor in the sample from Monitoring Well MW-63, thus supporting the position that PCBs detected in turbid samples are indicative of suspended particles and not groundwater quality.

3.3.4.2 Phase II RI/Phase II RI Addendum Deep Groundwater Quality

During the Phase II RI, groundwater samples were collected from one deep monitoring well (MW-23D) and were analyzed for VOCs, PCBs, and SVOCs to verify previous detections at MW-23D during the Phase I RI (Section 3.1.2). None of the analytes were detected above GA groundwater standards. Analytical results are presented in Tables A-1, A-2, and A-3, and on Plates A-1, A-2, and A-3 and are discussed below.

Two VOCs were detected in MW-23D: 1,1-dichloroethane (2 µg/L) and xylenes (1 µg/L), but no PCBs were detected. Four SVOCs (no cPAHs) were detected including 23 µg/L 2-methylnaphthalene (no standard), 4 µg/L acenaphthene (below standard), 4 µg/L dibenzofuran (no standard), and 2 µg/L phenanthrene (below standard).

Three deep monitoring wells (MW-38D, MW-39D and MW-40D) were sampled and analyzed for VOCs, SVOCs, and PCBs during the Phase II RI Addendum. None of the analytes were detected above GA groundwater standards. Analytical results are presented in Tables A-1, A-2, and A-3, and on Plates A-1, A-2, and A-3 and are discussed below.

VOCs were detected in two of the three deep monitoring wells sampled during the Phase II RI Addendum: MW-40D, which is located in OU-1 (5 µg/L of PCE [at GA groundwater standard]), MW-38D (3 µg/L of 1,1-dichloroethane [below GA groundwater standard]). Monitoring Well MW-38D is located downgradient of SMP (Plate 3-1), and although MW-40D is not located directly downgradient of SMP, the water table is nearly flat between MW-63 (also located downgradient of SMP) and MW-40D suggesting that the VOC plume is spreading radially away from the SMP site (see Plate 3-1 for Monitoring well locations, and Plate 2-1 for groundwater flow map [Section 7.2]). Although there is an upward vertical gradient within Area 1 (OU-3), contamination at the SMP site reportedly extends greater than 42 feet bls (Holzmacher, McLendon & Murrell, P.C., 1992), which is deeper than the screen zones of all monitoring wells in Area 1 (OU-3). Only one SVOC was detected in deep groundwater within Area 1 (OU-3): naphthalene was present in MW-39D at a concentration of 1 µg/L. Other monitoring wells screened in deep groundwater, located closer to the SMP site, exist in OU-6 and will be further addressed in the OU-6 RI.

3.3.5 Phase II RI/Phase II RI Addendum SPH Characterization

As discussed in Section 3.3.4, during the February 17, 1994 groundwater-sampling event in Area 1 (OU-3), monitoring wells were screened for the presence of SPH. Thickness measurements were collected in all the wells that contained SPH. In selected monitoring wells (i.e., monitoring wells containing a sufficient quantity of SPH), bail-down tests were conducted to determine "true" SPH thickness to compare to the apparent SPH thickness. In addition, SPH

samples were collected from selected monitoring wells containing SPH for laboratory analysis. The results of the bail-down testing and laboratory analysis for SPH are discussed below.

3.3.5.1 Bail-Down Testing to Determine "True" SPH Thickness

In March 1994, SPH bail-down tests were conducted in the following seven monitoring wells (all containing more than 0.5 feet of SPH) within Area 1 (OU-3) to determine "true" SPH thickness: MW-17, MW-22, MW-36, MW-50, MW-53, MW-54 and MW-60. The data collected during these tests were plotted as graphs of depth to water/depth to SPH (in feet bls) versus elapsed time (in minutes) for each well tested. These graphs were used to determine the true SPH thickness by:

- Identifying the inflection point of the depth-to-water graph (i.e., the point where the graph changes from a positive to a negative slope).
- Reading the elapsed time that corresponds to the inflection point (i.e., the inflection point time) off the graph.
- Determining the SPH thickness that occurred at the inflection point time, which is the "true" SPH thickness. This information can be read off a graph of measured (apparent) SPH thickness versus elapsed time (Testa and Paczkowski, 1989).

Graphs and tables of the bail-down test data are included in Appendix B. In general, the true SPH thickness within each well had recharged in 10 minutes or less, and the pre-test measured thickness (i.e., apparent thickness) had recharged in about 30 minutes.

The results of the data evaluation indicate that the thickest portion of the SPH plume occurs near Monitoring Well MW-50, which showed a measured SPH thickness of 4.14 feet and a true SPH thickness of approximately 1.2 feet. A similar true SPH thickness is indicated for Monitoring Well MW-17 (slightly greater than 1 foot), which had a measured (apparent) SPH thickness of 3.62 feet. The other five monitoring wells tested contained true SPH thicknesses that were 0.5 feet or less.

Monitoring Well MW-36 contained a measured (apparent) SPH thickness of 0.56 feet. The bail-down test on this well was performed in the same manner as the previous tests, with all SPH being bailed from the well. The SPH recovered to a thickness of 0.03 feet after 1.13 minutes. However, although recovery was monitored for greater than four hours, the inflection point of

the depth-to-water readings was never attained and the recovered SPH thickness remained at 0.03 foot for more than four hours after SPH was bailed from the well. The minimal SPH thickness in this off-site area is not expected to be mobile as determined by the Brooks-Corey model, which indicates that SPH is not mobile unless it is greater than 0.5-foot apparent thickness in the silty formation found here.

The majority of the SPH plume in Area 1 (OU-3) has an apparent (not true) thickness of less than one foot. Apparent SPH thicknesses of greater than one foot were limited to the IRM SPH recovery area (see Section 6.1). This area included Monitoring Wells MW-50, MW-17, and RW-3 and RW-1. Monitoring Well MW-16, which was used as a recovery well in place of RW-2, was estimated to contain less than one foot of SPH as a result of recovery through the SPH IRMs.

It is important to understand that the maps depicting SPH thickness (see Section 8.0) show apparent (measured) SPH thickness, which may be three or more times greater than the true thickness of the SPH floating on the water table (based on Yard soil characteristics) and is a considerable exaggeration of the actual vertical extent of the SPH plume and the volume of SPH that remains in OU-3. Nevertheless, unless otherwise stated, for the remainder of this report, SPH will be discussed in terms of apparent thickness, the SPH thickness measured in the field. Furthermore, when considering the significance of apparent SPH thickness, it is important to keep in mind that the Brooks-Corey model indicates that SPH is not mobile unless it is greater than 0.5-foot.

3.3.5.2 Phase II RI/Phase II RI Addendum SPH Analysis

As mentioned above, on February 17, 1994, SPH samples were collected from four monitoring wells (MW-50, MW-53, MW-54 and MW-60) where a sufficient volume of SPH was present to allow for the analysis of PCBs, hydrocarbon fingerprinting via a hydrocarbon scan, specific gravity, and kinematic viscosity. The analytical results for PCBs and the hydrocarbon scan are presented in Tables 3-10 and 3-11, respectively, and are discussed in the following paragraphs.

PCBs were detected in all four samples. Two samples contained only Aroclor-1260: MW-50 (18,000 µg/kg), located north of the Engine House, and MW-60 (830 µg/kg), located

downgradient (west) of the Turntable. The remaining two samples each contained both Aroclor-1260 and Aroclor-1254. Samples MW-53 and MW-54 contained similar concentrations of Aroclor-1254: 5,300 µg/kg and 5,200 µg/kg, respectively. Aroclor-1260 was detected in MW-53 at 3,100 µg/kg and in MW-54 at 2,200 µg/kg.

Although the same Aroclors were found in the SPH in Monitoring Wells MW-50 and MW-60, the concentration of Aroclor-1260 detected in these two samples vary by greater than one order of magnitude. These data indicate different sources of PCBs for these two locations. The results of the hydrocarbon scans indicate that the SPH within the four wells sampled most resembled No. 2 fuel oil.

The specific gravity of the four samples was similar, ranging from 0.8704 (MW-54) to 0.8799 (MW-50). These specific gravity values (dimensionless) are similar to those documented for No. 2 fuel oil (American Petroleum Institute, 1989). The kinematic viscosity of the samples ranged from 5.35 centistokes (cSts) (MW-53) to 7.70 cSts (MW-50). These data will be used during the FS for remedial alternative screening.

3.3.6 Phase II RI/Phase II RI Addendum Sewer Investigation and Oil/Water Separator Inspection

On February 8 and 9, 1993, sewer water and sediment samples were collected from manholes within Area 1 (OU-3) as part of a Yard-wide investigation to determine if the primary or secondary combined sewer system beneath the Yard (as defined in the Phase I RI) was acting as a conduit for offsite migration of PCBs. In addition, the oil/water separator in OU-3 was also inspected to determine the condition and status of the system.

Four water samples (MHW-3, and MHW-5 to MHW-7) and one sediment sample (MHS-3) were collected from primary sewer system manholes located within Area 1 (OU-3) and analyzed for PCBs. A water sample was also planned to be collected from Manhole MH-4, but it was not accessible, and therefore, was not sampled (see Plate 3-1 for manhole locations). Samples collected at each manhole were given the same sample identification with a "W" added to indicate water sample and an "S" added to indicate a sediment sample (e.g., the water sample collected from Manhole MH-3 was labeled MHW-3, and the sediment sample collected was

labeled MHS-3). A summary of the results for the sewer water and sediment samples is presented in Tables A-6 and A-7, respectively. For completeness, these tables also include analytical data collected from the manholes in OU-3 (as well as in Catch Basin CB-4) before and subsequent to the Phase II RI/Phase II RI Addendum.

PCBs were detected in the water sample collected from the Manhole MH-7, which is located immediately north and downstream of the former Metro Shed. PCBs were detected at total concentrations of 14.8 µg/L. However, no PCBs were detected in the two sewer water samples collected downstream of MH-7: MHW-3 and MHW-5, respectively. No PCBs were detected in the water sample collected from Manhole MH-6 (sample MHW-6), located adjacent to the Drum Storage Area (Area 6) and downstream of the former Engine House (Plate A-5).

PCBs were detected at a total concentration of 54,000 µg/kg in MHS-3, which is above the NYSDEC-recommended soil cleanup level of 25,000 µg/kg for PCBs. The presence of PCBs in the sediment sample at MH-3 but their absence in the water sample at this location demonstrate that the PCBS have a high soil/water partition coefficient (i.e., a high affinity for soil/sediment compared with water).

In April 1994, Roux Associates performed an inspection and evaluation of the Oil/Water Separator. The location of the Oil/Water Separator (near the northeast corner of the former Engine House and south of CB-4) and location of existing sewer piping in the area are shown in Plate 3-1. The liquid contents of the separator were pumped out and it was inspected to determine the condition and status of the system.

After the pump out, Roux Associates personnel investigated the status of the Oil/Water Separator for three days. On the third day, after it had rained the night before, water was observed to have accumulated in the separator.

Based on the results of the Oil/Water Separator inspection and evaluation, Roux Associates recommended that the Oil/Water Separator be properly abandoned during the future construction activities and remediation work. Abandonment of the Oil/Water Separator was completed in 1996.

3.3.7 Phase II RI/Phase II RI Addendum Area 6 Sampling

Phase II RI work performed within Area 6 consisted of the collection of two soil samples adjacent to the Drum Storage Area platform for PCB confirmation (CS-61 and CS-64), and, as part of the Phase II RI Addendum work, the collection of groundwater samples from one downgradient shallow well (MW-37) for analysis of TCL/TAL parameters. The analytical results for the soil and groundwater sampling are discussed below.

3.3.7.1 Area 6 Soil Sampling

The analytical results (i.e., PCBs) for the soil samples (CS-61 and CS-64) are presented in Table 3-2 and on Plate 3-2. Samples were collected from depth intervals where visual soil staining was indicated, but neither a sheen nor SPH was observed on the water table at either location. Soil sample CS-61 (5 to 7 feet bls) contained a total PCB concentration of 97 µg/kg and CS-64 (2 to 3 feet bls) contained a total PCB concentration of 1,500 µg/kg, which are both below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg.

3.3.7.2 Area 6 Groundwater Sampling

Monitoring Well MW-37 was sampled on February 17, 1994 for TCL/TAL analyses. The analytical results were already discussed in Section 3.3.4.1, and are discussed in more detail in this section to provide for an understanding of groundwater quality relating specifically to Area 6. The analytical results are presented in Tables A-1 to A-4. The location of this monitoring well, situated in the extreme western part of Area 1 (OU-3), was chosen to provide groundwater quality data downgradient (northwest) of Areas 6 and 7. No VOCs were detected, but three SVOCs (all PAHs) were detected in concentrations of 1 µg/L or less. Dibenzofuran was detected at a concentration of 1 µg/L (no standard or guidance value). Four metals, iron, manganese, sodium, and thallium were detected at concentrations above the GA groundwater standard. These metals detections are likely attributable to historical salt-water intrusion of the aquifer (Soren, 1971) and anoxic conditions beneath the Yard (Buxton, et, al, 1981), rather than related to OU-3 operations. No PCBs were detected in MW-37.

These data suggest that groundwater downgradient of Area 6 has not been impacted by VOCs or SVOCs. In addition, delineation of the SPH occurrence north of Area 6 (near MW-12) (see Section 3.3.2.4) indicates that the SPH is isolated, limited in extent, and does not appear to

extend beneath Area 6. This conclusion is supported by observations made while completing borings CS-61 and CS-64: although black staining was present in two soil horizons at locations CS-61 (0 to 2 and 5 to 7 feet bls), no sheen or SPH was observed on the water table at either location. The soil boring logs for these two soil borings are included in Appendix C.

3.3.8 Phase II RI/Phase II RI Addendum Area 7 Sampling

Phase II RI work within Area 7, which was located in the southwest corner of OU-3 immediately below Area 6, consisted of further defining the extent of contamination in soil by sampling a shallow soil boring (S-99). The sample was analyzed for the TCL/TAL parameters (Tables 3-2 to 3-5). As part of the Phase II RI Addendum, confirmatory soil sample (CS-67) was collected for PCB analyses to confirm the analysis performed at S-67, and, as previously discussed, one shallow downgradient well MW-37 was sampled.

3.3.8.1 Area 7 Soil Sampling

No COCs were detected above NYSDEC-recommended soil cleanup levels in sample S-99. Sixteen different SVOCs were detected in S-99 (Table 3-4), but the total concentrations of cPAHs (596 µg/kg) were below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg. Several metals were detected above the NYSDEC RSCOs: arsenic (16.8 mg/kg), beryllium (0.22 mg/kg), chromium (18.8 mg/kg), copper (90.7 mg/kg), iron (21,300 mg/kg), mercury (0.2 mg/kg), nickel (13.8 mg/kg), and zinc (56.8 mg/kg). The concentration of lead (61.9 mg/kg) in this sample was well below the NYSDEC-recommended soil cleanup level of 1,000 mg/kg. PCBs were detected at a total concentration of 120 µg/kg, which is below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg.

In the shallow confirmatory soil sample (CS-67), PCBs were detected at a total concentration of 430 µg/kg, which is below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg.

3.3.8.2 Area 7 Groundwater Sampling

As mentioned in Section 3.3.7.2, Monitoring Well MW-37 was sampled to determine potential groundwater quality impacts downgradient (northwest) of Areas 6 and 7. As discussed above, VOCs and PCBs were not detected in groundwater downgradient of Area 7. Three SVOCs (all PAHs) were detected in concentrations of 1 µg/L or less. The metals that were detected are

likely not attributable to activities in OU-3, but attributable to historical saltwater intrusion of the aquifer and anoxic conditions beneath the Yard (Buxton, et. al, 1981).

These data indicate that groundwater downgradient of Area 7 (southwest part of OU-3) has not been impacted by organic compounds (VOCs or SVOCs, including cPAHs). Though a source of the hydrocarbon sheen observed on the water table beneath Area 7 was not identified during the Phase II RI work, analytical results for groundwater samples collected from Monitoring Well MW-37 and the absence of SPH on the water table in Areas 6 and 7 soil borings indicate limited hydrocarbon impacts.

3.4 Soil Borings in HST Area

Four soil borings were completed (MW-58, HST-1, HST-16, and HST-17; Plate 3-1) west of the HSTF S&I Building in OU-3. Soil samples from MW-58, HST-16, and HST-17 were collected and submitted for analysis for cPAHs, lead, and PCBs. Two soil samples from HST-1 were collected (0 to 2-foot and 2 to 4-foot intervals) and submitted for TCL/TAL analysis. The soil sample collected from MW-58 was collected immediately adjacent to the existing monitoring well for analysis of the 0 to 2-foot interval. The results of the original soil sample from the 2 to 3 foot interval that was collected during the well installation were discussed in Section 3.3.3.1. The analytical results for these soil samples are provided in Tables 3-2 to 3-6. Of these soil samples, one sample (MW-58) was identified to exceed the NYSDEC-recommended soil cleanup level for lead (1,000 mg/kg) with a lead concentration of 1,160 mg/kg. Delineation of this exceedance was performed and is discussed below.

At Amtrak's request, in 1998, Roux Associates performed a subsurface investigation (eight soil borings) in the HST area following installation of two new sets of tracks to enable trains to exit the HSTF S&I Building. These tracks and corresponding fill material were constructed over a portion of OU-3, some of which is underlain by the thin, trailing edge of the SPH plume. The work was performed in accordance with the NYSDEC-approved document entitled "Work Plan for the Delineation and Further Characterization of Soil in the HSTF-Related Work Area located in OU-3," (Roux Associates, 1997c) as modified by NYSDEC comments contained in December 5 and 22, 1997 correspondence.

As mentioned above, the HST area investigation consisted of the installation of eight soil borings (HST-21 to HST-28) and was designed to achieve the following: further characterize both saturated and unsaturated soil in that part of the HST area located in OU-3 for the COCs (Plate 3-1); evaluate the portion of the SPH plume located beneath the work area; delineate a previously identified location that exceeded the NYSDEC-recommended soil cleanup level for lead; and determine removal/disposal options for soil where concentrations of the COCs exceed their respective NYSDEC-recommended soil cleanup level. The soil borings were completed to a maximum of three feet bls. Soil samples were collected and analyzed in accordance with the work plan (Roux Associates, 1997c), as modified.

Due to the NYSDEC's concern regarding the possibility of contamination extending into the saturated soil, the agency requested that additional (deeper) saturated soil samples be collected from Borings HST-21 through HST-25 (Plate 3-1). Therefore, Soil Borings HST-21 to HST-25 were re-drilled beyond the initial depth of three feet bls to a depth of three feet below the water table. Soil samples from the two-foot interval intersecting the water table (i.e., one foot above and one foot below) and the following deeper two-foot interval were collected and analyzed for PCBs, cPAHs, and lead.

Additionally, on January 12 and 20, 1998, soil sampling to complete horizontal delineation at locations where contaminant concentrations were identified which exceeded the NYSDEC-recommended cleanup levels was conducted. The analytical results indicated two locations where only the surface sample interval exceeded the respective NYSDEC-recommended soil cleanup level (i.e., the zero to one-foot bls interval around location HST-22 for cPAHs [the previous level of 10,000 µg/kg, see Plate 3-3], and the zero to two-feet bls interval at Monitoring Well MW-58 for lead [Plate 3-4]). Both of these exceedances were further delineated horizontally.

Soil samples HST-25 through HST-28 were collected radially around MW-58 in order to delineate the lead exceedance (1,160 mg/kg) in the zero to one-foot interval in the MW-58 boring. The results for soil samples HST-25 through HST-27 were all less than the 1,000 mg/kg NYSDEC-recommended soil cleanup level for lead, completing horizontal delineation on three sides of the exceedance at MW-58. Lead was detected in sample HST-28 (zero to two foot bls

interval) at a concentration of 1,180 mg/kg, which exceeds the NYSDEC-recommended soil cleanup level for lead. Sample HST-29 (zero to two foot bls interval) was collected approximately 20 feet west of boring location HST-28 in order to complete the horizontal delineation. Lead was detected at a concentration of 30.8 mg/kg at location HST-29, successfully completing the horizontal delineation of the lead exceedance at MW-58. HST-22 was horizontally delineated by HST-22A through HST-22D, HST-22A+10, HST-22B+20, and HST-22D+10. Both areas were remediated as part of the excavation/construction activities related to the addition of tracks to accommodate the HSTF S&I building.

The analytical results from the saturated soil samples, including those collected at and below the oil-water interface in the HST area, indicate that concentrations of COCs, where present, are well below the NYSDEC-recommended soil cleanup levels, specifically:

- PCBs were not detected above the NYSDEC-recommended soil cleanup level of 25,000 µg/kg in either saturated or unsaturated soil samples.
- Only four of the 30 samples analyzed for cPAHs exceeded the previous NYSDEC-recommended soil cleanup level of 10,000 µg/kg (i.e., the zero to one-foot bls interval at locations HST-22, HST-22A, HST-22B, and HST-22D). The cleanup level was subsequently revised to 25,000 µg/kg. Only samples HST-22A and HST-22B exceeded the revised cPAH cleanup level.
- Two unsaturated samples (0 to 2 feet bls interval at HST-28 and MW-58) exceeded the NYSDEC-recommended soil cleanup level for lead of 1,000 mg/kg. No lead was detected in saturated soil above the NYSDEC-recommended soil cleanup level.

On January 12, 1998, hydrocarbon screening was conducted near Borings HST-21 through HST-25. The presence of SPH, although not measurable, was noted at locations HST-22 and HST-23. Additionally, 0.02 feet of SPH was measured (apparent thickness) in Monitoring Well MW-22, but SPH was not detected in the sump of Recovery Trench 3 (see Section 6.1.1) (Plate 3-1).

Results of the investigation were submitted to the NYSDEC in "Results of Soil Sampling in Selected Work Areas Located in OU-3" (Roux Associates, 1998c). The evaluation of the SPH plume indicated that the actual SPH thickness in the HST area was not recoverable by conventional methods and contained no PCBs in excess of the NYSDEC-recommended soil cleanup level.

At Amtrak's direction, a bioremediation delivery system was installed throughout the hydrocarbon-impacted area beneath the proposed HST tracks. The system was installed as a precautionary measure to provide a means to mitigate residual hydrocarbon impacts in the area, if necessary, without disrupting HST service.

3.5 Additional Soil Borings in HST Area

In response to NYSDEC comments regarding the HST investigation, five additional soil borings (HST-30 to HST-34) were completed at random locations within the SPH plume. The purpose of the investigation was to characterize saturated soil beneath the SPH plume for residual PCB contamination. Additionally, at the NYSDEC's request, an oil/water sample was also collected from one of the borings and analyzed for PCBs. The results of the additional sampling are summarized below:

The five soil borings (HST-30 through HST-34) were completed to the water table (oil/water interface) using a hollow-stem auger drill rig and the following 2-feet interval of saturated soil was collected for PCB analysis. The depth to water ranged from 2.5 feet bls at location HST-31 to 5 feet bls at locations HST-33 and HST-34 where surficial fill material was encountered. At the NYSDEC's request, an oil/water sample was collected from the open borehole at location HST-30 for PCB analysis.

Total PCB concentrations in the five soil samples ranged from 37 µg/kg in sample HST-30 (3 to 5 feet bls) to a high of 300 µg/kg in sample HST-31 (2.5 to 4.5 feet bls), all well below the NYSDEC's recommended cleanup level of 25,000 µg/kg. Additionally, PCBs were not detected in the oil/water sample collected at location HST-30.

Results of the investigation were submitted to the NYSDEC in a letter report (Roux Associates, 1998e).

3.6 OU-6 RI Baseline Groundwater Sampling in Area 1 (OU-3)

In June 1997, Roux Associates collected groundwater samples from 32 active permanent and three temporary monitoring wells at the Yard as part of the OU-6 baseline sampling program (which included seven monitoring wells in OU-3) in accordance with a June 2, 1997 letter to the

NYSDEC (Roux Associates, 1997a) and the sampling procedures detailed in the Phase II RI Addendum Work Plan (Roux Associates, 1993). All wells that did not contain SPH (including a sheen) were sampled for TCL VOCs, TCL SVOCs, PCBs, and TAL metals. Temperature, pH, and conductivity measurements of the groundwater samples were collected and recorded in the field. Samples were also analyzed for TDS and chloride since these parameters must be within standards for groundwater to be suitable as drinking water.

The OU-3 monitoring wells sampled included four shallow monitoring wells (MW-19, MW-35, MW-37, and MW-49) and three deep monitoring wells (MW-23D, MW-38D, and MW-39D). Shallow monitoring well MW-63 had been destroyed and was not sampled during this event. Groundwater samples were analyzed for TCL VOCs, TCL SVOCs, PCBs, TAL metals, chloride, and TDS with the exception of MW-39D, which was analyzed for PCBs, TDS, and chloride only.

The June-July 1997 analytical data for the seven monitoring wells in OU-3 were evaluated in terms of GA groundwater standards (NYSDEC, 1998). Although the GA standards were used for evaluating the results for the seven monitoring wells, it is important to understand that the groundwater in western Queens County is degraded and is not used for drinking water. Moreover, the site is in part made land from filling of a tidal channel and marsh. Therefore, this evaluation (given below) is considered very conservative. A summary of the groundwater sampling results is presented in Tables A-1 to A-5 of Appendix A and is discussed below. These tables also include data from groundwater sampling events previous and subsequent to the Phase II RI/Phase II RI Addendum, and include data for other OU-3 monitoring wells. The groundwater data are included in Appendix A and are also plotted on Plates in Appendix A.

- Benzene, detected at a concentration of 3 µg/L in MW-35, was the only VOC to exceed its GA groundwater standard (0.7 µg/L). Analysis of the November 14, 1997 split sample from MW-35 (collected as part of the New York City Transit Authority [NYCTA]'s dewatering monitoring program) confirmed this exceedance (2 µg/L benzene). Based on the location of this monitoring well (i.e., north of the primary sewer), this exceedance may be attributable to an offsite upgradient source (i.e., SMP [see Section 3.3.4.1]) or releases associated with other commercial/light industrial buildings along Northern Boulevard.

- Four metals were detected above the GA groundwater standard or guidance value in the six samples (MW-39D was not submitted for metals analysis).
  - Antimony was detected above the guidance value (3 µg/L) in two shallow monitoring wells (MW-35 and MW-37).
  - Iron and manganese were detected above their respective standards (300 µg/L) in all six monitoring wells.
  - Sodium was detected above the standard (20,000 µg/L) in five of the six monitoring wells (MW-19, MW-23D, MW-35, MW-37, and MW-38D).
- No SVOCs (including cPAHs) were detected above GA groundwater standards or guidance values.
- No PCBs were detected above GA groundwater standard (0.09 µg/L) in any monitoring well.
- Chloride was not detected above the GA groundwater standard in any monitoring well.
- Two groundwater samples, MW-38D (1,030 mg/L) and MW-39D (842 mg/L) contained TDS concentrations that exceed the GA groundwater standard of 500 mg/L. The sample from Monitoring Well MW-38D also exceeded the New York State Class GSA (saline groundwater) standard (greater than 1,000 µg/L).

Results of the investigation were originally submitted to the NYSDEC in the May 14, 1999 report titled "Operable Unit 6 Remedial Investigation Report, Sunnyside Yard, Queens, New York" (Roux Associates, 1999b).

3.7 Soil Borings and Monitoring to Confirm SPH Plume Configuration

On September 27, 1999, a change in configuration of the SPH plume in OU-3 was observed during routine monitoring of the existing SPH IRM system. Specifically, SPH was detected in Monitoring Well MW-49 for the first time. Apparently, the SPH migrated as a result of the water table rebounding following the cessation of a prolonged de-watering operation (approximately June 1998 through September 1999) associated with the construction of a NYCTA subway along Northern Boulevard. As a result of the detection of SPH in Monitoring Well MW-49, on September 29, 1999, a soil boring and monitoring well gauging program was initiated to confirm and define the extent of the observed narrow finger of the SPH plume in the vicinity of MW-49.

A total of 27 soil borings (DB-1 to DB-27, Plate 3-5) were completed and 13 monitoring wells in the area (including former recovery wells) were gauged (i.e., collection of water levels and SPH

thickness measurements). The results of the soil-boring program indicated that a narrow finger of the SPH plume had migrated approximately 55 feet in a westerly direction between the outer boundary of Engine House Track 6 and the above grade retaining wall along the northern property boundary. There are no obvious structural controls on the south or north side of the finger, but the finger almost appears to be a linear extension of the west to east trending Interceptor Trench, one of the IRMs that was designed to collect and recover SPH (see Section 6.1). This suggests that the Interceptor Trench, which was filled with high permeability material, may have facilitated the westward movement of the SPH into more permeable materials near the surface and to the west but that the tighter formation to the north prevented migration of SPH in this direction.

The results of the soil-boring program, which included a recommendation for the installation of an additional monitoring well (MW-70), were submitted to the NYSDEC in a letter report from Roux Associates dated October 14, 1999 (Roux Associates, 1999d). The locations of the 27 soil borings (DB-1 to DB-27) and 13 monitoring wells were provided in this letter report. Monitoring Well MW-70 was installed on October 18, 1999, four days following the October 14, 1999 Roux Associates letter report. MW-70 and other monitoring wells in the area were measured at approximately two-week intervals from October 22, 1999 until April 13, 2000 to monitor for the possible continuing migration of the SPH plume.

3.7.1 Results of Monitoring the SPH Plume in OU-3

The results of the gauging activities indicated that the apparent SPH thickness measured in Monitoring Well MW-49 increased slowly from October 22, 1999 until it reached steady state on March 2, 2000 (approximately 0.75 foot). On March 31, 2000, approximately one gallon of an SPH/water mixture was bailed from the well, leaving a measured SPH thickness of 0.09-foot. On April 13, and 19, 2000, the SPH thickness in Monitoring Well MW-49 was 0.11 foot and 0.10 foot, respectively. No SPH was detected in new Monitoring Well MW-70 during the entire six-month monitoring period.

The results of the soil boring and monitoring well gauging program indicated that neither the narrow finger of SPH plume nor the SPH plume proper was migrating.

3.8 OU-3 RI

The OU-3 RI was conducted in October 2000 and consisted of the collection and analysis of soil and groundwater samples from soil borings. The sampling objectives and analytical results for each media are discussed in the following two sections.

3.8.1 OU-3 RI Soil Sampling

During the OU-3 RI, 22 soil borings were completed: TSB-2 and TSB-4 to TSB-24 (Plate 3-1). However, proposed Soil Borings TSB-1 and TSB-3 were not completed due to the presence of a concrete pad, approximately 1.5 feet in thickness, at those two locations. Six hand borings (TSB-19 through TSB-24) were completed to further define the visual extent of hydrocarbon-contaminated surface soil (not associated with the SPH plume), as presented in the approved OU-3 RI Work Plan (Roux Associates, 1997b), and were not submitted for analysis.

Soil samples from the remaining 16 of the 22 soil borings (TSB-2 and TSB-4 to TSB-18) were collected and submitted for analysis to address the following:

- Characterize lithologic conditions.
- Evaluate soil-quality conditions and confirm the depth of hydrocarbon-impacted soil beneath the SPH plume.
- Further delineate the extent of contamination exceeding the NYSDEC-recommended soil cleanup levels for the three COCs (PCBs, cPAHs, and lead).

A total of 32 soil samples, including both saturated and unsaturated soil, were collected from the 16 soil borings for laboratory analyses. None of the samples exceeded NYSDEC-recommended soil cleanup levels. The analytical results of the soil sampling are summarized in Table 3-2, 3-3, 3-5, 3-7, 3-8, and 3-9, and are also discussed below.

- All 32 soil samples collected during the OU-3 RI were analyzed for PCBs. As shown in Table 3-2, total PCB concentrations ranged from non detect to a high of 8,000 µg/kg in sample TSB–14 (2.5 to 3.5 feet bls), all below the NYSDEC-recommended soil cleanup level for PCBs (25,000 µg/kg).
- Four soil samples were analyzed for cPAHs. Analytical results are shown in Table 3-3. Total cPAH concentrations ranged from 390 µg/kg in TSB-9 (2.5 to 3.5 feet bls) to 9,080 µg/kg, in TSB-18 (0 to 1 foot bls), all below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg.

- Four samples were submitted for analysis for lead. Concentrations for lead in soil ranged from 21.3 mg/kg in sample TSB-9 (2.5 to 3.5 feet bls) to a high of 364 mg/kg in sample TSB-2 (0 to -2 feet bls), all below the NYSDEC-recommended soil cleanup level of 1,000 mg/kg. Analytical results are shown in Table 3-5.

- Four samples were submitted for Toxicity Characteristic Leaching Procedure (TCLP) analysis for SVOCs and metals; soil samples TSB-2 (0 to 2 feet bls), TSB-9 (2.5 to 3.5 feet bls), TSB-11 (2.5 to 3.5 feet bls), and TSB-18 (0 to 1 foot bls). The TCLP SVOC results were all non detect. Out of the eight TCLP metals that were analyzed, five were detected in one or more of the samples, but all at concentrations significantly less than the USEPA TCLP limits for RCRA characteristic waste. Analytical results for TCLP SVOCs and TCLP metals are shown in Tables 3-7 and 3-8, respectively. These data will be used in the FS to evaluate remedial options.

- Four soil samples, TSB-2 (0 to 2 feet bls), TSB-9 (2.5 to 3.5 feet bls), TSB-11 (2.5 to 3.5 feet bls), and TSB-18 (0 to 1 foot bls), were submitted for analysis for RCRA Characteristics (reactive cyanide, reactive sulfide, and ignitability). Results for reactive cyanide and reactive sulfide were non-detect for all samples, and ignitability for all samples was zero. Analytical results are shown in Table 3-8.

- Four soil samples, TSB-5 (0 to 2 feet bls), TSB-8 (0 to 1 feet bls), TSB-9 (2.5 to 3.5 feet bls), and TSB-17 (24 to 25 feet bls), were analyzed for wet chemistry parameters (biological oxygen demand, chemical oxygen demand, nitrate, total organic carbon, and total petroleum hydrocarbons). The results for wet chemistry analysis are shown in Table 3-9. These data will be used in the FS to evaluate remedial options.

In addition to the soil sampling described above for laboratory analysis, soil samples were also collected to the water table and visually examined to determine the vertical extent of hydrocarbon-impacted surface soil from six hand borings (TSB-19 through TSB-24). That information was evaluated along with the previous visual screening results to refine the limits of the visual hydrocarbon-impacted surface soil as shown on Plate 3-1.

3.8.2 OU-3 RI Groundwater Sampling

During the OU-3 RI, groundwater samples were collected from temporary well points in three soil borings located within the SPH plume: TSB-9 (17.5 feet bls); TSB-10 (13.5 feet bls); and TSB-16 (19.5 feet bls). These samples were analyzed for TCL VOCs, TCL SVOCs, PCBs, TAL metals, chloride and TDS. Due to turbidity in the samples (i.e., collected from Geoprobe® points rather than monitoring wells), both filtered and non-filtered samples were collected for PCB and metals analyses.

Analytical results are presented in Tables A-1 to A-5, and are discussed below in terms of GA groundwater standards and guidance values (NYSDEC, 1998). As discussed previously, these standards are considered very conservative due to the regionally degraded groundwater quality documented for this area of Queens, New York (see Section 3.6).

- Acetone, ethylbenzene, 2-hexanone, and xylenes (total) were the only VOCs detected in groundwater collected during the OU-3 RI. Ethylbenzene and xylenes (total) were detected in sample TSB-9 (5.4 µg/L and 14.6 µg/L, respectively) in concentrations that exceed their GA groundwater standards of 5 µg/L. Acetone and 2-hexanone, both common laboratory contaminants, were detected in sample TSB-10 (14 µg/L and 4.8 µg/L, respectively) at concentrations below their GA groundwater guidance values of 50 µg/L each. No VOCs were detected in sample TSB-16.

- A total of six SVOCs (acenaphthene, anthracene, dibenzofuran, fluorene, phenanthrene, and 2-methylnaphthalene) were detected in groundwater during the OU-3 RI. No SVOCs were detected above GA groundwater standards or guidance values.

- Although analyzed with a detection limit that exceeds the standard, estimated PCB concentrations would be reported if detected below the detection limit. No PCBs were detected in the groundwater samples above GA groundwater standards.

- Metals (arsenic in the unfiltered TSB-10 sample, iron in all but the filtered TSB-16 sample, manganese in all samples, and sodium in the filtered TSB-16 sample and thallium in the unfiltered TSB-10 sample) were detected above their respective GA groundwater standards or guidance values.

4.0 SUPPLEMENTAL OU-3 RI

The results of the OU-3 RI and previous investigations conducted in OU-3 prompted the Supplemental OU-3 RI to better delineate hydrocarbon impacts underlying the existing SPH plume (Task I), characterize soil quality underlying and surrounding the SPH plume (Task II), and to characterize unsaturated surface soil quality for PCBs in areas of OU-3 not previously sampled for PCBs (Task III). The Supplemental OU-3 RI activities were completed from November through December 2003 in accordance with the Supplemental RI work plan (Roux Associates, 2003). A summary of the methods, activities and results of the Supplemental RI are presented below. The results are also presented in Tables 3-2 to 3-6 and on Plates 3-2, 3-3, and 3-4.

4.1 Supplemental OU-3 RI Methodology

The Supplemental OU-3 RI included the vertical delineation of hydrocarbon impact using Cone Penetrometer Testing/Ultraviolet-Induced Fluorescence (CPT/UVIF), and the collection of soil samples from the saturated and unsaturated soil - Tasks I, II and III, respectively. Details of sample collection for each task are provided in Sections 4.1.1 through 4.1.3 below.

4.1.1 Vertical Delineation of Petroleum Impacts Underlying the SPH Plume (Task I)

The Supplemental RI soil-boring program included the completion of 20 soil borings (HD-1 through HD-20, Plate 3-1) using the CPT unit equipped with a UVIF module. The CPT/UVIF data from Borings HD-1 through HD-20 were used to delineate the vertical limit of hydrocarbon impacts to saturated soil underlying the SPH plume. The CPT/UVIF combined the down-hole analysis of UVIF of hydrocarbon contamination, and the geologic logging capabilities of the CPT. A copy of the CPT/UVIF data report was provided in Appendix A of the IRM Conceptual Design Report (Roux Associates, 2004c). A discussion of these data is provided in Section 4.2.1 and a summary report is provided in Appendix D.

4.1.2 Soil Borings in the Saturated Soil (Task II)

The supplemental soil-boring program to complete characterization of soil quality in the saturated soil underlying the SPH plume in OU-3 consisted of the collection of soil samples from 20 soil borings (HD-1 through HD-20, Plate 3-1) using the direct push Geoprobe® method. The borings were completed to a minimum of 24 feet bls with two borings (HD-7 and HD-8)

completed to 40 feet bls. Select sampling intervals in each boring were submitted for laboratory analysis based on the results of UVIF screening that was performed in CPT borings at the same locations and having the same designations as the 20 Geoprobe® borings. The first of the two samples was collected from the interval exhibiting the highest degree of hydrocarbon impact (i.e., UVIF response curve, staining or odor, elevated photoionization detector [PID] readings, visible SPH) below the 2-foot interval straddling the oil/water interface. The other (second) sample from each soil boring was collected from the first un-impacted interval beneath the hydrocarbon-impacted zone. All un-impacted sample intervals collected for laboratory analyses were first screened in the field for physical evidence of hydrocarbon contamination (as previously described) and observations were recorded in the field notebook. If hydrocarbon impact was not observed in a boring, at a minimum, the first sample interval below the water table was selected for analysis to represent the highest potential impact.

Continuous soil samples were collected from three of the twenty borings (control borings HD-7, HD-8, and HD-10) and screened for physical evidence of hydrocarbon impacts. These results were compared to the UVIF data. The UVIF data and the control boring screening data correlated well with each other thus demonstrating that the UVIF was an acceptable method for determining sampling intervals for the remaining borings.

A total of 41 soil samples were collected and analyzed for one or more of the following contaminants: PCBs, cPAHs, Lead, TCL SVOCs, and TCL VOCs (Tables 3-2 to 3-6). Analyses were performed following the latest NYSDEC analytical service protocols (ASP) with Category B deliverables. Data Validation and Data Usability Reports are provided in Appendix E.

4.1.3 Sampling of Unsaturated Soil (Task III)

Samples were collected of the unsaturated soil (0 to 2 feet bls) using decontaminated hand tools (i.e., hand auger, post-hole digger or shovel) at 14 locations (S-150 to S-163, Plate 3-1). All samples were analyzed for PCBs (Table 3-2) following the latest NYSDEC ASP with Category B deliverables. Data Validation and Data Usability Reports are provided in Appendix E.

4.2 Supplemental OU-3 RI Results

The analytical data collected to complete characterization of both saturated and unsaturated soil in OU-3 are presented in Tables 3-2 to 3-6 and are summarized below. The analytical results were evaluated in terms of the site-specific NYSDEC-recommended soil cleanup levels for the three COCs (PCBs, cPAHs, and lead) and in terms of RSCOs, for other compounds. PCBs were the only COC analyzed for unsaturated soil samples. Concentrations of metals with no RSCO were evaluated in terms of Eastern United States Background concentrations and both levels are provided in Table 3-5 (NYSDEC, 1994). Data for PCBs, cPAHs, and lead are also presented on Plates 3-2, 3-3, and 3-4, respectively, along with historic data for these compounds in the soil in OU-3.

4.2.1 Vertical Delineation of Petroleum Impacts Underlying the SPH Plume

The CPT/UVIF data and soil-boring logs were used to construct Cross Sections A-A' and B-B', which depict the vertical extent of hydrocarbon impacts underlying the SPH plume. The locations of the two sections are shown on Plate 3-1, and Cross Sections A-A' and B-B' are shown on Plates 4-1 and 4-2, respectively.

The results of the UVIF testing are given as two separate response curves from approximately three feet bls to the bottom of each soil boring: a Light Fuel Fluorescence Detector (LFFD) response curve, and a Heavy Fuel Fluorescence Detector (HFFD) response curve. Both curves are shown on the two cross sections (Plates 4-1 and 4-2) and are given in terms of magnitude in volts, as measured horizontally from the CPT boring line with one inch equal to 0.5 volts, and represent a qualitative (not quantitative) determination. The relative hydrocarbon contamination at a given depth is determined by the magnitude of the UVIF response (i.e., the more the curve deviates from the vertical, the higher the relative hydrocarbon concentration). A summary report that discusses the UVIF testing results is provided in Appendix D.

4.2.2 Saturated Soil

The analytical results of soil samples collected from soil borings completed in the saturated soil are discussed below.

4.2.2.1 PCBs

A total of 39 samples from Borings HD-1 to HD-20 were analyzed for PCBs and the analytical results are presented in Table 3-2 and on Plate 3-2. All samples were below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg for PCBs. Total PCB concentrations in saturated soil ranged from non-detect in 22 of the 39 samples, to a high of 1,500 µg/kg in sample HD-15C (sample depth: 6-8 feet bls).

4.2.2.2 SVOC/cPAHs

A total of 23 saturated soil samples were collected and analyzed for cPAHs only. Further, 18 additional saturated soil samples were analyzed for full SVOCs, including cPAHs. The analytical results for all 41 samples that included cPAH analyses are presented on Plate 3-3 and in Table 3-3. The analytical results for full SVOCs is presented in Table 3-4.

All samples were below the NYSDEC-recommended soil cleanup level of 25,000 µg/kg for cPAHs. Total cPAH concentrations ranged from non detect in 31 of the 41 sample intervals to a high of 2,840 µg/kg in sample HD-14 (4 to 6 feet bls). 2-methylnaphthalene was the only SVOC detected at a concentration that exceeded the respective RSCO. This compound is a common constituent of fuel oil and is found throughout OU-3.

4.2.2.3 VOCs

A total of 21 saturated soil samples were analyzed for VOCs. Analytical results are presented in Table 3-6. Only one of the 21 samples (HD-8D [7 to 9 feet bls]) contained VOCs (total xylenes, 2-butanone, and methylene chloride) at concentrations that exceed the RSCOs. The Data Usability Report (Appendix E) explains that the detections of 2-butanone and methylene chloride may be attributed to laboratory contamination.

4.2.2.4 Metals

A total of 15 saturated soil samples were analyzed for TAL metals, including lead. An additional 23 saturated soil samples were analyzed for lead only. The analytical results for lead are presented on Plate 3-4 and the analytical results for all 38 samples are presented in Table 3-5. Lead concentrations ranged from 1.5 mg/kg in sample HD-16 (13 to 15 feet bls) to a high of 182 mg/kg in sample HD-17 (4 to 6 feet bls), all below the NYSDEC-recommended soil cleanup

level for lead of 1,000 mg/kg. Chromium, copper, iron, nickel, and zinc exceeded the respective RSCO in one or more samples. Magnesium exceeded the Eastern USA Background criteria in two samples.

4.2.3 Unsaturated Soil (PCBs Only)

Total PCB concentrations in unsaturated soil ranged from 67 µg/kg in sample S-154 (0 to 2 feet bls) to a high of 4,500 µg/kg in sample S-161 (0 to 2 feet bls). None of the unsaturated soil samples exceeded the NYSDEC-recommended soil cleanup level for PCBs of 25,000 µg/kg. The analytical results are presented in Table 3-2 and on Plate 3-2.

4.3 Summary of Supplemental OU-3 RI Findings

The objectives of the Supplemental OU-3 RI were successfully accomplished. No COCs were detected above the NYSDEC-recommended soil cleanup levels in either saturated or unsaturated soil. Samples were collected for analysis from 41 saturated intervals from 20 borings and 14 unsaturated intervals from 14 borings. A summary of the number of samples from the saturated and unsaturated soil collected for each analytical parameter in terms of either NYSDEC-recommended soil cleanup levels or RSCOs is presented in the following table:

Parameters	Samples Collected	Exceedance of Site Specific Cleanup Level	Exceedance of RSCO
PCBs	39 saturated 14 unsaturated	**None** **None**	Not Applicable (NA) NA
cPAHs	41 saturated	**None**	NA
Lead	38 saturated	**None**	NA
SVOCs	18 saturated	NA	2-methylnaphthalene (six locations)
VOCs	21 saturated	NA	Total xylenes, 2-butanone, and methylene chloride (one location- Probable laboratory cross contamination [2-butanone and methylene chloride])
Metals	15 saturated	NA	Chromium, copper, iron, nickel, and zinc (one or more locations)

5.0 SUBSURFACE STRUCTURES

Subsurface structures within OU-3 include the former Engine House inspection and drop table pits, the Oil House basement, the former UST Areas (and former Fuel Transfer Areas), the former Metro Shed inspection pit, and the former Turntable. The following sections provide background information for these structures and discuss the previous investigations that have been performed. The subsurface structures will be addressed in more detail in the OU-3 FS.

5.1 Former Engine House Pits

The Engine House interior inspection pit system consists of four interconnected concrete pits, including two long, shallow (approximately 2 feet deep) inspection pits (Track Nos. 1 and 2 inspection pits) trending east/west (parallel to the long side of the building) and two shorter, deeper (ranging from 6 to 25 feet deep) drop table pits trending north/south (parallel to the short side of the buildings), as shown on Figure 5-1. These pits have rails passing over them and were designed to provide workers access to the locomotives and other rail equipment from underneath for maintenance and repairs, including heavy repair work at the drop table pits. Two additional inspection pits (approximately 3 feet deep) are located to the north and exterior of the former Engine House structure (Track Nos. 3 and 4 inspection pits). One of the exterior inspection pits is temporarily covered with wooden planking, while the other inspection pit remains uncapped.

As a result of approximately 90 years of servicing locomotives and other rail equipment, residual petroleum accumulated in the interior pits. In addition, the walls of the west drop table pit (6-feet in depth) became deteriorated and allowed groundwater to seep in. The shallower inspection pits and east drop table pit remained water tight, but as the west drop table pit filled with water to the level of the shallow water table, the entire pit system filled with water also. As a result, in 1994, the Engine House building was officially condemned and closed, and the above-grade portion of the building was subsequently demolished in 1996. The interior inspection pit system was left in place and capped with a concrete slab, as discussed in the April 1999 letter report titled "Engine House in Operable Unit 3" (Roux Associates, Inc., 1999a).

5.1.1 Former Engine House Pits Investigations

Sludge samples were collected from the walls and floors of the interior Engine House east drop table pit in February 1985 and submitted for analysis for PCBs. Based on the analytical results,

the walls and floor were cleaned with kerosene. All waste was collected and properly disposed offsite. Additional sludge and wipe sampling of the walls and floor was performed in November 1985 and January 1986. The Engine House east drop table pit sampling results are provided in Appendix F.

In April 1986, the National Institute for Occupational Safety and Health (NIOSH) conducted environmental monitoring, including the collection of wipe and bulk samples from the Engine House pits (NIOSH, 1986). An oily substance was still reportedly entering the west drop table pit through small cracks in the walls. . Due to the continuous groundwater seepage into the west drop table pit through deterioration cracks, the drop table pit was recleaned (sandblasted) and pressure-grouted to seal cracks in 1986. The walls and floor were then sealed with PCB-resistant epoxy paint. The NIOSH report and supporting analytical data is provided in Appendix F.

Continued deterioration of the west drop table pit allowed groundwater to again seep into the pit. In December 1993, SPH thickness measurements were taken from the water collected in the west drop table pit and Track No. 1 inspection pit (Roux Associates, 1993b). These measurements indicated that the presence of SPH was discontinuous and measured between 0.01 and 0.1 foot of SPH. The SPH was removed using oil sorbent pads. The water was transferred from the west drop table pit to the larger east drop table pit. SPH and sludge samples were collected from the west drop table pit and submitted for analysis for PCBs. The results of the laboratory analyses indicated PCBs were present in both samples. The PCB concentrations detected in these samples were 512 mg/kg and 517 mg/kg in the SPH and sludge samples, respectively. These sampling results are provided in Appendix F.

Prior to commencing demolition in 1996, Amtrak contracted Clean Harbors Environmental Services, Inc. (Clean Harbors) to clean and remove all remaining debris from the Engine House building floor. The demolition and capping of the interior pits commenced later that year. SPH remaining within the inspection pits was removed prior to placing the concrete cap.

In April 2004, as part of the Pre-Design Study, Roux Associates collected SPH thickness measurements through two vent pipes (east end and west end) in the cap over the Track No. 2 inspection pit to evaluate the potential for the interconnected pits to be a continuing source of

SPH to the area surrounding the former Engine House. SPH was detected in the pit at a thickness of 0.01 feet. However, the SPH appeared to be much more viscous than the SPH in the plume (having a consistency similar to used motor oil). Based on these visual field observations (i.e., discontinuous SPH layer and minimal SPH thickness), the Engine House interior pits do not present a continuing source of SPH recontamination.

Engine House Track No. 3 and Track No. 4 inspection pits, which are located outside the former Engine House, were also inspected in April 2004 by Roux Associates. Based on visual observation, these exterior inspection pits were not found to contain SPH. Therefore, these pits do not present a continuing source of SPH recontamination.

Management of the Engine House pits (interior and exterior pits), as appropriate, will be addressed in the OU-3 FS.

5.2 Oil House Basement Investigations

The Oil House Basement is located below the platform area located west of the former Oil House, which is no longer in use (Figure 5-1). In late 1980 into 1981, a 45-foot by 40-foot open basement was found to contain PCB-contaminated liquids by DTK, Incorporated (DTK Inc., 1980, Appendix F). Amtrak authorized the remediation of the basement, which included the following: removal and proper disposal of all contaminated liquid and solid debris; decontamination of the basement and adjacent area using steam; removal and disposal of all residues; backfilling the basement with sand; and capping the area with a six-inch layer of concrete.

In April 2004, as part of the Pre-Design Study, Roux Associates completed two borings through the concrete cap to evaluate the potential for the basement to be a continuing source of SPH to the area surrounding the Oil House basement. No SPH was detected in either boring, confirming that the basement does not present a continuing source of SPH. Management of the former Oil House Basement, as appropriate, will be addressed in the OU-3 FS.

5.3 Former UST Areas Investigations

The nine USTs are located in the two former UST areas, west (three USTs, Nos. 1, 2, and 3) and east (six USTs, Nos. 4 through 9) and immediately north of the former Metro Shed (Figure 5-1). The nine USTs reportedly range from 8,200 to 17,600 gallons in capacity. Tank Nos. 1 through 5 reportedly contained No. 2 fuel oil, while Tank Nos. 6 through 9 reportedly contained No. 4 fuel oil. The No. 2 fuel oil tanks were connected by underground pipelines to the Fuel Transfer Areas, located to the north and east of the former Engine House. The No. 4 fuel oil tanks were connected by underground pipelines to a boiler house previously located at the southwestern end of the former Engine House. All but one of these USTs were taken out of service between 1961 and the end of 1976. By the end of 1973, it was reported that seven of these USTs were emptied of fuel and filled with either water or sand. By May 1984, all nine USTs had been taken out of service, emptied of fuel, and filled with water or sand.

The purpose of the October 2004 investigation was to evaluate the potential of the USTs to act as a continuing source of SPH to the area surrounding the former UST Areas. Under Roux Associates' supervision, Clean Harbors accessed the UST openings and pumped out the contents of the manways that provide access to the USTs.

The findings of the investigation are consistent with the closure methods reported above. In the west area, UST Nos. 1, 2, and 3 were all found to be filled with both sand and water: UST No. 1 had a small discontinuous layer of SPH floating on the water surface in the tank (approximately 0.1 foot). SPH was not observed in Tank Nos. 2 and 3. In the east area, four of the six USTs were accessed (Nos. 4, 5, 6, and 9). UST No. 4 contained only sand; No. 5 contained sand and water; and Nos. 6 and 9 contained only water. SPH was not observed in any of the USTs in the east area. USTs Nos. 7 and 8 were buried beneath a significant amount of debris and were not accessed, but will be at some future time so that they can be investigated following the procedure described above.

The observations made during investigation of these tanks suggest that the USTs were emptied of product at their time of closure and are not a continuing source of SPH. Based on records of abandonment, similar to the other tanks, and observations of the inspected tanks, it is unlikely

that Tank Nos. 7 and 8 are continuing sources of SPH. Management of the nine USTs will be addressed in the OU-3 FS.

5.4 Former Metro Shed Inspection Pit Investigation

The former Metro Shed was located north of the former Locker Room and the new HSTF S&I Building (Plate 3-1). The concrete inspection pit, located within the former Metro Shed, was a shallow pit that ran the length of the Metro Shed. This inspection pit was used for the maintenance of rail cars containing lavatories.

In July 1997, the former Metro Shed inspection pit was cleaned of all liquid and debris by Amtrak's remedial contractor (Clean Harbors). Analytical data is provided in Appendix F. The above-grade structure and a portion of the Metro Shed foundation were demolished to allow construction of the HSTF S&I Building; the remaining portion was filled with sand. Management of the remaining structure (i.e., foundation and inspection pit), as appropriate, will be addressed in the OU-3 FS (see Section 9.0).

5.5 Former Turntable Investigation

The former Turntable is a large circular concrete structure located in the eastern part of OU-3 that was used to reverse the direction of railroad locomotives (Figure 5-1). The Turntable structure is approximately 100-feet in diameter and 10-feet in depth with a concrete bottom and drainage to the sewer system. The exterior walls extended approximately 4 feet above surrounding land surface. Reportedly, Turntable operations had ceased prior to 1970, but the structure was left intact. By 1991, proper drainage of the structure had ceased and it had become a mosquito breeding area. The structure was then backfilled to deter this condition and the filled structure provided a roadway for heavy equipment and vehicles to move through this area of the Yard.

In 1998, it was determined that HST construction project parking and access road extended into the Turntable area and, at the NYSDEC's request, an investigation was performed to determine the nature of the material used for backfill. This was accomplished by collecting soil samples for analyses of the COCs from each of four soil borings, one in each of four quadrants, completed to the bottom of the Turntable (Roux Associates, 1998a, 1998b). The results of the investigation

(no exceedances of any of the COCs) were presented to the NYSDEC in a letter report (Roux Associates, 1998d). Approximately 80 percent of the aboveground portion of the Turntable was demolished in preparation for HST construction, but the below-ground superstructure was left intact and remains to this day.

6.0 INTERIM REMEDIAL MEASURES

Several IRMs have been implemented to remediate contamination in OU-3: SPH IRMs (Figure 6-1); and soil IRMs (Plate 3-1). A detailed discussion of each of the IRMs is presented in this section.

6.1 SPH IRMs

IRMs to recover SPH in OU-3 have proceeded in three phases. The IRM locations are shown on Figure 6-1, and a discussion of each is provided below.

6.1.1 Phase I – Recovery Trenches

The Phase I SPH IRM implemented in early 1990, consisted of three SPH recovery trenches (RT-1, RT-2, and RT-3) to mitigate the flow of SPH into the service pit located in the former Metro Shed and recover SPH in the general Metro Shed area. One of the trenches was located along the southern side and two were located along the northern side of the western end of the Metro Shed (Figure 6-1). The gravel-filled trenches (RT-1, RT-2, and RT-3) measured approximately 25, 35, and 40 feet in length, respectively, and each contained a recovery sump constructed of four-foot diameter perforated concrete rings installed to a depth of six feet bls. The trenches and sumps spanned the water table allowing SPH to accumulate within them. Each sump was outfitted with an ORS® large-diameter Filter Scavenger™ that pumped recovered SPH into one of two 2,000-gallon capacity aboveground tanks for storage.

6.1.2 Phase II - Recovery Wells

The Phase II SPH IRM was implemented in June 1991 to augment the Phase I SPH IRM (i.e., RT-1, RT-2, and RT-3) and was designed based on additional data on the nature and extent of the SPH plume collected during the Phase I RI. The Phase II IRM consisted of the installation of three 4-inch diameter recovery wells (RW-1, RW-2 and RW-3) in the area immediately northeast of the former Engine House where the apparent SPH plume was thickest (Figure 6-1). Each well was fitted with an ORS® small-diameter Filter Scavenger™ product-only recovery pump to recover SPH. Since groundwater and the SPH plume were so shallow, the screened intervals began between 0.5 and 2.0 feet bls. The recovered SPH was pumped through an underground conduit into one of the two 2,000-gallon capacity aboveground storage tanks.

Based on the monitoring data (i.e., water-level and SPH thickness measurements, and SPH sampling and analysis) generated during operation of the Phase II SPH IRM, the following modifications to the Phase I (Recovery Trenches) and Phase II (Recovery Wells) IRMs were implemented in August 1993:

- Discontinue SPH recovery in Recovery Well RW-2 (apparent SPH thickness measured at less than 0.2 feet) and initiate SPH recovery in nearby Monitoring Well MW-16 (apparent SPH thickness measured at over 3-feet) as a replacement to RW-2.
- Continued SPH recovery in Recovery Well RW-1 because it contained recoverable volume of SPH.
- Decommissioned Recovery Trench RT-2 because it no longer contained recoverable SPH.
- Decommissioned Recovery Trench RT-3 because it no longer contained recoverable SPH.

In February 1996, the partial collapse of the wall at the northwest end of the Metro Shed necessitated relocation of the SPH recovery tank and associated equipment. Additionally, due to the decrease in recoverable SPH volume and the damage sustained, Recovery Trench RT-1 was decommissioned, and the sumps in each of the three recovery trenches were backfilled. SPH recovery recommenced at Recovery Wells RW-1, RW-3, and MW-16 in May 1996 and continued recovery until the Phase III IRM was constructed.

6.1.3 Phase III - Interceptor Trench

Construction of the Phase III IRM began in October 1998, and full operation of the system commenced in February 1999. The Phase III SPH IRM consisted of construction of a 340-foot long interceptor trench installed along the northern property boundary and through the thickest part of the SPH plume (Figure 6-1). The interceptor trench is approximately two feet in width and up to four feet in depth, and was designed to penetrate the full thickness of the SPH plume and remain functional during seasonal water table fluctuations. A 12-inch inside diameter Schedule 40 perforated PVC pipe was placed horizontally in the trench on a bed of graded gravel. The remainder of the trench was backfilled with graded gravel to facilitate mobile SPH movement. Two recovery sumps were installed in the trench approximately one third of the way from each end of the trench (see Figure 6-1). Each sump was constructed with four-foot diameter perforated pre-cast concrete rings stacked to a depth of eight feet bls, and the annulus between the rings and surrounding soil was backfilled with graded gravel. A large-diameter ORS

Filter Scavenger™ was installed in each recovery sump and the power cables and discharge lines, contained within an underground Schedule 40 PVC conduit, were directed to a new 2,000-gallon SPH recovery tank located on the concrete pad covering the former Engine House foundation. Because Recovery Well RW-3 was situated where the Interceptor Trench was planned, the well was abandoned during construction of the trench.

The combined SPH IRM systems have recovered more than 11,500 gallons of SPH to date.

6.2 Soil IRMs

Three soil IRMs have been implemented in OU-3 since 1985. A brief summary of each of these IRMs is presented below.

6.2.1 1985/1986

The first soil IRM was implemented between 1985 and 1986 by Amtrak and consisted of excavation of soil saturated with SPH. The excavated area was approximately 50 feet wide by 150 feet long located at the east end of the former Engine House and was dug to a minimum of 0.5 feet bls. An estimated 140 CY of soil were excavated. A soil sample (821-E) was collected from the excavation and was found to contain total PCBs at a concentration of 43,400 µg/kg (Table 3-2). The excavated soil was disposed offsite.

6.2.2 1998

The second soil IRM was implemented in 1998, and consisted of the excavation of soils at two locations (near Soil Boring HST-22 [area south of the former Engine House] and Monitoring Well MW-58 [area south of the former Locker Room]). cPAHs and lead were detected at concentrations exceeding their respective cleanup levels in soil samples collected from Boring HST-22 and the soil boring for Monitoring Well MW-58, respectively (Table 3-3 and 3-5). This IRM took place during construction of tracks associated with the HSTF S&I Building. Excavation was completed horizontally and vertically to previously delineated depths (minimum of two feet bls) and locations where the respective concentrations of cPAHs (Plate 3-3) and lead (Plate 3-4) were below NYSDEC-recommended soil cleanup levels. An estimated 650 CY of soil were excavated. The excavated soil was disposed offsite in accordance with applicable Federal, State, and local regulations.

6.2.3 1999

The third soil IRM was implemented by Amtrak in 1999 and consisted of the removal of approximately 835 CY of contaminated soil encountered during an excavation to locate the source of a water leak. Amtrak personnel uncovered a quantity of hydrocarbon-impacted soil in OU-4 located adjacent to OU-3. At the NYSDEC's request, Areas 6 and 7, and consequently a portion of the excavated area, shown on Plate 3-1, were moved into OU-3. The portion of the IRM performed in OU-4 is included in this report for completeness and will not be discussed in the OU-4 RI. Further excavation caused the leaking pipe to break. The water from the pipe came into contact with the hydrocarbon-impacted soil, causing a small quantity of SPH to accumulate on the surface of water that had collected in a utility trench down gradient. Clean Harbors was on-site and collected both the SPH (which they estimated to be less than five gallons) and the water for proper disposal. At Amtrak's request, the SPH was sampled and found to contain total PCBs at concentrations of 2,200 mg/kg (Clean Harbors sample) and 1,067 mg/kg (Roux Associates confirmatory sample) (Roux Associates, 1999c).

An investigation of the area soil consisted of the collection of 27 characterization soil samples from 16 boring locations (SP-1 (OU-4) through SP-11 (OU-4) and SPA-1 (OU-4) through SPA-5 (OU-4)), as shown on Plate 3-2, and analysis for PCBs. No exceedances of the NYSDEC-recommended soil cleanup level were found (Table 3-2). Following excavation and offsite disposal of hydrocarbon-contaminated soil, eight confirmatory samples (CS-1 (OU-4) through CS-8 (OU-4)) were collected at NYSDEC-approved locations and analyzed for PCBs (Plate 3-2). Again, no exceedances of the PCB soil cleanup level were detected (Table 3-2). Remediation was performed to mitigate the unsaturated visually hydrocarbon-impacted soil present in this area of the Yard. Impacted soil did not extend into the water table, further confirming previous data indicating this was an isolated incident and not connected to the OU-3 SPH plume.

7.0 PRE-DESIGN STUDY WORK IN OU-3

In April 2004, Roux Associates began conducting the elements of the Pre-Design Study in accordance with the Pre-Design Study Work Plan (Roux Associates, 2004a) and the Supplement to the Pre-Design Study Work Plan (Roux Associates, 2004b) to provide additional information to evaluate a potential IRM and for the OU-3 FS. The Pre-Design Study elements applicable to the OU-3 RI included the following scope of work.

- Installation of Seven Monitoring Wells.
- SPH and Water Level Monitoring.
- Inspection of the former Engine House Inspection Pits.
- Inspection of the Oil House basement.
- Inspection of the former UST Areas.
- Hump Track Investigation (Supplement to the Pre-Design Study Work Plan).
- Evaluation of Backfill for the Excavation of the SPH Plume (Supplement to the Pre-Design Study Work Plan).

Discussion of the inspection of the former Engine House inspection pits, the Oil House Basement, and the former UST Areas was provided in Section 5.0. A discussion of the remaining tasks, listed above, is given in the following subsections. In addition, because the results of some of the Pre-Design Work provided additional information on the nature and extent of the SPH contamination, those results are discussed in that section (Section 8.1). The Pre-Design Study also included the collection of baseline characterization sampling for physical, chemical, and biological soil parameters as part of a treatability study to evaluate potential biological and chemical remedial technologies. These data and findings will be provided in the OU-3 FS.

7.1 Installation of Monitoring Wells

In April 2004, Roux Associates supervised the installation of seven new monitoring wells (MW-71 to MW-77) for the Interim Remedial Measure Conceptual Design Plan (proposed Phase IV IRM) (Roux Associates, 2004c). These seven monitoring wells were installed to provide better definition of the SPH plume (see Section 7.2 for additional discussion of the Pre-Design Study). The monitoring well locations are provided on Plate 3-1.

7.2 SPH and Water Level Monitoring (April to August 2004)

Following installation of the seven new monitoring wells (April 2004), Roux Associates began collecting weekly SPH thickness and water level measurements from OU-3 monitoring wells containing SPH. The monitoring frequency ranged from weekly to biweekly and continued until August 2004. A summary of measurements collected during the period from April to August 2004 is provided in Table 7-1. These data were evaluated to describe the current extent of the SPH plume and are discussed in detail in Section 8.0 (Nature and Extent of Contamination).

The water level data collected from the shallow monitoring wells on August 5, 2004 (Table 7-1) were used to construct a contour map of the water table elevations to depict the groundwater flow direction in OU-3 (Plate 2-1). As shown on Plate 2-1, the direction of groundwater flow on August 5, 2004 was west/northwesterly, and is consistent with previous groundwater flow maps constructed for the Yard (Roux Associates, 1999b). The groundwater contours are more closely spaced and curved in a more east-west alignment near the western part of the SPH plume. The east-west orientation of the contours indicates that the groundwater is flowing in a more northerly direction in this area and is probably influenced by the now buried Dutch Kills Creek bed shown on Plate 2-1. The closeness of the groundwater contours indicates a relatively steep horizontal groundwater gradient, which is likely due to the presence of a tightly compacted clayey silt layer that the groundwater is slowly flowing through in that area. This layer is depicted on Figure 7-1, which is a map of the geology at the water table in the vicinity of the SPH plume. In other areas of OU-3, the horizontal groundwater gradient is relatively flat and oriented in a more north-south direction and indicates that groundwater is flowing through higher permeability material and in a more westerly direction. The water table is particularly flat in the eastern half of OU-3 and this is also consistent with previous groundwater flow maps constructed for the Yard (Roux Associates, 1999b).

7.3 Hump Track Investigation to Define SPH North of Amtrak Property Boundary

On October 21, 2004, the Hump Track investigation was conducted in accordance with the Supplement to the Pre-Design Work Plan (Roux Associates, 2004b). The investigation consisted of the excavation of four test pits (TP-1 to TP-4) north of the Amtrak property boundary: two on the south side of the former Hump Track (TP-1 and TP-2) and two on the north side (TP-3 and

TP-4). The purpose of the investigation was to determine if subsurface foundations for the former Hump Track walls were still present, what influence these structures, if any, may have on the SPH plume, and to provide better definition of the SPH thickness of the plume north of the Amtrak property line. Excavation work was performed by Clean Harbors under the supervision of Roux Associates.

Clean Harbors dug the four test pits to a maximum depth of seven feet and each pit was left open for approximately two hours to allow any SPH potentially present at those locations to enter the pits (Plate 3-1). Bail down testing, previously conducted in nearby monitoring well MW-50 (Section 3.3.5.1), showed SPH thickness equilibration with the formation in 30 minutes or less). A measurable quantity of SPH was observed only in Test Pit TP-1 (0.02 foot). In the other three test pits only small globules were observed floating on the water table. Unsecured timbers were found in all four test pits and were found running east to west at about 1.5 feet bls. However, because the timbers are above the SPH, they obviously do not affect the potential migration of SPH. No foundations of any kind were found during the investigation that may influence migration of the SPH plume. Tightly compacted gray clayey silt was found in each test pit beginning at a minimum depth of two feet bls and extending to the bottom of each (i.e., to a maximum depth of seven feet bls). This clayey silt layer is likely preventing the northerly migration of the SPH. The findings of the Hump Track investigation were provided in a memorandum to NYSDEC dated November 12, 2004 (Roux Associates, 2004d)

7.4 Backfill Tests for Proposed IRM SPH Excavation

If excavation was selected as a component of the remedy, there was a concern that residual SPH contamination below the excavated soil in the plume core (see Section 8.1) could possibly be drawn through negative capillary forces up into and re-contaminate the clean backfill. To evaluate this concern, an investigation was conducted using two different sized fill material. This investigation involved the installation of two, 8-inch diameter PVC casings located approximately 10 feet south of Monitoring Well MW-16 near the thickest parts of the plume core (greater than 0.5 foot apparent thickness SPH). The casings were installed on April 22, 2004 to a depth of approximately one foot below the SPH/water interface (approximately three feet bls) with the casings extending approximately one foot above land surface. One test casing was filled with clean Morie #00 fine sand and the other was filled with Morie #3 fine gravel. The two grain

sizes were used to test whether the capillary force of each material affected the potential rise of SPH in the material differently.

On October 6, 2004 (more than five months later), Roux Associates completed a soil boring within each test casing using a Geoprobe® two-inch Macrocore sampler that was advanced using a hand-operated hammer. Continuous cores were collected from land surface to approximately four feet bls through the backfill and into the undisturbed visually SPH contaminated soil in each casing. The clean fill from each boring was then examined for the presence of visual SPH contamination due to capillary forces. SPH contamination was not observed in either boring, which demonstrates that re-contamination from capillary forces does not occur and would be unlikely to occur following implementation of an excavation remedial alternative, if selected following preparation of the FS. The findings of the backfill tests were provided in a memorandum to NYSDEC dated November 12, 2004 (Roux Associates, 2004d).

8.0 NATURE AND EXTENT OF CONTAMINATION

The purpose of this section is to provide a comprehensive evaluation of the nature and extent of contamination in OU-3 based on the collective results of the Supplemental OU-3 RI and the previous investigations discussed in detail in preceding sections of this Final OU-3 RI Report. Specifically, in the sections below, the nature and extent of contamination will be evaluated for the following: the SPH plume; the soil (unsaturated and saturated); the groundwater; and the sewer (water and sediment).

8.1 SPH Plume

The SPH plume (including associated contaminated soil) is currently being addressed by the existing OU-3 Phase III IRM system (Interceptor Trench) (see Section 6.1.3). The SPH plume core is the area of the plume with 0.5 feet or more of apparent thickness of SPH. The SPH plume core may also be defined as the extent of mobile SPH. The SPH plume core, residual SPH or any SPH-related contamination will be addressed by the FS, which will evaluate several remedial options and select the most appropriate for OU-3.

The terms residual and mobile SPH characterize the saturation of SPH in the soil matrix within OU-3. The saturation of a fluid (e.g., SPH) at a certain location in the subsurface is defined as the ratio of the volume of that fluid that is present in the soil pore space to the total volume of soil pore space. Capillary pressure is inversely proportional to fluid saturation, thus when capillary pressure is high, the saturation of a particular fluid is low. SPH that is trapped in the soil by capillary pressure is retained as isolated globules within the pore space and is termed residual SPH. Alternately, mobile SPH is present in volumes greater than that retained as a residual phase and the SPH may migrate vertically or horizontally through the soil pores (Higinbotham et al., 2003).

Many models have been developed to evaluate mobility of SPH within the subsurface. The American Petroleum Institute (API) recommends the Brooks-Corey model for calculating SPH distribution. Based on this model, the SPH thickness in a monitoring well determines the vertical distribution of mobile SPH, or SPH saturation, in the vicinity of that monitoring well depending upon field-measured soil and fluid conditions (e.g., air/water surface tension, non-aqueous phase liquid [NAPL]/water interfacial tension, and air/NAPL surface tension). At

low SPH thicknesses, (i.e., 0.5 feet or less as observed in monitoring wells) the Brooks-Corey model is unable to estimate the saturation within the surrounding soil matrix, thus the depth of mobile SPH below the water table is considered minimal. Because the volume of SPH below the water table is minimal, the SPH saturation is not sufficient to overcome soil capillary pressure and is considered not mobile. Therefore, based on the Brooks –Corey model findings, the extent of mobile SPH in OU-3 lies within the 0.5-foot SPH thickness contour. Further detail of the model findings is provided in Appendix G.

SPH thickness and water level measurements have been collected in the monitoring well network for many years. Historic SPH thickness measurements collected during the Phase II RI/Phase II RI Addendum (February and June 1994) and after (October 1999 to April 2000) were discussed in Sections 3.3.3.2 and 3.8, respectively. As discussed in Section 6.0 - Interim Remedial Measures, the combined action of the three SPH IRMs has resulted in the recovery of more than 11,500 gallons of SPH causing a significant reduction in the mass of the SPH plume (i.e., vertical and horizontal [areal] extent - see below). Therefore, as discussed in Section 7.0, recently collected data needed to be examined to provide an accurate depiction of current conditions. A summary of SPH thickness and water level data for the period April to August 2004 is provided in Table 7-1, and the May 20, 2004 SPH thickness data were used to depict the SPH plume core (0.5-foot SPH apparent thickness contour and above) and the 0.1-foot apparent thickness SPH contour (Figure 8-1).

8.1.1 Horizontal Extent

SPH was measured at a thickness of 0.32 foot in Monitoring Well MW-77 on May 20, 2004, which is located outside the plume core, approximately 280 feet east of the middle of the plume core (see Figure 8-1). The detection of SPH in this monitoring well is apparently a localized occurrence and lies within the historic zero-foot contour of the SPH plume.

The historic zero-foot SPH contour, which is very conservatively defined by the absence of a visible sheen on the water table, is shown on Plate 3-1 and is based on data collected from numerous soil borings and monitoring wells completed to define it. As shown on this plate, and as discussed in Section 3.8, a narrow "finger" of the plume extends in a westward direction approximately 55 feet west of the main plume ending just beyond Monitoring Well MW-49.

This extension of the SPH plume was discovered in September 1999 during routine monitoring of the Phase III SPH IRM (Interceptor Trench). An investigation into the change in the plume configuration immediately ensued (see Section 3.8) and the results indicated that the narrow finger of the SPH plume had migrated approximately 55 feet in a westerly direction between the outer boundary of Engine House Track 6 and the above grade retaining wall along the northern property boundary. As discussed in Section 3.8, SPH measurements were collected from a new monitoring well (MW-70) and eight other monitoring wells including MW-49, for a period of about six months (October 1999 to April 2000); the monitoring data indicated that the narrow finger of SPH had not migrated any further. In the event that the narrow finger of the plume does migrate at some point in the future, Monitoring Well MW-70 is strategically positioned to detect it.

8.1.2 Vertical Extent (Plume Thickness)

In June 1994, the thickest apparent measurements of SPH were detected in Monitoring Well MW-50. Apparent SPH thickness has decreased from 4.56 feet on June 14, 1994 (see Section 3.3.3.2) to 3.35 feet on May 20, 2004, 1.21 feet less in thickness (see Table 7-1 and Figure 2.1). These apparent SPH thickness measurements are about three times greater than the true or actual thickness of the SPH floating on the water table (see Section 3.3.5.1). Thus, the apparent SPH thickness is a considerable exaggeration of the actual or true thickness or vertical extent of the SPH plume, and the volume of SPH that remains to be recovered. To appreciate the reduction of mass of the plume, the vertical and horizontal extent of the plume core need to be evaluated together. As mentioned previously, the three SPH IRMs have collectively recovered a total of more than 11,500 gallons of SPH and the plume configuration has decreased considerably reflecting the successful SPH recovery efforts.

8.1.3 Plume Migration

Recent water level and SPH thickness data collected from monitoring wells in OU-3 (April to August 2004) (Section 7.0) and knowledge of the layout of OU-3 indicate that migration of the SPH plume is prevented in all four directions as follows:

- South and West - building structures /foundations to the south and west.
- North - the Interceptor Trench (the Phase III SPH IRM, which is located at the north property boundary and north extent of the plume core) is passively capturing and

recovering SPH, thus preventing the northerly migration of the plume. In addition, the tightly compacted clayey silt found at the four test pit locations near the former Hump Track Wall has probably helped prevent the northerly migration of the SPH plume prior to the construction of the Interceptor Trench.

- East - migration of the plume to the east is prevented by the west/northwest groundwater flow direction.

Analytical results of SPH samples collected in 1994 (see Section 3.3.5.2 and Table 3-8) indicate that the SPH in the plume consists of degraded No. 2 fuel oil.

8.1.4 Summary

The SPH plume has been fully delineated both horizontally and vertically and is located entirely within the boundaries of OU-3. The outer boundary of the plume (historic zero-foot SPH contour), which is very conservatively defined by the absence of a visible sheen on the water table, occupies an area of approximately three acres in the central part of OU-3 (see Plate 3-1). The core of the plume, as defined by the 0.5-foot SPH apparent thickness contour, currently occupies approximately 0.5 acres (Figure 8-1). The combined operation of the OU-3 SPH IRMs has resulted in the recovery of more than 11,500 gallons of SPH and has caused a significant reduction of the extent of the SPH plume horizontally and vertically (thickness). The migration of the SPH plume in all four directions is prevented by a variety of conditions in OU-3.

8.2 Soil

In total, 122 PCB samples, 54 cPAH samples, and 88 lead samples were collected and analyzed during the various investigations in OU-3. The NYSDEC-recommended soil cleanup levels for any of the three COCs (PCBs, cPAHs, and lead) were exceeded in soil samples from seven boring locations: PCBs in 821-E and CS-76; cPAHs in HST-22A and HST-22B; and lead in HST-28, MW-58, and S-62. The soil at these locations was remediated as part of the soil IRMs discussed in Section 6.0, except for the soil near Borings CS-76 (PCBs) and S-62 (lead), which will be addressed during the FS.

In addition to the soil contamination detected in soil borings, an area of approximately 0.5 acre of hydrocarbon-impacted surface soil was delineated visually and the impacts were found to be limited to the unsaturated zone (see Plate 3-1). Based on observations from soil borings

completed at different times within this 0.5 acre area, the average depth of the hydrocarbon impacts is approximately one foot bls.

8.3 Groundwater

Groundwater in OU-3 is only slightly impacted at concentrations above the GA standards and guidance values from the Yard-related activities. Groundwater in OU-3 may be impacted by at least one suspected upgradient source, SMP, of contamination (primarily chlorinated VOCs, BTEX, and metals) and by saltwater intrusion (see Section 3.3.4.1). Further, groundwater at or near the Yard is not used for potable supply. PCBs have been detected in OU-3 groundwater sporadically at concentrations that exceed GA groundwater standards. However, based on the sporadic nature of these detections and the low solubility of PCBs in water, they are more likely the result of the presence of SPH or sediment contained in the sample rather than PCBs dissolved in groundwater.

SVOCs (three cPAHs) were detected in only one former OU-3 monitoring well (MW-59) at concentrations that exceed their respective GA groundwater standards. The second of three sampling rounds from this well had estimated detections of four individual cPAHs that exceeded the standard (during the first and third sampling rounds, these compounds were not detected). It is not likely that the detections are attributable to the SPH plume as this monitoring well was located hydraulically upgradient from the SPH plume and by the sporadic nature of the detections, they are more likely the result of sediment in the sample than cPAHs dissolved in groundwater.

VOCs (BTEX and chlorinated VOCs) have been detected in OU-3 monitoring wells sporadically at concentrations that exceed GA groundwater standards. Detections of these compounds are limited to monitoring wells along the northern property boundary or on LIRR property, all hydraulically downgradient from SMP. SMP is listed in the New York State Registry of Inactive Hazardous Waste Disposal Sites as a Class II site with VOCs (BTEX and chlorinated compounds) detected in soil and groundwater to 20 feet bls and with BTEX concentrations up to 3,430 mg/L in groundwater, and likely the source of BTEX and chlorinated compound detections in OU-3.

Metals have been detected in OU-3 monitoring wells at concentrations that exceed GA groundwater standards including arsenic (one unfiltered Geoprobe® sample), antimony, iron, lead, magnesium, manganese, sodium, thallium, and zinc. Some of these metals are likely attributed to the upgradient SMP property, salt-water intrusion of the aquifer contributing to the magnesium concentrations and anoxic conditions within the aquifer contributing to the iron and manganese concentrations.

Although the groundwater contamination in OU-3 may be attributable to at least one upgradient source (SMP), it will nevertheless be addressed during the OU-6 RI.

8.4 Sewer

The investigation of the combined sanitary/storm-water sewer system was performed in phases. During the Phase II RI and Phase II RI Addendum (February 8 and 9, 1993), four sewer-water samples were collected in OU-3 for PCB analysis (MHW-3, MHW-5, MHW-6, and MHW-7). Additionally, one sediment sample (MHS-3) was collected because it was only at this one location where there was enough sediment for sampling. Analytical results are presented in Tables A-6 and A-7 for water and sediment samples, respectively, and are discussed below.

PCBs were not detected in MHW-5 and MHW-6, but were detected in sample MHW-7 at total concentration of 14.8 µg/L. MHW-3, MHW-5, and MHW-6 were resampled in July 1996. PCBs were detected at each of these locations at concentrations of 0.89 µg/L, 0.077µg/L, and 0.015µg/L, respectively.

PCBs (total concentrations) were detected in sediment sample MHS-3 at 54,000 µg/kg.

As noted in Section 1.0, the entire sewer system at the Yard, including that portion that passes through OU-3, will be addressed during the OU-5 RI.

9.0 PLANNED FEASIBILITY STUDY

As part of the RI/FS process, Roux Associates will conduct an FS for OU-3 to determine the most appropriate alternative to address mobile SPH (plume core), residual SPH and associated hydrocarbon-impacted soil, visual hydrocarbon-impacted surface soil, the two locations where soil exceeds the NYSDEC-recommended soil cleanup levels for COCs, and areas associated with remaining subsurface structures in OU-3, so that a comprehensive and effective remedy can be identified. In 2001, Roux Associates had completed a draft FS work plan for OU-3 (Roux Associates, 2001b), but that document is now outdated. The OU-3 FS will be conducted in accordance with all the appropriate guidance documents and with the OOC effective October 1989 and revised in 1998.

The main purpose of this section is to present a preliminary overview of the remediation options that will be considered for addressing the contamination in OU-3. A discussion of the various remedial options being considered at this time is given in the following subsections.

9.1 Mobile and Residual SPH and Associated Hydrocarbon-Impacted Soil

The historic SPH plume (as defined by the historic zero SPH contour – see Plate 3-1) covered an area of approximately three acres and the current SPH plume core area (SPH thickness greater than 0.5 feet) is less than 0.5 acres. Removal of the mobile SPH (plume core), comprising the majority of the mass of SPH in OU-3 as well as the majority of the PCB contamination in the SPH in OU-3, will be addressed by the FS. Remedial alternatives to address the soils containing residual hydrocarbon impacts will be evaluated in the FS. Presently, it appears that the most appropriate technology for remediation of residual hydrocarbon-impacted soils is enhanced bioremediation by delivering nutrients, oxygen, and/or microorganisms to the native bacteria existing in the soil.

9.2 Visual Hydrocarbon-Impacted Soil

The extent of visual hydrocarbon-impacted surface soil has been delineated to the north, west and east of the former Engine House, within the bounds of the historic SPH plume and partly within the limits of the SPH plume core. Approximately 0.5 acre of this surface soil is impacted to an average depth of approximately one foot bls. Removal of the impacted soil to the limits shown on Plate 3-1 will be addressed in the OU-3 FS.

9.3 Areas Associated with Remaining Subsurface Structures

It was determined during previous investigations that there is the potential that residual hydrocarbon contamination may remain at the former Engine House Pits, former Metro Shed Service Pit, the former UST Areas (a total of nine USTs), and the former Fuel Transfer Area. The Former Fuel Transfer Area consists of two concrete vaults extending underground and containing fuel pumps. The remedial options to be addressed in the FS for the residual contamination in these four areas are as follows: institutional controls/monitoring; excavation and offsite disposal; and in-place cleaning and repair.

10.0 PRELIMINARILY IDENTIFIED ARARS

Consistent with the National Contingency Plan (NCP) (USEPA, 1990) and the "CERCLA Compliance with Other Laws Manual" (USEPA, 1988), ARARs continue to be developed at multiple stages of the remedy selection process for OU-3, including during the scoping and characterization phases of the RI. Preliminary potential ARARs identified during the scoping phase were presented in the document titled "Work Plan for the Operable Unit 3 Remedial Investigation" (Roux Associates, Inc., 1997b). Site characterization data obtained during the RI process were used to further identify potential chemical and location-specific ARARs. The results of the identification of action-specific ARARs will be presented in the FS. Continued development of ARARs will be performed during the FS, and a final presentation of chemical, location, and action specific ARARs will be provided in the FS report.

As previously discussed, while groundwater and sewer water and sediment co-exist with soil and SPH in OU-3, the OU-3 RI addresses only soil and SPH in OU-3, and the ARARs discussed in this section of the Final OU-3 RI Report address primarily soil. These other media, with the NYSDEC's concurrence, will be addressed in OU-5 (sewers) and OU-6 (groundwater).

The following subsections are presented below: Section 10.1 (Definition and Overview of ARARs); Section 11.2 (Procedure for Identifying ARARs); Section 10.3 (Potential Chemical-Specific ARARs); and Section 10.4 (Location-Specific ARARs).

10.1 Definition and Overview of ARARs

ARARs are defined as follows (40 CFR 300.5) (USEPA, 1990).

Applicable requirements are:

> *"Those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations, promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable."*

Relevant and appropriate requirements are:

> *"Those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate."*

The three different types of ARARs are:

1. Ambient- or chemical-specific ARARs are health- or risk-based numerical values or methodologies. Chemical-specific ARARs establish the amount or concentration of a chemical that may be found in, or discharged to, the environment;

2. Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes; and

3. Location-specific ARARs set restrictions on the concentration of hazardous substances or the conduct of activities based on the specific location of the site (USEPA, 1988).

In New York State, remedy selection must also conform to standards and criteria that are generally applicable, consistently applied, and officially promulgated. The site's program should be designed with consideration being given to guidance determined, after the exercise of engineering judgment, to be applicable on a case-specific basis.

The terms "standards and criteria" and "guidance" (SCGs) include both those of the state and those of the United States to the extent that they are more stringent than those of this state (6 NYCRR 375-1.10).

In addition to ARARs/SCGs, to-be-considered materials (TBCs) are also identified as part of the remedy selection process. TBCs are nonpromulgated advisories, criteria, or guidance developed by Federal or State governments that may be useful in developing CERCLA remedies (40 CFR 300.400[g][3]) (USEPA, 1990). It should be noted here that the NYSDEC has issued recommended soil cleanup levels for relevant OUs of the Yard. These chemical-specific cleanup levels are classified TBCs.

CERCLA Section 121 requires selection of a remedial action that is protective of human health and the environment (42 USC 9621[b][1][G]). The two threshold criteria for selection of a remedial alternative are overall protection of human health and the environment and compliance with ARARs (40 CFR 300.430[f][1][i][A]) (USEPA, 1990).

During the FS, remedial action objectives will be established and will specify contaminants and media of concern, potential exposure pathways, and remediation goals. Initially, preliminary remediation goals are determined based on readily available information, such as chemical-specific ARARs or other reliable information. Final remediation goals are determined when the remedy is selected. Remediation goals establish acceptable exposure levels that are protective of human health and the environment and are developed by consideration listed below.

- ARARs, if available, and the following factors:
  - For systemic toxicants, acceptable exposure levels shall represent concentrations to which the human population can be exposed without adverse effect during a lifetime or part of a lifetime, incorporating an adequate margin of safety;
  - For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10-4 and 10-6. The 10-6 risk level is used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure;
  - Factors related to technical limitations such as detection/quantitation limits for contaminants;
  - Factors related to uncertainty;
  - Other pertinent information (40 CFR 300.430[e][2][i][A][1 through 5]) (USEPA, 1990);
  - An alternate concentration limit may be established in accordance with CERCLA Section 121(d)(2)(B)(ii); and
  - Environmental evaluations are to be conducted to assess threats to the environment, especially sensitive habitats and critical habitats of species protected under the Endangered Species Act (40 CFR 300.430[e][2][i][B through G]) (USEPA, 1990).

10.2 Procedure for Identifying ARARs

The process of identifying potential ARARs/SCGs and TBCs for OU-3 consisted of the following activities.

- Pertinent facts concerning the chemicals detected in OU-3 media (soil) and the location of OU-3 were identified.
- Federal regulations and State SCGs were reviewed to identify potential ARARs.
- The "CERCLA Compliance with Other Laws Manual" (USEPA, 1988) was reviewed for lists of all potential chemical- and location-specific Federal ARARs. Requirements contained in these lists, together with any requirements promulgated subsequent to the issuance of the "CERCLA Compliance with Other Laws Manual" were considered during the identification of potential Federal chemical- and location-specific ARARs for OU-3 at the Yard. The list of potential State ARARs, together with any requirements promulgated subsequent to the publication date of the list, were considered during the identification of potential State chemical- and location-specific ARARs for OU-3.
- Provisions of each potential ARAR were reviewed to obtain pertinent information, including the following:
  - substances regulated by the requirement;
  - types of facilities regulated by the requirement;
  - locations regulated by the requirement; and
  - persons or entities regulated or affected by the requirement.
- The concentrations of contaminants detected in OU-3 soil and facts concerning the type and location of facility were compared to the provisions of the identified potential ARARs/SCGs. If all pertinent provisions for a requirement were met, the requirement was deemed applicable. If all pertinent provisions for a requirement were not met, the following comparison of factors was made to determine if a requirement was both relevant and appropriate in OU-3:
  - The purpose of the requirement and the purpose of the action in OU-3.;
  - The medium regulated or affected by the requirement and the medium contaminated or affected in OU-3.
  - The substances regulated by the requirement and the substances found in OU-3.
  - The type of place regulated and the type of place affected by the release.
  - The type and size of structure or facility regulated and the type and size of structure or facility affected by the release.

– Any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resource in OU-3 at the Yard (40 CFR 300.400 [g] [2] [i through iii and vi through viii]) (USEPA, 1990).

A requirement may have been determined to be potentially relevant because it closely matched OU-3 on some of the factors listed above, but may have been determined to be not appropriate because OU-3 circumstances differed significantly on other key factors. Portions of a requirement may be relevant and appropriate even if a requirement in its entirety is not (USEPA, 1988).

In addition to ARARs/SCGs, TBCs were also identified from the list contained in the "CERCLA Compliance with Other Laws Manual" (USEPA, 1988), as well as from TBCs issued after publication of the "CERCLA Compliance with Other Laws Manual."

10.3 Potential Chemical-Specific ARARs

The data developed during the RI were used to further define the potential chemical-specific ARARs/SCGs and TBCs for the soil in OU-3. As will be discussed in Section 11.0 of this RI, the migration pathways for constituents of concern include groundwater, soil, and sewer water and sediments. However, as previously discussed, sewers and groundwater will be addressed in the OU-5 and OU-6 RIs, respectively. Chemical-specific ARARs/SCGs and TBCs for soil are discussed below.

The NYSDEC recognizes that restoration to predisposal conditions is not always feasible; therefore, the NYSDEC-recommended soil cleanup levels for the Yard (including OU-3) are as follows:

- PCBs – 25,000 µg/kg;
- cPAHs – 25,000 µg/kg; and
- Lead – 1,000 mg/kg .

These cleanup levels have been referenced throughout this report. Investigations in OU-3 have identified only two locations in OU-3 where remaining soil exceeds the respective NYSDEC-recommended soil cleanup level, (CS-76 for PCBs and S-62 for lead).

10.4 Location Specific ARARs

The Federal Floodplain Management Act (16 USC 661 et seq.) evaluates adverse effects associated with direct and indirect development of a floodplain. This act is not considered applicable (no development presently occurring), but it is considered potentially relevant and appropriate for future use (including potential remediation).

The Federal Fish and Wildlife Coordination Act (16 USC 661 through 666) states that whenever waters of any stream are controlled or modified for any purpose, the department or agency of the United States responsible for the stream or the public or private agency managing the stream under Federal permit or license, must consult with the Department of the Interior and the United States Fish and Wildlife Service. Although not presently applicable, this regulation is considered potentially relevant and appropriate due to the presence of buried wetlands.

The National Historic Preservation Act (36 CFR Part 65) addresses facilities where alteration of terrain may threaten significant scientific, prehistorical, historical, or archeological data. Although there is no knowledge that the Yard has historical significance, this regulation is considered a potential ARAR.

The location-specific ARARs will be further developed in the OU-3 FS.

11.0 CONTAMINANT FATE AND TRANSPORT

An evaluation of the environmental fate and transport of contaminants in OU-3 was performed to support the RI. This evaluation consisted of the following two elements:

1) Compilation of information regarding physicochemical properties that can influence the fate of contaminants.

2) An evaluation of contaminant transport and degradation processes.

As previously discussed, while groundwater and sewer water and sediment co-exist with soil and SPH in OU-3, the OU-3 RI addresses only soil and SPH in OU-3. These other media, with the NYSDEC's concurrence, will be addressed in OU-5 (sewers) and OU-6 (groundwater).

11.1 Physicochemical Properties of Contaminants

Physical and chemical properties that will affect the fate and transport of contaminants in soil and groundwater include:

- solubility;
- specific gravity;
- vapor pressure;
- Henry's Law constant;
- organic carbon partition coefficient (K_{oc}); and
- octanol-water partition coefficient (K_{ow}).

Solubility is the maximum concentration of a chemical that will dissolve in water at a given temperature without forming a separate phase.

Specific gravity is the ratio of the density of a pure chemical to the density of water. As a separate phase, a compound with a specific gravity less than 1.0, such as SPH, will float on top of the water table, while a compound with a specific gravity greater than 1.0, like trichloroethene, will sink as a separate phase. Specific gravity does not effect the dissolved phase distribution of contaminants. Specific gravity data for SPH samples collected from monitoring wells with the SPH plume are provided in Table 3-11.

Vapor pressure is a property of a chemical in its pure state and is an indicator of the rate of volatilization of a chemical in an aqueous environment.

Henry's Law constant is the ratio of a chemical's concentration in the vapor phase above water to its concentration in the aqueous phase, at equilibrium. It indicates the tendency of the chemical to evaporate from a water solution, and essentially represents the water to air partitioning coefficient.

The organic carbon partition coefficient (K_{oc}) is the ratio of a chemical's concentration adsorbed to soil organic carbon to its concentration in soil pore water, at equilibrium.

The octanol-water partition coefficient (K_{ow}) is the ratio of a chemical's concentration in the n-octanol phase to its concentration in the aqueous phase of an octanol-water mixture at equilibrium. The K_{ow} can give an indication of how a chemical will preferentially distribute into an aqueous solution such as groundwater. Low K_{ow} values indicate that the contaminant is more hydrophilic; that is, a large fraction will be dissolved in the water phase and this implies higher environmental mobility.

Table 11-1 lists values for these properties obtained from literature references for the contaminants detected in OU-3.

11.2 Processes Affecting Contaminant Migration

The processes by which chemicals in OU-3 can migrate include: 1) leaching from soil to groundwater; 2) transport in groundwater; 3) discharge from groundwater to surface water; and 4) volatilization from soil and surface water. The parameters controlling contaminant transport by these processes that affect the media are described below.

11.2.1 Leaching from Soil to Groundwater

The leaching of contaminants from soil into groundwater depends on the degree of binding of the chemical to soil, the amount of water the soil-bound chemical comes in contact with, and the chemical characteristics of the soil and recharging water. The degree of soil binding is reflected in the K_{oc} values, with higher K_{oc} values indicating greater binding and lower leaching

propensities. Since K_{oc} values are available for only a few chemicals, K_{oc} has been found to be correlated with K_{ow}, such that higher K_{ow} values would also indicate greater binding to soil. The actual distribution coefficient (the ratio of bound to dissolved concentration at equilibrium, K_d) for the binding of chemicals to soil must take into account the soil organic carbon content and is discussed below. The amount of water available to leach chemicals is a function of annual rainfall and the fraction of rainfall that percolates downward. The key chemical characteristics of the soil and water that influence the ability to leach contaminants are Eh (redox potential), pH, and the presence of dissolved co-solvents. Eh influences the predominant oxidation state of metals, and therefore the aqueous solubilities of those metals. Water with low pH (acidic) is more efficient in leaching some metals from the soil. Co-solvents (i.e., of organic origin) act to increase the solubilities of organic chemicals in water.

11.2.2 Volatilization from Soil and Surface Water

Volatilization can be an important migration mechanism whereby contaminants are removed from surface water, soil, and (to a lesser extent) groundwater, and transferred to air. Chemicals with high vapor pressures and low aqueous solubility are generally most affected by this process. Those compounds with large Henry's Law constants (Table 11-1) will readily volatilize into the atmosphere (Nyer et al., 1991) where they may be degraded by reaction with sunlight. Although Henry's Law constants were unavailable for many of the compounds in Table 11-1, it would be predicted from their vapor pressures and solubility that the aromatic compounds and the halogenated aliphatics would have Henry's Law constants large enough for significant removal from waters and soil by this process. The more soluble compounds, such as the phenols, and the less volatile compounds, such as the PCBs, are not readily volatilized from water.

11.3 Degradation

Degradation processes include biologically mediated degradation and chemical, or abiotic, degradation. Various naturally occurring processes can result in the transformation of organic compounds to other compounds of the same type, to products of a different type (such as conversion of alcohols to carboxylic acids), or to the complete mineralization of organics to carbon dioxide and water (Nyer et al., 1991). Several factors must be considered in the evaluation of these reactions. The biological and abiotic degradation pathways for a given contaminant may produce different products, and the proportion of these products may vary

depending upon the reaction rates. Typically, the biologically mediated reactions will be faster than the strictly abiotic reactions. However, the biological reaction rates are more variable than the abiotic rates because of the extreme dependence of biological degradations on the conditions around the microbial colonies in the soil and aquifer matrix. These conditions include pH, Eh, temperature, contaminant concentration, and the presence of other nutrients or biological toxicants in the soil pore water or groundwater. It is therefore not possible to predict degradation rates with a high degree of certainty.

Photolysis occurs when a compound is broken down to smaller compounds by the action of light. It is dependent upon non-chemical-specific factors such as the intensity of the sunlight and the depth and turbidity of the surface-water body.

11.4 Contaminant Fate and Transport

For the groups of compounds identified in Table 11-1, the following processes are considered to be important in affecting their fate and transport and, therefore, concentrations over time.

K_{ow}: Given the high K_{ow} values (and resulting high retardation factors) for PAHs and PCBs, these compounds are expected to be strongly retarded by naturally occurring organic matter in the soil and the aquifer matrix. They will be relatively immobile in groundwater. However, soil containing these compounds may be transported to sewers from areas exposed to surface-water runoff and flooding.

Volatilization: The aromatics, phenols, halogenated aliphatics, and ketones display varying degrees of mobility in groundwater systems. Volatilization from soil and groundwater occurs very slowly, due to lack of mixing of groundwater and tortuous diffusion pathways in soil. Volatilization from these two media is not considered to be a significant transport route. Volatilization from surface water may be a factor in reducing the concentrations of aromatic and halogenated aliphatic compounds.

Degradation: Degradation of aromatics, halogenated aliphatics, ketones, phenols, and polycyclic aromatics, has been observed to occur at measurable rates in soil and groundwater, although the rates carry large uncertainties (Howard et al., 1991).

The migration of contaminants in OU-3 soils is discussed below.

11.4.1 Soil

Contaminated unsaturated soil in OU-3 is generally not covered with pavement or buildings. Moreover, the shallow depth to groundwater in OU-3 increases the potential for contaminated soil to impact groundwater.

Soil contamination in OU-3 is primarily characterized by PAHs and PCBs of low or zero mobility. These compounds tend to remain tightly bound to soil particles, and do not have significant potential for migration into groundwater relative to lower molecular weight organics and more soluble compounds. However, these compounds are exposed in surface soil. Surface runoff during precipitation may result in the transport of contaminated sediment into the sewer system and subsequently offsite. Detection of PCBs in sediments from the Yard sewer system indicates that this transport pathway is present and the fate and transport will be discussed during the OU-5 RI.

The metals previously detected in soil in OU-3 could also be subjected to migration via either precipitation runoff to the sewer system or leaching from soil to groundwater. Of these metals, four (arsenic, iron, manganese, and sodium) were historically detected in groundwater (see Sections 3.3.4, 3.6, and 3.8.2) and their fate and transport will be discussed during the OU-6 RI. The other metals are assumed to be completely immobilized in soil at the Yard. Their mobilization and release from the soil could only occur as a result of a release of strong acid or alkali onto the soil in OU-3 at the Yard.

12.0 EXPOSURE ASSESSMENT

This Exposure Assessment (EA) for OU-3 was conducted following the NYSDEC Spill Guidance Manual (NYSDEC, 1995) and the NYSDEC Technical Guidance for Site Investigation and Remediation (NYSDEC, 2002), and was conducted to evaluate the potential for exposure to chemicals that remain in soil within the area defined as OU-3. In addition, an SPH plume containing PCBs is known to be present. More than 11,500 gallons of degraded No. 2 fuel oil have been removed subsequent to developing the majority of the PCB in SPH analyses database. However, to take a conservative approach, potential exposure to PCBs identified in the SPH plume in the early 1990's is considered as part of the OU-3 evaluation.

EAs describe the type and magnitude of exposures to chemicals of potential concern (COPCs) present at a site. The NYSDEC describes the following four components of an EA (NYSDEC, 1995, 2002):

- Selection of COPCs
- Identification of exposure pathways
- Measurement of the chemical concentrations at each exposure point (Exposure Point Concentrations)
- Comparison of exposure point concentrations to available health-based or other criteria (Comparison to Relevant Criteria).

During the course of the investigations previously described, several areas within OU-3 were identified with exceedances of NYSDEC-recommended soil cleanup levels for the COCs and most of these areas were subsequently remediated (excavated) by Amtrak. The remaining contamination in OU-3 is represented by the SPH plume and associated soils and subsurface structures. Exceedances of the NYSDEC-recommended soil cleanup levels of COCs remain at only two sampling locations CS-76 and S-62. Other areas in OU-3 include SPH and associated soil and visual hydrocarbon-impacted surface soil. Therefore, to be most descriptive of current conditions in OU-3, all soil data that represents current conditions is included in the database for this EA. In addition, PCB analyses of the SPH plume collected between 1991 and 1999 are also considered. Sewer and groundwater data collected in OU-3 will be addressed as part of the OU-5 and OU-6 RI/FSs.

The organization of this section is based on the four NYSDEC EA elements identified above and will occur in the same order: Selection of COPCs (Section 12.1); Identification of Exposure Pathways (soil, SPH plume and groundwater) (Section 12.2); Exposure Point Concentrations (Section 12.3), and Comparison to Relevant Criteria (Section 12.4). In addition, Current and Future Site Conditions are discussed in Section 12.5, and the EA Summary is presented in Section 12.6. Subsections are included as appropriate. This EA is primarily based on an extensive data evaluation of soil samples collected within OU-3 between August 1985 and December 2003 (Appendix F). A more simplified statistical evaluation was conducted for PCBs in the SPH plume and is briefly described in Section 12.3. The purpose of the data evaluation was to consolidate the various data for conducting this EA to facilitate the NYSDEC's task of evaluating the current conditions at the Site.

12.1 Selection of COPCs

COPCs are chemicals that are present at a site and have data that are of sufficient quality for use in the EA. Characteristics of COPCs include the following:

- Positively detected in at least one sample in a given environmental medium.
- Detected at concentrations significantly elevated above concentrations reported in associated blank samples.
- Detected at concentrations significantly elevated above naturally occurring levels of the same chemicals.
- Are the transformation products of chemicals detected at the site.

As mentioned above, an extensive data evaluation was performed as part of this EA and is presented in Appendix H. Analytical data for samples collected from the following three soil horizons were considered for the data analysis: surface soil (0 to 2 feet bls); shallow soil (2 to 4 feet bls); and deep soil (greater than or equal to 4 feet bls). In addition, the surface and shallow horizons were combined to form a fourth soil horizon (surface/shallow horizon) for analyzing construction work, which would likely entail soil excavation activity in the combined soil horizon. This was done for the purposes of evaluating remedial alternatives. For the remainder of this report, reference will be made to four soil horizons.

Data tables summarizing the total concentrations of each chemical grouping (PCBs, cPAHs, benzo(a)pyrene (B[a]P) equivalents, PAHs, and lead) for the four soil horizons for each sample collected during the referenced period (August 1985 to December 2003) are presented in tables as follows: Tables 12-1 to 12-4 for PCBs; Tables 12-5 to 12-8 for cPAHs; Tables 12-9 to 12-12 for B(a)P equivalents; Tables 12-13 to 12-16 for PAHs; and Tables 12-17 and 12-18 for lead (for 0 to 2 and 0 to 4 feet bls only). Statistical summaries of data from Tables 12-1 to 12-18 are provided (for the four soil horizons) in Tables 12-19 to 12-22 for VOCs, SVOCs, and metals, and a summary of the average concentrations for the four soil horizons for PCBs, total B(a)P equivalents, cPAHs, and PAHs is provided in Table 12-23. All constituents identified as being present in OU-3 were initially considered COPCs.

Table 3-10 provides the concentrations of PCBs in samples collected from the SPH plume. Concentrations of total PCBs range from 840 to 170,000 µg/kg (0.008 to 170 mg/kg). Utilizing the most recent sample from each sampling location the average concentration of total PCBs in the SPH plume is approximately 24,800 µg/kg (24.8 mg/kg).

12.2 Identification of Exposure Pathways

Exposure pathways describe the ways in which persons (receptors) come into contact with COPCs present in environmental media at a site. Relevant exposure pathways for a site are determined by reviewing site-specific characteristics such as the following:

- Locations of COPCs at the site.
- Environmental fate of the COPCs.
- Potential receptor locations at or near the site.

A complete exposure pathway is defined by the USEPA (1989) as having the following components:

- A source and mechanism of chemical release.
- A retention or transport medium.
- A point of potential human contact with the medium containing the chemical(s) of potential concern.
- An exposure route (e.g., ingestion) at the contact point.

12.2.1 Soil

Based on the criteria given above, soil is the primary complete exposure pathway in OU-3. Groundwater is present beneath OU-3 from less than one to three feet bls. Soils may be a retention and transport medium for chemicals. Receptors may come into direct contact with soil within OU-3 while performing routine job-related activities. During the course of contacting the soil on their skin, persons may, under some circumstances, accidentally ingest soil derived from the Site.

Inhalation of vapors from volatile organic compounds volatilizing from soils into the ambient air during soil moving activities is not considered a viable exposure pathway because the number of VOCs detected in soil are limited and concentrations are sufficiently low (maximum concentrations below 1 mg/kg in surface and shallow soil and below 3 mg/kg in deep soil) that ambient air levels could not rise to a level of concern. While exposure to fugitive dust may occur on a limited basis, the primary exposure routes for on-site receptors to chemicals present in soil is via dermal absorption and incidental ingestion.

12.2.2 Groundwater

Direct contact with groundwater could occur during any intrusive activities such as excavation associated with track maintenance. However, any potential contact with groundwater would likely be limited by the dewatering that will be required to conduct the planned activities. Furthermore, construction personnel who may work in this area will likely be wearing waterproof gloves, thus limiting any direct contact with groundwater by the hands. An examination of groundwater data in OU-3 indicates that concentrations of VOCs detected are low (less than 30 µg/L), and therefore, any potential casual contact with groundwater would result in minimal exposure. Furthermore, it can be stated that ingestion of groundwater in OU-3 would never be considered a complete exposure pathway since groundwater is not a source of drinking water in OU-3 or anywhere at the Yard. Therefore, the presence of constituents in groundwater was not quantitatively evaluated as part of this exposure assessment.

12.2.3 SPH Plume

As previously indicated, in OU-3, the SPH plume occurs at a depth of 1 to 3 feet bls. Therefore, direct contact with the SPH plume could occur during any intrusive activities such as excavation associated with track maintenance. However, any potential contact with SPH plume would likely be

limited by the product removal that will be required to conduct the planned activities. Furthermore, construction personnel who may work in this area will likely be wearing waterproof gloves, thus limiting any direct contact with the SPH plume by the hands. An examination of SPH plume data from OU-3 indicates that concentrations of total PCBs detected are relatively low and therefore, any potential casual contact with the SPH plume would result in minimal exposure to PCBs. Furthermore, it can be stated that there would be no ingestion of the degraded No. 2 fuel oil containing PCBs (SPH plume) in OU-3. Thus, ingestion would never be considered a complete exposure pathway. With this very limited exposure potential, the presence of PCBs in the SPH plume was not quantitatively evaluated as part of this EA.

12.3 Exposure Point Concentrations

Tables 12-1 to 12-18 present data for individual sampling locations for a series of chemicals of interest in soil as described in Section 12.1. In addition, Tables 12-19 to 12-22 list the chemicals (except PCBs and PAHs) detected at least one time in soil samples collected from one of the four soil horizons (see Data Evaluation Report in Appendix F). Also shown in Tables 12-19 to 12-22 are the range of sample quantitation limits (SQLs), the range of Site concentrations (minimum and maximum), and the average concentration. Due to the random nature in which persons typically come into contact with soil at a site, the average (arithmetic mean) concentrations were considered the relevant exposure point concentrations. The average concentrations for PCBs, cPAHs, B(a)P equivalents, and all PAHs are shown in Table 12-23.

12.3.1 Potential Receptors

OU-3 is one relatively small area of an active railroad maintenance facility. The principal receptors will be adult site workers conducting routine track and other site maintenance activities. In addition, activities might include occasional construction projects that could result in limited excavation. Residential uses for OU-3 are not possible in the foreseeable future, therefore, residential receptors are not considered in this EA. The occurrence of limited trespassing activities are possible at the Yard, but OU-3 would be considered relatively inaccessible to trespassers because it is distant from any of the access points to the Yard. Therefore, trespassers are also not considered as potential receptors at OU-3.

12.4 Comparison to Relevant Criteria

As stated by the NYSDEC (1995), exposure point concentrations should be compared to available health-based criteria to determine the need to conduct a cleanup at a site. The relevant criteria for evaluating soil exposure point concentrations were determined to be USEPA Region III Risk-Based Concentrations (RBCs) for industrial land use (USEPA, 2004). These RBCs were developed by the USEPA by using protective default exposure scenarios for industrial land use. The best available toxicity factors (reference doses and cancer potency factors) were incorporated into the calculated RBC. USEPA Region III re-evaluates and updates the RBCs twice per year, using the most recently available peer-reviewed toxicity factors. The RBCs for soil presented in the risk-based table are sufficiently conservative and health-protective such that the USEPA would typically not address these concentrations further in terms of risk to human health (USEPA, 1993).

Tables 12-19 to 12-22 present the range of COC concentrations detected in OU-3, the average concentration, and the USEPA Region III RBC for each chemical (except PCBs and PAHs) detected at least one time in the four soil horizons defined earlier in this section: surface (0 to 2 feet bls), shallow (2 to 4 feet bls), surface/shallow (0 to 4 feet bls), and deep (greater than 4 feet bls) soils, respectively. As shown in these tables, the average concentrations of OU-3-related chemicals were below their respective USEPA Region III RBC, indicating that OU-3 soils are protective of human health and suitable for industrial use. The exception to this is arsenic, which exceeds the health-based criteria in all four soil horizons. However, the average arsenic concentrations in the four soil horizons are within typical regional background concentrations (3 to 12 mg/kg) (NYSDEC 1994, Suffolk County 1999).

Based on the above discussion, additional COCs for OU-3 are clearly not necessary, and the existing three COCs are sufficient for evaluating soil-quality conditions in OU-3.

12.5 Current and Future Site Conditions

As previously stated, OU-3 is part of a large and very active rail yard, and is partially covered with ballast supporting multiple railroad tracks. The remaining area is either covered with asphalt or ballast for vehicular traffic, but some areas are bare soil. The bare soil therefore represents an exposure pathway for workers in OU-3 during non-intrusive activities.

Although specific plans for the future use of OU-3 are not finalized, it is anticipated that many of the currently routine activities will continue for the foreseeable future. These activities include removal and replacement of ballast, installation of subsurface utility lines, and other activities involving the excavation and movement of potentially contaminated soil, which could put workers (potential receptors) in contact with contaminated soil.

12.6 Summary

This EA primarily addressed soil-quality conditions that currently exist in OU-3. As illustrated in Section 12.5, exposure to soil in OU-3 is possible by workers engaged in routine activities. Residential and trespassing exposure scenarios were not considered viable for the reasons stated above. Therefore, exposure point concentrations in soil were compared to appropriate health-based criteria (RBCs) to determine the potential for present and future workers to be exposed to chemicals present in soil.

Secondary exposure to groundwater or the SPH plume was recognized but the likelihood of any extensive exposure was considered highly unlikely because of the anticipated use of protective clothing (boots and gloves) and the need to pump out any accumulation of liquids in a construction excavation.

As discussed in Section 12.4, all of the exposure point concentrations for the COPCs in both surface and subsurface soil were below the RBCs for soil, except for background levels of arsenic. Therefore, additional COCs for OU-3 are not necessary, and the existing three COCs (PCBs, cPAHs, and lead) are sufficient for evaluating existing soil-quality conditions in OU-3. Thus, workers in OU-3 engaged in routine work involving soil-moving activities are not expected to experience exposure to unacceptable levels of Site-specific chemicals in soil.

13.0 CONCLUSIONS

Based on the findings in this Final OU-3 RI Report, Roux Associates has arrived at the following conclusions:

- The nature and extent of contamination in OU-3 has been adequately delineated to allow for remediation of the contamination (SPH and soils) in this OU. Specifically, the SPH plume core (as defined by the 0.5-foot SPH contour) has been reduced in size and is currently approximately 0.5 acres in areal extent. The maximum apparent thickness (i.e., vertical extent) of the SPH plume is currently approximately 3 feet, 1.21 feet less than it was in June 1994. Bail-down testing of monitoring wells containing SPH indicates that the true thickness of the SPH plume is more than one-third the apparent thickness observed in the monitoring wells. The visual hydrocarbon-impacted surface soil is approximately 0.5 acres in extent.

- IRMs implemented in OU-3 have resulted in significant remediation of SPH and soil in OU-3: more than 11,500 gallons of SPH recovered by the SPH IRM systems resulting in the reduction of the horizontal and vertical extent of the SPH plume as discussed above. In addition, soil IRMs have resulted in the removal of a large volume of contaminated soil (containing PCBs, cPAHs, and lead above their respective NYSDEC-recommended soil cleanup levels) at specific locations.

- The FS will address the mobile SPH (plume core), residual SPH and associated hydrocarbon-impacted soil, visual hydrocarbon-impacted surface soil, the two locations where soil exceeds the NYSDEC-recommended soil cleanup levels for COCs, and remaining subsurface structures in OU-3.

- COCs detected at concentrations exceeding the NYSDEC-recommended soil cleanup levels remain at only two isolated locations, which will be addressed by the FS.

- Migration of the SPH plume is prevented to the south and west by existing building foundations, and it is being passively captured by the Interceptor Trench (located at the northern property boundary and northern extent of the plume core) where the SPH is being recovered. Migration of the plume to the east is prevented by the west/northwest groundwater flow direction. In addition, low-permeability soil is preventing migration to the north.

- Groundwater contamination (i.e., chlorinated VOCs) detected in OU-3 monitoring wells can be attributed to an upgradient source (SMP) with other additional upgradient sources possible from other nearby industries. Groundwater contamination is minimal and will be addressed in the OU-6 RI/FS.

- PCBs were found in sewer water and sewer sediment samples collected from manholes located in OU-3 and will be addressed as part of the OU-5 RI/FS.

- Workers engaged in routine work involving soil-moving activities in OU-3 are not expected to experience exposure to OU-unacceptable levels of chemicals in the soil.

- Additional COCs for OU-3 are not necessary, and the existing three COCs (PCBs, cPAHs, and lead) are sufficient for evaluating existing soil-quality conditions in OU-3, because all of the exposure point concentrations for the COPCs in both surface and subsurface soil were below the RBCs for soil, except for background levels of arsenic.

14.0 RECOMMENDATIONS

Based on the findings and conclusions in this Final OU-3 RI Report, the following recommendations should be implemented to effect a timely and orderly remediation of contamination remaining in OU-3:

- Continue operating the remaining SPH IRM (Interceptor Trench) to recover SPH until implementation of the final remedy for SPH as determined by the FS.
- Periodically measure SPH in OU-3 monitoring wells to monitor the horizontal and vertical extent of the SPH plume.
- Proceed with the FS to address the mobile SPH (plume core), residual SPH and associated hydrocarbon-impacted soil, visual hydrocarbon-impacted surface soil, the two locations where soil exceeds the NYSDEC-recommended soil cleanup levels of COCs, and areas associated with remaining subsurface structures in OU-3.

Respectfully submitted,

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Table 3-1. Summary of Sampling Data (Sample Identification, Depth, Date and Analyses Performed) for Soil Samples Collected in OU-3 (August 1985 to November 2003), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Sample Location/ Designation	Sample Depth Interval (Ft. Below Land Surface)	Sample Date	Analyte(s)
821-E *	0 to 0.5	08/21/85	PCBs
821-F *	0 to 0.5	08/21/85	PCBs
821-G *	0 to 0.5	08/22/85	PCBs
CMW-20	0 to 2	11/08/93	PCBs
CMW-22	0 to 2	11/08/93	PCBs
CS-1 (OU-4)	0 to 0.5	08/10/99	PCBs
CS-2 (OU-4)	0 to 0.5	08/10/99	PCBs
CS-3 (OU-4)	0 to 0.5	08/10/99	PCBs
CS-4 (OU-4)	0 to 0.5	08/10/99	PCBs
CS-5 (OU-4)	0 to 0.5	08/10/99	PCBs
CS-6 (OU-4)	0 to 0.5	08/10/99	PCBs
CS-7 (OU-4)	0 to 0.5	08/10/99	PCBs
CS-8 (OU-4)	0 to 0.5	08/10/99	PCBs
CS-1	0 to 2	01/26/93	PCBs
CS-3	3 to 5	11/08/93	PCBs
CS-5	0 to 2	11/08/93	PCBs
CS-10	0 to 2	11/08/93	PCBs
CS-61	5 to 7	11/08/93	PCBs
CS-64	2 to 3	02/01/93	PCBs
CS-67	0 to 2	11/08/93	PCBs
CS-76	0 to 0.5	01/26/93	PCBs
HD-1	4 to 6	12/18/03	cPAHs, Lead, PCBs, VOCs
HD-2	9 to 11	12/18/03	cPAHs, Lead, PCBs
HD-2	13 to 15	12/18/03	cPAHs, Lead, PCBs
HD-3	5 to 7	11/26/03	cPAHs, Lead, PCBs
HD-3	8 to 10	11/26/03	cPAHs, Lead, PCBs
HD-3	20 to 22	11/26/03	cPAHs, SVOCs
HD-4	8 to 10	11/26/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-4	14 to 16	11/26/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-5B	9 to 11	11/25/03	cPAHs, Lead, PCBs
HD-5B	15 to 16	11/25/03	cPAHs, Lead, PCBs
HD-6	9 to 11	11/26/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-6	18 to 20	11/26/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-7	8 to 10	11/25/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-7	21 to 23	11/25/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-8D	7 to 9	11/24/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-8D	20 to 22	11/24/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-8D	36 to 38	11/24/03	cPAHs, PCBs, SVOCs, VOCs
HD-9	8 to 10	11/26/03	cPAHs, Lead, PCBs
HD-9	13 to 15	11/26/03	cPAHs, Lead, PCBs
HD-10	6 to 8	11/25/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-10	8 to 10	11/25/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-10	16 to 18	11/25/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-11	4 to 6	12/18/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-11	8 to 10	12/18/03	cPAHs, SVOCs, VOCs
HD-11	13 to 15	12/18/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-12	6 to 8	11/25/03	cPAHs, Lead, PCBs
HD-12	14 to 16	11/25/03	cPAHs, Lead, PCBs
HD-13	3 to 5	12/19/03	cPAHs, Lead, PCBs
HD-14	4 to 6	12/18/03	cPAHs, Lead, PCBs, VOCs
HD-14	6 to 8	12/18/03	cPAHs, Lead, PCBs, VOCs
HD-15C	6 to 8	11/25/03	cPAHs, Lead, PCBs

Table 3-1. Summary of Sampling Data (Sample Identification, Depth, Date and Analyses Performed) for Soil Samples Collected in OU-3 (August 1985 to November 2003), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Sample Location/ Designation	Sample Depth Interval (Ft. Below Land Surface)	Sample Date	Analyte(s)
HD-15C	20 to 22	11/25/03	cPAHs, Lead, PCBs
HD-15C	28 to 30	11/25/03	cPAHs, Lead, PCBs
HD-16	9 to 11	12/19/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-16	13 to 15	12/19/03	cPAHs, Metals, PCBs, SVOCs, VOCs
HD-17	4 to 6	12/18/03	cPAHs, Lead, PCBs
HD-17	8 to 10	12/18/03	cPAHs, Lead, PCBs
HD-18	4 to 6	12/18/03	cPAHs, Lead, PCBs
HD-19	2 to 4	12/19/03	cPAHs, Lead, PCBs, VOCs
HD-20	6 to 8	11/26/03	cPAHs, Lead, PCBs
HD-20	10 to 12	11/26/03	cPAHs, Lead, PCBs
HST-1	0 to 2	04/19/96	cPAHs, Metals, PCBs, SVOCs
HST-1	2 to 4	04/19/96	cPAHs, Metals, PCBs, SVOCs
HST-16	0 to 2	03/25/97	cPAHs, Lead, PCBs
HST-17	0 to 2	03/25/97	cPAHs, Lead, PCBs
HST-21	0 to 1	12/08/97	cPAHs, Lead, PCBs
HST-21	1 to 2	12/08/97	cPAHs, Lead, PCBs
HST-21	2 to 3	12/08/97	cPAHs, Lead, PCBs
HST-21	3 to 5	01/12/98	cPAHs, Lead, PCBs
HST-21	5 to 7	01/12/98	cPAHs, Lead, PCBs
HST-22	0 to 1	12/08/97	cPAHs, Lead, PCBs
HST-22	1 to 2	12/08/97	cPAHs, Lead, PCBs
HST-22	1 to 3	01/12/98	cPAHs, Lead, PCBs
HST-22	3 to 5	01/12/98	cPAHs, Lead, PCBs
HST-22A	0 to 1	12/08/97	cPAHs
HST-22A+10	0 to 1	02/20/98	cPAHs
HST-22B	0 to 1	12/08/97	cPAHs
HST-22B+20	0 to 1	02/20/98	cPAHs
HST-22C	0 to 1	12/08/97	cPAHs
HST-22D	0 to 1	12/08/97	cPAHs
HST-22D+10	0 to 1	02/20/98	cPAHs
HST-23	0 to 1	12/08/97	cPAHs, Lead, PCBs
HST-23	1 to 2	12/08/97	cPAHs, Lead, PCBs
HST-23	1 to 3	01/12/98	cPAHs, Lead, PCBs
HST-23	3 to 5	01/12/98	cPAHs, Lead, PCBs
HST-24	0 to 1	12/08/97	cPAHs, Lead, PCBs
HST-24	1 to 2	12/08/97	cPAHs, Lead, PCBs
HST-24	2 to 3	12/08/97	cPAHs, Lead, PCBs
HST-24	4.5 to 6.5	01/12/98	cPAHs, Lead, PCBs
HST-24	6.5 to 8.5	01/12/98	cPAHs, Lead, PCBs
HST-25	0 to 2	12/08/97	cPAHs, Lead, PCBs
HST-25	1 to 3	01/12/98	cPAHs, Lead, PCBs
HST-25	3 to 5	01/12/98	cPAHs, Lead, PCBs
HST-26	0 to 2	12/08/97	cPAHs, Lead
HST-27	0 to 2	12/08/97	cPAHs, Lead
HST-28	0 to 2	12/08/97	cPAHs, Lead
HST-29	0 to 2	12/08/97	Lead
HST-30	3 to 5	06/30/98	PCBs
HST-31	2.5 to 4.5	06/30/98	PCBs
HST-32	4.8 to 6.8	06/30/98	PCBs
HST-33	5 to 7	06/30/98	PCBs
HST-34	5 to 7	06/30/98	PCBs
MSF-1	7 to 9	12/26/01	PCBs
MSF-1	9 to 11	12/26/01	PCBs

Table 3-1. Summary of Sampling Data (Sample Identification, Depth, Date and Analyses Performed) for Soil Samples Collected in OU-3 (August 1985 to November 2003), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Sample Location/ Designation	Sample Depth Interval (Ft. Below Land Surface)	Sample Date	Analyte(s)
MW-1 *	0 to 2	02/27/86	PCBs
MW-2 *	0 to 2	02/24/86	PCBs
MW-3 *	0 to 2	02/28/86	PCBs
MW-4 *	0 to 2	03/03/86	PCBs
MW-5 *	0 to 2	02/26/86	PCBs
MW-6 *	0 to 2	02/24/86	PCBs
MW-7 *	0 to 2	02/28/86	PCBs
MW-8 *	0 to 2	02/26/86	PCBs
MW-9 *	0 to 2	03/05/86	PCBs
MW-10 *	0 to 2	03/05/86	PCBs
MW-11 *	0 to 2	02/27/86	PCBs
MW-12 *	0 to 2	02/21/86	PCBs
MW-13*	0 to 2	02/24/86	PCBs
MW-13 (G&M)	0 to 2	10/20/90	PCBs
MW-14 *	0 to 2	02/21/86	PCBs
MW-15 *	0 to 2	02/27/86	PCBs
MW-16	0 to 2	11/07/90	PCBs
MW-16	10 to 12	11/07/90	PCBs
MW-17	0 to 2	10/26/90	PCBs
MW-19	0 to 2	12/07/90	Lead, PCBs
MW-20	0 to 2	12/11/90	Lead, PCBs
MW-21	0 to 2	12/06/90	Lead, PCBs
MW-22	0 to 2	10/20/90	PCBs
MW-54	3 to 5	11/29/93	cPAHs, Metals, PCBs, SVOCs, VOCs
MW-58	0 to 2	03/25/97	cPAHs, Lead, PCBs
MW-58	2 to 3	12/07/93	cPAHs, Metals, PCBs, SVOCs, VOCs
S-1	0 to 2	10/26/90	PCBs
S-1	2 to 3	10/26/90	PCBs
S-2	0 to 2	10/24/90	Lead, PCBs
S-3	0 to 2	10/10/90	PCBs
S-3	3 to 5	10/10/90	PCBs
S-4	0 to 2	10/10/90	PCBs
S-5	0 to 2	10/26/90	PCBs
S-7	0 to 2	10/25/90	PCBs
S-8	0 to 2	10/25/90	PCBs
S-9	0 to 2	10/10/90	PCBs
S-9	3 to 4.5	10/10/90	PCBs
S-10	0 to 2	10/16/90	Lead, PCBs
S-61	5 to 7	10/24/90	cPAHs, Metals, PCBs, SVOCs, VOCs
S-62	0 to 2	10/24/90	cPAHs, Metals, PCBs, SVOCs, VOCs
S-63	0 to 2	10/25/90	PCBs
S-64	2 to 3	10/18/90	cPAHs, Metals, PCBs, SVOCs, VOCs
S-66	3 to 5	10/10/90	PCBs
S-67	0 to 2	10/27/90	PCBs
S-68	0 to 2	10/27/90	PCBs
S-76	0 to 0.7	10/25/90	PCBs
S-99	0 to 2	01/18/93	cPAHs, Metals, PCBs, SVOCs,
S-122	7.5 to 8.5	04/09/94	cPAHs, Metals, PCBs, SVOCs, VOCs
S-129	3 to 5	11/29/93	cPAHs, Metals, PCBs, SVOCs, VOCs
S-134	2 to 4	11/08/93	cPAHs, Metals, PCBs, SVOCs, VOCs
S-135	3 to 3.5	12/07/93	cPAHs, Metals, PCBs, SVOCs, VOCs
S-139	3 to 3.5	12/07/93	cPAHs, Metals, PCBs, SVOCs, VOCs
S-150	0 to 2	11/03/03	PCBs

Table 3-1. Summary of Sampling Data (Sample Identification, Depth, Date and Analyses Performed) for Soil Samples Collected in OU-3 (August 1985 to November 2003), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Sample Location/ Designation	Sample Depth Interval (Ft. Below Land Surface)	Sample Date	Analyte(s)
S-151	0 to 2	11/03/03	PCBs
S-152	0 to 2	11/03/03	PCBs
S-153	0 to 2	11/03/03	PCBs
S-154	0 to 2	11/03/03	PCBs
S-155	0 to 2	11/03/03	PCBs
S-156	0 to 2	11/03/03	PCBs
S-157	0 to 2	11/03/03	PCBs
S-158	0 to 2	11/03/03	PCBs
S-159	0 to 2	11/03/03	PCBs
S-160	0 to 2	11/03/03	PCBs
S-161	0 to 2	11/03/03	PCBs
S-162	0 to 2	11/03/03	PCBs
S-163	0 to 2	11/03/03	PCBs
SP-1 (OU-4)	0 to 1	07/08/99	PCBs
SP-1 (OU-4)	1 to 2	07/08/99	PCBs
SP-1 (OU-4)	2 to 3	07/08/99	PCBs
SP-2 (OU-4)	0 to 1	07/08/99	PCBs
SP-2 (OU-4)	1 to 2	07/08/99	PCBs
SP-2 (OU-4)	2 to 3	07/08/99	PCBs
SP-3 (OU-4)	0 to 1	07/08/99	PCBs
SP-3 (OU-4)	1 to 2	07/08/99	PCBs
SP-3 (OU-4)	2 to 3	07/08/99	PCBs
SP-3 (OU-4)	4 to 5	07/08/99	PCBs
SP-4 (OU-4)	7 to 8	07/08/99	PCBs
SP-5 (OU-4)	7 to 8	07/08/99	PCBs
SP-6 (OU-4)	7 to 8	07/08/99	PCBs
SP-7 (OU-4)	7 to 8	07/08/99	PCBs
SP-8 (OU-4)	7 to 8	07/08/99	PCBs
SP-9 (OU-4)	0 to 1	07/08/99	PCBs
SP-9 (OU-4)	1 to 2	07/08/99	PCBs
SP-9 (OU-4)	2 to 3	07/08/99	PCBs
SP-10 (OU-4)	0 to 0.5	07/14/99	PCBs
SP-11 (OU-4)	0 to 0.5	07/15/99	PCBs
SPA-1 (OU-4)	0 to 1	07/20/99	PCBs
SPA-2 (OU-4)	0 to 1	07/20/99	PCBs
SPA-3 (OU-4)	0 to 1	07/20/99	PCBs
SPA-4 (OU-4)	0 to 1	07/20/99	PCBs
SPA-4 (OU-4)	1 to 2	07/20/99	PCBs
SPA-4 (OU-4)	2 to 3	07/20/99	PCBs
SPA-5 (OU-4)	0 to 1	07/20/99	PCBs
SS-6 (OU-4)	0 to 1	12/08/97	cPAHs, Lead, PCBs, SVOCs
SS-6 (OU-4)	1 to 2	12/08/97	cPAHs, Lead, PCBs, SVOCs
TSB-2	0 to 2	10/31/00	cPAHs, Lead, PCBs, TCLP SVOCs, TCLP Metals, RCRA Characteristics
TSB-4	0 to 2	10/31/00	PCBs
TSB-5	0 to 2	10/31/00	PCBs, BOD, COD, Nitrate, TOC, TPH
TSB-6	0 to 2	10/31/00	PCBs
TSB-7	0 to 2	10/31/00	PCBs
TSB-8	0 to 1	10/24/00	PCBs, BOD, COD, Nitrate, TOC, TPH
TSB-8	2.5 to 3.5	10/24/00	PCBs
TSB-8	10 to 11	10/24/00	PCBs
TSB-9	0 to 1	10/24/00	PCBs
TSB-9	2.5 to 3.5	10/24/00	cPAHs, Lead, PCBs, TCLP SVOCs, TCLP Metals, RCRA Characteristics, BOD, COD, Nitrate, TOC, TPH

Table 3-1. Summary of Sampling Data (Sample Identification, Depth, Date and Analyses Performed) for Soil Samples Collected in OU-3 (August 1985 to November 2003), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Sample Location/ Designation	Sample Depth Interval (Ft. Below Land Surface)	Sample Date	Analyte(s)
TSB-9	16 to 17	10/24/00	PCBs
TSB-10	0 to 1	10/23/00	PCBs
TSB-10	2 to 3	10/23/00	PCBs
TSB-10	12 to 13	10/23/00	PCBs
TSB-11	2.5 to 3.5	10/25/00	cPAHs, Lead, PCBs, TCLP SVOCs, TCLP Metals, RCRA Characteristics
TSB-12	2.5 to 3.5	10/25/00	PCBs
TSB-13	2.5 to 3.5	10/25/00	PCBs
TSB-14	2.5 to 3.5	10/25/00	PCBs
TSB-14	4.5 to 5.5	10/25/00	PCBs
TSB-14	23 to 24	10/25/00	PCBs
TSB-15	0 to 1	10/25/00	PCBs
TSB-15	2.5 to 3.5	10/25/00	PCBs
TSB-15	19 to 20	10/25/00	PCBs
TSB-16	0 to 1	10/24/00	PCBs
TSB-16	3 to 4	10/24/00	PCBs
TSB-16	18 to 19	10/24/00	PCBs
TSB-17	0 to 1	10/30/00	PCBs
TSB-17	3 to 4	10/30/00	PCBs
TSB-17	24 to 25	10/30/00	PCBs, BOD, COD, Nitrate, TOC, TPH
TSB-18	0 to 1	10/30/00	cPAHs, Lead, PCBs, TCLP SVOCs, TCLP Metals, RCRA Characteristics
TSB-18	3.5 to 4.5	10/30/00	PCBs
TSB-18	19 to 20	10/30/00	PCBs
TSB-19	19 to 20	10/30/00	PCBs

Notes:

cPAHs - Seven Specific Polycyclic Aromatic Hydrocarbons Considered by the NYSDEC to be Carcinogenic
PCBs - Polychlorinated Biphenyls
SVOCs - Semivolatile Organic Compounds
VOCs - Volatile Organic Compounds
TCLP - Toxicity Characteristic Leaching Procedure
RCRA - Resource Conservation and Recovery Act
BOD - Biological Oxygen Demand
COD - Chemical Oxygen Demand
TOC - Total Organic Carbon
TPH - Total Petroleum Hydrocarbons
ft bls - feet below land surface as measured at the time of sampling
* Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	821-E	821-F	821-G	CMW-20	CMW-22	CS-1	CS-1 (OU-4)	CS-2 (OU-4)	CS-3
		Sample Date:	08/21/85	08/21/85	08/22/85	11/08/93	11/08/93	01/26/93	08/10/99	08/10/99	11/08/93
		Sample Depth (ft bls):	0-0.5	0-5	0-0.5	0-2	0-2	0-2	0-0.5	0-0.5	3-5
Aroclor-1016			NA	NA	NA	200 U	200 U	3900 U	19 U	17 U	210 U
Aroclor-1221			NA	NA	NA	200 U	200 U	7900 U	19 U	17 U	210 U
Aroclor-1232			NA	NA	NA	200 U	200 U	3900 U	19 U	17 U	210 U
Aroclor-1242			NA	NA	NA	200 U	200 U	3900 U	19 U	17 U	210 U
Aroclor-1248			NA	NA	NA	200 U	200 U	3900 U	19 U	17 U	210 U
Aroclor-1254			NA	NA	NA	190 J	400 J	3900 U	19 D	17 U	850
Aroclor-1260			NA	NA	NA	360 J	1100	8600	38	130	1400
Total PCBs	25,000		**43400**	6320	9750	550 J	1500 J	8600	57 D	130	2250

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation: CS-3 (OU-4)	CS-4 (OU-4)	CS-5	CS-5 (OU-4)	CS-6 (OU-4)	CS-7 (OU-4)	CS-8 (OU-4)	CS-10
		Sample Date: 08/10/99	08/10/99	11/08/93	08/10/99	08/10/99	08/10/99	08/10/99	11/08/93
		Sample Depth (ft bls): 0-0.5	0-0.5	0-2	0-0.5	0-0.5	0-0.5	0-0.5	0-2
Aroclor-1016		17 U	17 U	190 U	17 U	18 U	18 U	17 U	180 U
Aroclor-1221		17 U	17 U	190 U	17 U	18 U	18 U	17 U	180 U
Aroclor-1232		17 U	17 U	190 U	17 U	18 U	18 U	17 U	180 U
Aroclor-1242		17 U	17 U	190 U	17 U	18 U	18 U	17 U	180 U
Aroclor-1248		17 U	17 U	190 U	17 U	18 U	18 U	17 U	180 U
Aroclor-1254		17 U	17 U	440	17 U	18 U	18 U	17 U	360 U
Aroclor-1260		17 U	17 U	1700	17 U	18 U	18 U	17 U	370
Total PCBs	25,000	0	0	2140	0	0	0	0	370

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation: CS-61	CS-64	CS-67	CS-76	HD-1	HD-2	HD-2	HD-3	HD-3	HD-4
		Sample Date: 11/08/93	02/01/93	11/08/93	01/26/93	12/18/03	12/18/03	12/18/03	11/26/03	11/26/03	11/26/03
		Sample Depth (ft bls): 5-7	2-3	0-2	0-0.5	4-6	9-11	13-15	5-7	8-10	8-10
Aroclor-1016		200 UJ	400 U	190 U	38000 U	22 U	20 U	19 U	20 U	19 U	21 U
Aroclor-1221		200 UJ	820 U	190 U	76000 U	42 U	38 U	36 U	38 U	37 U	41 U
Aroclor-1232		200 UJ	400 U	190 U	38000 U	22 U	20 U	19 U	20 U	19 U	21 U
Aroclor-1242		200 UJ	400 U	190 U	38000 U	22 U	20 U	19 U	20 U	19 U	21 U
Aroclor-1248		200 UJ	400 U	190 U	38000 U	22 U	20 U	19 U	20 U	19 U	21 U
Aroclor-1254		400 U	400 U	380 U	38000 U	22 U	20 U	19 U	20 U	19 U	21 U
Aroclor-1260		97 J	1500 J	430	73000	22 U	20 U	19 U	6.7 JNV	19 U	21 U
Total PCBs	25,000	97 J	1500 J	430	**73000**	0	0	0	6.7 JNV	0	0

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation: HD-4 Sample Date: 11/26/03 Sample Depth (ft bls): 14-16	HD-5B 11/25/03 9-11	HD-5B 11/25/03 15-16	HD-6 11/26/03 9-11	HD-6 11/26/03 18-20	HD-7 11/25/03 8-10	HD-7 11/25/03 21-23	HD-8D 11/24/03 7-9	HD-8D 11/24/03 20-22	HD-8D 11/24/03 36-38
Aroclor-1016		19 U	19 U	20 U	18 U	19 U	18 U	19 U	19 U	18 U	19 U
Aroclor-1221		37 U	37 U	38 U	35 U	37 U	36 U	37 U	37 U	36 U	38 U
Aroclor-1232		19 U	19 U	20 U	18 U	19 U	18 U	19 U	19 U	18 U	19 U
Aroclor-1242		19 U	19 U	20 U	18 U	19 U	18 U	19 U	19 U	18 U	19 U
Aroclor-1248		19 U	19 U	20 U	18 U	19 U	18 U	19 U	19 U	18 U	19 U
Aroclor-1254		19 U	19 U	20 U	18 U	19 U	18 U	19 U	63 B	18 U	19 U
Aroclor-1260		19 U	87	30	31 JV	19 U	140	19 U	34	18 U	19 U
Total PCBs	25,000	0	87	30	31 JV	0	140	0	97 B	0	0

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ft bls - Feet below land surface
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NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
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Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HD-9	HD-9	HD-10	HD-10	HD-10	HD-11	HD-11	HD-12	HD-12	HD-13
		Sample Date:	11/26/03	11/26/03	11/25/03	11/25/03	11/25/03	12/18/03	12/18/03	11/25/03	11/25/03	12/19/03
		Sample Depth (ft bls):	8-10	13-15	6-8	8-10	16-18	4-6	13-15	6-8	14-16	3-5
Aroclor-1016			37 U	19 U	19 U	19 U	19 U	19 U	18 U	380 U	20 U	20 U
Aroclor-1221			73 U	37 U	36 U	36 U	37 U	37 U	36 U	740 U	39 U	38 U
Aroclor-1232			37 U	19 U	19 U	19 U	19 U	19 U	18 U	380 U	20 U	20 U
Aroclor-1242			37 U	19 U	19 U	19 U	19 U	19 U	18 U	380 U	20 U	20 U
Aroclor-1248			37 U	19 U	19 U	19 U	19 U	19 U	18 U	380 U	20 U	20 U
Aroclor-1254			37 U	19 U	19 U	19 U	19 U	19 U	18 U	380 U	20 U	23
Aroclor-1260			350	19 U	170	22	19 U	180	18 U	1200	20 U	20 U
Total PCBs	25,000		350	0	170	22	0	180	0	1200	0	23

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
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Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
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Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation: HD-14	HD-14	HD-15C	HD-15C	HD-15C	HD-16	HD-16	HD-17	HD-17	HD-18
		Sample Date: 12/18/03	12/18/03	11/25/03	11/25/03	11/25/03	12/19/03	12/19/03	12/18/03	12/18/03	12/18/03
		Sample Depth (ft bls): 4-6	6-8	6-8	20-22	28-30	9-11	13-15	4-6	8-10	4-6
Aroclor-1016		22 U	22 U	380 U	22 U	19 U	19 U	19 U	21 U	20 U	19 U
Aroclor-1221		43 U	43 U	740 U	42 U	36 U	37 U	37 U	42 U	39 U	37 U
Aroclor-1232		22 U	22 U	380 U	22 U	19 U	19 U	19 U	21 U	20 U	19 U
Aroclor-1242		22 U	22 U	380 U	22 U	19 U	19 U	19 U	21 U	20 U	19 U
Aroclor-1248		22 U	22 U	380 U	22 U	19 U	19 U	19 U	21 U	20 U	19 U
Aroclor-1254		22 U	22 U	380 U	22 U	19 U	19 J	19 U	21 U	20 U	19 U
Aroclor-1260		22 U	22 U	1500	22 U	31	19 U	19 U	91	13 J	19 U
Total PCBs	25,000	0	0	1500	0	31	19 J	0	91	13 J	0

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HD-19	HD-20	HD-20	HST-1	HST-1	HST-16	HST-17	HST-21	HST-21	HST-21
		Sample Date:	12/19/03	11/26/03	11/26/03	04/19/96	04/19/96	03/25/97	03/25/97	12/08/97	12/08/97	12/08/97
		Sample Depth (ft bls):	2-4	6-8	10-12	0-2	2-4	0-2	0-2	0-1	1-2	2-3
Aroclor-1016			20 U	20 U	19 U	38 U	38 U	190 U	200 U	38 U	36 U	37 U
Aroclor-1221			38 U	38 U	38 U	76 U	77 U	380 U	400 U	38 U	36 U	37 U
Aroclor-1232			20 U	20 U	19 U	38 U	38 U	190 U	200 U	38 U	36 U	37 U
Aroclor-1242			20 U	20 U	19 U	38 U	38 U	190 U	200 U	38 U	36 U	37 U
Aroclor-1248			20 U	20 U	19 U	38 U	38 U	190 U	200 U	38 U	36 U	37 U
Aroclor-1254			20 U	20 U	19 U	38 U	38 U	170 J	210	38 U	36 U	37 U
Aroclor-1260			20 U	20 U	19 U	190	56	330	420	32 J	36 U	37 U
Total PCBs	25,000		0	0	0	190	56	500 J	630	32 J	0	0

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µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
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N - Compound is tentative in identification
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Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
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Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HST-21	HST-21	HST-22	HST-22	HST-22	HST-22	HST-23	HST-23	HST-23	HST-23	HST-24
		Sample Date:	01/12/98	01/12/98	12/08/97	12/08/97	01/12/98	01/12/98	12/08/97	12/08/97	01/12/98	01/12/98	12/08/97
		Sample Depth (ft bls):	3-5	5-7	0-1	1-2	1-3	3-5	0-1	1-2	1-3	3-5	0-1
Aroclor-1016			39 U	39 U	42 U	41 U	43 U	43 U	38 U	38 U	38 U	38 U	390 U
Aroclor-1221			39 U	39 U	42 U	41 U	43 U	43 U	38 U	38 U	38 U	38 U	390 U
Aroclor-1232			39 U	39 U	42 U	41 U	43 U	43 U	38 U	38 U	38 U	38 U	390 U
Aroclor-1242			39 U	39 U	42 U	41 U	43 U	43 U	38 U	38 U	38 U	38 U	390 U
Aroclor-1248			39 U	39 U	42 U	41 U	43 U	43 U	38 U	38 U	38 U	38 U	390 U
Aroclor-1254			39 U	39 U	42 U	41 U	43 U	43 U	38 U	38 U	38 U	38 U	1200 JV
Aroclor-1260			39 U	39 U	42 U	97	110	43 U	170	270 JV	200	72	1700 JV
Total PCBs	25,000		0	0	0	97	110	0	170	270 JV	200	72	2900 JV

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µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
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V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
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Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HST-24	HST-24	HST-24	HST-24	HST-25	HST-25	HST-25	HST-30	HST-31	HST-32	HST-33
		Sample Date:	12/08/97	12/08/97	01/12/98	01/12/98	12/08/97	01/12/98	01/12/98	06/30/98	06/30/98	06/30/98	06/30/98
		Sample Depth (ft bls):	1-2	2-3	4.5-6.5	6.5-8.5	0-2	1-3	3-5	3-5	2.5 - 4.5	4.8 - 6.8	5 - 7
Aroclor-1016			39 U	38 U	39 U	39 U	38 U	40 U	38 U	39 U	38 U	38 U	39 U
Aroclor-1221			39 U	38 U	39 U	39 U	38 U	40 U	38 U	78 U	76 U	76 U	78 U
Aroclor-1232			39 U	38 U	39 U	39 U	38 U	40 U	38 U	39 U	38 U	38 U	39 U
Aroclor-1242			39 U	38 U	39 U	39 U	38 U	40 U	38 U	39 U	38 U	38 U	39 U
Aroclor-1248			39 U	38 U	39 U	39 U	38 U	40 U	38 U	39 U	130	38 U	39 U
Aroclor-1254			39 U	38 U	39 U	39 U	38 U	40 U	38 U	39 U	38 U	38 U	39 U
Aroclor-1260			220	280	39 U	39 U	170	40 U	38 U	37 J	170	270	180
Total PCBs	25,000		220	280	0	0	170	0	0	37 J	300	270	180

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
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N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
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Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
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Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HST-34	MSF-1	MSF-1	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8
		Sample Date:	06/30/98	12/26/01	12/26/01	02/27/86	02/24/86	02/28/86	03/03/86	02/26/86	02/24/86	02/28/86	02/26/86
		Sample Depth (ft bls):	5-7	7-9	9-11	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2
Aroclor-1016			38 U	19 U	18 U	400 U	40 U	400 U	400 U	40 U	400 U	800 U	2000 U
Aroclor-1221			77 U	19 U	18 U	400 U	40 U	400 U	400 U	40 U	400 U	800 U	2000 U
Aroclor-1232			38 U	19 U	18 U	400 U	40 U	400 U	400 U	40 U	400 U	800 U	2000 U
Aroclor-1242			38 U	19 U	18 U	400 U	40 U	400 U	400 U	40 U	400 U	800 U	2000 U
Aroclor-1248			38 U	19 U	18 U	400 U	40 U	400 U	400 U	40 U	400 U	800 U	2000 U
Aroclor-1254			38 U	19 U	18 U	400 U	40 U	400 U	8100	40 U	920	800 U	2000 U
Aroclor-1260			82	100	85	3300	190	1700	4000 U	760	1000	7300	24000
Total PCBs	25,000		82	100	85	3300	190	1700	8100	760	1920	7300	24000

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µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
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U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
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Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	MW-9	MW-10	MW-11	MW-12	MW-13	MW-13 (G&M)	MW-14	MW-15	MW-16	MW-16
		Sample Date:	03/05/86	03/05/86	02/27/86	02/21/86	10/20/90	10/20/90	02/21/86	02/27/86	11/07/90	11/07/90
		Sample Depth (ft bls):	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	10-12
Aroclor-1016			1000 U	500 U	40 U	40 U	930 U	2000 U	40 U	40 U	980 U	930 U
Aroclor-1221			1000 U	500 U	40 U	40 U	930 U	2000 U	40 U	40 U	980 U	930 U
Aroclor-1232			1000 U	500 U	40 U	40 U	930 U	2000 U	40 U	40 U	980 U	930 U
Aroclor-1242			1000 U	500 U	40 U	40 U	930 U	2000 U	40 U	40 U	980 U	930 U
Aroclor-1248			1000 U	500 U	40 U	40 U	930 U	2000 U	40 U	40 U	980 U	930 U
Aroclor-1254			1000 U	500 U	40 U	40 U	930 U	13500	40 U	40 U	980 U	930 U
Aroclor-1260			6100	3000	40 U	40 U	4350 JV	2000 U	200	300	1210 JV	3655 JV
Total PCBs	25,000		6100	3000	0	0	4350 JV	13500	200	300	1210 JV	3655 JV

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
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R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation: MW-17	MW-19	MW-20	MW-21	MW-22	MW-54	MW-58	MW-58	S-1	S-1	S-2
		Sample Date: 10/26/90	12/07/90	12/11/90	12/06/90	10/20/90	11/29/93	03/25/97	12/07/93	10/26/90	10/26/90	10/24/90
		Sample Depth (ft bls): 0-2	0-2	0-2	0-2	0-2	3-5	0-2	2-3	0-2	2-3	0-2
Aroclor-1016		90 UR	110 U	100 U	90 U	1010 U	180 UVJ	230 J	88 U	1000 UR	100 UR	910 U
Aroclor-1221		90 UR	110 U	100 U	90 U	1010 U	180 UVJ	190 J	88 U	1000 UR	100 UR	910 U
Aroclor-1232		90 UR	110 U	100 U	90 U	1010 U	180 UVJ	930	88 U	1000 UR	100 UR	910 U
Aroclor-1242		90 UR	110 U	100 U	90 U	1010 U	180 UVJ	320 J	88 U	1000 UR	100 UR	910 U
Aroclor-1248		90 UR	110 U	100 U	90 U	1010 U	140 J	800	100	1000 UR	100 UR	910 U
Aroclor-1254		90 UR	110 U	100 U	90 U	1010 U	320 UVJ	400 U	340 JV	1000 UR	100 UR	910 U
Aroclor-1260		670 BR	52 JV	60 JV	320 JV	790 JV	33 J	47 J	290 JV	3010 BRV	590 JBRV	7877 JV
Total PCBs	25,000	670 BR	52 JV	60 JV	320 JV	790 JV	173 J	2517	730 JV	3010 BRV	590 JBRV	7877 JV

PCBs - Polychlorinated Biphenyls

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

B - Compound was found in the blank and sample

J - Estimated value

N - Compound is tentative in identification

R - Result declared unusable during data validation

V - Qualifier added and/or value altered during data validation

U - Compound was analyzed for but not detected

NYSDEC - New York State Department of Environmental Conservation

NA - Specific Aroclor data is not available

Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.

Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	S-3	S-3	S-4	S-5	S-7	S-8	S-9	S-9	S-10	S-61	S-62
		Sample Date:	10/10/90	10/10/90	10/10/90	10/26/90	10/25/90	10/25/90	10/10/90	10/10/90	10/16/90	10/24/90	10/24/90
		Sample Depth (ft bls):	0-2	3-5	0-2	0-2	0-2	0-2	0-2	3-4.5	0-2	5-7	0-2
Aroclor-1016			900 U	1700 U	870 U	880 UR	90 U	90 U	860 U	950 U	80 U	90 U	90 U
Aroclor-1221			900 U	1700 U	870 U	880 UR	90 U	90 U	860 U	950 U	80 U	90 U	90 U
Aroclor-1232			900 U	1700 U	870 U	880 UR	90 U	90 U	860 U	950 U	80 U	90 U	90 U
Aroclor-1242			900 U	1700 U	870 U	880 UR	90 U	90 U	860 U	950 U	80 U	90 U	90 U
Aroclor-1248			900 U	1700 U	870 U	880 UR	90 U	90 U	860 U	950 U	80 U	90 U	90 U
Aroclor-1254			900 U	1700 U	870 U	880 UR	90 U	90 U	860 U	950 U	80 U	90 U	90 U
Aroclor-1260			9324 JV	1700 U	2541 JV	8150 BR	955 JV	1089 JV	1724 JV	935 JV	96 JV	90 U	90 U
Total PCBs	25,000		9324 JV	0	2541 JV	8150 BR	955 JV	1089 JV	1724 JV	935 JV	96 JV	0	0

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
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V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
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Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	S-63	S-64	S-66	S-67	S-68	S-76	S-99	S-122	S-129	S-134	S-135
		Sample Date:	10/25/90	10/18/90	10/10/90	10/27/90	10/27/90	10/25/90	01/18/93	04/09/94	11/29/93	11/08/93	12/07/93
		Sample Depth (ft bls):	0-2	2-3	3-5	0-2	0-2	0-0.7	0-2	7.5-8.5	3-5	2-4	3-3.5
Aroclor-1016			95 U	95 U	90 U	90 URV	90 UR	900 U	38 U	91 U	200 UVJ	100 U	170 U
Aroclor-1221			95 U	95 U	90 U	90 URV	90 UR	900 U	76 U	91 U	200 UVJ	100 U	170 U
Aroclor-1232			95 U	95 U	90 U	90 URV	90 UR	900 U	38 U	91 U	200 UVJ	100 U	170 U
Aroclor-1242			95 U	95 U	90 U	90 URV	90 UR	900 U	38 U	91 U	200 UVJ	100 U	170 U
Aroclor-1248			95 U	95 U	90 U	90 URV	90 UR	900 U	38 U	91 U	200 UVJ	100 U	170 U
Aroclor-1254			95 U	95 U	90 U	90 URV	90 UR	900 U	38 U	180 U	400 UVJ	110 U	12 J
Aroclor-1260			1489 JV	979 JV	90 U	290 RV	270 RV	13652 JV	120	37 J	190 J	390	340 U
Total PCBs	25,000		1489 JV	979 JV	0	290 RV	270 RV	13652 JV	120	37 J	190 J	390	12 J

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	S-139	S-150	S-151	S-152	S-153	S-154	S-155	S-156	S-157	S-158	S-159
		Sample Date:	12/07/93	11/3/03	11/3/03	11/3/03	11/3/03	11/3/03	11/3/03	11/3/03	11/3/03	11/3/03	11/3/03
		Sample Depth (ft bls):	3-3.1	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2
Aroclor-1016			160 U	42 U	97 U	38 U	21 U	19 U	41 U	190 U	390 U	370 U	390 U
Aroclor-1221			160 U	82 U	190 U	73 U	40 U	37 U	80 U	370 U	750 U	720 U	750 U
Aroclor-1232			160 U	42 U	97 U	38 U	21 U	19 U	41 U	190 U	390 U	370 U	390 U
Aroclor-1242			160 U	42 U	97 U	38 U	21 U	19 U	41 U	190 U	390 U	370 U	390 U
Aroclor-1248			160 U	42 U	97 U	38 U	46 NJV	19 U	41 U	190 U	390 U	370 U	390 U
Aroclor-1254			320 U	42 U	97 U	56	21 U	27	110	190 U	390 U	370 U	390 U
Aroclor-1260			140 J	350	750	390	100	40	330	1000	3200	2500	2500
Total PCBs	25,000		140 J	350	750	446	146 NJV	67	440	1000	3200	2500	2500

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	S-160	S-161	S-162	S-163	SP-1 (OU-4)	SP-1 (OU-4)	SP-1 (OU-4)	SP-2 (OU-4)	SP-2 (OU-4)
		Sample Date:	11/3/03	11/3/03	11/3/03	11/3/03	07/08/99	07/08/99	07/08/99	07/08/99	07/08/99
		Sample Depth (ft bls):	0-2	0-2	0-2	0-2	0-1	1-2	2-3	0-1	1-2
Aroclor-1016			370 U	400 U	380 U	190 U	37 U	36 U	36 U	35 U	35 U
Aroclor-1221			720 U	780 U	740 U	380 U	74 U	71 U	72 U	71 U	71 U
Aroclor-1232			370 U	400 U	380 U	190 U	37 U	36 U	36 U	35 U	35 U
Aroclor-1242			370 U	400 U	380 U	190 U	37 U	36 U	36 U	35 U	35 U
Aroclor-1248			370 U	400 U	380 U	190 U	37 U	36 U	36 U	35 U	35 U
Aroclor-1254			370 U	2900	920	2100	750 D	140	110	720 D	16 J
Aroclor-1260			2400	1600	2000	720	37 U	36 U	36 U	35 U	35 U
Total PCBs	25,000		2400	4500	2920	2820	750 D	140	110	720 D	16 J

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	SP-2 (OU-4)	SP-3 (OU-4)	SP-3 (OU-4)	SP-3 (OU-4)	SP-3 (OU-4)	SP-4 (OU-4)	SP-5 (OU-4)	SP-6 (OU-4)
		Sample Date:	07/08/99	07/08/99	07/08/99	07/08/99	07/08/99	07/08/99	07/08/99	07/08/99
		Sample Depth (ft bls):	2-3	0-1	1-2	2-3	4-5	7-8	7-8	7-8
Aroclor-1016			36 U	36 U	36 U	37 U	36 U	36 U	39 U	36 U
Aroclor-1221			71 U	71 U	72 U	74 U	72 U	72 U	78 U	71 U
Aroclor-1232			36 U	36 U	36 U	37 U	36 U	36 U	39 U	36 U
Aroclor-1242			36 U	36 U	36 U	37 U	36 U	36 U	39 U	36 U
Aroclor-1248			36 U	36 U	36 U	37 U	36 U	36 U	39 U	36 U
Aroclor-1254			30 J	61	36 U	37 U	36 U	36 U	39 U	36 U
Aroclor-1260			36 U	36 U	36 U	37 U	36 U	36 U	39 U	36 U
Total PCBs	25,000		30 J	61	0	0	0	0	0	0

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation: SP-7 (OU-4)	SP-8 (OU-4)	SP-9 (OU-4)	SP-9 (OU-4)	SP-9 (OU-4)	SP-10 (OU-4)	SP-11 (OU-4)
		Sample Date: 07/08/99	07/08/99	07/08/99	07/08/99	07/08/99	07/14/99	07/15/99
		Sample Depth (ft bls): 7-8	7-8	0-1	1-2	2-3	0-0.5	0-0.5
Aroclor-1016		37 U	41 U	37 U	330 U	330 U	36 U	54 U
Aroclor-1221		73 U	82 U	73 U	650 U	660 U	71 U	110 U
Aroclor-1232		37 U	41 U	37 U	330 U	330 U	36 U	54 U
Aroclor-1242		37 U	41 U	37 U	330 U	330 U	36 U	54 U
Aroclor-1248		37 U	41 U	37 U	330 U	330 U	36 U	54 U
Aroclor-1254		37 U	41 U	37 U	330 U	330 U	36 U	54 U
Aroclor-1260		37 U	41 U	37 U	330 U	330 U	36 U	54 U
Total PCBs	25,000	0	0	0	0	0	0	0

PCBs - Polychlorinated Biphenyls

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

B - Compound was found in the blank and sample

J - Estimated value

N - Compound is tentative in identification

R - Result declared unusable during data validation

V - Qualifier added and/or value altered during data validation

U - Compound was analyzed for but not detected

NYSDEC - New York State Department of Environmental Conservation

NA - Specific Aroclor data is not available

Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.

Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	SPA-1 (OU-4)	SPA-2 (OU-4)	SPA-3 (OU-4)	SPA-4 (OU-4)	SPA-4 (OU-4)	SPA-4 (OU-4)	SPA-5 (OU-4)
		Sample Date:	07/20/99	07/20/99	07/20/99	07/20/99	07/20/99	07/20/99	07/20/99
		Sample Depth (ft bls):	0-1	0-1	0-1	0-1	1-2	2-3	0-1
Aroclor-1016			33 U	33 U	33 U	33 U	33 U	33 U	33 U
Aroclor-1221			67 U	67 U	67 U	67 U	67 U	67 U	67 U
Aroclor-1232			33 U	33 U	33 U	33 U	33 U	33 U	33 U
Aroclor-1242			33 U	33 U	33 U	33 U	33 U	33 U	33 U
Aroclor-1248			33 U	33 U	33 U	33 U	33 U	33 U	33 U
Aroclor-1254			2800	28 J	29 J	33 U	33 U	33 U	1600 J
Aroclor-1260			3100	42	39	11 J	14 J	8 J	4200
Total PCBs	25,000		5900	70	68 J	11 J	14 J	8 J	5800 J

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	SS-6 (OU-4)	SS-6 (OU-4)	TSB-2	TSB-4	TSB-5	TSB-6	TSB-7	TSB-8	TSB-8	TSB-8
		Sample Date:	12/08/97	12/08/97	10/31/00	10/31/00	10/31/00	10/31/00	10/31/00	10/24/00	10/24/00	10/24/00
		Sample Depth (ft bls):	0-1	1-2	0-2	0-2	0-2	0-2	0-2	0-1	2.5-3.5	10-11
Aroclor-1016			39 U	40 U	20 U	19 U	18 U	18 U	179 U	20 U	20 U	18 U
Aroclor-1221			39 U	40 U	20 U	19 U	18 U	18 U	179 U	20 U	20 U	18 U
Aroclor-1232			39 U	40 U	20 U	19 U	18 U	18 U	179 U	20 U	20 U	18 U
Aroclor-1242			39 U	40 U	20 U	19 U	18 U	18 U	179 U	20 U	20 U	18 U
Aroclor-1248			39 U	40 U	20 U	19 U	18 U	18 U	179 U	20 U	20 U	18 U
Aroclor-1254			220	40 U	20 U	19 U	18 U	18 U	179 U	20 U	20 U	18 U
Aroclor-1260			200	42	27	59	160	76	1800	160	180	18 U
Total PCBs	25,000		420	42	27	59	160	76	1800	160	180	0

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	TSB-9	TSB-9	TSB-9	TSB-10	TSB-10	TSB-10	TSB-11	TSB-12	TSB-13	TSB-14	TSB-14
		Sample Date:	10/24/00	10/24/00	10/24/00	10/23/00	10/23/00	10/23/00	10/25/00	10/25/00	10/25/00	10/25/00	10/25/00
		Sample Depth (ft bls):	0-1	2.5-3.5	16-17	0-1	2-3	12-13	2.5-3.5	2.5-3.5	2.5-3.5	2.5-3.5	4.5-5.5
Aroclor-1016			20 U	18 U	19 U	21 U	20 U	20 U	190 U	190 U	200 U	480 U	370 U
Aroclor-1221			20 U	18 U	19 U	21 U	20 U	20 U	190 U	190 U	200 U	480 U	370 U
Aroclor-1232			20 U	18 U	19 U	21 U	20 U	20 U	190 U	190 U	200 U	480 U	370 U
Aroclor-1242			20 U	18 U	19 U	21 U	20 U	20 U	190 U	190 U	200 U	480 U	370 U
Aroclor-1248			20 U	18 U	19 U	21 U	20 U	20 U	190 U	190 U	200 U	480 U	370 U
Aroclor-1254			20 U	18 U	19 U	21 U	20 U	20 U	190 U	190 U	200 U	480 U	370 U
Aroclor-1260			400	190	19 U	340	370	20 U	3500	3000	2200	8000	5700
Total PCBs	25,000		400	190	0	340	370	0	3500	3000	2200	8000	5700

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation: TSB-14	TSB-15	TSB-15	TSB-15	TSB-16	TSB-16	TSB-16	TSB-17	TSB-17	TSB-17	TSB-18
		Sample Date: 10/25/00	10/25/00	10/25/00	10/25/00	10/24/00	10/24/00	10/24/00	10/30/00	10/30/00	10/30/00	10/30/00
		Sample Depth (ft bls): 23-24	0-1	2.5-3.5	19-20	0-1	3-4	18-19	0-1	3-4	24-25	0-1
Aroclor-1016		19 U	76 U	180 U	19 U	73 U	19 U	20 U	18 U	21 U	19 U	78 U
Aroclor-1221		19 U	76 U	180 U	19 U	73 U	19 U	20 U	18 U	21 U	19 U	78 U
Aroclor-1232		19 U	76 U	180 U	19 U	73 U	19 U	20 U	18 U	21 U	19 U	78 U
Aroclor-1242		19 U	76 U	180 U	19 U	73 U	19 U	20 U	18 U	21 U	19 U	78 U
Aroclor-1248		19 U	76 U	180 U	19 U	73 U	19 U	20 U	18 U	21 U	19 U	78 U
Aroclor-1254		19 U	76 U	180 U	19 U	73 U	19 U	20 U	18 U	21 U	19 U	78 U
Aroclor-1260		19 UJV	660	2800	19 U	580	190	20 U	190	370	19 U	860
Total PCBs	25,000	0	660	2800	0	580	190	0	190	370	0	860

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-2. Summary of PCB Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation: TSB-18 Sample Date: 10/30/00 Sample Depth (ft bls): 3.5-4.5	Sample Designation: TSB-18 Sample Date: 10/30/00 Sample Depth (ft bls): 19-20
Aroclor-1016		19 U	20 U
Aroclor-1221		19 U	20 U
Aroclor-1232		19 U	20 U
Aroclor-1242		19 U	20 U
Aroclor-1248		19 U	20 U
Aroclor-1254		19 U	20 U
Aroclor-1260		59	20 U
Total PCBs	25,000	59	0

PCBs - Polychlorinated Biphenyls
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
B - Compound was found in the blank and sample
J - Estimated value
N - Compound is tentative in identification
R - Result declared unusable during data validation
V - Qualifier added and/or value altered during data validation
U - Compound was analyzed for but not detected
NYSDEC - New York State Department of Environmental Conservation
NA - Specific Aroclor data is not available
Samples 821-E, 821-F, 821-G and MW-1 through MW-15 were not collected by Roux Associates, Inc.
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for PCBs

Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HD-1	HD-2	HD-2	HD-3	HD-3	HD-3	HD-4	HD-4
		Sample Date:	12/18/03	12/18/03	12/18/03	11/26/03	11/26/03	11/26/03	11/26/03	11/26/03
		Sample Depth (ft bls):	4-6	9-11	13-15	5-7	8-10	20-22	8-10	14-16
Benzo[a]anthracene			410 U	370 U	360 U	490 JNV	380 U	360 U	410 U	360 U
Benzo[a]pyrene			410 U	370 U	360 U	3700 U	380 U	360 U	410 U	360 U
Benzo[b]fluoranthene			410 U	370 U	360 U	430 U	380 U	360 U	410 U	360 U
Benzo[k]fluoranthene			410 U	370 U	360 U	3700 U	380 U	360 U	410 U	360 U
Chrysene			410 U	370 U	360 U	1600 J	380 U	360 U	410 U	360 U
Dibenzo[a,h]anthracene			410 U	370 U	360 U	3700 U	380 U	360 U	410 U	360 U
Indeno[1,2,3-cd]pyrene			410 U	370 U	360 U	3700 U	380 U	360 U	410 U	360 U
Total cPAHs:	25,000		0	0	0	2090 JNV	0	0	0	0

cPAH - Seven Specific Polycyclic Aromatic Hydrocarbons
Considered by the NYSDEC to be Carcinogenic
NYSDEC - New York State Department of Environmental Protection
µg/kg - Micrograms per kilogram
Ft bls- Feet below land surface
J - Estimated value
N - Compound is tentative in identification
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during validation
[1] - Result is for Benzo[b+k]fluoranthene analysis
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for cPAHs

Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HD-5B	HD-5B	HD-6	HD-6	HD-7	HD-7	HD-8D	HD-8D
		Sample Date:	11/25/03	11/25/03	11/26/03	11/26/03	11/25/03	11/25/03	11/24/03	11/24/03
		Sample Depth (ft bls):	9-11	15-16	9-11	18-20	8-10	21-23	7-9	20-22
Benzo[a]anthracene			18000 U	19000 U	17000 UJV	370 UJV	8800 U	350 U	36000 U	350 U
Benzo[a]pyrene			18000 U	19000 U	17000 UJV	370 UJV	8800 U	350 U	36000 U	350 U
Benzo[b]fluoranthene			18000 U	19000 U	17000 UJV	370 UJV	8800 U	350 U	36000 U	350 U
Benzo[k]fluoranthene			18000 U	19000 U	17000 UJV	370 UJV	8800 U	350 U	36000 U	350 U
Chrysene			18000 U	19000 U	17000 UJV	370 UJV	8800 U	350 U	36000 U	350 U
Dibenzo[a,h]anthracene			18000 U	19000 U	17000 UJV	370 UJV	8800 U	350 U	36000 U	350 U
Indeno[1,2,3-cd]pyrene			18000 U	19000 U	17000 U	370 U	8800 U	350 U	36000 U	350 U
Total cPAHs:	25,000		0	0	0	0	0	0	0	0

cPAH - Seven Specific Polycyclic Aromatic Hydrocarbons Considered by the NYSDEC to be Carcinogenic
NYSDEC - New York State Department of Environmental Protection
µg/kg - Micrograms per kilogram
Ft bls- Feet below land surface
J - Estimated value
N - Compound is tentative in identification
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during validation
[1] - Result is for Benzo[b+k]fluoranthene analysis
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for cPAHs

Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HD-8D	HD-9	HD-9	HD-10	HD-10	HD-10	HD-11	HD-11
		Sample Date:	11/24/03	11/26/03	11/26/03	11/25/03	11/25/03	11/25/03	12/18/03	12/18/03
		Sample Depth (ft bls):	36-38	8-10	13-15	6-8	8-10	16-18	4-6	8-10
Benzo[a]anthracene			370 U	3600 UJV	370 UJV	8700 U	3700 U	360 U	520 J	19000 U
Benzo[a]pyrene			370 U	3600 UJV	370 UJV	8700 U	3700 U	360 U	9300 U	19000 U
Benzo[b]fluoranthene			370 U	3600 UJV	370 UJV	8700 U	3700 U	360 U	9300 U	19000 U
Benzo[k]fluoranthene			370 U	3600 UJV	370 UJV	8700 U	3700 U	360 U	9300 U	19000 U
Chrysene			370 U	3600 U	370 UJV	8700 U	3700 U	360 U	630 J	19000 U
Dibenzo[a,h]anthracene			370 U	3600 UJV	370 UJV	8700 U	3700 U	360 U	9300 U	19000 U
Indeno[1,2,3-cd]pyrene			370 U	3600 UJV	370 UJV	8700 U	3700 U	360 U	9300 U	19000 U
Total cPAHs:	25,000		0	0	0	0	0	0	1150 J	0

cPAH - Seven Specific Polycyclic Aromatic Hydrocarbons Considered by the NYSDEC to be Carcinogenic
NYSDEC - New York State Department of Environmental Protection
µg/kg - Micrograms per kilogram
Ft bls- Feet below land surface
J - Estimated value
N - Compound is tentative in identification
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during validation
[1] - Result is for Benzo[b+k]fluoranthene analysis
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for cPAHs

Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HD-11	HD-12	HD-12	HD-13	HD-14	HD-14	HD-15C	HD-15C
		Sample Date:	12/18/03	11/25/03	11/25/03	12/19/03	12/18/03	12/18/03	11/25/03	11/25/03
		Sample Depth (ft bls):	13-15	6-8	14-16	3-5	4-6	6-8	6-8	20-22
Benzo[a]anthracene			100 J	15000 UJV	370 U	360 U	570	420 U	18000 U	420 U
Benzo[a]pyrene			110 J	15000 UJV	370 U	360 U	490	210 J	18000 U	420 U
Benzo[b]fluoranthene			95 J	15000 UJV	370 U	360 U	290 J	420 U	18000 U	420 U
Benzo[k]fluoranthene			89 J	15000 UJV	370 U	360 U	470	420 U	18000 U	420 U
Chrysene			120 J	15000 UJV	370 UV	360 U	650	420 U	18000 U	420 U
Dibenzo[a,h]anthracene			27 J	15000 UJV	370 U	360 U	120 J	420 U	18000 U	420 U
Indeno[1,2,3-cd]pyrene			79 J	15000 UJV	370 U	360 U	250 J	420 U	18000 U	420 U
Total cPAHs:	25,000		620 J	0	0	0	2840 J	210 J	0	0

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[1] - Result is for Benzo[b+k]fluoranthene analysis
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for cPAHs

Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HD-15C	HD-16	HD-16	HD-17	HD-17	HD-18	HD-19	HD-20
		Sample Date:	11/25/03	12/19/03	12/19/03	12/18/03	12/18/03	12/18/03	12/19/03	11/26/03
		Sample Depth (ft bls):	28-30	9-11	13-15	4-6	8-10	4-6	2-4	6-8
Benzo[a]anthracene			360 U	360 U	380 U	130 J	20 J	42 J	370 U	19000 UJV
Benzo[a]pyrene			360 U	360 U	380 U	120 J	380 U	39 J	370 U	19000 UJV
Benzo[b]fluoranthene			360 U	360 U	380 U	110 J	380 U	360 UV	370 U	19000 UJV
Benzo[k]fluoranthene			360 U	360 U	380 U	100 J	380 U	360 UV	370 U	19000 UJV
Chrysene			24 J	29 J	380 U	160 J	32 J	48 J	370 U	19000 UJV
Dibenzo[a,h]anthracene			360 U	360 U	380 U	29 J	380 U	360 U	370 U	19000 UJV
Indeno[1,2,3-cd]pyrene			360 U	360 U	380 U	81 J	380 U	21 J	370 U	19000 UJV
Total cPAHs:	25,000		24 J	29 J	0	730 J	52 J	150 J	0	0

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V - Qualifier added and/or value altered during validation
[1] - Result is for Benzo[b+k]fluoranthene analysis
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for cPAHs

Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HD-20	HST-1	HST-1	HST-16	HST-17	HST-21	HST-21	HST-21
		Sample Date:	11/26/03	04/19/96	04/19/96	03/25/97	03/25/97	12/08/97	12/08/97	12/08/97
		Sample Depth (ft bls):	10-12	0-2	2-4	0-2	0-2	0-1	1-2	2-3
Benzo[a]anthracene			370 U	45 J	82 J	360 J	430	110 J	360 U	370 U
Benzo[a]pyrene			370 U	42 J	89 J	260 J	360 J	100 J	360 U	370 U
Benzo[b]fluoranthene			370 U	57 J	120 J	440 J	940	390	97 J	370 U
Benzo[k]fluoranthene			370 U	32 J	110 J	3800 U	620	380 U	360 U	370 U
Chrysene			370 U	68 J	100 J	670 J	780	160 J	360 U	370 U
Dibenzo[a,h]anthracene			370 U	370 U	330 U	3800 U	43 J	380 U	360 U	370 U
Indeno[1,2,3-cd]pyrene			370 U	11 J	13 J	310 J	110 J	45 J	360 U	370 U
Total cPAHs:	25,000		0	255 J	514 J	2040 J	3283 J	805 J	97 J	0

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[1] - Result is for Benzo[b+k]fluoranthene analysis
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Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HST-21	HST-21	HST-22	HST-22	HST-22	HST-22	HST-22A	HST-22A+10
		Sample Date:	01/12/98	01/12/98	12/08/97	12/08/97	01/12/98	01/12/98	01/12/98	02/20/98
		Sample Depth (ft bls):	3-5	5-7	0-1	1-2	1-3	3-5	0-1	0-1
Benzo[a]anthracene			20 J	390 U	1900 JV	84 J	140 J	300 J	5100 J	820
Benzo[a]pyrene			390 U	390 U	2400 JV	110 J	190 J	35 J	2100 J	1300
Benzo[b]fluoranthene			62 J	390 U	6000 JV	67 J	430	59 J	13000	3200
Benzo[k]fluoranthene			390 U	390 U	410 UJV	410 U	430 U	440 U	12000 U	420 U
Chrysene			35 J	390 U	2000 JV	130 J	160 J	300 J	7000 J	1000
Dibenzo[a,h]anthracene			390 U	390 U	500 JV	410 U	46 J	440 U	2100 J	190 J
Indeno[1,2,3-cd]pyrene			390 U	390 U	990 JV	62 J	120 J	440 U	4200 J	750
Total cPAHs:	25,000		117 J	0	13790 JV	453 J	1086 J	694 J	**33500 J**	7260 J

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[1] - Result is for Benzo[b+k]fluoranthene analysis
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Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HST-22B	HST-22B+20	HST-22C	HST-22D	HST-22D+10	HST-23	HST-23	HST-23
		Sample Date:	01/12/98	02/20/98	01/12/98	01/12/98	02/20/98	12/08/97	12/08/97	01/12/98
		Sample Depth (ft bls):	0-1	0-1	0-1	0-1	0-1	0-1	1-2	1-3
Benzo[a]anthracene			21000	230 J	330 J	3200 J	120 J	540 J	690 J	38 J
Benzo[a]pyrene			16000	310 J	250 J	3600 J	200 J	430 J	3800 U	380 U
Benzo[b]fluoranthene			40000	680	550	8100 J	200 J	710 J	720 J	47 J
Benzo[k]fluoranthene			11000 U	280 J	390 U	12000 U	200 J	3800 U	3800 U	380 U
Chrysene			20000	330 J	430	3900 J	140 J	860 J	960 J	59 J
Dibenzo[a,h]anthracene			3600 J	270 J	63 J	1100 J	770 U	3800 U	3800 U	380 U
Indeno[1,2,3-cd]pyrene			7600 J	290 J	120 J	2800 J	770 U	3800 U	3800 U	380 U
Total cPAHs:	25,000		**108200 J**	2390 J	1743 J	22700 J	860 J	2540 J	2370 J	144 J

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[1] - Result is for Benzo[b+k]fluoranthene analysis
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Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HST-23	HST-24	HST-24	HST-24	HST-24	HST-24	HST-25	HST-25
		Sample Date:	01/12/98	12/08/97	12/08/97	12/08/97	01/12/98	01/12/98	12/08/97	01/12/98
		Sample Depth (ft bls):	3-5	0-1	1-2	2-3	4.5-6.5	6.5-8.5	0-2	1-3
Benzo[a]anthracene			45 J	960 JV	380 J	700	500	690	920 JV	370 J
Benzo[a]pyrene			22 J	640 JV	660	930	1000	1200	750 JV	250 J
Benzo[b]fluoranthene			60 J	4600 JV	1400	2300	2300	2900	2200 JV	550
Benzo[k]fluoranthene			380 U	390 UJV	390 U	380 U	390 U	390 U	380 UJV	400 U
Chrysene			76 J	1800 JV	580	970	690	930	980 JV	330 J
Dibenzo[a,h]anthracene			380 U	250 JV	86 J	130 J	340 J	360 J	220 JV	68 J
Indeno[1,2,3-cd]pyrene			380 U	460 JV	170 J	250 J	580	610	580 JV	140 J
Total cPAHs:	25,000		203 J	8710 JV	3276 J	5280 J	5410 J	6690 J	5650 JV	1708 J

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[1] - Result is for Benzo[b+k]fluoranthene analysis
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Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	HST-25	HST-26	HST-27	HST-28	MW-54	MW-58	MW-58	S-61
		Sample Date:	01/12/98	12/08/97	12/08/97	12/08/97	11/29/93	12/07/93	03/25/97	10/24/90
		Sample Depth (ft bls):	3-5	0-2	0-2	0-2	3-5	2-3	0-2	5-7
Benzo[a]anthracene			51 J	250 J	1200 JV	440 JV	7600 U	7300 U	230 J	3750 U
Benzo[a]pyrene			57 J	250 J	1100 JV	500 JV	7600 U	7300 U	190 J	3750 U
Benzo[b]fluoranthene			120 J	830	3000 JV	1800 JV	7600 U	860 J	930	3750 U[1]
Benzo[k]fluoranthene			380 U	400 U	410 UJV	410 UJV	7600 U	7300 U	320 J	3750 U[1]
Chrysene			63 J	320 J	1500 JV	680 JV	7600 U	650 J	800	3750 U
Dibenzo[a,h]anthracene			20 J	67 J	350 JV	160 JV	7600 U	7300 U	400 U	3750 U
Indeno[1,2,3-cd]pyrene			48 J	130 J	620 JV	320 JV	7600 U	7300 U	47 J	3750 U
Total cPAHs:	25,000		359 J	1847 J	7770 JV	3900 JV	0	1510 J	2517 J	0

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Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	S-62	S-64	S-99	S-122	S-129	S-134	S-135	S-139
		Sample Date:	10/24/90	10/18/90	01/18/93	04/09/94	11/29/93	11/08/93	12/07/93	12/07/93
		Sample Depth (ft bls):	0-2	2-3	0-2	7.5-8.5	3-5	2-4	3-3.5	3-3.5
Benzo[a]anthracene			3670 U	3930 U	65 J	22 J	410 U	370 J	350 U	330 U
Benzo[a]pyrene			3670 U	3930 U	88 J	370 U	47 J	460 J	350 UJV	46 J
Benzo[b]fluoranthene			3670 U[1]	3930 U[1]	100 J	28 J	250 J	790 UJV	350 UJV	89 J
Benzo[k]fluoranthene			3670 U[1]	3930 U[1]	110 J	37 J	37 J	820 JV	350 UJV	330 U
Chrysene			3670 U	3930 U	110 J	40 J	81 J	630 J	350 U	56 J
Dibenzo[a,h]anthracene			3670 U	3930 U	13 J	370 U	410 U	790 UJV	350 UJV	330 U
Indeno[1,2,3-cd]pyrene			3670 U	3930 U	110 J	370 U	63 J	550 J	350 UJV	330 U
Total cPAHs:	25,000		0	0	596 J	127 J	478 J	2830 J	0	191 J

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[1] - Result is for Benzo[b+k]fluoranthene analysis
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Table 3-3. Summary of cPAH Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC-Recommended Cleanup Level (µg/kg)	Sample Designation:	SS-6 (OU-4)	SS-6 (OU-4)	TSB-2 DL	TSB-9	TSB-11	TSB-18 DL
		Sample Date:	12/08/97	12/08/97	10/31/00	10/24/00	10/25/00	10/30/00
		Sample Depth (ft bls):	0-1	1-2	0-2	2.5-3.5	2.5-3.5	0-1
Benzo[a]anthracene			48 J	36 J	330 J	3600 U	950 J	1400 D
Benzo[a]pyrene			390 U	400 U	320 J	3600 U	470 J	1400 JD
Benzo[b]fluoranthene			180 J	80 J	400 J	3600 U	760 J	2200 JD
Benzo[k]fluoranthene			390 U	400 U	420	3600 U	660 J	1600 JD
Chrysene			81 J	27 J	380 J	390 J	1300 J	1800 D
Dibenzo[a,h]anthracene			390 U	400 U	410 U	3600 U	3900 U	210 JD
Indeno[1,2,3-cd]pyrene			60 J	400 U	99 J	3600 U	3900 U	470 JD
Total cPAHs:	25,000		369 J	143 J	1949 J	390 J	4140 J	9080 JD

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µg/kg - Micrograms per kilogram
Ft bls- Feet below land surface
J - Estimated value
N - Compound is tentative in identification
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during validation
[1] - Result is for Benzo[b+k]fluoranthene analysis
Bold text indicates the exceedance of the NYSDEC Site Specific Cleanup Level for cPAHs

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	Designation: / Sample Date: / Sample Depth (ft bls):	HD-3 11/26/03 20-22	HD-4 11/26/03 8-10	HD-4 11/26/03 14-16	HD-6 11/26/03 9-11
1,2,4-Trichlorobenzene	3,400		360 U	410 U	360 U	17000 UJV
1,2-Dichlorobenzene	7,900		360 U	410 U	360 U	17000 UJV
1,3-Dichlorobenzene	1,600		360 U	410 U	360 U	17000 UJV
1,4-Dichlorobenzene	8,500		360 U	410 U	360 U	17000 UJV
2,2'-oxybis(1-Chloropropane)	--		360 U	410 U	360 U	17000 UJV
2,4,5-Trichlorophenol	100		1700 U	2000 U	1800 U	84000 UJV
2,4,6-Trichlorophenol	--		360 U	410 U	360 U	17000 UJV
2,4-Dichlorophenol	400		360 U	410 U	360 U	17000 UJV
2,4-Dimethylphenol	--		360 U	410 U	360 U	17000 UJV
2,4-Dinitrophenol	200		1700 U	2000 U	1800 U	84000 UJV
2,4-Dinitrotoluene	--		360 U	410 U	360 U	17000 UJV
2,6-Dinitrotoluene	100		360 U	410 U	360 U	17000 UJV
2-Chloronaphthalene	--		360 U	410 U	360 U	17000 UJV
2-Chlorophenol	800		360 U	410 U	360 U	17000 UJV
2-Methylnaphthalene	36,400		360 U	410 U	360 U	**92000 JV**
2-Methylphenol	100		360 U	410 U	360 U	17000 UJV
2-Nitroaniline	430		1700 U	2000 U	1800 U	84000 UJV
2-Nitrophenol	330		360 U	410 U	360 U	17000 UJV
3,3'-Dichlorobenzidine	--		720 U	820 U	730 U	35000 UJV
3-Nitroaniline	500		1700 U	2000 U	1800 U	84000 UJV
4,6-Dinitro-2-methylphenol	--		1700 U	2000 U	1800 U	84000 UJV
4-Bromophenyl phenyl ether	--		360 U	410 U	360 U	17000 UJV
4-Chloro-3-methylphenol	240		360 U	410 U	360 U	17000 UJV
4-Chloroaniline	220		360 U	410 U	360 U	17000 UJV
4-Chlorophenyl phenyl ether	--		360 U	410 U	360 U	17000 UJV
4-Methylphenol	900		360 U	410 U	360 U	17000 UJV
4-Nitroaniline	--		720 U	820 U	730 U	35000 UJV
4-Nitrophenol	100		1700 U	2000 U	1800 U	84000 UJV
Acenaphthene	50,000		360 U	330 J	360 U	4400 JJV
Acenaphthylene	50,000		360 U	410 U	360 U	17000 UJV
Anthracene	50,000		360 U	280 J	360 U	1200 JV
Benzidine	--		NA	NA	NA	NA
Benzo[a]anthracene	*		360 U	410 U	360 U	17000 UJV
Benzo[a]pyrene	*		360 U	410 U	360 U	17000 UJV
Benzo[b]fluoranthene	*		360 U	410 U	360 U	17000 UJV
Benzo[g,h,i]perylene	50,000		360 U	410 U	360 U	17000 UJV
Benzo[k]fluoranthene	*		360 U	410 U	360 U	17000 UJV
Benzoic acid	--		RV	RV	RV	RV
Benzyl alcohol	--		360 U	410 U	360 U	17000 UJV
bis(2-Chloroethoxy)methane	--		360 U	410 U	360 U	17000 UJV
bis(2-Chloroethyl) ether	--		360 U	410 U	360 U	17000 UJV
Bis(2-Chloroisopropyl)Ether	--		NA	NA	NA	NA
bis(2-Ethylhexyl) phthalate	50,000		48 J	330 J	59 J	17000 UJV
Butylbenzyl phthalate	50,000		360 U	410 U	360 U	17000 UJV
Carbazole	--		360 U	410 U	360 U	17000 UJV
Chrysene	*		360 U	410 U	360 U	17000 UJV
Di-n-butyl phthalate	8,100		360 U	40 J	360 U	17000 UJV
Di-n-octyl phthalate	50,000		360 U	410 U	360 U	17000 UJV
Dibenzo[a,h]anthracene	*		360 U	410 U	360 U	17000 UJV

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-3 11/26/03 20-22	HD-4 11/26/03 8-10	HD-4 11/26/03 14-16	HD-6 11/26/03 9-11
Dibenzofuran	6,200		360 U	410 U	360 U	17000 UJV
Diethyl phthalate	7,100		360 U	410 U	360 U	17000 UJV
Dimethyl phthalate	2,000		360 U	410 U	360 U	17000 UJV
Fluoranthene	50,000		360 U	410 U	360 U	17000 U
Fluorene	50,000		360 U	600 NJV	360 U	7000 J
Hexachlorobenzene	41		360 U	410 U	360 U	17000 U
Hexachlorobutadiene	--		360 U	410 U	360 U	17000 U
Hexachlorocyclopentadiene	--		360 U	410 U	360 U	17000 UJV
Hexachloroethane	--		360 U	410 U	360 U	17000 U
Indeno[1,2,3-cd]pyrene	*		360 U	410 U	360 U	17000 U
Isophorone	4,400		360 U	410 U	360 U	17000 U
N-Nitrosodi-n-propylamine	--		360 U	410 U	360 U	17000 U
N-Nitrosodimethylamine	--		NA	NA	NA	NA
N-Nitrosodiphenylamine	--		360 U	410 U	360 U	17000 U
Naphthalene	13,000		360 U	410 U	360 U	17000 U
Nitrobenzene	200		360 U	410 U	360 U	17000 U
Pentachlorophenol	1,000		1700 U	2000 U	1800 U	84000 U
Phenanthrene	50,000		360 U	2100	360 U	14000 J
Phenol	30		360 U	410 U	360 U	17000 U
Pyrene	50,000		360 U	73 J	360 U	17000 U

SVOC - Semivolatile Organic Compound
µg/kg - Micrograms per kilogram
ft bls- Feet below land surface
J - Estimated value
V - Qualifier added and/or value altered during data validation
N - Compound is tentative in identification - added during validation
R - Data rejected during validation
U - Indicates that the compound was analyzed for but not detected
* - Site specific criteria for total cPAHs used in place of NYSDEC RSCO criteria (see Table 3-3)
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - No NYSDEC RSCO available
NA - Sample not analyzed for specific parameter
[1] - Result is for Benzo[b+k]fluoranthene analysis
Note:
Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-6 11/26/03 18-20	HD-7 11/25/03 8-10	HD-7 11/25/03 21-23	HD-8D 11/24/03 7-9
1,2,4-Trichlorobenzene	3,400		370 UJV	8800 U	350 U	36000 U
1,2-Dichlorobenzene	7,900		370 UJV	8800 U	350 U	36000 U
1,3-Dichlorobenzene	1,600		370 UJV	8800 U	350 U	36000 U
1,4-Dichlorobenzene	8,500		370 UJV	8800 U	350 U	36000 U
2,2'-oxybis(1-Chloropropane)	--		370 UJV	8800 U	350 U	36000 U
2,4,5-Trichlorophenol	100		1800 UJV	43000 U	1700 U	180000 U
2,4,6-Trichlorophenol	--		370 UJV	8800 U	350 U	36000 U
2,4-Dichlorophenol	400		370 UJV	8800 U	350 U	36000 U
2,4-Dimethylphenol	--		370 UJV	8800 U	350 U	36000 U
2,4-Dinitrophenol	200		1800 UJV	43000 U	1700 U	180000 U
2,4-Dinitrotoluene	--		370 UJV	8800 U	350 U	36000 U
2,6-Dinitrotoluene	100		370 UJV	8800 U	350 U	36000 U
2-Chloronaphthalene	--		370 UJV	8800 U	350 U	36000 U
2-Chlorophenol	800		370 UJV	8800 U	350 U	36000 U
2-Methylnaphthalene	36,400		310UJV	**60000**	350 U	**150000**
2-Methylphenol	100		370 UJV	8800 U	350 U	36000 U
2-Nitroaniline	430		1800 UJV	43000 U	1700 U	180000 U
2-Nitrophenol	330		370 UJV	8800 U	350 U	36000 U
3,3'-Dichlorobenzidine	--		730 UJV	18000 U	700 U	72000 U
3-Nitroaniline	500		1800 UJV	43000 U	1700 U	180000 U
4,6-Dinitro-2-methylphenol	--		1800 UJV	43000 U	1700 U	180000 U
4-Bromophenyl phenyl ether	--		370 UJV	8800 U	350 U	36000 U
4-Chloro-3-methylphenol	240		370 UJV	8800 U	350 U	36000 U
4-Chloroaniline	220		370 UJV	8800 U	350 U	36000 U
4-Chlorophenyl phenyl ether	--		370 UJV	8800 U	350 U	36000 U
4-Methylphenol	900		370 UJV	8800 U	350 U	36000 U
4-Nitroaniline	--		730 UJV	18000 U	700 U	72000 U
4-Nitrophenol	100		1800 UJV	43000 U	1700 U	180000 U
Acenaphthene	50,000		370 UJV	4300 J	350 U	5900 J
Acenaphthylene	50,000		370 UJV	8800 U	350 U	36000 U
Anthracene	50,000		370 UJV	1400 J	350 U	36000 U
Benzidine	--		NA	NA	NA	NA
Benzo[a]anthracene	*		370 UJV	8800 U	350 U	36000 U
Benzo[a]pyrene	*		370 UJV	8800 U	350 U	36000 U
Benzo[b]fluoranthene	*		370 UJV	8800 U	350 U	36000 U
Benzo[g,h,i]perylene	50,000		370 UJV	8800 U	350 U	36000 U
Benzo[k]fluoranthene	*		370 UJV	8800 U	350 U	36000 U
Benzoic acid	--		RV	RV	RV	RV
Benzyl alcohol	--		370 UJV	8800 U	350 U	36000 U
bis(2-Chloroethoxy)methane	--		370 UJV	8800 U	350 U	36000 U
bis(2-Chloroethyl) ether	--		370 UJV	8800 U	350 U	36000 U
Bis(2-Chloroisopropyl)Ether	--		NA	NA	NA	NA
bis(2-Ethylhexyl) phthalate	50,000		48 JV	8800 U	300 J	36000 UJV
Butylbenzyl phthalate	50,000		370 UJV	8800 U	350 U	36000 U
Carbazole	--		370 UJV	8800 U	350 U	36000 U
Chrysene	*		370 UJV	8800 U	350 U	36000 U
Di-n-butyl phthalate	8,100		370 UJV	8800 U	350 U	36000 U
Di-n-octyl phthalate	50,000		370 UJV	8800 U	350 U	36000 U
Dibenzo[a,h]anthracene	*		370 UJV	8800 U	350 U	36000 U

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-6 11/26/03 18-20	HD-7 11/25/03 8-10	HD-7 11/25/03 21-23	HD-8D 11/24/03 7-9
Dibenzofuran	6,200		370 UJV	8800 U	350 U	36000 U
Diethyl phthalate	7,100		370 UJV	8800 U	350 U	36000 U
Dimethyl phthalate	2,000		370 UJV	8800 U	350 U	36000 U
Fluoranthene	50,000		370 U	8800 U	350 U	36000 U
Fluorene	50,000		370 U	6500 J	350 U	11000 J
Hexachlorobenzene	41		370 U	8800 U	350 U	36000 U
Hexachlorobutadiene	--		370 U	8800 U	350 U	36000 U
Hexachlorocyclopentadiene	--		370 U	8800 UJV	350 U	36000 U
Hexachloroethane	--		370 U	8800 U	350 U	36000 U
Indeno[1,2,3-cd]pyrene	*		370 U	8800 U	350 U	36000 U
Isophorone	4,400		370 U	8800 U	350 U	36000 U
N-Nitrosodi-n-propylamine	--		370 U	8800 U	350 U	36000 U
N-Nitrosodimethylamine	--		NA	NA	NA	NA
N-Nitrosodiphenylamine	--		370 U	8800 U	350 U	36000 U
Naphthalene	13,000		370 U	1200 J	350 U	36000 U
Nitrobenzene	200		370 U	8800 U	350 U	36000 U
Pentachlorophenol	1,000		1800 U	43000 U	1700 U	180000 U
Phenanthrene	50,000		370 U	14000	350 U	26000 J
Phenol	30		370 U	8800 U	350 U	36000 U
Pyrene	50,000		370 U	840 J	350UJV	2600 J

SVOC - Semivolatile Organic Compound
µg/kg - Micrograms per kilogram
ft bls- Feet below land surface
J - Estimated value
V - Qualifier added and/or value altered during data validation
N - Compound is tentative in identification - added during validation
R - Data rejected during validation
U - Indicates that the compound was analyzed for but not detected
* - Site specific criteria for total cPAHs used in place of NYSDEC RSCO criteria (see Table 3-3)
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - No NYSDEC RSCO available
NA - Sample not analyzed for specific parameter
[1] - Result is for Benzo[b+k]fluoranthene analysis
Note:
Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-8D 11/24/03 20-22	HD-8D 11/24/03 36-38	HD-10 11/25/03 6-8	HD-10 11/25/03 8-10
1,2,4-Trichlorobenzene	3,400		350 U	370 U	8700 U	3700 U
1,2-Dichlorobenzene	7,900		350 U	370 U	8700 U	3700 U
1,3-Dichlorobenzene	1,600		350 U	370 U	8700 U	3700 U
1,4-Dichlorobenzene	8,500		350 U	370 U	8700 U	3700 U
2,2'-oxybis(1-Chloropropane)	--		350 UJV	370 U	8700 U	3700 U
2,4,5-Trichlorophenol	100		1700 U	1800 U	42000 U	18000 U
2,4,6-Trichlorophenol	--		350 U	370 U	8700 U	3700 U
2,4-Dichlorophenol	400		350 U	370 U	8700 U	3700 U
2,4-Dimethylphenol	--		350 U	370 U	8700 U	3700 U
2,4-Dinitrophenol	200		1700 U	1800 U	42000 U	18000 U
2,4-Dinitrotoluene	--		350 U	370 U	8700 U	3700 U
2,6-Dinitrotoluene	100		350 U	370 U	8700 U	3700 U
2-Chloronaphthalene	--		350 U	370 U	8700 U	3700 U
2-Chlorophenol	800		350 UJV	370 U	8700 U	3700 U
2-Methylnaphthalene	36,400		80 J	370 U	**56000**	27000
2-Methylphenol	100		350 U	370 U	8700 U	3700 U
2-Nitroaniline	430		1700 UJV	1800 U	42000 U	18000 U
2-Nitrophenol	330		350 U	370 U	8700 U	3700 U
3,3'-Dichlorobenzidine	--		700 U	740 U	17000 U	7400 U
3-Nitroaniline	500		1700 U	1800 U	42000 U	18000 U
4,6-Dinitro-2-methylphenol	--		1700 U	1800 U	42000 U	18000 U
4-Bromophenyl phenyl ether	--		350 U	370 U	8700 U	3700 U
4-Chloro-3-methylphenol	240		350 U	370 U	8700 U	3700 U
4-Chloroaniline	220		350 U	370 U	8700 U	3700 U
4-Chlorophenyl phenyl ether	--		350 U	370 U	8700 U	3700 U
4-Methylphenol	900		350 U	370 U	8700 U	3700 U
4-Nitroaniline	--		700 U	740 U	17000 U	7400 U
4-Nitrophenol	100		1700 U	1800 U	42000 U	18000 U
Acenaphthene	50,000		350 U	370 U	3800 J	2000 J
Acenaphthylene	50,000		350 U	370 U	8700 U	3700 U
Anthracene	50,000		350 U	370 U	960 J	740 J
Benzidine	--		NA	NA	NA	NA
Benzo[a]anthracene	*		350 U	370 U	8700 U	3700 U
Benzo[a]pyrene	*		350 U	370 U	8700 U	3700 U
Benzo[b]fluoranthene	*		350 U	370 U	8700 U	3700 U
Benzo[g,h,i]perylene	50,000		350 U	370 U	8700 U	3700 U
Benzo[k]fluoranthene	*		350 U	370 U	8700 U	3700 U
Benzoic acid	--		RV	RV	RV	RV
Benzyl alcohol	--		350 U	370 U	8700 U	3700 U
bis(2-Chloroethoxy)methane	--		350 U	370 U	8700 U	3700 U
bis(2-Chloroethyl) ether	--		350 U	370 U	8700 U	3700 U
Bis(2-Chloroisopropyl)Ether	--		NA	NA	NA	NA
bis(2-Ethylhexyl) phthalate	50,000		350 UJV	370 U	8700 U	940 J
Butylbenzyl phthalate	50,000		350 U	370 U	8700 U	3700 U
Carbazole	--		350 U	370 U	8700 U	3700 U
Chrysene	*		350 U	370 U	8700 U	3700 U
Di-n-butyl phthalate	8,100		350 U	370UV	8700 U	3700 U
Di-n-octyl phthalate	50,000		350 U	370 U	8700 U	3700 U
Dibenzo[a,h]anthracene	*		350 U	370 U	8700 U	3700 U

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-8D 11/24/03 20-22	HD-8D 11/24/03 36-38	HD-10 11/25/03 6-8	HD-10 11/25/03 8-10
Dibenzofuran	6,200		350 U	370 U	2900 J	3700 U
Diethyl phthalate	7,100		350 U	370 U	8700 U	3700 U
Dimethyl phthalate	2,000		350 U	370 U	8700 U	3700 U
Fluoranthene	50,000		350 U	370 U	8700 U	460 J
Fluorene	50,000		23 J	370 U	6200 J	3800
Hexachlorobenzene	41		350 U	370 U	8700 U	3700 U
Hexachlorobutadiene	--		350 U	370 U	8700 U	3700 U
Hexachlorocyclopentadiene	--		350 U	370 U	8700 UJV	3700 UJV
Hexachloroethane	--		350 U	370 U	8700 U	3700 U
Indeno[1,2,3-cd]pyrene	*		350 U	370 U	8700 U	3700 U
Isophorone	4,400		350 U	370 U	8700 U	3700 U
N-Nitrosodi-n-propylamine	--		350 U	370 U	8700 U	3700 U
N-Nitrosodimethylamine	--		NA	NA	NA	NA
N-Nitrosodiphenylamine	--		350 U	370 U	8700 U	3700 U
Naphthalene	13,000		350 U	370 U	8700 U	990 J
Nitrobenzene	200		350 U	370 U	8700 U	3700 U
Pentachlorophenol	1,000		1700 U	1800 U	42000 U	18000 U
Phenanthrene	50,000		53 J	370 U	14000	6600
Phenol	30		350 U	370 U	8700 U	3700 U
Pyrene	50,000		350 U	370 U	8700UJV	600 J

SVOC - Semivolatile Organic Compound
µg/kg - Micrograms per kilogram
ft bls- Feet below land surface
J - Estimated value
V - Qualifier added and/or value altered during data validation
N - Compound is tentative in identification - added during validation
R - Data rejected during validation
U - Indicates that the compound was analyzed for but not detected
* - Site specific criteria for total cPAHs used in place of NYSDEC RSCO criteria (see Table 3-3)
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - No NYSDEC RSCO available
NA - Sample not analyzed for specific parameter
[1] - Result is for Benzo[b+k]fluoranthene analysis

Note:
Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-10 11/25/03 16-18	HD-11 12/18/03 4-6	HD-11 12/18/03 8-10	HD-11 12/18/03 13-15
1,2,4-Trichlorobenzene	3,400		360 U	9300 U	19000 U	350 U
1,2-Dichlorobenzene	7,900		360 U	9300 U	19000 U	350 U
1,3-Dichlorobenzene	1,600		360 U	9300 U	19000 U	350 U
1,4-Dichlorobenzene	8,500		360 U	9300 U	19000 U	350 U
2,2'-oxybis(1-Chloropropane)	--		360 U	9300 U	19000 U	350 U
2,4,5-Trichlorophenol	100		1700 U	45000 U	92000 U	1700 U
2,4,6-Trichlorophenol	--		360 U	9300 U	19000 U	350 U
2,4-Dichlorophenol	400		360 U	9300 U	19000 U	350 U
2,4-Dimethylphenol	--		360 U	9300 U	19000 U	350 U
2,4-Dinitrophenol	200		1700 U	RV	RV	RV
2,4-Dinitrotoluene	--		360 U	9300 U	19000 U	350 U
2,6-Dinitrotoluene	100		360 U	9300 U	19000 U	350 U
2-Chloronaphthalene	--		360 U	9300 U	19000 U	350 U
2-Chlorophenol	800		360 U	9300 U	19000 U	350 U
2-Methylnaphthalene	36,400		360 U	**69000**	**80000**	350 U
2-Methylphenol	100		360 U	9300 U	19000 U	350 U
2-Nitroaniline	430		1700 U	45000 U	92000 U	1700 U
2-Nitrophenol	330		360 U	9300 U	19000 U	350 U
3,3'-Dichlorobenzidine	--		710 U	19000 U	38000 U	690 U
3-Nitroaniline	500		1700 U	45000 U	92000 U	1700 U
4,6-Dinitro-2-methylphenol	--		1700 U	45000 U	92000 U	1700 U
4-Bromophenyl phenyl ether	--		360 U	9300 U	19000 U	350 U
4-Chloro-3-methylphenol	240		360 U	9300 U	19000 U	350 U
4-Chloroaniline	220		360 U	9300 U	19000 U	350 U
4-Chlorophenyl phenyl ether	--		360 U	9300 U	19000 U	350 U
4-Methylphenol	900		360 U	9300 U	19000 U	350 U
4-Nitroaniline	--		710 U	19000 U	38000 U	690 U
4-Nitrophenol	100		1700 U	45000 U	92000 U	1700 U
Acenaphthene	50,000		360 U	9300 U	4500 J	16 J
Acenaphthylene	50,000		360 U	9300 U	19000 U	13 J
Anthracene	50,000		360 U	1800 J	1400 J	26 J
Benzidine	--		NA	NA	NA	NA
Benzo[a]anthracene	*		360 U	520 J	19000 U	100 J
Benzo[a]pyrene	*		360 U	9300 U	19000 U	110 J
Benzo[b]fluoranthene	*		360 U	9300 U	19000 U	95 J
Benzo[g,h,i]perylene	50,000		360 U	480 U	19000 U	97 J
Benzo[k]fluoranthene	*		360 U	9300 U	19000 U	89 J
Benzoic acid	--		RV	RV	RV	RV
Benzyl alcohol	--		360 U	9300 U	19000 U	350 U
bis(2-Chloroethoxy)methane	--		360 U	9300 U	19000 U	350 U
bis(2-Chloroethyl) ether	--		360 U	9300 U	19000 U	350 U
Bis(2-Chloroisopropyl)Ether	--		NA	NA	NA	NA
bis(2-Ethylhexyl) phthalate	50,000		150 J	9300UV	1900UV	350UV
Butylbenzyl phthalate	50,000		360 U	9300 U	19000 U	350 U
Carbazole	--		360 U	9300 U	19000 U	350 U
Chrysene	*		360 U	630 J	19000 U	120 J
Di-n-butyl phthalate	8,100		360 U	9300 U	19000 U	350 U
Di-n-octyl phthalate	50,000		360 U	9300 U	19000 U	350 U
Dibenzo[a,h]anthracene	*		360 U	9300 U	19000 U	27 J

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-10 11/25/03 16-18	HD-11 12/18/03 4-6	HD-11 12/18/03 8-10	HD-11 12/18/03 13-15
Dibenzofuran	6,200		360 U	9300 U	19000 U	350 U
Diethyl phthalate	7,100		360 U	9300 U	19000 U	350 U
Dimethyl phthalate	2,000		360 U	9300 U	19000 U	350 U
Fluoranthene	50,000		360 U	1800 J	19000 U	240 J
Fluorene	50,000		360 U	6400 J	7200 J	350 U
Hexachlorobenzene	41		360 U	9300 U	19000 U	350 U
Hexachlorobutadiene	--		360 U	9300 U	19000 U	350 U
Hexachlorocyclopentadiene	--		360 U	9300 U	19000 U	350 U
Hexachloroethane	--		360 U	9300 U	19000 U	350 U
Indeno[1,2,3-cd]pyrene	*		360 U	9300 U	19000 U	79 J
Isophorone	4,400		360 U	9300 U	19000 U	350 U
N-Nitrosodi-n-propylamine	--		360 U	9300 U	19000 U	350 U
N-Nitrosodimethylamine	--		NA	NA	NA	NA
N-Nitrosodiphenylamine	--		360 U	9300 U	19000 U	350 U
Naphthalene	13,000		360 U	9300 U	19000 U	350 U
Nitrobenzene	200		360 U	9300 U	19000 U	350 U
Pentachlorophenol	1,000		1700 U	45000 U	92000 U	1700 U
Phenanthrene	50,000		47 J	15000	12000 J	190 J
Phenol	30		360 U	9300 U	19000 U	350 U
Pyrene	50,000		360UJV	1900 J	1400 J	260 J

SVOC - Semivolatile Organic Compound
µg/kg - Micrograms per kilogram
ft bls- Feet below land surface
J - Estimated value
V - Qualifier added and/or value altered during data validation
N - Compound is tentative in identification - added during validation
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* - Site specific criteria for total cPAHs used in place of NYSDEC RSCO criteria (see Table 3-3)
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - No NYSDEC RSCO available
NA - Sample not analyzed for specific parameter
[1] - Result is for Benzo[b+k]fluoranthene analysis
Note:
Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-16 12/19/03 9-11	HD-16 12/19/03 13-15	HST-1 04/19/96 0-2	HST-1 04/19/96 2-4
1,2,4-Trichlorobenzene	3,400		360 U	380 U	370 U	330 U
1,2-Dichlorobenzene	7,900		360 U	380 U	370 U	330 U
1,3-Dichlorobenzene	1,600		360 U	380 U	370 U	330 U
1,4-Dichlorobenzene	8,500		360 U	380 U	370 U	330 U
2,2'-oxybis(1-Chloropropane)	--		360 U	380 U	370 U	330 U
2,4,5-Trichlorophenol	100		1800 U	1800 U	1800 U	1600 U
2,4,6-Trichlorophenol	--		360 U	380 U	370 U	330 U
2,4-Dichlorophenol	400		360 U	380 U	370 U	330 U
2,4-Dimethylphenol	--		360 U	380 U	370 U	330 U
2,4-Dinitrophenol	200		RV	RV	1800 U	1600 U
2,4-Dinitrotoluene	--		360 U	380 U	370 U	330 U
2,6-Dinitrotoluene	100		360 U	380 U	370 U	330 U
2-Chloronaphthalene	--		360 U	380 U	370 U	330 U
2-Chlorophenol	800		360 U	380 U	370 U	330 U
2-Methylnaphthalene	36,400		1100	380 U	750	370
2-Methylphenol	100		360 U	380 U	370 U	330 U
2-Nitroaniline	430		1800 U	1800 U	1800 U	1600 U
2-Nitrophenol	330		360 U	380 U	370 U	330 U
3,3'-Dichlorobenzidine	--		730 U	760 U	740 U	660 U
3-Nitroaniline	500		1800 U	1800 U	1800 U	1600 U
4,6-Dinitro-2-methylphenol	--		1800 U	1800 U	1800 U	1600 U
4-Bromophenyl phenyl ether	--		360 U	380 U	370 U	330 U
4-Chloro-3-methylphenol	240		360 U	380 U	370 U	330 U
4-Chloroaniline	220		360 U	380 U	370 U	330 U
4-Chlorophenyl phenyl ether	--		360 U	380 U	370 U	330 U
4-Methylphenol	900		360 U	380 U	370 U	330 U
4-Nitroaniline	--		730 U	760 U	1800 U	1600 U
4-Nitrophenol	100		1800 U	1800 U	1800 U	1600 U
Acenaphthene	50,000		360 U	380 U	370 U	330 U
Acenaphthylene	50,000		360 U	380 U	370 U	330 U
Anthracene	50,000		31 J	380 U	13 J	290 J
Benzidine	--		NA	NA	NA	NA
Benzo[a]anthracene	*		360 U	380 U	45 J	82 J
Benzo[a]pyrene	*		360 U	380 U	42 J	89 J
Benzo[b]fluoranthene	*		360 U	380 U	57 J	120 J
Benzo[g,h,i]perylene	50,000		360 U	380 U	10 J	14 J
Benzo[k]fluoranthene	*		360 U	380 U	32 J	110 J
Benzoic acid	--		RV	RV	1800 U	1600 U
Benzyl alcohol	--		360 U	380 U	370 U	330 U
bis(2-Chloroethoxy)methane	--		360 U	380 U	370 U	330 U
bis(2-Chloroethyl) ether	--		360 U	380 U	370 U	330 U
Bis(2-Chloroisopropyl)Ether	--		NA	NA	NA	NA
bis(2-Ethylhexyl) phthalate	50,000		360 U	380 U	370 U	330 U
Butylbenzyl phthalate	50,000		360 U	380 U	36 J	330 U
Carbazole	--		360 U	380 U	NA	NA
Chrysene	*		29 J	380 U	68 J	100 J
Di-n-butyl phthalate	8,100		360 U	380 U	30 JB	330 U
Di-n-octyl phthalate	50,000		360 U	380 U	370 U	330 U
Dibenzo[a,h]anthracene	*		360 U	380 U	370 U	330 U

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-16 12/19/03 9-11	HD-16 12/19/03 13-15	HST-1 04/19/96 0-2	HST-1 04/19/96 2-4
Dibenzofuran	6,200		360 U	380 U	9 J	330 U
Diethyl phthalate	7,100		360 U	380 U	11 J	330 U
Dimethyl phthalate	2,000		360 U	380 U	370 U	330 U
Fluoranthene	50,000		29 J	380 U	73 J	200 J
Fluorene	50,000		150 J	380 U	370 U	200 J
Hexachlorobenzene	41		360 U	380 U	370 U	330 U
Hexachlorobutadiene	--		360 U	380 U	370 U	330 U
Hexachlorocyclopentadiene	--		360 UJV	380 UJV	370 U	330 U
Hexachloroethane	--		360 U	380 U	370 U	330 U
Indeno[1,2,3-cd]pyrene	*		360 U	380 U	11 J	13 J
Isophorone	4,400		360 U	380 U	370 U	330 U
N-Nitrosodi-n-propylamine	--		360 U	380 U	370 U	330 U
N-Nitrosodimethylamine	--		NA	NA	NA	NA
N-Nitrosodiphenylamine	--		360 U	380 U	370 U	330 U
Naphthalene	13,000		360 U	380 U	200 J	330 U
Nitrobenzene	200		360 U	380 U	370 U	330 U
Pentachlorophenol	1,000		1800 U	1800 U	1800 U	1600 U
Phenanthrene	50,000		260 J	380 U	68 J	330 U
Phenol	30		360 U	380 U	370 U	330 U
Pyrene	50,000		79 J	380 U	72 J	190 J

SVOC - Semivolatile Organic Compound
µg/kg - Micrograms per kilogram
ft bls- Feet below land surface
J - Estimated value
V - Qualifier added and/or value altered during data validation
N - Compound is tentative in identification - added during validation
R - Data rejected during validation
U - Indicates that the compound was analyzed for but not detected
* - Site specific criteria for total cPAHs used in place of NYSDEC RSCO criteria (see Table 3-3)
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - No NYSDEC RSCO available
NA - Sample not analyzed for specific parameter
[1] - Result is for Benzo[b+k]fluoranthene analysis
Note:
Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-54 11/29/93 3-5	MW-58 12/07/93 2-3	S-61 10/24/90 5-7	S-62 10/24/90 0-2
1,2,4-Trichlorobenzene	3,400		7600 U	7300 U	3750 U	3670 U
1,2-Dichlorobenzene	7,900		7600 U	7300 U	3750 U	3670 U
1,3-Dichlorobenzene	1,600		7600 U	7300 U	3750 U	3670 U
1,4-Dichlorobenzene	8,500		7600 U	7300 U	3750 U	3670 U
2,2'-oxybis(1-Chloropropane)	--		7600 U	7300 U	NA	NA
2,4,5-Trichlorophenol	100		37000 U	35000 U	18200 U	17800 U
2,4,6-Trichlorophenol	--		7600 U	7300 U	3750 U	3670 U
2,4-Dichlorophenol	400		7600 U	7300 U	3750 U	3670 U
2,4-Dimethylphenol	--		7600 U	7300 U	3750 U	3670 U
2,4-Dinitrophenol	200		37000 U	35000 U	18200 U	17800 U
2,4-Dinitrotoluene	--		7600 U	7300 U	3750 U	3670 U
2,6-Dinitrotoluene	100		7600 U	7300 U	3750 U	3670 U
2-Chloronaphthalene	--		7600 U	7300 U	3750 U	3670 U
2-Chlorophenol	800		7600 U	7300 U	3750 U	3670 U
2-Methylnaphthalene	36,400		21000	**45000**	3750 U	3670 U
2-Methylphenol	100		7600 U	7300 U	3750 U	3670 U
2-Nitroaniline	430		37000 U	35000 U	18200 U	17800 U
2-Nitrophenol	330		7600 U	7300 U	3750 U	3670 U
3,3'-Dichlorobenzidine	--		7600 U	7300 U	6500 U	7330 U
3-Nitroaniline	500		37000 UJV	35000 UJV	18200 U	17800 U
4,6-Dinitro-2-methylphenol	--		37000 U	35000 U	18200 U	17800 U
4-Bromophenyl phenyl ether	--		7600 U	7300 U	3750 U	3670 U
4-Chloro-3-methylphenol	240		7600 U	7300 U	3750 U	3670 U
4-Chloroaniline	220		7600 U	7300 U	3750 U	3670 U
4-Chlorophenyl phenyl ether	--		7600 U	7300 U	3750 U	3670 U
4-Methylphenol	900		7600 U	7300 U	3750 U	3670 U
4-Nitroaniline	--		37000 U	35000 U	18200 U	17800 U
4-Nitrophenol	100		37000 U	35000 U	18200 U	17800 U
Acenaphthene	50,000		7600 U	7300 U	3750 U	3670 U
Acenaphthylene	50,000		7600 U	7300 U	3750 U	3670 U
Anthracene	50,000		7600 U	500 J	3750 U	3670 U
Benzidine	--		NA	NA	6829 U	6670 U
Benzo[a]anthracene	*		7600 U	7300 U	3750 U	3670 U
Benzo[a]pyrene	*		7600 U	7300 U	3750 U	3670 U
Benzo[b]fluoranthene	*		7600 U	860 J	3750 U[1]	3670 U[1]
Benzo[g,h,i]perylene	50,000		7600 U	7300 U	3750 U	3670 U
Benzo[k]fluoranthene	*		7600 U	7300 U	3750 U[1]	3670 U[1]
Benzoic acid	--		37000 U	35000 U	18200 U	17800 U
Benzyl alcohol	--		7600 U	7300 U	3750 U	3670 U
bis(2-Chloroethoxy)methane	--		7600 U	7300 U	3750 U	3670 U
bis(2-Chloroethyl) ether	--		7600 U	7300 U	3750 U	3670 U
Bis(2-Chloroisopropyl)Ether	--		NA	NA	3750 U	3670 U
bis(2-Ethylhexyl) phthalate	50,000		7600 UV	7300 U	3750 U	3670 U
Butylbenzyl phthalate	50,000		7600 U	7300 U	3750 U	3670 U
Carbazole	--		NA	NA	NA	NA
Chrysene	*		7600 U	650 J	3750 U	3670 U
Di-n-butyl phthalate	8,100		7600 U	7300 U	3750 U	3670 U
Di-n-octyl phthalate	50,000		7600 U	7300 U	3750 U	3670 U
Dibenzo[a,h]anthracene	*		7600 U	7300 U	3750 U	3670 U

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-54 11/29/93 3-5	MW-58 12/07/93 2-3	S-61 10/24/90 5-7	S-62 10/24/90 0-2
Dibenzofuran	6,200		7600 U	760 J	3750 U	3670 U
Diethyl phthalate	7,100		7600 U	7300 U	3750 U	3670 U
Dimethyl phthalate	2,000		7600 U	7300 U	3750 U	3670 U
Fluoranthene	50,000		7600 U	1500 J	3750 U	3670 U
Fluorene	50,000		2600 J	1400 J	3750 U	3670 U
Hexachlorobenzene	41		7600 U	7300 U	3750 U	3670 U
Hexachlorobutadiene	--		7600 U	7300 U	3750 U	3670 U
Hexachlorocyclopentadiene	--		7600 U	7300 U	3750 U	3670 U
Hexachloroethane	--		7600 U	7300 U	3750 U	3670 U
Indeno[1,2,3-cd]pyrene	*		7600 U	7300 U	3750 U	3670 U
Isophorone	4,400		7600 U	7300 U	3750 U	3670 U
N-Nitrosodi-n-propylamine	--		7600 J	7300 U	3750 U	3670 U
N-Nitrosodimethylamine	--		NA	NA	3750 U	3670 U
N-Nitrosodiphenylamine	--		7600 U	7300 U	3750 U	3670 U
Naphthalene	13,000		6600 J	**20000**	3750 U	3670 U
Nitrobenzene	200		7600 U	7300 U	3750 U	3670 U
Pentachlorophenol	1,000		7600 U	7300 U	18200 U	17800 U
Phenanthrene	50,000		4200 J	1500 J	3750 U	3670 U
Phenol	30		7600 U	7300 U	3750 U	3670 U
Pyrene	50,000		660 J	1200 J	3750 U	3670 U

SVOC - Semivolatile Organic Compound
µg/kg - Micrograms per kilogram
ft bls- Feet below land surface
J - Estimated value
V - Qualifier added and/or value altered during data validation
N - Compound is tentative in identification - added during validation
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- - No NYSDEC RSCO available
NA - Sample not analyzed for specific parameter
[1] - Result is for Benzo[b+k]fluoranthene analysis
Note:
Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	S-64 10/18/90 2-3	S-99 01/18/93 0-2	S-122 04/09/94 7.5-8.5	S-129 11/29/93 3-5
1,2,4-Trichlorobenzene	3,400		3930 U	380 U	370 U	410 U
1,2-Dichlorobenzene	7,900		3930 U	380 U	370 U	410 U
1,3-Dichlorobenzene	1,600		3930 U	380 U	370 U	410 U
1,4-Dichlorobenzene	8,500		3930 U	380 U	370 U	410 U
2,2'-oxybis(1-Chloropropane)	--		NA	380 U	370 U	410 U
2,4,5-Trichlorophenol	100		19000 U	910 U	1800 U	2000 U
2,4,6-Trichlorophenol	--		3930 U	380 U	370 U	410 U
2,4-Dichlorophenol	400		3930 U	380 U	370 U	410 U
2,4-Dimethylphenol	--		3930 U	380 U	370 U	410 U
2,4-Dinitrophenol	200		19000 U	910 U	1800 UJV	2000 U
2,4-Dinitrotoluene	--		3930 U	380 U	370 U	410 U
2,6-Dinitrotoluene	100		3930 U	380 U	370 U	410 U
2-Chloronaphthalene	--		3930 U	380 U	370 U	410 U
2-Chlorophenol	800		3930 U	380 U	370 U	410 U
2-Methylnaphthalene	36,400		3930 U	11 J	370 U	410 U
2-Methylphenol	100		3930 U	380 U	370 U	410 U
2-Nitroaniline	430		19000 U	910 U	1800 U	2000 U
2-Nitrophenol	330		3930 U	380 U	370 U	410 U
3,3'-Dichlorobenzidine	--		7860 U	380 U	750 U	410 U
3-Nitroaniline	500		19000 U	910 UJ	1800 U	2000 U
4,6-Dinitro-2-methylphenol	--		19000 U	910 U	1800 U	2000 U
4-Bromophenyl phenyl ether	--		3930 U	380 U	370 U	410 U
4-Chloro-3-methylphenol	240		3930 U	380 U	370 U	410 U
4-Chloroaniline	220		3930 U	380 UJ	370 U	410 U
4-Chlorophenyl phenyl ether	--		3930 U	380 U	370 U	410 U
4-Methylphenol	900		3930 U	380 U	370 U	410 U
4-Nitroaniline	--		19000 U	910 U	1800 U	2000 U
4-Nitrophenol	100		19000 U	910 U	1800 U	2000 U
Acenaphthene	50,000		3930 U	380 U	370 U	410 U
Acenaphthylene	50,000		3930 U	16 J	370 U	40 J
Anthracene	50,000		3930 U	17 J	370 U	57 J
Benzidine	--		7140 U	NA	NA	NA
Benzo[a]anthracene	*		3930 U	65 J	22 J	410 U
Benzo[a]pyrene	*		3930 U	88 J	370 U	47 J
Benzo[b]fluoranthene	*		3930 U[1]	100 J	28 J	250 J
Benzo[g,h,i]perylene	50,000		3930 U	80 J	370 U	43 J
Benzo[k]fluoranthene	*		3930 U[1]	110 J	37 J	37 J
Benzoic acid	--		19000 U	NA	1800 U	480 J
Benzyl alcohol	--		3930 U	NA	370 U	NA
bis(2-Chloroethoxy)methane	--		3930 U	380 U	370 U	410 U
bis(2-Chloroethyl) ether	--		3930 U	380 U	370 U	410 U
Bis(2-Chloroisopropyl)Ether	--		3930 U	NA	NA	NA
bis(2-Ethylhexyl) phthalate	50,000		3930 U	380 UV	370 UV	410 UV
Butylbenzyl phthalate	50,000		3930 U	380 U	370 U	410 U
Carbazole	--		NA	NA	NA	NA
Chrysene	*		3930 U	110 J	40 J	81 J
Di-n-butyl phthalate	8,100		3930 U	380 UV	15 J	30 J
Di-n-octyl phthalate	50,000		3930 U	380 U	370 U	410 U
Dibenzo[a,h]anthracene	*		3930 U	13 J	370 U	410 U

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	S-64 10/18/90 2-3	S-99 01/18/93 0-2	S-122 04/09/94 7.5-8.5	S-129 11/29/93 3-5
Dibenzofuran	6,200		3930 U	8 J	370 U	58 J
Diethyl phthalate	7,100		3930 U	380 UV	370 U	410 U
Dimethyl phthalate	2,000		3930 U	380 U	370 U	410 U
Fluoranthene	50,000		3930 U	100 J	48 J	140 J
Fluorene	50,000		3930 U	380 U	370 U	410 U
Hexachlorobenzene	41		3930 U	380 U	370 U	410 U
Hexachlorobutadiene	--		3930 U	380 U	370 U	410 U
Hexachlorocyclopentadiene	--		3930 U	380 U	370 U	410 U
Hexachloroethane	--		3930 U	380 U	370 U	410 U
Indeno[1,2,3-cd]pyrene	*		3930 U	110 J	370 U	63 J
Isophorone	4,400		3930 U	380 U	370 U	410 U
N-Nitrosodi-n-propylamine	--		3930 U	380 U	370 U	410 U
N-Nitrosodimethylamine	--		3930 U	NA	NA	NA
N-Nitrosodiphenylamine	--		3930 U	380 U	370 U	410 U
Naphthalene	13,000		3930 U	9 J	370 U	410 U
Nitrobenzene	200		3930 U	380 U	370 U	410 U
Pentachlorophenol	1,000		19000 U	910 U	1800 U	410 U
Phenanthrene	50,000		3930 U	45 J	15 J	140 J
Phenol	30		3930 U	380 U	370 U	410 U
Pyrene	50,000		3930 U	77 J	39 J	130 J

SVOC - Semivolatile Organic Compound
µg/kg - Micrograms per kilogram
ft bls- Feet below land surface
J - Estimated value
V - Qualifier added and/or value altered during data validation
N - Compound is tentative in identification - added during validation
R - Data rejected during validation
U - Indicates that the compound was analyzed for but not detected
* - Site specific criteria for total cPAHs used in place of NYSDEC RSCO criteria (see Table 3-3)
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - No NYSDEC RSCO available
NA - Sample not analyzed for specific parameter
[1] - Result is for Benzo[b+k]fluoranthene analysis
Note:
Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	S-134 11/08/93 2-4	S-135 12/07/93 3-3.5	S-139 12/07/93 3-3.1
1,2,4-Trichlorobenzene	3,400		790 UJV	350 U	330 U
1,2-Dichlorobenzene	7,900		790 UJV	350 U	330 U
1,3-Dichlorobenzene	1,600		790 UJV	350 U	330 U
1,4-Dichlorobenzene	8,500		790 UJV	350 U	330 U
2,2'-oxybis(1-Chloropropane)	--		790 UJV	350 U	330 U
2,4,5-Trichlorophenol	100		3800 UJV	1700 U	1600 U
2,4,6-Trichlorophenol	--		790 UJV	350 U	330 U
2,4-Dichlorophenol	400		790 UJV	350 U	330 U
2,4-Dimethylphenol	--		790 UJV	350 U	330 U
2,4-Dinitrophenol	200		3800 UJV	1700 U	1600 U
2,4-Dinitrotoluene	--		790 UJV	350 U	330 U
2,6-Dinitrotoluene	100		790 UJV	350 U	330 U
2-Chloronaphthalene	--		790 UJV	350 U	330 U
2-Chlorophenol	800		790 UJV	350 U	330 U
2-Methylnaphthalene	36,400		790 UJV	350 U	18 J
2-Methylphenol	100		790 UJV	350 U	330 U
2-Nitroaniline	430		3800 UJV	1700 U	1600 U
2-Nitrophenol	330		790 UJV	350 U	330 U
3,3'-Dichlorobenzidine	--		1600 UJV	350 U	330 U
3-Nitroaniline	500		3800 UJV	1700 UJV	1600 UJV
4,6-Dinitro-2-methylphenol	--		3800 UJV	1700 U	1600 U
4-Bromophenyl phenyl ether	--		790 UJV	350 U	330 U
4-Chloro-3-methylphenol	240		790 UJV	350 U	330 U
4-Chloroaniline	220		790 UJV	350 U	330 U
4-Chlorophenyl phenyl ether	--		790 UJV	350 U	330 U
4-Methylphenol	900		790 UJV	350 U	330 U
4-Nitroaniline	--		3800 UJV	1700 U	1600 U
4-Nitrophenol	100		3800 UJV	1700 U	1600 U
Acenaphthene	50,000		790 UJV	350 U	330 U
Acenaphthylene	50,000		330 JV	350 U	330 U
Anthracene	50,000		210 JV	350 U	330 U
Benzidine	--		NA	NA	NA
Benzo[a]anthracene	*		370 J	350 U	330 U
Benzo[a]pyrene	*		460 J	350 UJV	46 J
Benzo[b]fluoranthene	*		790 UJV	350 UJV	89 J
Benzo[g,h,i]perylene	50,000		790 UJV	350 UJV	330 U
Benzo[k]fluoranthene	*		820 JV	350 UJV	330 U
Benzoic acid	--		3800 UJV	17000 U	1600 U
Benzyl alcohol	--		790 UJV	350 U	330 U
bis(2-Chloroethoxy)methane	--		790 UJV	350 U	330 U
bis(2-Chloroethyl) ether	--		790 UJV	350 U	330 U
Bis(2-Chloroisopropyl)Ether	--		NA	NA	NA
bis(2-Ethylhexyl) phthalate	50,000		790 UJV	350 UV	330 UV
Butylbenzyl phthalate	50,000		790 UJV	350 U	330 U
Carbazole	--		NA	NA	NA
Chrysene	*		630 J	350 U	56 J
Di-n-butyl phthalate	8,100		120 J	350 U	18 J
Di-n-octyl phthalate	50,000		790 UJV	350 UJV	330 U
Dibenzo[a,h]anthracene	*		790 UJV	350 UJV	330 U

Table 3-4. Summary of SVOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	S-134 11/08/93 2-4	S-135 12/07/93 3-3.5	S-139 12/07/93 3-3.1
Dibenzofuran	6,200		790 UJV	17 J	330 U
Diethyl phthalate	7,100		790 UJV	350 U	330 U
Dimethyl phthalate	2,000		790 UJV	350 U	330 U
Fluoranthene	50,000		500 J	350 U	93 J
Fluorene	50,000		790 UJV	31 J	330 U
Hexachlorobenzene	41		790 UJV	350 U	330 U
Hexachlorobutadiene	--		790 UJV	350 U	330 U
Hexachlorocyclopentadiene	--		790 UJV	350 U	330 U
Hexachloroethane	--		790 UJV	350 U	330 U
Indeno[1,2,3-cd]pyrene	*		550 J	350 UJV	330 U
Isophorone	4,400		790 UJV	350 U	330 U
N-Nitrosodi-n-propylamine	--		790 UJV	350 U	330 U
N-Nitrosodimethylamine	--		NA	NA	NA
N-Nitrosodiphenylamine	--		790 UJV	350 U	330 U
Naphthalene	13,000		790 UJV	350 U	33 J
Nitrobenzene	200		790 UJV	350 U	330 U
Pentachlorophenol	1,000		790 UJV	350 U	330 U
Phenanthrene	50,000		920 JV	350 U	58 J
Phenol	30		790 UJV	350 U	330 U
Pyrene	50,000		2100 JV	350 U	100 J

SVOC - Semivolatile Organic Compound
µg/kg - Micrograms per kilogram
ft bls- Feet below land surface
J - Estimated value
V - Qualifier added and/or value altered during data validation
N - Compound is tentative in identification - added during validation
R - Data rejected during validation
U - Indicates that the compound was analyzed for but not detected
* - Site specific criteria for total cPAHs used in place of NYSDEC RSCO criteria (see Table 3-3)
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - No NYSDEC RSCO available
NA - Sample not analyzed for specific parameter
[1] - Result is for Benzo[b+k]fluoranthene analysis
Note:
Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	Sample Designation: / Sample Date: / Sample Depth (ft bls):	HD-1 12/18/03 4-6	HD-2 12/18/03 9-11	HD-2 12/18/03 13-15
Aluminum		33000*		-	-	-
Antimony		--		-	-	-
Arsenic		7.5		-	-	-
Barium		300		-	-	-
Beryllium		0.16		-	-	-
Cadmium		1		-	-	-
Calcium		35000*		-	-	-
Chromium		10		-	-	-
Cobalt		30		-	-	-
Copper		25		-	-	-
Iron		2000		-	-	-
Lead	1,000	--		5 B	2.2 B	1.9 B
Magnesium		5,000*		-	-	-
Manganese		5,000*		-	-	-
Mercury		0.1		-	-	-
Nickel		13		-	-	-
Potassium		43,000*		-	-	-
Selenium		2		-	-	-
Silver		--		-	-	-
Sodium		8,000*		-	-	-
Thallium		--		-	-	-
Vanadium		150		-	-	-
Zinc		20		-	-	-

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
B - Indicates analyte result between instrument detection limit and the contract required detection limit
N - Spike recovery exceeds the upper or lower control limits
S - Value determined by method of standard addition
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during data validation
W - Post-digestion spike was outside 85-115% control limits.
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - Sample submitted for Lead analysis only, and not analyzed for specific metal
* - Eastern USA Background criteria used due to lack of NYSDEC RSCO criteria for specific metal
-- No NYSDEC RSCO or Eastern USA Background criteria available

Notes:

Bold data indicates that parameter was detected above the NYSDEC RSCOs Eastern USA Background Criteria or the NYSDEC recommended cleanup level for Lead.

Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HD-3 11/26/03 5-7	HD-3 11/26/03 8-10	HD-4 11/26/03 8-10	HD-4 11/26/03 14-16	HD-5B 11/25/03 9-11
Aluminum		33000*	-	-	3200	3010	-
Antimony		--	-	-	1.8 UJV	1.6 UJV	-
Arsenic		7.5	-	-	1.5 UJV	1.3 UJV	-
Barium		300	-	-	22.2	114	-
Beryllium		0.16	-	-	3 U	2.7 U	-
Cadmium		1	-	-	4.5 U	4 U	-
Calcium		35000*	-	-	1420	1310	-
Chromium		10	-	-	7.6	**10.8**	-
Cobalt		30	-	-	3.1	3.7	-
Copper		25	-	-	12.2 JV	12.2 JV	-
Iron		2000	-	-	**7770**	**6880**	-
Lead	1,000	--	3.2 B	3.1 B	3.4 B	1.9 B	4.2 B
Magnesium		5,000*	-	-	1740	1880	-
Manganese		5,000*	-	-	88 JV	818 JV	-
Mercury		0.1	-	-	2.2 U	1.8 U	-
Nickel		13	-	-	7.8	8.2	-
Potassium		43,000*	-	-	392 V	469 V	-
Selenium		2	-	-	2.4 UV	2.2 UV	-
Silver		--	-	-	4.5 U	4 U	-
Sodium		8,000*	-	-	189	175	-
Thallium		--	-	-	32.8 U	29.7 U	-
Vanadium		150	-	-	17.8	9.8	-
Zinc		20	-	-	15.9 B	12.9 B	-

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
B - Indicates analyte result between instrument detection limit and the contract required detection limit
N - Spike recovery exceeds the upper or lower control limits
S - Value determined by method of standard addition
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during data validation
W - Post-digestion spike was outside 85-115% control limits.
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - Sample submitted for Lead analysis only, and not analyzed for specific metal
* - Eastern USA Background criteria used due to lack of NYSDEC RSCO criteria for specific metal
-- No NYSDEC RSCO or Eastern USA Background criteria available

Notes:

Bold data indicates that parameter was detected above the NYSDEC RSCOs Eastern USA Background Criteria or the NYSDEC recommended cleanup level for Lead.

Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HD-5B 11/25/03 15-16	HD-6 11/26/03 9-11	HD-6 11/26/03 18-20	HD-7 11/25/03 8-10	HD-7 11/25/03 21-23
Aluminum		33000*	-	3450	3010	6370	2990
Antimony		--	-	15.4 UJV	15.9 UJV	1.5 UJV	1.6 UJV
Arsenic		7.5	-	10.5 UJV	10.9 UJV	1.2 UJV	1.3 UJV
Barium		300	-	59.4	26.3	79.9	34.5
Beryllium		0.16	-	2.6 U	2.7 U	2.5 U	2.7 U
Cadmium		1	-	3.9 U	4.1 U	3.7 U	4 U
Calcium		35000*	-	1350 JV	3410 JV	9560 JV	4010 JV
Chromium		10	-	7.2	6.7	**14.7**	6.4
Cobalt		30	-	3.4	3.1	6.4	2.8
Copper		25	-	9.8	8.3	**25.5**	8.8
Iron		2000	-	**8320**	**7110**	**13500**	**7360**
Lead	1,000	--	17.4	2.6 B	1.8 B	3.3 B	2 B
Magnesium		5,000*	-	2170	2460	7160	2470
Manganese		5,000*	-	1460 JV	227 JV	358 JV	143 JV
Mercury		0.1	-	2.1 U	2 U	1.8 U	2.1 U
Nickel		13	-	8.2	7.1	**13.8**	7.1
Potassium		43,000*	-	586	488	1080	483
Selenium		2	-	21 U	21.7 U	19.9 U	21.4 U
Silver		--	-	3.9 U	4.1 U	3.7 U	4 U
Sodium		8,000*	-	96.4 B	104 B	401	114 B
Thallium		--	-	28.9 U	29.9 U	27.3 U	29.4 U
Vanadium		150	-	9.6	8.1	19.1	11
Zinc		20	-	16 B	13.7 B	**28**	14.6 B

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
B - Indicates analyte result between instrument detection limit and the contract required detection limit
N - Spike recovery exceeds the upper or lower control limits
S - Value determined by method of standard addition
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during data validation
W - Post-digestion spike was outside 85-115% control limits.
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - Sample submitted for Lead analysis only, and not analyzed for specific metal
* - Eastern USA Background criteria used due to lack of NYSDEC RSCO criteria for specific metal
-- No NYSDEC RSCO or Eastern USA Background criteria available

Notes:

Bold data indicates that parameter was detected above the NYSDEC RSCOs Eastern USA Background Criteria or the NYSDEC recommended cleanup level for Lead.

Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HD-8D 11/24/03 7-9	HD-8D 11/24/03 20-22	HD-9 11/26/03 8-10	HD-9 11/26/03 13-15	HD-10 11/25/03 6-8
Aluminum		33000*	4070	4570	-	-	3880
Antimony		--	1.6 UJV	1.6 UJV	-	-	1.4 UJV
Arsenic		7.5	1.4 UJV	1.3 UJV	-	-	1.2 UJV
Barium		300	97.3	60.3	-	-	80.9
Beryllium		0.16	2.7 U	2.6 U	-	-	2.4 U
Cadmium		1	4.1 U	3.9 U	-	-	3.5 U
Calcium		35000*	1560 JV	3050 JV	-	-	6090 JV
Chromium		10	**10.3**	9.1	-	-	9.6
Cobalt		30	4.6	4.8	-	-	4.5
Copper		25	15.3	12.8	-	-	12.1
Iron		2000	**10500**	**12200**	-	-	**9620**
Lead	1,000	--	3.4 B	4.4 B	4.5 B	2.1 B	2.5 B
Magnesium		5,000*	2190	4010	-	-	4710
Manganese		5,000*	343 JV	237 JV	-	-	765 JV
Mercury		0.1	1.9 U	1.9 U	-	-	2.2 U
Nickel		13	9.5	11.9	-	-	9.1
Potassium		43,000*	681	518	-	-	747
Selenium		2	21.8 U	20.9 U	-	-	18.9 U
Silver		--	4.1 U	3.9 U	-	-	3.5 U
Sodium		8,000*	145	188	-	-	161
Thallium		--	30 U	28.7 U	-	-	25.9 U
Vanadium		150	21.7	11.9	-	-	12.7
Zinc		20	**22.1 B**	**22.3 B**	-	-	**22.8 B**

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
B - Indicates analyte result between instrument detection limit and the contract required detection limit
N - Spike recovery exceeds the upper or lower control limits
S - Value determined by method of standard addition
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during data validation
W - Post-digestion spike was outside 85-115% control limits.
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - Sample submitted for Lead analysis only, and not analyzed for specific metal
* - Eastern USA Background criteria used due to lack of NYSDEC RSCO criteria for specific metal
-- No NYSDEC RSCO or Eastern USA Background criteria available

Notes:

Bold data indicates that parameter was detected above the NYSDEC RSCOs Eastern USA Background Criteria or the NYSDEC recommended cleanup level for Lead.

Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HD-10 11/25/03 8-10	HD-10 11/25/03 16-18	HD-11 12/18/03 4-6	HD-11 12/18/03 13-15	HD-12 11/25/03 6-8
Aluminum		33000*	3910	4620	3870	3590	-
Antimony		--	1.5 UJV	1.6 UJV	1.6 UJV	1.6 UJV	-
Arsenic		7.5	1.2 UJV	1.3 UJV	5 B	10.4 U	-
Barium		300	63.1	82.5	45.4	44.1	-
Beryllium		0.16	2.4 U	2.7 U	2.7 U	2.6 U	-
Cadmium		1	3.7 U	4 U	4.1 U	3.9 U	-
Calcium		35000*	6660 JV	3980 JV	2420	8350	-
Chromium		10	9.6	**10.6**	**13.3**	8.6	-
Cobalt		30	4.6	4.4	4.5	4	-
Copper		25	15.4	13.4	**25.1**	17.4	-
Iron		2000	**10300**	**10900**	**17300**	**8520**	-
Lead	1,000	--	2.9 B	3.3 B	159	2.3 B	2.3 B
Magnesium		5,000*	4630	3640	1580	5160	-
Manganese		5,000*	178 JV	196 JV	157	199	-
Mercury		0.1	2 U	2.2 U	0.097 BJV	0.043 U	-
Nickel		13	9.1	9.6	9.4	8	-
Potassium		43,000*	820	1020	435	712	-
Selenium		2	19.6 U	21.5 U	22 U	20.7 U	-
Silver		--	3.7 U	4 U	4.1 U	3.9 U	-
Sodium		8,000*	130	102 B	224	189	-
Thallium		--	26.9 U	29.6 U	30.2 U	28.5 U	-
Vanadium		150	16.5	13.5	14.4	13.5	-
Zinc		20	**23.1 B**	**22.8 B**	**188**	18.9 B	-

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
B - Indicates analyte result between instrument detection limit and the contract required detection limit
N - Spike recovery exceeds the upper or lower control limits
S - Value determined by method of standard addition
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during data validation
W - Post-digestion spike was outside 85-115% control limits.
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - Sample submitted for Lead analysis only, and not analyzed for specific metal
* - Eastern USA Background criteria used due to lack of NYSDEC RSCO criteria for specific metal
-- No NYSDEC RSCO or Eastern USA Background criteria available

Notes:

Bold data indicates that parameter was detected above the NYSDEC RSCOs Eastern USA Background Criteria or the NYSDEC recommended cleanup level for Lead.

Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HD-12 11/25/03 14-16	HD-13 12/19/03 3-5	HD-14 12/18/03 4-6	HD-14 12/18/03 6-8	HD-15C 11/25/03 6-8
Aluminum		33000*	-	-	-	-	-
Antimony		--	-	-	-	-	-
Arsenic		7.5	-	-	-	-	-
Barium		300	-	-	-	-	-
Beryllium		0.16	-	-	-	-	-
Cadmium		1	-	-	-	-	-
Calcium		35000*	-	-	-	-	-
Chromium		10	-	-	-	-	-
Cobalt		30	-	-	-	-	-
Copper		25	-	-	-	-	-
Iron		2000	-	-	-	-	-
Lead	1,000	--	2.9 B	4 B	41.3	4.3 B	3.4 B
Magnesium		5,000*	-	-	-	-	-
Manganese		5,000*	-	-	-	-	-
Mercury		0.1	-	-	-	-	-
Nickel		13	-	-	-	-	-
Potassium		43,000*	-	-	-	-	-
Selenium		2	-	-	-	-	-
Silver		--	-	-	-	-	-
Sodium		8,000*	-	-	-	-	-
Thallium		--	-	-	-	-	-
Vanadium		150	-	-	-	-	-
Zinc		20	-	-	-	-	-

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
B - Indicates analyte result between instrument detection limit and the contract required detection limit
N - Spike recovery exceeds the upper or lower control limits
S - Value determined by method of standard addition
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during data validation
W - Post-digestion spike was outside 85-115% control limits.
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
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* - Eastern USA Background criteria used due to lack of NYSDEC RSCO criteria for specific metal
-- No NYSDEC RSCO or Eastern USA Background criteria available

Notes:

Bold data indicates that parameter was detected above the NYSDEC RSCOs Eastern USA Background Criteria or the NYSDEC recommended cleanup level for Lead.

Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HD-15C 11/25/03 20-22	HD-15C 11/25/03 28-30	HD-16 12/19/03 9-11	HD-16 12/19/03 13-15	HD-17 12/18/03 4-6
Aluminum		33000*	-	-	4440	2120	-
Antimony		--	-	-	1.6 UJV	1.6 UJV	-
Arsenic		7.5	-	-	10.5 U	10.7 U	-
Barium		300	-	-	59.3	13.9	-
Beryllium		0.16	-	-	2.6 U	2.7 U	-
Cadmium		1	-	-	3.9 U	4 U	-
Calcium		35000*	-	-	3990	1420	-
Chromium		10	-	-	**14.3**	4.4	-
Cobalt		30	-	-	4.2	2.2 B	-
Copper		25	-	-	17.7	3.9 B	-
Iron		2000	-	-	**10100**	**5020**	-
Lead	1,000	--	3.3 B	2.7 B	3.2 B	1.5 B	182
Magnesium		5,000*	-	-	3900	1680	-
Manganese		5,000*	-	-	127	52.6	-
Mercury		0.1	-	-	0.054 U	0.049 U	-
Nickel		13	-	-	8.5	6.1 B	-
Potassium		43,000*	-	-	1350	265 B	-
Selenium		2	-	-	20.9 U	21.4 U	-
Silver		--	-	-	3.9 U	4 U	-
Sodium		8,000*	-	-	163	91.5 B	-
Thallium		--	-	-	28.7 U	29.4 U	-
Vanadium		150	-	-	23.1	6.8	-
Zinc		20	-	-	**26.7**	9.5 B	-

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
B - Indicates analyte result between instrument detection limit and the contract required detection limit
N - Spike recovery exceeds the upper or lower control limits
S - Value determined by method of standard addition
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during data validation
W - Post-digestion spike was outside 85-115% control limits.
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
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-- No NYSDEC RSCO or Eastern USA Background criteria available

Notes:

Bold data indicates that parameter was detected above the NYSDEC RSCOs Eastern USA Background Criteria or the NYSDEC recommended cleanup level for Lead.

Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HD-17 12/18/03 8-10	HD-18 12/18/03 4-6	HD-19 12/19/03 2-4	HD-20 11/26/03 6-8	HD-20 11/26/03 10-12
Aluminum		33000*	-	-	-	-	-
Antimony		--	-	-	-	-	-
Arsenic		7.5	-	-	-	-	-
Barium		300	-	-	-	-	-
Beryllium		0.16	-	-	-	-	-
Cadmium		1	-	-	-	-	-
Calcium		35000*	-	-	-	-	-
Chromium		10	-	-	-	-	-
Cobalt		30	-	-	-	-	-
Copper		25	-	-	-	-	-
Iron		2000	-	-	-	-	-
Lead	1,000	--	10.7 B	20.1	3.5 B	2.3 B	2.3 B
Magnesium		5,000*	-	-	-	-	-
Manganese		5,000*	-	-	-	-	-
Mercury		0.1	-	-	-	-	-
Nickel		13	-	-	-	-	-
Potassium		43,000*	-	-	-	-	-
Selenium		2	-	-	-	-	-
Silver		--	-	-	-	-	-
Sodium		8,000*	-	-	-	-	-
Thallium		--	-	-	-	-	-
Vanadium		150	-	-	-	-	-
Zinc		20	-	-	-	-	-

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
B - Indicates analyte result between instrument detection limit and the contract required detection limit
N - Spike recovery exceeds the upper or lower control limits
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- - Sample submitted for Lead analysis only, and not analyzed for specific metal
* - Eastern USA Background criteria used due to lack of NYSDEC RSCO criteria for specific metal
-- No NYSDEC RSCO or Eastern USA Background criteria available

Notes:

Bold data indicates that parameter was detected above the NYSDEC RSCOs Eastern USA Background Criteria or the NYSDEC recommended cleanup level for Lead.

Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HST-1 04/19/96 0-2	HST-1 04/19/96 2-4	HST-16 03/25/97 0-2	HST-17 03/25/97 0-2	HST-21 12/08/97 0-1
Aluminum		33000*	4800	4940	-	-	-
Antimony		--	14.8 U	12.7 U	-	-	-
Arsenic		7.5	3	3.3	-	-	-
Barium		300	49.2 U	42.4 U	-	-	-
Beryllium		0.16	1.2 U	1.1 U	-	-	-
Cadmium		1	1.2 U	1.1 U	-	-	-
Calcium		35000*	13900	5140	-	-	-
Chromium		10	**38.8**	**13.7**	-	-	-
Cobalt		30	12.3 U	10.6 U	-	-	-
Copper		25	**55.8**	**38.3**	-	-	-
Iron		2000	**13800**	**15000**	-	-	-
Lead	1,000	--	225	137	179	360	118
Magnesium		5,000*	2670	2630	-	-	-
Manganese		5,000*	284	172	-	-	-
Mercury		0.1	0.11 U	0.12 U	-	-	-
Nickel		13	**31**	11.4	-	-	-
Potassium		43,000*	1230 U	1420	-	-	-
Selenium		2	1.8	**2.2**	-	-	-
Silver		--	2.4 U	2.1 U	-	-	-
Sodium		8,000*	1230 U	1060 U	-	-	-
Thallium		--	2.4 U	2.1 U	-	-	-
Vanadium		150	17	22.6	-	-	-
Zinc		20	**66.8**	**48.7**	-	-	-

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
B - Indicates analyte result between instrument detection limit and the contract required detection limit
N - Spike recovery exceeds the upper or lower control limits
S - Value determined by method of standard addition
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Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HST-21 12/08/97 1-2	HST-21 12/08/97 2-3	HST-21 01/12/98 3-5	HST-21 01/12/98 5-7	HST-22 12/08/97 0-1
Aluminum		33000*	-	-	-	-	-
Antimony		--	-	-	-	-	-
Arsenic		7.5	-	-	-	-	-
Barium		300	-	-	-	-	-
Beryllium		0.16	-	-	-	-	-
Cadmium		1	-	-	-	-	-
Calcium		35000*	-	-	-	-	-
Chromium		10	-	-	-	-	-
Cobalt		30	-	-	-	-	-
Copper		25	-	-	-	-	-
Iron		2000	-	-	-	-	-
Lead	1,000	--	8.1	2.6	3	4	768
Magnesium		5,000*	-	-	-	-	-
Manganese		5,000*	-	-	-	-	-
Mercury		0.1	-	-	-	-	-
Nickel		13	-	-	-	-	-
Potassium		43,000*	-	-	-	-	-
Selenium		2	-	-	-	-	-
Silver		--	-	-	-	-	-
Sodium		8,000*	-	-	-	-	-
Thallium		--	-	-	-	-	-
Vanadium		150	-	-	-	-	-
Zinc		20	-	-	-	-	-

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Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HST-22 12/08/97 1-2	HST-22 01/12/98 1-3	HST-22 01/12/98 3-5	HST-23 12/08/97 0-1	HST-23 12/08/97 1-2
Aluminum		33000*	-	-	-	-	-
Antimony		--	-	-	-	-	-
Arsenic		7.5	-	-	-	-	-
Barium		300	-	-	-	-	-
Beryllium		0.16	-	-	-	-	-
Cadmium		1	-	-	-	-	-
Calcium		35000*	-	-	-	-	-
Chromium		10	-	-	-	-	-
Cobalt		30	-	-	-	-	-
Copper		25	-	-	-	-	-
Iron		2000	-	-	-	-	-
Lead	1,000	--	333	48	69	626	153
Magnesium		5,000*	-	-	-	-	-
Manganese		5,000*	-	-	-	-	-
Mercury		0.1	-	-	-	-	-
Nickel		13	-	-	-	-	-
Potassium		43,000*	-	-	-	-	-
Selenium		2	-	-	-	-	-
Silver		--	-	-	-	-	-
Sodium		8,000*	-	-	-	-	-
Thallium		--	-	-	-	-	-
Vanadium		150	-	-	-	-	-
Zinc		20	-	-	-	-	-

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Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HST-23 01/12/98 1-3	HST-23 01/12/98 3-5	HST-24 12/08/97 0-1	HST-24 12/08/97 1-2	HST-24 12/08/97 2-3
Aluminum		33000*	-	-	-	-	-
Antimony		--	-	-	-	-	-
Arsenic		7.5	-	-	-	-	-
Barium		300	-	-	-	-	-
Beryllium		0.16	-	-	-	-	-
Cadmium		1	-	-	-	-	-
Calcium		35000*	-	-	-	-	-
Chromium		10	-	-	-	-	-
Cobalt		30	-	-	-	-	-
Copper		25	-	-	-	-	-
Iron		2000	-	-	-	-	-
Lead	1,000	--	12	18	991	165	259
Magnesium		5,000*	-	-	-	-	-
Manganese		5,000*	-	-	-	-	-
Mercury		0.1	-	-	-	-	-
Nickel		13	-	-	-	-	-
Potassium		43,000*	-	-	-	-	-
Selenium		2	-	-	-	-	-
Silver		--	-	-	-	-	-
Sodium		8,000*	-	-	-	-	-
Thallium		--	-	-	-	-	-
Vanadium		150	-	-	-	-	-
Zinc		20	-	-	-	-	-

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ft bls - Feet below land surface
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Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HST-24 01/12/98 4.5-6.5	HST-24 01/12/98 6.5-8.5	HST-25 12/08/97 0-2	HST-25 01/12/98 1-3	HST-25 01/12/98 3-5
Aluminum		33000*	-	-	-	-	-
Antimony		--	-	-	-	-	-
Arsenic		7.5	-	-	-	-	-
Barium		300	-	-	-	-	-
Beryllium		0.16	-	-	-	-	-
Cadmium		1	-	-	-	-	-
Calcium		35000*	-	-	-	-	-
Chromium		10	-	-	-	-	-
Cobalt		30	-	-	-	-	-
Copper		25	-	-	-	-	-
Iron		2000	-	-	-	-	-
Lead	1,000	--	10	7	448	76.5	23.9
Magnesium		5,000*	-	-	-	-	-
Manganese		5,000*	-	-	-	-	-
Mercury		0.1	-	-	-	-	-
Nickel		13	-	-	-	-	-
Potassium		43,000*	-	-	-	-	-
Selenium		2	-	-	-	-	-
Silver		--	-	-	-	-	-
Sodium		8,000*	-	-	-	-	-
Thallium		--	-	-	-	-	-
Vanadium		150	-	-	-	-	-
Zinc		20	-	-	-	-	-

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Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	HST-26 12/08/97 0-2	HST-27 12/08/97 0-2	HST-28 12/08/97 0-2	HST-29 01/12/98 0-2	MW-19 12/08/90 0-2
Aluminum		33000*	-	-	-	-	-
Antimony		--	-	-	-	-	-
Arsenic		7.5	-	-	-	-	-
Barium		300	-	-	-	-	-
Beryllium		0.16	-	-	-	-	-
Cadmium		1	-	-	-	-	-
Calcium		35000*	-	-	-	-	-
Chromium		10	-	-	-	-	-
Cobalt		30	-	-	-	-	-
Copper		25	-	-	-	-	-
Iron		2000	-	-	-	-	-
Lead	1,000	--	863	559	**1180**	30.8	498 J
Magnesium		5,000*	-	-	-	-	-
Manganese		5,000*	-	-	-	-	-
Mercury		0.1	-	-	-	-	-
Nickel		13	-	-	-	-	-
Potassium		43,000*	-	-	-	-	-
Selenium		2	-	-	-	-	-
Silver		--	-	-	-	-	-
Sodium		8,000*	-	-	-	-	-
Thallium		--	-	-	-	-	-
Vanadium		150	-	-	-	-	-
Zinc		20	-	-	-	-	-

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Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	MW-20 12/13/90 0-2	MW-21 12/08/90 0-2	MW-54 11/29/93 3-5	MW-58 03/25/97 0-2	MW-58 12/07/93 2-3
Aluminum		33000*	-	-	1600	-	4050
Antimony		--	-	-	4.6 U	-	5 U
Arsenic		7.5	-	-	1.1 B	-	3.8 BS
Barium		300	-	-	34.4 JV	-	68 JV
Beryllium		0.16	-	-	0.22 U	-	**0.31 BS**
Cadmium		1	-	-	0.43 U	-	**2.5**
Calcium		35000*	-	-	242 B	-	817 B
Chromium		10	-	-	5.1	-	**17.7**
Cobalt		30	-	-	2.5 B	-	6.4 B
Copper		25	-	-	22	-	**406**
Iron		2000	-	-	**6810**	-	**16900**
Lead	1,000	--	415 J	0.4 U	18.5 JV	**1160**	529 JV
Magnesium		5,000*	-	-	802 B	-	1390
Manganese		5,000*	-	-	148	-	112
Mercury		0.1	-	-	0.11 U	-	**0.12**
Nickel		13	-	-	6.5 B	-	**24.5**
Potassium		43,000*	-	-	286 B	-	457 B
Selenium		2	-	-	0.43 JV	-	0.47 JV
Silver		--	-	-	0.43 U	-	0.47 U
Sodium		8,000*	-	-	29.3 B	-	107 B
Thallium		--	-	-	0.22 JV	-	0.24 JV
Vanadium		150	-	-	10.7 B	-	32.1
Zinc		20	-	-	**37.4**	-	**763**

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Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	S-2 10/26/90 0-2	S-10 10/18/90 0-2	S-61 10/24/90 5-7	S-62 10/20/90 0-2	S-64 10/19/90 2-3
Aluminum		33000*	-	-	4970 N	4090 N	3000 N
Antimony		--	-	-	1.7 UN	1.7 UN	4.8 BN
Arsenic		7.5	-	-	2.6	3.1	**8.1**
Barium		300	-	-	**418**	43 B	97
Beryllium		0.16	-	-	**0.46 B**	0.36 U	0.38 U
Cadmium		1	-	-	0.76 U	0.74 U	**2.1**
Calcium		35000*	-	-	772 B	751 B	1610
Chromium		10	-	-	10 NS	**14 N**	**19 N**
Cobalt		30	-	-	6.4 B	2.5 B	3.1 B
Copper		25	-	-	**96**	**76**	**279**
Iron		2000	-	-	**13000**	**10100**	**38700**
Lead	1,000	--	332 N	149 N	44 S N	**1080 NS**	212 N
Magnesium		5,000*	-	-	2150	1630	1420
Manganese		5,000*	-	-	82	314	445
Mercury		0.1	-	-	**0.17 N**	**0.31 N**	**0.29 N**
Nickel		13	-	-	**14**	10	**23**
Potassium		43,000*	-	-	832 B	466 B	412 B
Selenium		2	-	-	0.6 UN	0.58 U	0.62 UNW
Silver		--	-	-	0.53 U	0.52 UW	0.79 BW
Sodium		8,000*	-	-	328 B	607 B	433 B
Thallium		--	-	-	0.64 U	0.63 U	0.67 U
Vanadium		150	-	-	32	13	37
Zinc		20	-	-	**100**	**58**	**303**

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Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	S-99 01/18/93 0-2	S-122 04/09/94 7.5-8.5	S-129 11/29/93 3-5	S-134 11/08/93 2-4	S-135 12/07/93 3-3.5
Aluminum		33000*	9370	7000	2570	6270	1910
Antimony		--	4.2 U	9.2 U	4.8 U	4.9 JV	4.5 U
Arsenic		7.5	**16.8**	1.6 B	4.7	**8.9**	0.37 B
Barium		300	50.6	65.9 B	38.6 JV	83.5	30.3 JV
Beryllium		0.16	**0.22 B**	**0.63 B**	0.23 U	0.23 U	0.21 U
Cadmium		1	0.4 U	0.72 B	0.46 U	**3.7**	0.43 U
Calcium		35000*	920 B	1850	5890	2060	402 B
Chromium		10	**18.8**	**16.1**	**17**	**66.3 JV**	6.7
Cobalt		30	7.5 B	6.6 B	4.3 B	5.7 B	1.8 B
Copper		25	**90.7 JV**	**33.7**	**106**	**168**	21.9
Iron		2000	**21300**	**16900**	**17700**	**25200**	**3910**
Lead	1,000	--	61.9	12.1	46.9 JV	591	5.4 JV
Magnesium		5,000*	2180	3660	3980	1760	957 B
Manganese		5,000*	321	624	3.27	206	89.3
Mercury		0.1	**0.2**	0.1 U	0.1 U	**0.37 JV**	0.1 U
Nickel		13	**13.8**	**13.2 B**	**14**	**23**	4.5 B
Potassium		43,000*	762 B	1240	516 B	671 B	398 B
Selenium		2	0.4 JV	0.23 U	0.46 JV	1.3 BJV	0.43 JV
Silver		--	0.6 U	0.69 U	0.46 U	0.47 U	0.43 U
Sodium		8,000*	96.9 B	103 B	47.6 B	244 B	46.8 B
Thallium		--	0.4 U	0.23 U	0.23 JV	0.23 U	0.21 JV
Vanadium		150	30.6	26.5	15.2	46.3	5.9 B
Zinc		20	**56.8**	**66**	**50.2**	**223**	**38.8**

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Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	S-139 12/07/93 3-3.1	SS-6 (OU-4) 12/08/97 0-1	SS-6 (OU-4) 12/08/97 1-2	TSB-2 10/31/00 (0-2)	TSB-9 10/24/00 (2.5-3.5)
Aluminum		33000*	4430	-	-	-	-
Antimony		--	5.1 U	-	-	-	-
Arsenic		7.5	2.5	-	-	-	-
Barium		300	52 JV	-	-	-	-
Beryllium		0.16	0.24 U	-	-	-	-
Cadmium		1	0.49 U	-	-	-	-
Calcium		35000*	549 B	-	-	-	-
Chromium		10	**11.6**	-	-	-	-
Cobalt		30	3.4 B	-	-	-	-
Copper		25	**54.2**	-	-	-	-
Iron		2000	**10400**	-	-	-	-
Lead	1,000	--	27.1 JV	254	11.6	364	21.3
Magnesium		5,000*	1710	-	-	-	-
Manganese		5,000*	121	-	-	-	-
Mercury		0.1	0.1 U	-	-	-	-
Nickel		13	8.3 B	-	-	-	-
Potassium		43,000*	421 B	-	-	-	-
Selenium		2	0.49 JV	-	-	-	-
Silver		--	0.49 U	-	-	-	-
Sodium		8,000*	149 B	-	-	-	-
Thallium		--	0.24 JV	-	-	-	-
Vanadium		150	14.9	-	-	-	-
Zinc		20	**38.3**	-	-	-	-

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
B - Indicates analyte result between instrument detection limit and the contract required detection limit
N - Spike recovery exceeds the upper or lower control limits
S - Value determined by method of standard addition
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during data validation
W - Post-digestion spike was outside 85-115% control limits.
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - Sample submitted for Lead analysis only, and not analyzed for specific metal
* - Eastern USA Background criteria used due to lack of NYSDEC RSCO criteria for specific metal
-- No NYSDEC RSCO or Eastern USA Background criteria available

Notes:

Bold data indicates that parameter was detected above the NYSDEC RSCOs Eastern USA Background Criteria or the NYSDEC recommended cleanup level for Lead.

Table 3-5. Summary of Metal Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC - Recommended Cleanup Level for Lead (mg/kg)	NYSDEC RSCO or Eastern USA Background Level (mg/kg)	TSB-11 10/25/00 (2.5-3.5)	TSB-18 10/30/00 (0-1)
Aluminum		33000*	-	-
Antimony		--	-	-
Arsenic		7.5	-	-
Barium		300	-	-
Beryllium		0.16	-	-
Cadmium		1	-	-
Calcium		35000*	-	-
Chromium		10	-	-
Cobalt		30	-	-
Copper		25	-	-
Iron		2000	-	-
Lead	1,000	--	71	307
Magnesium		5,000*	-	-
Manganese		5,000*	-	-
Mercury		0.1	-	-
Nickel		13	-	-
Potassium		43,000*	-	-
Selenium		2	-	-
Silver		--	-	-
Sodium		8,000*	-	-
Thallium		--	-	-
Vanadium		150	-	-
Zinc		20	-	-

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
B - Indicates analyte result between instrument detection limit and the contract required detection limit
N - Spike recovery exceeds the upper or lower control limits
S - Value determined by method of standard addition
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during data validation
W - Post-digestion spike was outside 85-115% control limits.
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
- - Sample submitted for Lead analysis only, and not analyzed for specific metal
* - Eastern USA Background criteria used due to lack of NYSDEC RSCO criteria for specific metal
-- No NYSDEC RSCO or Eastern USA Background criteria available

Notes:

Bold data indicates that parameter was detected above the NYSDEC RSCOs Eastern USA Background Criteria or the NYSDEC recommended cleanup level for Lead.

Table 3-6. Summary of VOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCO (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-1 12/18/03 4-6	HD-4 11/26/03 8-10	HD-4 11/26/03 14-16	HD-6 11/26/03 9-11
1,1,1-Trichloroethane	800		6 U	630 U	6 U	2700 U
1,1,2,2-Tetrachloroethane	600		6 U	630 U	6 U	2700 U
1,1,2-Trichloroethane	--		6 U	630 U	6 U	2700 U
1,1-Dichloroethane	200		6 U	630 U	6 U	2700 U
1,1-Dichloroethene	400		6 U	630 U	6 U	2700 U
1,2-Dichloroethane	100		6 U	630 U	6 U	2700 U
1,2-Dichloroethene (total)	--		NA	NA	NA	NA
1,2-Dichloropropane	--		6 U	630 U	6 U	2700 U
2-Butanone	300		12 U	630 UJV	11 U	2700 UJV
2-Hexanone	--		12 U	630 U	11 U	2700 U
4-Methyl-2-Pentanone	1,000		12 U	630 U	11 U	2700 U
Acetone	200		12 UJV	630 UV	11 U	2700 UV
Benzene	60		6 U	630 U	6 U	2700 U
Bromodichloromethane	--		6 U	630 U	6 U	2700 U
Bromoform	--		6 U	630 U	6 U	2700 U
Bromomethane	--		RV	630 U	6 U	2700 UJV
Carbon Disulfide	2,700		6 U	630 U	6 U	2700 U
Carbon Tetrachloride	600		6 U	630 U	6 U	2700 U
Chlorobenzene	1,700		6 U	630 U	6 U	2700 U
Chloroethane	1,900		6 U	630 U	6 U	2700 U
Chloroform	300		6 U	630 U	6 U	2700 U
Chloromethane	--		6 U	630 U	6 U	2700 U
cis-1,2-Dichloroethene	--		6 U	630 U	6 U	2700 U
cis-1,3-Dichloropropene	--		6 U	630 U	6 U	2700 U
Dibromochloromethane	--		6 U	630 U	6 U	2700 U
Ethylbenzene	5,500		6 U	630 U	6 U	2700 U
Methylene Chloride	100		6 UJV	630 UV	6 UV	2700 UV
Styrene	--		6 U	630 U	6 U	2700 U
Tetrachloroethene	1,400		6 U	630 UJV	6 U	2700 U
Toluene	1,500		0.6 J	630 U	6 U	2700 U
trans-1,2-Dichloroethene	300		6 U	630 U	6 U	2700 U
trans-1,3-Dichloropropene	--		6 U	630 U	6 U	2700 U
Trichloroethene	700		6 U	630 U	6 U	2700 U
Vinyl Acetate	--		6 U	630 U	6 U	2700 U
Vinyl Chloride	200		6 U	630 U	6 U	2700 U
Xylenes (total)	1,200		2 J	630 U	6 U	2700 U

VOCs - Volatile Organic Compounds

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

V - Qualifier added and/or value altered during data validation

R - Data rejected during validation

-- No NYSDEC RSCO available

NA - Sample not analyzed for specific parameter

NYSDEC - New York State Department of Environmental Conservation

RSCOs - Recommended Soil Cleanup Objectives

Note:

Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-6. Summary of VOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCO (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-6 11/26/03 18-20	HD-7 11/25/03 8-10	HD-7 11/25/03 21-23	HD-8D 11/24/03 7-9
1,1,1-Trichloroethane	800		6 U	560 U	6 U	5700 U
1,1,2,2-Tetrachloroethane	600		6 U	560 U	6 U	5700 U
1,1,2-Trichloroethane	--		6 U	560 U	6 U	5700 U
1,1-Dichloroethane	200		6 U	560 U	6 U	5700 U
1,1-Dichloroethene	400		6 U	560 U	6 U	5700 U
1,2-Dichloroethane	100		6 U	560 U	6 U	5700 U
1,2-Dichloroethene (total)	--		NA	NA	NA	NA
1,2-Dichloropropane	--		6 U	560 U	6 U	5700 U
2-Butanone	300		11 U	560 UJV	11 U	**4100 J**
2-Hexanone	--		11 U	560 U	11 U	5700 U
4-Methyl-2-Pentanone	1,000		11 U	560 U	11 U	5700 U
Acetone	200		11 U	620 UV	11 U	2200 UV
Benzene	60		6 U	560 U	6 U	5700 U
Bromodichloromethane	--		6 U	560 U	6 U	5700 U
Bromoform	--		6 U	560 U	6 U	5700 U
Bromomethane	--		6 U	560 UJV	6 U	5700 U
Carbon Disulfide	2,700		3 J	560 U	6 U	5700 U
Carbon Tetrachloride	600		6 U	560 U	6 U	5700 U
Chlorobenzene	1,700		6 U	560 U	6 U	5700 U
Chloroethane	1,900		6 U	560 U	6 U	5700 U
Chloroform	300		6 U	560 U	6 U	5700 U
Chloromethane	--		6 U	560 U	6 U	5700 U
cis-1,2-Dichloroethene	--		6 U	560 U	6 U	5700 U
cis-1,3-Dichloropropene	--		6 U	560 U	6 U	5700 U
Dibromochloromethane	--		6 U	560 U	6 U	5700 U
Ethylbenzene	5,500		6 U	460 J	6 U	2500 J
Methylene Chloride	100		6 UJV	560 UV	6 UJV	**630 J**
Styrene	--		6 U	560 U	6 U	5700 U
Tetrachloroethene	1,400		6 U	560 U	6 U	5700 U
Toluene	1,500		6 U	560 U	6 U	5700 U
trans-1,2-Dichloroethene	300		6 U	560 U	6 U	5700 U
trans-1,3-Dichloropropene	--		6 U	560 U	6 U	5700 U
Trichloroethene	700		6 U	560 U	6 U	5700 U
Vinyl Acetate	--		6 U	560 U	6 U	5700 U
Vinyl Chloride	200		6 U	560 U	6 U	5700 U
Xylenes (total)	1,200		6 U	850	6 U	**18000**

VOCs - Volatile Organic Compounds

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

V - Qualifier added and/or value altered during data validation

R - Data rejected during validation

-- No NYSDEC RSCO available

NA - Sample not analyzed for specific parameter

NYSDEC - New York State Department of Environmental Conservation

RSCOs - Recommended Soil Cleanup Objectives

Note:

Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-6. Summary of VOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCO (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-8D 11/24/03 20-22	HD-8D 11/24/03 36-38	HD-10 11/25/03 6-8	HD-10 11/25/03 8-10
1,1,1-Trichloroethane	800		5 U	6 U	560 U	560 U
1,1,2,2-Tetrachloroethane	600		5 U	6 U	560 U	560 U
1,1,2-Trichloroethane	--		5 U	6 U	560 U	560 U
1,1-Dichloroethane	200		5 U	6 U	560 U	560 U
1,1-Dichloroethene	400		5 U	6 U	560 U	560 U
1,2-Dichloroethane	100		5 U	6 U	560 U	560 U
1,2-Dichloroethene (total)	--		NA	NA	NA	NA
1,2-Dichloropropane	--		5 U	6 U	560 U	560 U
2-Butanone	300		11 U	11 U	560 UJV	560 UJV
2-Hexanone	--		11 U	11 U	560 U	560 U
4-Methyl-2-Pentanone	1,000		11 U	11 U	560 U	560 U
Acetone	200		7 J	11 U	650 UV	650 UV
Benzene	60		5 U	6 U	560 U	560 U
Bromodichloromethane	--		5 U	6 U	560 U	560 U
Bromoform	--		5 U	6 U	560 U	560 U
Bromomethane	--		5 U	6 U	560 UJV	560 UJV
Carbon Disulfide	2,700		5 U	6 U	560 U	560 U
Carbon Tetrachloride	600		5 U	6 U	560 U	560 U
Chlorobenzene	1,700		5 U	6 U	560 U	560 U
Chloroethane	1,900		5 U	6 U	560 U	560 U
Chloroform	300		5 U	6 U	560 U	560 U
Chloromethane	--		5 U	6 U	560 U	560 U
cis-1,2-Dichloroethene	--		5 U	6 U	560 U	560 U
cis-1,3-Dichloropropene	--		5 U	6 U	560 U	560 U
Dibromochloromethane	--		5 U	6 U	560 U	560 U
Ethylbenzene	5,500		5 U	6 U	110 J	180 J
Methylene Chloride	100		5 UJV	6 UJV	560 UV	560 UV
Styrene	--		5 U	6 U	560 U	560 U
Tetrachloroethene	1,400		5 U	6 U	560 U	560 U
Toluene	1,500		5 U	1 J	560 U	560 U
trans-1,2-Dichloroethene	300		5 U	6 U	560 U	560 U
trans-1,3-Dichloropropene	--		5 U	6 U	560 U	560 U
Trichloroethene	700		5 U	6 U	560 U	560 U
Vinyl Acetate	--		5 U	6 U	560 U	560 U
Vinyl Chloride	200		5 U	6 U	560 U	560 U
Xylenes (total)	1,200		5 U	6 U	330 J	590

VOCs - Volatile Organic Compounds
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
J - Estimated value
U - Indicates that the compound was analyzed for but not detected
V - Qualifier added and/or value altered during data validation
R - Data rejected during validation
-- No NYSDEC RSCO available
NA - Sample not analyzed for specific parameter
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
Note:
Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-6. Summary of VOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCO (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-10 11/25/03 16-18	HD-11 12/18/03 4-6	HD-11 12/18/03 8-10	HD-11 12/18/03 13-15
1,1,1-Trichloroethane	800		6 U	570 U	580 U	5 U
1,1,2,2-Tetrachloroethane	600		6 U	570 U	580 U	5 U
1,1,2-Trichloroethane	--		6 U	570 U	580 U	5 U
1,1-Dichloroethane	200		6 U	570 U	580 U	5 U
1,1-Dichloroethene	400		6 U	570 U	580 U	5 U
1,2-Dichloroethane	100		6 U	570 U	580 U	5 U
1,2-Dichloroethene (total)	--		NA	NA	NA	NA
1,2-Dichloropropane	--		6 U	570 U	580 U	5 U
2-Butanone	300		11 U	570 U	580 U	10 U
2-Hexanone	--		11 U	570 U	580 U	10 U
4-Methyl-2-Pentanone	1,000		11 U	570 U	580 U	10 U
Acetone	200		11 U	1300 UV	1000 UV	10 UJV
Benzene	60		6 U	570 U	580 U	5 U
Bromodichloromethane	--		6 U	570 U	580 U	5 U
Bromoform	--		6 U	570 U	580 U	5 U
Bromomethane	--		6 U	570 U	580 U	RV
Carbon Disulfide	2,700		6 U	570 U	580 U	5 U
Carbon Tetrachloride	600		6 U	570 U	580 U	5 U
Chlorobenzene	1,700		6 U	570 U	580 U	5 U
Chloroethane	1,900		6 U	570 U	580 U	5 U
Chloroform	300		6 U	570 U	580 U	5 U
Chloromethane	--		6 U	570 U	580 U	5 U
cis-1,2-Dichloroethene	--		6 U	570 U	580 U	5 U
cis-1,3-Dichloropropene	--		6 U	570 U	580 U	5 U
Dibromochloromethane	--		6 U	570 U	580 U	5 U
Ethylbenzene	5,500		6 U	570 U	580 U	5 U
Methylene Chloride	100		6 UJV	570 U	84 J	5 UJV
Styrene	--		6 U	570 U	580 U	5 U
Tetrachloroethene	1,400		6 U	570 U	580 U	5 U
Toluene	1,500		6 U	570 U	580 U	5 U
trans-1,2-Dichloroethene	300		6 U	570 U	580 U	5 U
trans-1,3-Dichloropropene	--		6 U	570 U	580 U	5 U
Trichloroethene	700		6 U	570 U	580 U	5 U
Vinyl Acetate	--		6 U	570 U	580 U	5 U
Vinyl Chloride	200		6 U	570 U	580 U	5 U
Xylenes (total)	1,200		6 U	570 U	580 U	5 U

VOCs - Volatile Organic Compounds

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

V - Qualifier added and/or value altered during data validation

R - Data rejected during validation

-- No NYSDEC RSCO available

NA - Sample not analyzed for specific parameter

NYSDEC - New York State Department of Environmental Conservation

RSCOs - Recommended Soil Cleanup Objectives

Note:

Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-6. Summary of VOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCO (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-14 12/18/03 4-6	HD-14 12/18/03 6-8	HD-16 12/19/03 9-11	HD-16 12/19/03 13-15
1,1,1-Trichloroethane	800		6 U	6 U	24 U	5 U
1,1,2,2-Tetrachloroethane	600		6 U	6 U	24 U	5 U
1,1,2-Trichloroethane	--		6 U	6 U	24 U	5 U
1,1-Dichloroethane	200		6 U	6 U	24 U	5 U
1,1-Dichloroethene	400		6 U	6 U	24 U	5 U
1,2-Dichloroethane	100		6 U	6 U	24 U	5 U
1,2-Dichloroethene (total)	--		NA	NA	NA	NA
1,2-Dichloropropane	--		6 U	6 U	24 U	5 U
2-Butanone	300		26	39	48 U	9 U
2-Hexanone	--		11 U	12 U	48 U	9 U
4-Methyl-2-Pentanone	1,000		11 U	12 U	48 U	9 U
Acetone	200		84 UJV	110 UJV	27 J	9 UJV
Benzene	60		6 U	6 U	24 U	5 U
Bromodichloromethane	--		6 U	6 U	24 U	5 U
Bromoform	--		6 U	6 U	24 U	5 U
Bromomethane	--		RV	RV	RV	RV
Carbon Disulfide	2,700		4 J	3 J	24 U	5 U
Carbon Tetrachloride	600		6 U	6 U	24 U	5 U
Chlorobenzene	1,700		6 U	6 U	24 U	5 U
Chloroethane	1,900		6 U	6 U	24 U	5 U
Chloroform	300		6 U	6 U	24 U	5 U
Chloromethane	--		6 U	6 U	24 U	5 U
cis-1,2-Dichloroethene	--		1 J	6 U	24 U	5 U
cis-1,3-Dichloropropene	--		6 U	6 U	24 U	5 U
Dibromochloromethane	--		6 U	6 U	24 U	5 U
Ethylbenzene	5,500		6 U	6 U	24 U	5 U
Methylene Chloride	100		6 UJV	6 UJV	24 UJV	5 UJV
Styrene	--		6 U	6 U	24 U	5 U
Tetrachloroethene	1,400		6 U	6 U	24 U	5 U
Toluene	1,500		6 U	6 U	24 U	5 U
trans-1,2-Dichloroethene	300		6 U	6 U	24 U	5 U
trans-1,3-Dichloropropene	--		6 U	6 U	24 U	5 U
Trichloroethene	700		6 U	6 U	24 U	5 U
Vinyl Acetate	--		6 U	6 U	24 U	5 U
Vinyl Chloride	200		6 U	6 U	24 U	5 U
Xylenes (total)	1,200		6 U	6 U	24 U	5 U

VOCs - Volatile Organic Compounds

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

V - Qualifier added and/or value altered during data validation

R - Data rejected during validation

-- No NYSDEC RSCO available

NA - Sample not analyzed for specific parameter

NYSDEC - New York State Department of Environmental Conservation

RSCOs - Recommended Soil Cleanup Objectives

Note:

Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-6. Summary of VOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCO (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	HD-19 12/19/03 2-4	MW-54 11/29/93 3-5	MW-58 12/07/93 2-3	S-61 10/24/90 5-7
1,1,1-Trichloroethane	800		6 U	1600 U	1600 U	6 U
1,1,2,2-Tetrachloroethane	600		6 U	1600 U	1600 U	6 U
1,1,2-Trichloroethane	--		6 U	1600 U	1600 U	6 U
1,1-Dichloroethane	200		6 U	1600 UJV	1600 U	6 U
1,1-Dichloroethene	400		6 U	1600 U	1600 UJV	6 U
1,2-Dichloroethane	100		6 U	1600 U	1600 U	6 U
1,2-Dichloroethene (total)	--		NA	1600 U	1600 U	6 U
1,2-Dichloropropane	--		6 U	1600 U	1600 U	6 U
2-Butanone	300		12 U	1600 UV	1600 U	11 U
2-Hexanone	--		12 U	1600 U	1600 U	11 U
4-Methyl-2-Pentanone	1,000		12 U	1600 U	1600 U	11 U
Acetone	200		12 UJV	2600 UV	1600 UV	53
Benzene	60		6 U	1600 U	1600 U	6 U
Bromodichloromethane	--		6 U	1600 U	1600 U	6 U
Bromoform	--		6 U	1600 U	1600 U	6 U
Bromomethane	--		RV	1600 U	1600 U	11 U
Carbon Disulfide	2,700		6 U	1600 U	1600 U	10
Carbon Tetrachloride	600		6 U	1600 U	1600 U	6 U
Chlorobenzene	1,700		6 U	1600 U	1600 U	6 U
Chloroethane	1,900		6 U	1600 U	1600 U	11 U
Chloroform	300		6 U	1600 U	1600 U	6 U
Chloromethane	--		6 U	1600 U	1600 U	11 U
cis-1,2-Dichloroethene	--		6 U	NA	NA	NA
cis-1,3-Dichloropropene	--		6 U	1600 U	1600 U	6 U
Dibromochloromethane	--		6 U	1600 U	1600 U	6 U
Ethylbenzene	5,500		6 U	640 J	1600 U	6 U
Methylene Chloride	100		6 UJV	1600 UV	1600 UV	14
Styrene	--		6 U	1600 U	1600 U	6 U
Tetrachloroethene	1,400		6 U	1600 U	1600 U	6 U
Toluene	1,500		6 U	1600 UV	1600 UV	7.6
trans-1,2-Dichloroethene	300		6 U	NA	NA	NA
trans-1,3-Dichloropropene	--		6 U	1600 U	1600 U	6 U
Trichloroethene	700		6 U	1600 U	1600 U	6 U
Vinyl Acetate	--		6 U	NA	NA	11 U
Vinyl Chloride	200		6 U	1600 U	1600 U	11 U
Xylenes (total)	1,200		6 U	1600 U	1600 U	6 U

VOCs - Volatile Organic Compounds

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

V - Qualifier added and/or value altered during data validation

R - Data rejected during validation

-- No NYSDEC RSCO available

NA - Sample not analyzed for specific parameter

NYSDEC - New York State Department of Environmental Conservation

RSCOs - Recommended Soil Cleanup Objectives

Note:

Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-6. Summary of VOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCO (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	S-62 10/24/90 0-2	S-64 10/18/90 2-3	S-122 04/09/94 7.5-8.5	S-129 11/29/93 3-5
1,1,1-Trichloroethane	800		6 U	6 U	6 U	1500 U
1,1,2,2-Tetrachloroethane	600		6 U	6 U	6 U	1500 U
1,1,2-Trichloroethane	--		6 U	6 U	6 U	1500 U
1,1-Dichloroethane	200		6 U	6 U	6 U	1500 U
1,1-Dichloroethene	400		6 U	6 U	6 U	1500 U
1,2-Dichloroethane	100		6 U	6 U	6 U	1500 U
1,2-Dichloroethene (total)	--		6 U	6 U	6 U	1500 U
1,2-Dichloropropane	--		6 U	6 U	6 U	1500 U
2-Butanone	300		11 U	12 U	11 U	1500 U
2-Hexanone	--		11 U	12 U	11 U	1500 U
4-Methyl-2-Pentanone	1,000		11 U	12 U	11 U	1500 U
Acetone	200		24	15	29 UV	1500 UV
Benzene	60		6 U	6 U	6 U	1500 U
Bromodichloromethane	--		6 U	6 U	6 U	1500 U
Bromoform	--		6 U	6 U	6 U	1500 U
Bromomethane	--		11 U	12 U	11 U	1500 U
Carbon Disulfide	2,700		11	6 U	6 U	1500 UJV
Carbon Tetrachloride	600		6 U	6 U	6 U	1500 U
Chlorobenzene	1,700		6 U	6 U	6 U	1500 U
Chloroethane	1,900		11 U	12 U	11 U	1500 U
Chloroform	300		6 U	6 U	6 U	1500 U
Chloromethane	--		11 U	12 U	11 UJV	1500 U
cis-1,2-Dichloroethene	--		NA	NA	NA	NA
cis-1,3-Dichloropropene	--		6 U	6 U	6 U	1500 U
Dibromochloromethane	--		6 U	6 U	6 U	1500 U
Ethylbenzene	5,500		6 U	6 U	6 U	1500 U
Methylene Chloride	100		14	6 U	6 U	1500 UV
Styrene	--		6 U	6 U	6 U	1500 U
Tetrachloroethene	1,400		6 U	6 U	6 U	1500 U
Toluene	1,500		11	6 U	6 U	1500 UV
trans-1,2-Dichloroethene	300		NA	NA	NA	NA
trans-1,3-Dichloropropene	--		6 U	6 U	6 U	1500 U
Trichloroethene	700		6 U	6 U	6 U	1500 U
Vinyl Acetate	--		11 U	12 U	NA	NA
Vinyl Chloride	200		11 U	12 U	11 U	1500 U
Xylenes (total)	1,200		6 U	6 U	6 U	1500 U

VOCs - Volatile Organic Compounds

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

V - Qualifier added and/or value altered during data validation

R - Data rejected during validation

-- No NYSDEC RSCO available

NA - Sample not analyzed for specific parameter

NYSDEC - New York State Department of Environmental Conservation

RSCOs - Recommended Soil Cleanup Objectives

Note:

Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-6. Summary of VOC Concentrations Detected in Soil Samples, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/kg)	NYSDEC RSCO (µg/kg)	**Designation:** **Sample Date:** **Sample Depth (ft bls):**	S-134 11/08/93 2-4	S-135 12/07/93 3-3.5	S-139 12/07/93 3-3.1
1,1,1-Trichloroethane	800		12 U	6 U	6 U
1,1,2,2-Tetrachloroethane	600		12 U	6 U	6 U
1,1,2-Trichloroethane	--		12 U	6 U	6 U
1,1-Dichloroethane	200		12 U	6 U	6 U
1,1-Dichloroethene	400		12 U	6 U	6 U
1,2-Dichloroethane	100		12 U	6 U	6 U
1,2-Dichloroethene (total)	--		12 U	6 U	6 U
1,2-Dichloropropane	--		12 U	6 U	6 U
2-Butanone	300		12 UV	12 UV	12 U
2-Hexanone	--		12 U	12 U	12 U
4-Methyl-2-Pentanone	1,000		12 U	12 U	12 U
Acetone	200		15 UV	24 UV	12 UV
Benzene	60		12 U	6 U	6 U
Bromodichloromethane	--		12 U	6 U	6 U
Bromoform	--		12 U	6 U	6 U
Bromomethane	--		12 U	12 U	12 U
Carbon Disulfide	2,700		12 U	6 U	6 U
Carbon Tetrachloride	600		12 U	6 U	6 U
Chlorobenzene	1,700		12 U	6 U	6 U
Chloroethane	1,900		12 U	12 U	12 U
Chloroform	300		12 U	6 U	6 U
Chloromethane	--		12 U	12 U	12 U
cis-1,2-Dichloroethene	--		NA	NA	NA
cis-1,3-Dichloropropene	--		12 U	6 U	6 U
Dibromochloromethane	--		12 U	6 U	6 U
Ethylbenzene	5,500		12 U	6 U	6 U
Methylene Chloride	100		12 UV	6 UV	6 UV
Styrene	--		12 U	6 U	6 U
Tetrachloroethene	1,400		12 U	6 U	6 U
Toluene	1,500		12 U	6 U	6 UV
trans-1,2-Dichloroethene	300		NA	NA	NA
trans-1,3-Dichloropropene	--		12 U	6 U	6 U
Trichloroethene	700		12 U	6 U	6 U
Vinyl Acetate	--		NA	NA	NA
Vinyl Chloride	200		12 U	12 U	12 U
Xylenes (total)	1,200		12 U	1 J	6 U

VOCs - Volatile Organic Compounds

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

V - Qualifier added and/or value altered during data validation

R - Data rejected during validation

-- No NYSDEC RSCO available

NA - Sample not analyzed for specific parameter

NYSDEC - New York State Department of Environmental Conservation

RSCOs - Recommended Soil Cleanup Objectives

Note:

Bold data indicates that parameter was detected above the NYSDEC RSCOs

Table 3-7. Summary of TCLP Semivolatile Organic Compound Concentrations Detected in Soil, OU-3 Final Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/L)	USEPA TCLP Limits	**Sample Designation:** / **Sample Date:** / **Sample Depth (ft bls):**	TSB-2 10/31/00 0-2	TSB-9 10/24/00 2.5-3.5	TSB-11 10/25/00 2.5-3.5	TSB-18 10/30/00 0-1
1,4-Dichlorobenzene	--		10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	400,000		10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	2,000		10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	130		10 U	10 U	10 U	10 U
2-Methylphenol	--		10 U	10 U	10 U	10 U
3+4-Methylphenols	--		20 U	20 U	20 U	20 U
Hexachlorobenzene	130		10 U	10 U	10 U	10 U
Hexachlorobutadiene	500		10 U	10 U	10 U	10 U
Hexachloroethane	3,000		10 U	10 U	10 U	10 U
Nitrobenzene	2,000		10 U	10 U	10 U	10 U
Pentachlorophenol	100,000		10 U	10 U	10 U	10 U
Pyridine	5,000		10 U	10 U	10 U	10 U

µg/L - Micrograms per liter
ft bls - Feet below land surface
U - Analyte was analyzed for but not detected
TCLP - Toxicity Characteristic Leaching Procedure
USEPA TCLP Limits - United States Environmental Protection Agency Limits for RCRA Characteristic Waste for Toxicity (Title 40, Part 261.24).
A blank in "USEPA TCLP Limits" column indicates that a TCLP Limit is not available for that parameter.

Table 3-8. Summary of TCLP Metal Concentrations and RCRA Characteristics
Detected in Soil, OU-3 Final Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in µg/L)	USEPA TCLP Limits	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	TSB-2 10/31/00 0-2	TSB-9 10/24/00 2.5-3.5	TSB-11 10/25/00 2.5-3.5	TSB-18 10/30/00 0-1
Arsenic	5,000		42.6 JV	57 UJV	75.6	37 UJV
Barium	100,000		717	1090	873	796
Cadmium	1,000		12	26	20 U	9.4
Chromium	5,000		5 U	37 U	37 U	5 U
Lead	5,000		51.8	22 U	27.1	24.2
Mercury	200		2 U	2 U	2 U	2 U
Selenium	1,000		38 UJV	40 UJV	40 UJV	38 UJV
Silver	5,000		9	16 U	16 U	6 U

Parameter (Concentrations in mg/kg)	USEPA Characteristics of Hazardous Waste	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	TSB-2 10/31/00 (0-2)	TSB-9 10/24/00 (2.5-3.5)	TSB-11 10/25/00 (2.5-3.5)	TSB-18 10/30/00 (0-1)
Reactive Cyanide	>250		10 U	10 U	10 U	10 U
Reactive Sulfide	>500		40 U	40 U	40 U	40 U

Parameter (Degrees F)	USEPA Characteristics of Hazardous Waste	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	TSB-2 10/31/00 (0-2)	TSB-9 10/24/00 (2.5-3.5)	TSB-11 10/25/00 (2.5-3.5)	TSB-18 10/30/00 (0-1)
Ignitability	<140		0	0	0	0

mg/kg - Milligrams per kilogram
µg/L - Micrograms per liter
F - Fahrenheit
ft bls - Feet below land surface
U - Indicates compound analyzed for but not detected
J - Estimated value
V - Qualifier added and/or value altered during validation
TCLP - Toxicity Characteristic Leaching Procedure
RCRA - Resource Conservation and Recovery Act
USEPA TCLP Limits - United States Environmental Protection Agency Limits for RCRA Characteristic Waste for Toxicity (Title 40, Part 261.24).

Table 3-9. Summary of Wet Chemistry Analysis for Soil,
OU-3 Final Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Parameter (Concentrations in mg/kg)	**Sample Designation:** / **Sample Date:** / **Sample Depth (ft bls):**	TSB-5 10/31/00 0-2	TSB-8 10/24/00 0-1	TSB-9 10/24/00 2.5-3.5	TSB-17 10/30/00 24-25
BOD5		3800	NA	3600	2 U
Chemical Oxygen Demand		8928	23392	19464	5 U
Nitrate-Nitrogen As Nitrogen		5.9 U	6.5 U	5.9 U	6.3 U
Total Organic Carbon		45000	38928	44000	2800
Total Petroleum Hydrocarbons		260	590	37000	180

mg/kg - milligrams per kilogram
NA - Not detected
ft bls - Feet below land surface
U - Compound analyzed for but not detected
BOD - Biological Oxygen Demand

Table 3-10. Summary of PCB Concentrations Detected in SPH Samples Collected from Selected Monitoring Wells (1991 to 1994), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Sample Designation:	**MW-16**	**MW-16**	**MW-16**	**MW-17**	**MW-17**
Sample Date:	**1/7/1991**	**12/7/1993**	**2/16/1994**	**1/7/1991**	**12/7/1993**
PCB Species (Concentrations in µg/kg)					
Aroclor-1016	16000 UV	U	U	1600 UV	U
Aroclor-1221	16000 UV	U	U	1600 UV	U
Aroclor-1232	16000 UV	U	U	1600 UV	U
Aroclor-1242	16000 UV	U	U	1600 UV	U
Aroclor-1248	16000 UV	U	20000	1600 UV	U
Aroclor-1254	16000 UV	U	U	1600 UV	U
Aroclor-1260	122763 JV	130000	150000	6716 JV	7300 J
Total PCBs	122763 JV	130000	170000	6716 JV	7300 J

PCB - Polychlorinated Biphenyl
SPH - Separate-Phase Hydrocarbon
µg/kg - Micrograms per kilogram
U - Compound was analyzed for but not detected
J - Estimated value
V - Data was qualified by validator
DL - Some samples were analyzed at a secondary dilution and are designated DL. Based upon data validation, either the primary or secondary results of some Aroclor species are considered to be more representative of actual conditions.

Table 3-10. Summary of PCB Concentrations Detected in SPH Samples Collected from Selected Monitoring Wells (1991 to 1994), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Sample Designation:	**MW-17**	**MW-17**	**MW-17**	**MW-17**	**MW-20**
Sample Date:	**3/7/1994**	**6/1/1994**	**8/25/1994**	**12/16/1994**	**1/7/1991**
PCB Species (Concentrations in µg/kg)					
Aroclor-1016	U	U	U	U	1600 UV
Aroclor-1221	U	U	U	U	1600 UV
Aroclor-1232	U	U	U	U	1600 UV
Aroclor-1242	U	U	U	U	1600 UV
Aroclor-1248	U	U	U	U	1600 UV
Aroclor-1254	U	U	U	U	1600 UV
Aroclor-1260	9200	15000	12000	8400	7624 JV
Total PCBs	9200	15000	12000	8400	7624 JV

PCB - Polychlorinated Biphenyl
SPH - Separate-Phase Hydrocarbon
µg/kg - Micrograms per kilogram
U - Compound was analyzed for but not detected
J - Estimated value
V - Data was qualified by validator
DL - Some samples were analyzed at a secondary dilution and are designated DL. Based upon data validation, either the primary or secondary results of some Aroclor species are considered to be more representative of actual conditions.

Table 3-10. Summary of PCB Concentrations Detected in SPH Samples Collected from Selected Monitoring Wells (1991 to 1994), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Sample Designation:	**MW-20**	**MW-22**	**MW-22**	**MW-22**	**MW-22**
Sample Date:	**12/7/1993**	**12/7/1993**	**3/7/1994**	**6/1/1994**	**8/25/1994**
PCB Species (Concentrations in µg/kg)					
Aroclor-1016	U	U	U	U	U
Aroclor-1221	U	U	U	U	U
Aroclor-1232	U	U	U	U	U
Aroclor-1242	U	U	U	U	U
Aroclor-1248	U	U	U	U	U
Aroclor-1254	U	U	U	U	U
Aroclor-1260	9200 J	11000 J	8900	21000	11000
Total PCBs	9200 J	11000 J	8900	21000	11000

PCB - Polychlorinated Biphenyl
SPH - Separate-Phase Hydrocarbon
µg/kg - Micrograms per kilogram
U - Compound was analyzed for but not detected
J - Estimated value
V - Data was qualified by validator
DL - Some samples were analyzed at a secondary dilution and are designated DL. Based upon data validation, either the primary or secondary results of some Aroclor species are considered to be more representative of actual conditions.

Table 3-10. Summary of PCB Concentrations Detected in SPH Samples Collected from Selected Monitoring Wells (1991 to 1994), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Sample Designation:	**MW-22**	**MW-36DL**	**MW-50**	**MW-50**	**MW-50**
Sample Date:	**12/16/1994**	**2/8/1993**	**2/17/1994**	**3/7/1994**	**6/1/1994**
PCB Species (Concentrations in µg/kg)					
Aroclor-1016	U	10000 U	2400 U	U	U
Aroclor-1221	U	20000 U	2400 U	U	U
Aroclor-1232	U	10000 U	2400 U	U	U
Aroclor-1242	U	10000 U	2400 U	U	U
Aroclor-1248	U	10000 U	2400 U	U	U
Aroclor-1254	U	10000 U	2800 U	U	U
Aroclor-1260	13000	14000	18000	21000	23000
Total PCBs	13000	14000	18000	21000	23000

PCB - Polychlorinated Biphenyl
SPH - Separate-Phase Hydrocarbon
µg/kg - Micrograms per kilogram
U - Compound was analyzed for but not detected
J - Estimated value
V - Data was qualified by validator
DL - Some samples were analyzed at a secondary dilution and are designated DL. Based upon data validation, either the primary or secondary results of some Aroclor species are considered to be more representative of actual conditions.

Table 3-10. Summary of PCB Concentrations Detected in SPH Samples Collected from Selected Monitoring Wells (1991 to 1994), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Sample Designation:	**MW-50**	**MW-50**	**MW-53**	**MW-54**	**MW-54**
Sample Date:	**8/25/1994**	**12/16/1994**	**2/17/1994**	**2/17/1994**	**3/7/1994**
PCB Species (Concentrations in µg/kg)					
Aroclor-1016	U	U	2400 U	2400 U	U
Aroclor-1221	U	U	2400 U	2400 U	U
Aroclor-1232	U	U	2400 U	2400 U	U
Aroclor-1242	U	U	2400 U	2400 U	U
Aroclor-1248	U	U	2400 U	2400 U	U
Aroclor-1254	U	U	5300 JV	5200 JV	3500 J
Aroclor-1260	25000	26000	3100 JV	2200 JV	2900 J
Total PCBs	25000	26000	8400 JV	7400 JV	6400 J

PCB - Polychlorinated Biphenyl
SPH - Separate-Phase Hydrocarbon
µg/kg - Micrograms per kilogram
U - Compound was analyzed for but not detected
J - Estimated value
V - Data was qualified by validator
DL - Some samples were analyzed at a secondary dilution and are designated DL. Based upon data validation, either the primary or secondary results of some Aroclor species are considered to be more representative of actual conditions.

Table 3-10. Summary of PCB Concentrations Detected in SPH Samples Collected from Selected Monitoring Wells (1991 to 1994), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Sample Designation:	**MW-54**	**MW-54**	**MW-54**	**MW-60**	**RW-1**
Sample Date:	**6/1/1994**	**8/25/1994**	**12/16/1994**	**2/17/1994**	**2/16/1994**
PCB Species (Concentrations in µg/kg)					
Aroclor-1016	U	U	U	2400 U	U
Aroclor-1221	U	U	U	2400 U	U
Aroclor-1232	U	U	U	2400 U	U
Aroclor-1242	U	U	U	2400 U	U
Aroclor-1248	U	U	U	2400 U	U
Aroclor-1254	5000	4100	U	4800 UVJ	U
Aroclor-1260	4300 J	4300	3400	830	12000
Total PCBs	9300 J	8400	3400	830	12000

PCB - Polychlorinated Biphenyl
SPH - Separate-Phase Hydrocarbon
µg/kg - Micrograms per kilogram
U - Compound was analyzed for but not detected
J - Estimated value
V - Data was qualified by validator
DL - Some samples were analyzed at a secondary dilution and are designated DL. Based upon data validation, either the primary or secondary results of some Aroclor species are considered to be more representative of actual conditions.

Table 3-10. Summary of PCB Concentrations Detected in SPH Samples Collected from Selected Monitoring Wells (1991 to 1994), Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Sample Designation:	**RW-3**	**SUMP-1**	**SUMP-2**
Sample Date:	**2/16/1994**	**1/18/1999**	**1/18/1999**
PCB Species (Concentrations in µg/kg)			
Aroclor-1016	U	1000 U	1000 U
Aroclor-1221	U	2000 U	2000 U
Aroclor-1232	U	1000 U	1000 U
Aroclor-1242	U	1000 U	1000 U
Aroclor-1248	U	1000 U	1000 U
Aroclor-1254	U	1000 U	1000 U
Aroclor-1260	22000	20000	15000
Total PCBs	22000	20000	15000

PCB - Polychlorinated Biphenyl
SPH - Separate-Phase Hydrocarbon
µg/kg - Micrograms per kilogram
U - Compound was analyzed for but not detected
J - Estimated value
V - Data was qualified by validator
DL - Some samples were analyzed at a secondary dilution and are designated DL. Based upon data validation, either the primary or secondary results of some Aroclor species are considered to be more representative of actual conditions.

Table 3-11. Summary of Hydrocarbon Compounds and Characteristics Detected in SPH Samples Collected from Selected Monitoring Wells in February 1994, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, NY

Sample Designation:	**MW-50**	**MW-53**	**MW-54**	**MW-60**
Sample Date:	**2/17/1994**	**2/17/1994**	**2/17/1994**	**2/17/1994**
Hydrocarbon Compounds (Concentrations in mg/kg)				
Gasoline	U	U	U	U
Kerosene	U	U	U	U
Diesel	U	U	U	U
Residual Oil	U	U	U	U
No. 2 Fuel Oil	1,090,000	961,000	1,550,000	920,000
No. 4 Fuel Oil	U	U	U	U
No. 6 Fuel Oil	U	U	U	U
Characteristics				
Specific Gravity @ 60 degrees F (dimensionless)	0.8799	0.8739	0.8704	0.8709
Kinematic Viscosity @ 60 degrees F (cSt)	7.70	5.35	6.14	7.00

SPH - Separate-Phase Hydrocarbon
mg/kg - Milligrams per kilogram
U - Compound was analyzed for but not detected
F - Fahrenheit
cSt - Centistokes

Table 7-1. Summary of SPH Thickness and Water Level Monitoring Data Collected from OU-3 Monitoring Wells (April to August 2004), OU-3 Final Remedial Investigation Report, Sunnyside Yard, Queens, New York

		April 22, 2004					April 29, 2004				
Well ID	Measuring Point Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)
MW-13	17.27	--	2.78	--	--	14.49	--	2.50	--	--	14.77
MW-16	19.52	3.88	9.27	--	5.39	14.92	3.71	6.86	--	3.15	15.39
MW-19	20.13	--	7.17	--	--	12.96	--	6.93	--	--	13.20
MW-20	19.09	--	4.00	--	--	15.09	--	3.73	--	--	15.36
MW-23D	19.17	--	4.30	--	--	14.87	--	4.09	--	--	15.08
MW-35	19.02	--	6.15	--	--	12.87	--	5.91	--	--	13.11
MW-37	17.84	--	5.15	--	--	12.69	--	4.79	--	--	13.05
MW-38D	20.26	--	5.69	--	--	14.57	--	5.44	--	--	14.82
MW-39D	20.11	--	6.42	--	--	13.69	--	6.25	--	--	13.86
MW-49	19.18	4.95	5.40	--	0.45	14.17	4.65	5.23	--	0.58	14.45
MW-50	18.58	3.80	7.06	--	3.26	14.35	3.62	6.94	--	3.32	14.52
MW-52	16.87	2.00	2.32	--	0.32	14.83	1.78	1.86	--	0.08	15.08
MW-70	19.32	--	5.23	--	--	14.09	--	4.89	--	--	14.43
MW-71	17.25	Trace	1.62	--	--	15.63	--	1.00	--	--	16.25
MW-72	16.83	1.87	2.90	--	1.03	14.82	1.63	3.02	--	1.39	15.02
MW-73	18.63	3.16	5.98	--	2.82	15.09	3.07	4.92	--	1.85	15.31
MW-74	17.98	Trace	2.44	--	--	15.54	--	2.19	--	--	15.79
MW-75	22.01	NA	6.70	--	--	15.31	6.48	6.50	--	0.02	15.53
MW-76	21.1	5.70	5.89	--	0.19	15.37	5.50	5.69	--	0.19	15.57
MW-77	22.29	6.83	6.97	--	0.14	15.44	6.63	6.76	--	0.13	15.64
RW-1	19.55	3.54	4.52	--	0.98	15.88	3.63	3.81	--	0.18	15.90
RW-2	19.49	--	4.07	--	--	15.42	--	3.70	--	--	15.79
TA-2	16.51	NM	NM	--	NM	NM	1.11	1.41	--	0.30	15.36

SPH - Separate-Phase Hydrocarbon
MSL - Mean Sea Level
NM - Not Measured

All elevations are in feet reletive to 1988 National Geodetic Vertical Datum (NGVD) Mean Sea level.

For wells that contained SPH, and water level data from the measuring tube was available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Measuring Tube)

For wells that contained SPH, and water level data from measuring tubes was not available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Well) + (SPH Thickness * SPH Specific Gravity)

Correction assumes SPH Specific Gravity of 0.867.

Table 7-1. Summary of SPH Thickness and Water Level Monitoring Data Collected from OU-3 Monitoring Wells (April to August 2004), OU-3 Final Remedial Investigation Report, Sunnyside Yard, Queens, New York

		May 6, 2004					May 13, 2004				
Well ID	Measuring Point Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)
MW-13	17.27	--	2.71	--	--	14.56	--	2.52	--	--	14.75
MW-16	19.52	3.94	6.59	--	2.65	15.23	3.54	6.27	3.93	2.73	15.59
MW-19	20.13	--	7.13	--	--	13.00	NM	NM	NM	NM	NM
MW-20	19.09	--	3.98	--	--	15.11	--	3.61	--	--	15.48
MW-23D	19.17	--	4.30	--	--	14.87	--	4.12	--	--	15.05
MW-35	19.02	--	6.03	--	--	12.99	NM	NM	NM	NM	NM
MW-37	17.84	--	5.13	--	--	12.71	--	4.83	--	--	13.01
MW-38D	20.26	--	6.71	--	--	13.55	--	5.48	--	--	14.78
MW-39D	20.11	--	6.43	--	--	13.68	--	6.26	--	--	13.85
MW-49	19.18	5.04	5.12	--	0.08	14.13	4.80	4.84	4.81	0.04	14.37
MW-50	18.58	3.88	7.05	--	3.17	14.28	3.60	6.95	4.21	3.35	14.37
MW-52	16.87	2.00	2.15	2.07	0.15	14.80	1.71	1.73	1.71	0.02	15.16
MW-70	19.32	--	5.21	--	--	14.11	--	5.06	--	--	14.26
MW-71	17.25	--	1.54	--	--	15.71	--	1.09	--	--	16.16
MW-72	16.83	1.90	2.86	--	0.96	14.80	1.62	2.89	2.73	1.27	14.10
MW-73	18.63	3.35	4.79	3.54	1.44	15.09	3.09	4.72	3.23	1.63	15.40
MW-74	17.98	--	2.46	--	--	15.52	--	2.02	--	--	15.96
MW-75	22.01	6.68	6.70	6.69	0.02	15.32	6.50	6.62	6.33	0.12	15.68
MW-76	21.1	5.73	5.80	5.66	0.07	15.44	5.56	5.59	5.59	0.03	15.51
MW-77	22.29	6.81	7.14	--	0.33	15.44	6.69	6.71	6.51	0.02	15.78
RW-1	19.55	3.79	4.05	--	0.26	15.73	3.48	3.50	3.48	0.02	16.07
RW-2	19.49	NM	NM	NM	NM	NM	--	3.36	--	--	16.13
TA-2	16.51	1.56	1.75	--	0.19	14.92	1.24	1.41	--	0.17	15.25

SPH - Separate-Phase Hydrocarbon
MSL - Mean Sea Level
NM - Not Measured

All elevations are in feet reletive to 1988 National Geodetic Vertical Datum (NGVD) Mean Sea level.

For wells that contained SPH, and water level data from the measuring tube was available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Measuring Tube)

For wells that contained SPH, and water level data from measuring tubes was not available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Well) + (SPH Thickness * SPH Specific Gravity)

Correction assumes SPH Specific Gravity of 0.867.

Table 7-1. Summary of SPH Thickness and Water Level Monitoring Data Collected from OU-3 Monitoring Wells (April to August 2004), OU-3 Final Remedial Investigation Report, Sunnyside Yard, Queens, New York

		May 20, 2004					May 27, 2004				
Well ID	Measuring Point Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)
MW-13	17.27	--	2.65	--	--	14.62	--	2.73	--	--	14.54
MW-16	19.52	3.82	6.59	4.13	2.77	15.39	3.81	6.68	4.14	2.87	15.38
MW-19	20.13	--	7.11	--	--	13.02	--	7.17	--	--	12.96
MW-20	19.09	--	3.87	--	--	15.22	--	3.96	--	--	15.13
MW-23D	19.17	--	4.21	--	--	14.96	--	4.28	--	--	14.89
MW-35	19.02	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-37	17.84	--	4.97	--	--	12.87	--	5.06	--	--	12.78
MW-38D	20.26	--	5.57	--	--	14.69	--	5.66	--	--	14.60
MW-39D	20.11	--	6.32	--	--	13.79	--	6.34	--	--	13.77
MW-49	19.18	4.94	4.99	4.96	0.05	14.22	5.13	5.19	5.13	0.06	14.05
MW-50	18.58	3.74	7.09	4.09	3.35	14.49	3.81	7.19	4.19	3.38	14.39
MW-52	16.87	1.89	1.94	2.14	0.05	14.73	1.95	2.01	1.94	0.06	14.93
MW-70	19.32	--	5.13	--	--	14.19	--	5.24	--	--	14.08
MW-71	17.25	--	1.21	--	--	16.04	--	1.33	--	--	15.92
MW-72	16.83	1.72	3.03	1.91	1.31	14.92	1.71	2.94	1.94	1.23	14.89
MW-73	18.63	3.19	4.98	3.41	1.79	15.22	3.31	4.94	3.45	1.63	15.18
MW-74	17.98	--	2.33	--	--	15.65	--	2.24	--	--	15.74
MW-75	22.01	6.59	6.62	6.60	0.03	15.41	6.66	6.81	6.66	0.15	15.35
MW-76	21.1	5.64	5.68	5.63	0.04	15.47	5.72	5.76	5.72	0.04	15.38
MW-77	22.29	6.75	7.07	6.71	0.32	15.58	6.80	7.02	6.79	0.22	15.50
RW-1	19.55	--	3.69	--	--	15.86	3.68	3.69	3.69	0.01	15.86
RW-2	19.49	--	3.70	--	--	15.79	--	3.58	--	--	15.91
TA-2	16.51	1.43	1.69	--	0.26	15.05	1.74	2.03	--	0.29	14.73

SPH - Separate-Phase Hydrocarbon
MSL - Mean Sea Level
NM - Not Measured

All elevations are in feet reletive to 1988 National Geodetic Vertical Datum (NGVD) Mean Sea level.

For wells that contained SPH, and water level data from the measuring tube was available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Measuring Tube)

For wells that contained SPH, and water level data from measuring tubes was not available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Well) + (SPH Thickness * SPH Specific Gravity)

Correction assumes SPH Specific Gravity of 0.867.

Table 7-1. Summary of SPH Thickness and Water Level Monitoring Data Collected from OU-3 Monitoring Wells (April to August 2004), OU-3 Final Remedial Investigation Report, Sunnyside Yard, Queens, New York

		June 3, 2004					June 10, 2004				
Well ID	Measuring Point Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)
MW-13	17.27	--	2.77	--	--	14.50	--	2.83	--	--	14.44
MW-16	19.52	3.95	6.48	4.24	2.53	15.28	4.08	6.29	4.27	2.21	15.25
MW-19	20.13	--	7.14	--	--	12.99	--	7.21	--	--	12.92
MW-20	19.09	--	3.93	--	--	15.16	--	4.13	--	--	14.96
MW-23D	19.17	--	4.34	--	--	14.83	--	4.43	--	--	14.74
MW-35	19.02	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-37	17.84	--	5.13	--	--	12.71	--	5.39	--	--	12.45
MW-38D	20.26	--	5.71	--	--	14.55	--	5.79	--	--	14.47
MW-39D	20.11	--	6.45	--	--	13.66	--	6.43	--	--	13.68
MW-49	19.18	5.08	5.14	5.07	0.06	14.11	5.23	5.35	5.22	0.12	13.96
MW-50	18.58	3.89	7.05	4.24	3.16	14.34	3.95	7.24	4.32	3.29	14.26
MW-52	16.87	2.03	2.05	2.28	0.02	14.59	2.18	2.20	2.19	0.02	14.68
MW-70	19.32	--	5.19	--	--	14.13	--	5.36	--	--	13.96
MW-71	17.25	--	1.51	--	--	15.74	--	2.01	--	--	15.24
MW-72	16.83	1.85	3.03	2.01	1.18	14.82	1.96	3.01	2.12	1.05	14.71
MW-73	18.63	3.32	4.99	3.51	1.67	15.12	3.39	4.93	3.58	1.54	15.05
MW-74	17.98	--	2.49	--	--	15.49	--	2.61	--	--	15.37
MW-75	22.01	6.69	6.96	6.71	0.27	15.30	6.79	7.01	6.77	0.22	15.24
MW-76	21.1	5.78	5.81	5.76	0.03	15.34	--	5.81	--	--	15.29
MW-77	22.29	6.85	7.06	6.84	0.21	15.45	6.93	7.20	6.93	0.27	15.36
RW-1	19.55	3.84	3.86	4.02	0.02	15.53	3.97	4.00	3.96	0.03	15.59
RW-2	19.49	--	3.82	--	--	15.67	--	4.11	--	--	15.38
TA-2	16.51	1.57	1.80	--	0.23	14.91	1.89	2.24	--	0.35	14.57

SPH - Separate-Phase Hydrocarbon
MSL - Mean Sea Level
NM - Not Measured

All elevations are in feet reletive to 1988 National Geodetic Vertical Datum (NGVD) Mean Sea level.

For wells that contained SPH, and water level data from the measuring tube was available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Measuring Tube)

For wells that contained SPH, and water level data from measuring tubes was not available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Well) + (SPH Thickness * SPH Specific Gravity)

Correction assumes SPH Specific Gravity of 0.867.

Table 7-1. Summary of SPH Thickness and Water Level Monitoring Data Collected from OU-3 Monitoring Wells (April to August 2004), OU-3 Final Remedial Investigation Report, Sunnyside Yard, Queens, New York

		June 17, 2004					June 24, 2004				
Well ID	Measuring Point Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)
MW-13	17.27	--	2.99	--	--	14.28	--	2.99	--	--	14.28
MW-16	19.52	4.17	6.22	4.39	2.05	15.13	4.23	6.67	4.96	2.44	14.56
MW-19	20.13	--	7.35	--	--	12.78	--	7.31	--	--	12.82
MW-20	19.09	--	4.29	--	--	14.80	--	4.29	--	--	14.80
MW-23D	19.17	--	4.52	--	--	14.65	--	4.52	--	--	14.65
MW-35	19.02	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-37	17.84	--	5.49	--	--	12.35	--	5.44	--	--	12.40
MW-38D	20.26	--	6.90	--	--	13.36	--	5.89	--	--	14.37
MW-39D	20.11	--	6.55	--	--	13.56	--	6.53	--	--	13.58
MW-49	19.18	5.36	5.48	5.38	0.12	13.80	5.30	5.42	5.31	0.12	13.87
MW-50	18.58	4.06	7.30	4.41	3.24	14.17	4.08	7.21	4.45	3.13	14.13
MW-52	16.87	2.29	2.32	2.27	0.03	14.60	2.25	2.28	2.26	0.03	14.61
MW-70	19.32	--	5.78	--	--	13.54	--	5.72	--	--	13.60
MW-71	17.25	--	2.83	--	--	14.42	--	1.89	--	--	15.36
MW-72	16.83	2.08	2.96	2.21	0.88	14.62	2.08	3.06	2.21	0.98	14.62
MW-73	18.63	3.43	5.51	3.64	2.08	14.99	3.53	5.19	3.74	1.66	14.89
MW-74	17.98	--	2.72	--	--	15.26	--	2.75	--	--	15.23
MW-75	22.01	6.88	7.06	6.91	0.18	15.10	6.91	7.06	6.93	0.15	15.08
MW-76	21.1	5.94	5.97	5.94	0.03	15.16	5.94	5.96	5.94	0.02	15.16
MW-77	22.29	7.03	7.28	7.05	0.25	15.24	7.01	7.21	7.03	0.20	15.26
RW-1	19.55	4.06	4.08	4.04	0.02	15.51	4.15	4.27	4.18	0.12	15.37
RW-2	19.49	--	4.48	--	--	15.01	--	3.88	--	--	15.61
TA-2	16.51	2.32	2.49	--	0.17	14.17	2.32	2.41	--	0.09	14.18

SPH - Separate-Phase Hydrocarbon
MSL - Mean Sea Level
NM - Not Measured

All elevations are in feet reletive to 1988 National Geodetic Vertical Datum (NGVD) Mean Sea level.

For wells that contained SPH, and water level data from the measuring tube was available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Measuring Tube)

For wells that contained SPH, and water level data from measuring tubes was not available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Well) + (SPH Thickness * SPH Specific Gravity)

Correction assumes SPH Specific Gravity of 0.867.

Table 7-1. Summary of SPH Thickness and Water Level Monitoring Data Collected from OU-3 Monitoring Wells (April to August 2004), OU-3 Final Remedial Investigation Report, Sunnyside Yard, Queens, New York

		July 1, 2004					July 8, 2004				
Well ID	Measuring Point Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)
MW-13	17.27	--	2.92	--	--	14.35	--	2.81	--	--	14.46
MW-16	19.52	4.15	5.93	4.82	1.78	14.70	3.99	5.82	4.21	1.83	15.31
MW-19	20.13	--	7.22	--	--	12.91	--	7.13	--	--	13.00
MW-20	19.09	--	4.08	--	--	15.01	--	3.96	--	--	15.13
MW-23D	19.17	--	4.47	--	--	14.70	--	4.93	--	--	14.24
MW-35	19.02	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-37	17.84	--	5.32	--	--	12.52	--	5.19	--	--	12.65
MW-38D	20.26	--	5.81	--	--	14.45	--	7.01	--	--	13.25
MW-39D	20.11	--	6.48	--	--	13.63	--	6.38	--	--	13.73
MW-49	19.18	5.21	5.35	5.19	0.14	13.99	5.03	5.16	5.04	0.13	14.14
MW-50	18.58	3.98	7.13	4.31	3.15	14.27	3.84	7.31	4.22	3.47	14.36
MW-52	16.87	2.15	2.18	2.19	0.03	14.68	1.97	2.01	1.99	0.04	14.88
MW-70	19.32	--	5.33	--	--	13.99	--	5.27	--	--	14.05
MW-71	17.25	--	1.72	--	--	15.53	--	1.43	--	--	15.82
MW-72	16.83	1.99	2.97	2.09	0.98	14.74	1.85	2.95	2.01	1.10	14.82
MW-73	18.63	3.45	4.97	3.61	1.52	15.02	3.34	4.94	3.52	1.60	15.11
MW-74	17.98	2.65	2.66	2.65	0.01	15.33	2.57	2.59	2.56	0.02	15.42
MW-75	22.01	6.83	6.94	6.84	0.11	15.17	6.75	6.79	6.75	0.04	15.26
MW-76	21.1	5.85	5.89	5.83	0.04	15.27	5.80	5.83	5.79	0.03	15.31
MW-77	22.29	6.99	7.06	7.01	0.07	15.28	6.90	6.94	6.88	0.04	15.41
RW-1	19.55	4.12	4.13	4.11	0.01	15.44	3.99	4.02	4.01	0.03	15.54
RW-2	19.49	--	3.76	--	--	15.73	--	3.66	--	--	15.83
TA-2	16.51	1.80	1.92	--	0.12	14.69	1.64	1.76	--	0.12	14.85

SPH - Separate-Phase Hydrocarbon
MSL - Mean Sea Level
NM - Not Measured

All elevations are in feet reletive to 1988 National Geodetic Vertical Datum (NGVD) Mean Sea level.

For wells that contained SPH, and water level data from the measuring tube was available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Measuring Tube)

For wells that contained SPH, and water level data from measuring tubes was not available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Well) + (SPH Thickness * SPH Specific Gravity)

Correction assumes SPH Specific Gravity of 0.867.

Table 7-1. Summary of SPH Thickness and Water Level Monitoring Data Collected from OU-3 Monitoring Wells (April to August 2004), OU-3 Final Remedial Investigation Report, Sunnyside Yard, Queens, New York

		July 15, 2004					July 22, 2004				
Well ID	Measuring Point Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)
MW-13	17.27	--	2.14	--	--	15.13	--	2.69	--	--	14.58
MW-16	19.52	3.34	5.61	3.63	2.27	15.89	3.91	5.74	4.11	1.83	15.41
MW-19	20.13	--	6.75	--	--	13.38	--	7.13	--	--	13.00
MW-20	19.09	--	3.21	--	--	15.88	--	3.92	--	--	15.17
MW-23D	19.17	--	3.75	--	--	15.42	--	4.23	--	--	14.94
MW-35	19.02	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-37	17.84	--	4.37	--	--	13.47	--	5.06	--	--	12.78
MW-38D	20.26	--	5.11	--	--	15.15	--	5.61	--	--	14.65
MW-39D	20.11	--	5.99	--	--	14.12	--	6.33	--	--	13.78
MW-49	19.18	4.28	4.42	4.28	0.14	14.90	4.99	5.07	4.99	0.08	14.19
MW-50	18.58	3.23	7.05	3.64	3.82	14.94	3.76	7.13	4.14	3.37	14.44
MW-52	16.87	1.38	1.40	1.39	0.02	15.48	1.95	2.03	1.95	0.08	14.92
MW-70	19.32	--	4.52	--	--	14.80	--	5.25	--	--	14.07
MW-71	17.25	--	0.89	--	--	16.36	--	1.79	--	--	15.46
MW-72	16.83	1.25	2.66	1.44	1.41	15.39	1.79	2.82	1.92	1.03	14.91
MW-73	18.63	2.79	3.61	2.89	0.82	15.74	3.25	4.41	3.39	1.16	15.24
MW-74	17.98	1.73	1.75	1.74	0.02	16.24	--	2.49	--	--	15.49
MW-75	22.01	6.12	6.74	6.18	0.62	15.83	6.64	6.81	6.65	0.17	15.36
MW-76	21.1	5.21	5.26	5.21	0.05	15.89	5.63	5.66	5.63	0.03	15.47
MW-77	22.29	6.29	6.32	6.29	0.03	16.00	6.78	6.88	6.79	0.10	15.50
RW-1	19.55	3.30	3.32	3.31	0.02	16.24	3.94	3.97	3.94	0.03	15.61
RW-2	19.49	--	2.98	--	--	16.51	--	3.66	--	--	15.83
TA-2	16.51	0.61	0.73	--	0.12	15.88	1.55	1.63	--	0.08	14.95

SPH - Separate-Phase Hydrocarbon
MSL - Mean Sea Level
NM - Not Measured

All elevations are in feet reletive to 1988 National Geodetic Vertical Datum (NGVD) Mean Sea level.

For wells that contained SPH, and water level data from the measuring tube was available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Measuring Tube)

For wells that contained SPH, and water level data from measuring tubes was not available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Well) + (SPH Thickness * SPH Specific Gravity)

Correction assumes SPH Specific Gravity of 0.867.

Table 7-1. Summary of SPH Thickness and Water Level Monitoring Data Collected from OU-3 Monitoring Wells (April to August 2004), OU-3 Final Remedial Investigation Report, Sunnyside Yard, Queens, New York

		August 5, 2004				
Well ID	Measuring Point Elevation (Ft Relative to MSL)	Depth to SPH (Ft Below Measuring Point)	Depth to Water in Well (Ft Below Measuring Point)	Depth to Water in Measuring Tube (Ft Below Measuring Point)	SPH Thickness (Ft)	Water Level Elevation (Ft Relative to MSL)
MW-13	17.27	--	2.56	--	--	14.71
MW-16	19.52	3.81	6.53	4.09	2.72	15.43
MW-19	20.13	--	7.02	--	--	13.11
MW-20	19.09	--	3.81	--	--	15.28
MW-23D	19.17	--	4.06	--	--	15.11
MW-35	19.02	NM	NM	NM	NM	NM
MW-37	17.84	--	4.99	--	--	12.85
MW-38D	20.26	--	5.46	--	--	14.80
MW-39D	20.11	--	6.19	--	--	13.92
MW-49	19.18	4.88	4.96	4.88	0.08	14.30
MW-50	18.58	3.62	7.18	3.99	3.56	14.59
MW-52	16.87	1.81	1.83	1.81	0.02	15.06
MW-70	19.32	--	5.18	--	--	14.14
MW-71	17.25	--	1.75	--	--	15.50
MW-72	16.83	1.56	3.39	1.78	1.83	15.05
MW-73	18.63	3.12	4.23	3.22	1.11	15.41
MW-74	17.98	2.29	2.32	2.29	0.03	15.69
MW-75	22.01	6.39	6.42	6.39	0.03	15.62
MW-76	21.1	5.50	5.53	5.51	0.03	15.59
MW-77	22.29	6.58	6.65	6.58	0.07	15.71
RW-1	19.55	3.79	3.83	3.79	0.04	15.76
RW-2	19.49	--	3.73	--	--	15.76
TA-2	16.51	NM	NM	NM	NM	NM

SPH - Separate-Phase Hydrocarbon
MSL - Mean Sea Level
NM - Not Measured

All elevations are in feet reletive to 1988 National Geodetic Vertical Datum (NGVD) Mean Sea level.

For wells that contained SPH, and water level data from the measuring tube was available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Measuring Tube)

For wells that contained SPH, and water level data from measuring tubes was not available, the following formula was used to calculate the corrected water level elevation:
(Measuring Point Elevation) - (DTW in Well) + (SPH Thickness * SPH Specific Gravity)

Correction assumes SPH Specific Gravity of 0.867.

Table 11-1 Summary of Physicochemical Properties of Contaminants Detected in OU-3, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Compound	Solubility in Water[1] (mg/L)	Vapor Pressure [1] (mm Hg)	Specific Gravity[1]	Henry's Law Constant (atm·m^3/ mole)	Log Organic Carbon Distribution Coefficient (Log Koc)	Log Octanol/Water Partition Coefficient (Log Kow)
Aromatics						
Benzene	1780	76	0.8786	5.56E-03	--	2.13
Ethylbenzene	152	7	0.867	7.88E-03	--	3.15
Styrene	300	5	0.90 (25°)	2.76E-03	--	3.10
Toluene	515	22	0.867	6.63E-03	1.9	2.6
1,2,4-Trichlorobenzene	19 (22°)	0.45 (25°)	1.574 (10°)	1.42E-03	--	4.3
o-Xylene[2]	175	5	0.88	5.20E-03	--	2.77
m-Xylene[2]	--	6	0.864	7.34E-03	--	3.2
p-Xylene[2]	198 (25°)	6.5	0.86	7.66E-03	--	3.15
Chlorinated Volatile Organic Compounds						
Chloroform	8000	160	1.489	3.66E-03	--	1.97
1,1-Dichloroethane	5500	180	1.174	5.61E-03	--	1.79
cis-1,2-Dichloroethene	800	200 (25°)	1.28	4.07E-03	--	0.7
trans-1,2-Dichloroethene	600	200 (14°)	1.26	9.39E-03	--	0.48
Methylene Chloride (Dichloromethane)	20000	349	1.366	2.19E-03	--	1.28
Tetrachloroethene	150 (25°)	14	1.626	1.84E-02	--	2.6
1,1,1-Trichloroethane	4400	100	1.35	1.72E-02	--	2.51
1,1,2,2-Tetrachloroethane	2900	5	1.6	3.44E-04	--	2.42
Trichloroethene	1100 (25°)	60	1.46	1.03E-02	--	2.38
Ketones						
Acetone	miscible	270 (30°)	0.791	3.88E-05	--	-0.22
Other Volatiles						
Carbon disulfide	2300 (22°)	260	1.263	3.02E-02	--	1.84
Phenols						
4-Chloro-3-methylphenol	--	--	--	--		3.1
2,4-Dichlorophenol	4600	--	1.383 (60°)	3.17E-06	--	2.38
2,4-Dimethylphenol	--	--	1.036	2.00E-06	--	2.53
4-Methylphenol	24000 (40°)	0.04	1.035	--	--	1.92
Phthalate Esters						
Bis(2-ethylhexyl)phthalate	0.285	--	0.9843	1.02E-07	--	3.98
Butyl benzyl phthalate	2.9	8.60E-06	1.1 (25°)	1.26E-06	--	4.78
Di-n-butyl phthalate	400 (25°)	0.1 (115°)	1.0465	9.39E-10	--	4.74
Di-n-octyl phthalate	0.285 (24°)	1.2 (200°)	0.99	6.68E-05	--	8.13
Diethylphthalate	210	--	1.12 (25°)	4.51E-07	--	2.67
Polycyclic Aromatics						
Acenaphthene	3.47	0.00447 (25°)	1.069 (95°)	1.55E-04	--	4
Acenaphthylene	3.93 (25°)	--	0.899	--	--	--
Anthracene	1.29 (25°)	0.0196	1.25	6.51E-05	--	4.45
Benzo(a)anthracene	0.01	--	--	3.34E-06	--	5.61
Benzo(b)fluoranthene	0.0012	5.00E-07	--	1.11E-04	--	6.79

Table 11-1 Summary of Physicochemical Properties of Contaminants Detected in OU-3, Final OU-3 Remedial Investigation Report, Sunnyside Yard, Queens, New York.

Compound	Solubility in Water[1] (mg/L)	Vapor Pressure [1] (mm Hg)	Specific Gravity[1]	Henry's Law Constant (atm·m^3/ mole)	Log Organic Carbon Distribution Coefficient (Log Koc)	Log Octanol/Water Partition Coefficient (Log Kow)
Benzo(b+k)fluoranthenes	--	--	--	--	--	--
Benzo(k)fluoranthene	0.00055	5.00E-07	--	8.29E-07	--	6.84
Benzo(g,h,i)perylene	0.00026 (25°)	--	--	--	--	6.51
Benzo(a)pyrene	0.003	6.85E-07	1.35 (25°)	1.13E-06	--	6.04
Chrysene	0.0015 (15°)	6.30E-07	1.274	9.46E-05	--	5.61
Dibenz(a,h)anthracene	2.49E-03	--	--	1.47E-08	--	6.79
Dibenzofuran	--	--	--	--	--	4.12
Fluoranthene	0.265 (25°)	6.00E-06	--	1.61E-05	--	5.33
Fluorene	1.9 (25°)	0.000664 (25°)	--	6.37E-05	--	4.38
Indeno(1,2,3-cd)pyrene	0.062	1.00E-10	--	1.60E-06	--	7.66
Naphthalene	30	0.0492	1.152	4.83E-04	3.11	3.01
2-Methylnaphthalene	26-28 (25°)	0.0543 (25°)	1.025	--	--	4.11
Phenanthrene	1.6 (15°)	0.00068	1.025	--	4.36	4.46
Pyrene	0.16 (26°)	6.85E-07	--	1.10E-05	4.89	4.88
Polychlorinated Biphenyls and Pesticides						
Aroclor-1016	0.25	4E-4 (25°)	--	2.90E-04	--	5.88
Aroclor-1242	0.10 (24°)	4E-4 (25°)	1.41 (15.5°)	5.20E-04	--	4.73
Aroclor-1248	--	5E-4 (25°)	1.445	3.51E-03	--	6.11
Aroclor-1254	0.057 (24°)	7E-5 (25°)	1.5 (25°)	2.00E-03	--	6.47
Aroclor-1260	0.080 (24°)	4E-5 (25°)	1.62	4.60E-03	--	6.91
Dieldrin	0.1	1.8E-7 (25°)	1.75	1.51E-05	--	5.48
Endrin	--	2E-7 (25°)	--	7.51E-06	--	5.6
Heptachlor	0.18	3E-4 (25°)	1.58	1.09E-03	--	5.44
Other Organics						
Benzoic Acid	2900	--	1.27	1.54E-06	--	1.87
N-Nitrosodiphenylamine	3.51E-01	--	--	5.00E-06	--	3.32

mg/L - milligrams per liter

mm - millimeters Hg

atm·m^3/mole - atmosphere-cubic meters per mole

[1] Solubility, Vapor Pressure, and Specific Gravity values reported at 20°C, except as noted by values in parentheses.

[2] Because xylene analysis was often done for total xylenes, the most stringent isomer chemical property will be used as appropriate in the modeling performed in the assessment.

[3] No information available in the reference sources consulted.

Sources:

Verschueren, 1983. Mackay et al., 1982. Mackay, 1982. Gossett, 1987. Nyer et al., 1991. Sims et al., 1984. Federal Register, Vol. 55, No. 61, p. 11816-11817, March 29, 1990. Hutzinger et al., 1974. Monsanto Chemical Co., undated. Mackay and Leiononen, 1975. Hwang, 1982. U.S. EPA, 1980. ATSDR, 1995. USEPA, 1996.

Table 12-1: Summary of Total PCB Concentrations (mg/kg) Detected in the Surface Soil Horizon (0 to 2 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Aroclor-1248	Aroclor-1254	Aroclor-1260	Total PCBs
CS-76	0	0.5	2.9E+0		7.3E+1	7.6E+1
S-76	0	0.7			1.4E+1	1.4E+1
S-3	0	2			9.3E+0	9.3E+0
CS-1	0	2	7.0E-1		8.6E+0	9.3E+0
S-2	0	2			7.9E+0	7.9E+0
S-161	0	2		2.9E+0	1.6E+0	4.5E+0
MW-13	0	2			4.3E+0	4.3E+0
S-157	0	2			3.2E+0	3.2E+0
S-162	0	2		9.2E-1	2.0E+0	2.9E+0
HST-24	0	1		1.2E+0	1.7E+0	2.9E+0
S-163	0	2		2.1E+0	7.2E-1	2.8E+0
S-4	0	2			2.5E+0	2.5E+0
S-158	0	2			2.5E+0	2.5E+0
S-159	0	2			2.5E+0	2.5E+0
S-160	0	2			2.4E+0	2.4E+0
CS-5	0	2		4.4E-1	1.7E+0	2.1E+0
TSB-7	0	1			1.8E+0	1.8E+0
S-9	0	2			1.7E+0	1.7E+0
CMW-22	0	2		4.0E-1	1.1E+0	1.5E+0
S-63	0	2			1.5E+0	1.5E+0
MW-16	0	2			1.2E+0	1.2E+0
S-8	0	2			1.1E+0	1.1E+0
S-156	0	2			1.0E+0	1.0E+0
S-7	0	2			9.5E-1	9.5E-1
TSB-18	0	1			8.6E-1	8.6E-1
MW-22	0	2			7.9E-1	7.9E-1
S-151	0	2			7.5E-1	7.5E-1
TSB-15	0	1			6.6E-1	6.6E-1
HST-17	0	2		2.1E-1	4.2E-1	6.3E-1
TSB-16	0	1			5.8E-1	5.8E-1
CMW-20	0	2		1.9E-1	3.6E-1	5.5E-1
HST-16	0	2		1.7E-1	3.3E-1	5.0E-1
S-152	0	2		5.6E-2	3.9E-1	4.5E-1
S-155	0	2		1.1E-1	3.3E-1	4.4E-1
CS-67	0	2			4.3E-1	4.3E-1
TSB-9	0	1			4.0E-1	4.0E-1
CS-10	0	2			3.7E-1	3.7E-1
S-150	0	2			3.5E-1	3.5E-1
TSB-10	0	1			3.4E-1	3.4E-1
MW-21	0	2			3.2E-1	3.2E-1
HST-23	1	2			2.7E-1	2.7E-1
HST-24	1	2			2.2E-1	2.2E-1
HST-23	1	3			2.0E-1	2.0E-1
TSB-17	0	1			1.9E-1	1.9E-1

Table 12-1: Summary of Total PCB Concentrations (mg/kg) Detected in the Surface Soil Horizon (0 to 2 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Aroclor-1248	Aroclor-1254	Aroclor-1260	Total PCBs
HST-1	0	2			1.9E-1	1.9E-1
HST-23	0	1			1.7E-1	1.7E-1
TSB-5	0	1			1.6E-1	1.6E-1
TSB-8	0	1			1.6E-1	1.6E-1
S-153	0	2	4.6E-2		1.0E-1	1.5E-1
S-99	0	2			1.2E-1	1.2E-1
S-10	0	2			9.6E-2	9.6E-2
TSB-6	0	1			7.6E-2	7.6E-2
S-154	0	2		2.7E-2	4.0E-2	6.7E-2
MW-20	0	2			6.0E-2	6.0E-2
TSB-4	0	1			5.9E-2	5.9E-2
MW-19	0	2			5.2E-2	5.2E-2
HST-21	0	1			3.2E-2	3.2E-2
TSB-2	0	1			2.7E-2	2.7E-2

Table 12-2: Summary of Total PCB Concentrations (mg/kg) Detected in the Shallow Soil Horizon (2 to 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Aroclor-1248	Aroclor-1254	Aroclor-1260	Total PCBs
TSB-14	2.5	3.5			8.0E+0	8.0E+0
TSB-11	2.5	3.5			3.5E+0	3.5E+0
TSB-12	2.5	3.5			3.0E+0	3.0E+0
TSB-15	2.5	3.5			2.8E+0	2.8E+0
CS-3	3	5		8.5E-1	1.4E+0	2.3E+0
TSB-13	2.5	3.5			2.2E+0	2.2E+0
CS-64	2	3			1.5E+0	1.5E+0
S-64	2	3			9.8E-1	9.8E-1
S-9	3	4.5			9.4E-1	9.4E-1
MW-58	2	3	1.0E-1	3.4E-1	2.9E-1	7.3E-1
S-134	2	4		1.1E-1	3.9E-1	5.0E-1
TSB-10	2	3			3.7E-1	3.7E-1
TSB-17	3	4			3.7E-1	3.7E-1
HST-31	2.5	4.5	1.3E-1		1.7E-1	3.0E-1
HST-24	2	3			2.8E-1	2.8E-1
TSB-16	3	4			1.9E-1	1.9E-1
TSB-9	2.5	3.5			1.9E-1	1.9E-1
S-129	3	5			1.9E-1	1.9E-1
TSB-8	2.5	3.5			1.8E-1	1.8E-1
MW-54	3	5	1.4E-1		3.3E-2	1.7E-1
S-139	3	3.1			1.4E-1	1.4E-1
HST-23	3	5			7.2E-2	7.2E-2
TSB-18	3.5	4.5			5.9E-2	5.9E-2
HST-1	2	4			5.6E-2	5.6E-2
HST-30	3	5			3.7E-2	3.7E-2
HD-13	3	5		2.3E-2		2.3E-2
PD-45	3	4			1.4E-2	1.4E-2
S-135	3	3.5		1.2E-2		1.2E-2

Table 12-3: Summary of Total PCB Concentrations (mg/kg) Detected in the Surface/Shallow Soil Horizon (0 to 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Aroclor-1248	Aroclor-1254	Aroclor-1260	Total PCBs
CS-76	0	0.5	2.9E+0		7.3E+1	7.6E+1
S-76	0	0.7			1.4E+1	1.4E+1
S-3	0	2			9.3E+0	9.3E+0
CS-1	0	2	7.0E-1		8.6E+0	9.3E+0
TSB-14	2.5	3.5			8.0E+0	8.0E+0
S-2	0	2			7.9E+0	7.9E+0
S-161	0	2		2.9E+0	1.6E+0	4.5E+0
MW-13	0	2			4.3E+0	4.3E+0
TSB-11	2.5	3.5			3.5E+0	3.5E+0
S-157	0	2			3.2E+0	3.2E+0
TSB-12	2.5	3.5			3.0E+0	3.0E+0
S-162	0	2		9.2E-1	2.0E+0	2.9E+0
HST-24	0	1		1.2E+0	1.7E+0	2.9E+0
S-163	0	2		2.1E+0	7.2E-1	2.8E+0
TSB-15	2.5	3.5			2.8E+0	2.8E+0
S-4	0	2			2.5E+0	2.5E+0
S-159	0	2			2.5E+0	2.5E+0
S-158	0	2			2.5E+0	2.5E+0
S-160	0	2			2.4E+0	2.4E+0
CS-3	3	5		8.5E-1	1.4E+0	2.3E+0
TSB-13	2.5	3.5			2.2E+0	2.2E+0
CS-5	0	2		4.4E-1	1.7E+0	2.1E+0
TSB-7	0	1			1.8E+0	1.8E+0
S-9	0	2			1.7E+0	1.7E+0
CS-64	2	3			1.5E+0	1.5E+0
CMW-22	0	2		4.0E-1	1.1E+0	1.5E+0
S-63	0	2			1.5E+0	1.5E+0
MW-16	0	2			1.2E+0	1.2E+0
S-8	0	2			1.1E+0	1.1E+0
S-156	0	2			1.0E+0	1.0E+0
S-64	2	3			9.8E-1	9.8E-1
S-7	0	2			9.5E-1	9.5E-1
S-9	3	4.5			9.4E-1	9.4E-1
TSB-18	0	1			8.6E-1	8.6E-1
MW-22	0	2			7.9E-1	7.9E-1
S-151	0	2			7.5E-1	7.5E-1
MW-58	2	3	1.0E-1	3.4E-1	2.9E-1	7.3E-1
TSB-15	0	1			6.6E-1	6.6E-1
HST-17	0	2		2.1E-1	4.2E-1	6.3E-1
TSB-16	0	1			5.8E-1	5.8E-1
CMW-20	0	2		1.9E-1	3.6E-1	5.5E-1
HST-16	0	2		1.7E-1	3.3E-1	5.0E-1
S-134	2	4		1.1E-1	3.9E-1	5.0E-1
S-152	0	2		5.6E-2	3.9E-1	4.5E-1

Table 12-3: Summary of Total PCB Concentrations (mg/kg) Detected in the Surface/Shallow Soil Horizon (0 to 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Aroclor-1248	Aroclor-1254	Aroclor-1260	Total PCBs
S-155	0	2		1.1E-1	3.3E-1	4.4E-1
CS-67	0	2			4.3E-1	4.3E-1
TSB-9	0	1			4.0E-1	4.0E-1
CS-10	0	2			3.7E-1	3.7E-1
TSB-17	3	4			3.7E-1	3.7E-1
TSB-10	2	3			3.7E-1	3.7E-1
S-150	0	2			3.5E-1	3.5E-1
TSB-10	0	1			3.4E-1	3.4E-1
MW-21	0	2			3.2E-1	3.2E-1
HST-31	2.5	4.5	1.3E-1		1.7E-1	3.0E-1
HST-24	2	3			2.8E-1	2.8E-1
HST-23	1	2			2.7E-1	2.7E-1
HST-24	1	2			2.2E-1	2.2E-1
HST-23	1	3			2.0E-1	2.0E-1
HST-1	0	2			1.9E-1	1.9E-1
S-129	3	5			1.9E-1	1.9E-1
TSB-9	2.5	3.5			1.9E-1	1.9E-1
TSB-17	0	1			1.9E-1	1.9E-1
TSB-16	3	4			1.9E-1	1.9E-1
TSB-8	2.5	3.5			1.8E-1	1.8E-1
MW-54	3	5	1.4E-1		3.3E-2	1.7E-1
HST-23	0	1			1.7E-1	1.7E-1
TSB-8	0	1			1.6E-1	1.6E-1
TSB-5	0	1			1.6E-1	1.6E-1
S-153	0	2	4.6E-2		1.0E-1	1.5E-1
S-139	3	3.1			1.4E-1	1.4E-1
S-99	0	2			1.2E-1	1.2E-1
S-10	0	2			9.6E-2	9.6E-2
TSB-6	0	1			7.6E-2	7.6E-2
HST-23	3	5			7.2E-2	7.2E-2
S-154	0	2		2.7E-2	4.0E-2	6.7E-2
MW-20	0	2			6.0E-2	6.0E-2
TSB-18	3.5	4.5			5.9E-2	5.9E-2
TSB-4	0	1			5.9E-2	5.9E-2
HST-1	2	4			5.6E-2	5.6E-2
MW-19	0	2			5.2E-2	5.2E-2
HST-30	3	5			3.7E-2	3.7E-2
HST-21	0	1			3.2E-2	3.2E-2
TSB-2	0	1			2.7E-2	2.7E-2
HD-13	3	5		2.3E-2		2.3E-2
PD-45	3	4			1.4E-2	1.4E-2
S-135	3	3.5		1.2E-2		1.2E-2

Table 12-4: Summary of Total PCB Concentrations (mg/kg) Detected in the Deep Soil Horizon (greater than 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Aroclor-1242	Aroclor-1254	Aroclor-1260	Total PCBs
TSB-14	4.5	5.5			5.7E+0	5.7E+0
MW-16	10	12			3.7E+0	3.7E+0
HD-15C	6	8			1.5E+0	1.5E+0
HD-12	6	8			1.2E+0	1.2E+0
PD-47	6	7	1.4E-1	3.9E-1	2.7E-1	8.0E-1
HD-9	8	10			3.5E-1	3.5E-1
HST-32	4.8	6.8			2.7E-1	2.7E-1
HST-33	5	7			1.8E-1	1.8E-1
HD-11	4	6			1.8E-1	1.8E-1
HD-10	6	8			1.7E-1	1.7E-1
HD-7	8	10			1.4E-1	1.4E-1
MSF-1	7	9			1.0E-1	1.0E-1
HD-8D	7	9		6.3E-2	3.4E-2	9.7E-2
CS-61	5	7			9.7E-2	9.7E-2
HD-17	4	6			9.1E-2	9.1E-2
HD-5B	9	11			8.7E-2	8.7E-2
MSF-1	9	11			8.5E-2	8.5E-2
HST-34	5	7			8.2E-2	8.2E-2
S-122	7.5	8.5			3.7E-2	3.7E-2
HD-15C	28	30			3.1E-2	3.1E-2
HD-6	9	11			3.1E-2	3.1E-2
HD-5B	15	16			3.0E-2	3.0E-2
HD-10	8	10			2.2E-2	2.2E-2
HD-16	9	11		1.9E-2		1.9E-2
HD-17	8	10			1.3E-2	1.3E-2
HD-3	5	7			6.7E-3	6.7E-3

Table 12-5: Summary of cPAH Concentrations (mg/kg) Detected in the Surface Soil Horizon (0 to 2 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Benzo(a) anthracene	Benzo(a)pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3-cd)pyrene	Total cPAH Conc.
TSB-18	0	1	1.5E+0	1.5E+0	2.0E+0	2.1E+0	1.9E+0	5.0E-2	5.1E-1	9.6E+0
HST-24	0	1	9.6E-1	6.4E-1	4.6E+0		1.8E+0	2.5E-1	4.6E-1	8.7E+0
HST-27	0	2	1.2E+0	1.1E+0	3.0E+0		1.5E+0	3.5E-1	6.2E-1	7.8E+0
HST-17	0	2	4.3E-1	3.6E-1	9.4E-1	6.2E-1	7.8E-1	4.3E-2	1.1E-1	3.3E+0
HST-24	1	2	3.8E-1	6.6E-1	1.4E+0		5.8E-1	8.6E-2	1.7E-1	3.3E+0
HST-23	0	1	5.4E-1	4.3E-1	7.1E-1		8.6E-1			2.5E+0
HST-23	1	2	6.9E-1		7.2E-1		9.6E-1			2.4E+0
HST-16	0	2	3.6E-1	2.6E-1	4.4E-1		6.7E-1		3.1E-1	2.0E+0
TSB-2	0	2	3.4E-1	3.3E-1	4.4E-1	3.8E-1	3.8E-1		1.1E-1	2.0E+0
HST-22D+10	0	1	1.2E-1	2.0E-1	2.0E-1	2.0E-1	1.4E-1			8.6E-1
HST-21	0	1	1.1E-1	1.0E-1	3.9E-1		1.6E-1		4.5E-2	8.1E-1
S-99	0	2	6.5E-2	8.8E-2	1.0E-1	1.1E-1	1.1E-1	1.3E-2	1.1E-1	6.0E-1
HST-1	0	2	4.5E-2	4.2E-2	5.7E-2	3.2E-2	6.8E-2		1.1E-2	2.6E-1
HST-23	1	3	3.8E-2		4.7E-2		5.9E-2			1.4E-1
HST-21	1	2			9.7E-2					9.7E-2

Table12-6: Summary of cPAH Concentrations (mg/kg) Detected in the Shallow Soil Horizon (2 to 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Benzo(a) anthracene	Benzo(a)pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3-cd)pyrene	Total cPAH Conc.
HST-24	2	3	7.0E-1	9.3E-1	2.3E+0		9.7E-1	1.3E-1	2.5E-1	5.3E+0
TSB-11	2.5	3.5	9.5E-1	4.7E-1	7.6E-1	6.6E-1	1.3E+0			4.1E+0
S-134	2	4	3.7E-1	4.6E-1		8.2E-1	6.3E-1		5.5E-1	2.8E+0
MW-58	2	3			8.6E-1		6.5E-1			1.5E+0
HST-22	3	5	3.0E-1	3.5E-2	5.9E-2		3.0E-1			6.9E-1
HST-1	2	4	8.2E-2	8.9E-2	1.2E-1	1.1E-1	1.0E-1		1.3E-2	5.1E-1
S-129	3	5		4.7E-2	2.5E-1	3.7E-2	8.1E-2		6.3E-2	4.8E-1
TSB-9	2.5	3.5					3.9E-1			3.9E-1
HST-25	3	5	5.1E-2	5.7E-2	1.2E-1		6.3E-2	2.0E-2	4.8E-2	3.6E-1
HST-23	3	5	4.5E-2	2.2E-2	6.0E-2		7.6E-2			2.0E-1
S-139	3	3.1		4.6E-2	8.9E-2		5.6E-2			1.9E-1
HST-21	3	5	2.0E-2		6.2E-2		3.5E-2			1.2E-1

Table 12-7: Summary of cPAH Concentrations (mg/kg) Detected in the Surface/Shallow Soil Horizon (0 to 4 feet bls) in OU-3 Sunnyside Yard. Queens, New York

Designation	Top	Bottom	Benzo(a) anthracene	Benzo(a)pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3-cd)pyrene	Total cPAH Conc.
TSB-18	0	1	1.5E+0	1.5E+0	2.0E+0	2.1E+0	1.9E+0	5.0E-2	5.1E-1	9.6E+0
HST-24	0	1	9.6E-1	6.4E-1	4.6E+0		1.8E+0	2.5E-1	4.6E-1	8.7E+0
HST-27	0	2	1.2E+0	1.1E+0	3.0E+0		1.5E+0	3.5E-1	6.2E-1	7.8E+0
HST-24	2	3	7.0E-1	9.3E-1	2.3E+0		9.7E-1	1.3E-1	2.5E-1	5.3E+0
TSB-11	2.5	3.5	9.5E-1	4.7E-1	7.6E-1	6.6E-1	1.3E+0			4.1E+0
HST-17	0	2	4.3E-1	3.6E-1	9.4E-1	6.2E-1	7.8E-1	4.3E-2	1.1E-1	3.3E+0
HST-24	1	2	3.8E-1	6.6E-1	1.4E+0		5.8E-1	8.6E-2	1.7E-1	3.3E+0
S-134	2	4	3.7E-1	4.6E-1		8.2E-1	6.3E-1		5.5E-1	2.8E+0
HST-23	0	1	5.4E-1	4.3E-1	7.1E-1		8.6E-1			2.5E+0
HST-23	1	2	6.9E-1		7.2E-1		9.6E-1			2.4E+0
HST-16	0	2	3.6E-1	2.6E-1	4.4E-1		6.7E-1		3.1E-1	2.0E+0
TSB-2	0	2	3.4E-1	3.3E-1	4.4E-1	3.8E-1	3.8E-1		1.1E-1	2.0E+0
MW-58	2	3			8.6E-1		6.5E-1			1.5E+0
HST-22D+10	0	1	1.2E-1	2.0E-1	2.0E-1	2.0E-1	1.4E-1			8.6E-1
HST-21	0	1	1.1E-1	1.0E-1	3.9E-1		1.6E-1		4.5E-2	8.1E-1
HST-22	3	5	3.0E-1	3.5E-2	5.9E-2		3.0E-1			6.9E-1
S-99	0	2	6.5E-2	8.8E-2	1.0E-1	1.1E-1	1.1E-1	1.3E-2	1.1E-1	6.0E-1
HST-1	2	4	8.2E-2	8.9E-2	1.2E-1	1.1E-1	1.0E-1		1.3E-2	5.1E-1
S-129	3	5		4.7E-2	2.5E-1	3.7E-2	8.1E-2		6.3E-2	4.8E-1
TSB-9	2.5	3.5					3.9E-1			3.9E-1
HST-25	3	5	5.1E-2	5.7E-2	1.2E-1		6.3E-2	2.0E-2	4.8E-2	3.6E-1
HST-1	0	2	4.5E-2	4.2E-2	5.7E-2	3.2E-2	6.8E-2		1.1E-2	2.6E-1
HST-23	3	5	4.5E-2	2.2E-2	6.0E-2		7.6E-2			2.0E-1
S-139	3	3.1		4.6E-2	8.9E-2		5.6E-2			1.9E-1
HST-23	1	3	3.8E-2		4.7E-2		5.9E-2			1.4E-1
HST-21	3	5	2.0E-2		6.2E-2		3.5E-2			1.2E-1
HST-21	1	2			9.7E-2					9.7E-2

Table 12-8: Summary of cPAH Concentrations (mg/kg) Detected in the Deep Soil Horizon (greater than 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Benzo(a) anthracene	Benzo(a)pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3-cd)pyrene	Total cPAH Conc.
HST-24	6.5	8.5	6.9E-1	1.2E+0	2.9E+0		9.3E-1	3.6E-1	6.1E-1	6.7E+0
HST-24	4.5	6.5	5.0E-1	1.0E+0	2.3E+0		6.9E-1	3.4E-1	5.8E-1	5.4E+0
HD-14	4	6	5.7E-1	4.9E-1	2.9E-1	4.7E-1	6.5E-1	1.2E-1	2.5E-1	2.8E+0
HD-3	5	7	4.9E-1				1.6E+0			2.1E+0
HD-11	4	6	5.2E-1				6.3E-1			1.1E+0
HD-17	4	6	1.3E-1	1.2E-1	1.1E-1	1.0E-1	1.6E-1	2.9E-2	8.1E-2	7.3E-1
HD-11	13	15	1.0E-1	1.1E-1	9.5E-2	8.9E-2	1.2E-1	2.7E-2	7.9E-2	6.2E-1
HD-14	6	8		2.1E-1						2.1E-1
HD-18	4	6	4.2E-2	3.9E-2			4.8E-2		2.1E-2	1.5E-1
S-122	7.5	8.5	2.2E-2		2.8E-2	3.7E-2	4.0E-2			1.3E-1
HD-17	8	10	2.0E-2				3.2E-2			5.2E-2
HD-16	9	11					2.9E-2			2.9E-2
HD-15C	28	30					2.4E-2			2.4E-2

Table 12-9: Summary of B(a)P Equivalent Concentrations (mg/kg) Detected in the Surface Soil Horizon (0 to 2 feet bls), Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Benzo(a) anthracene	Benzo(a)pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3-cd)pyrene	Total B(a)P Equivalents
TSB-18	0	1	1.5E-1	1.5E+0	2.0E-1	2.1E-2	1.9E-3	5.0E-2	5.1E-2	2.0E+0
HST-27	0	2	1.2E-1	1.1E+0	3.0E-1		1.5E-3	3.5E-1	6.2E-2	1.9E+0
HST-24	0	1	9.6E-2	6.4E-1	4.6E-1		1.8E-3	2.5E-1	4.6E-2	1.5E+0
HST-24	1	2	3.8E-2	6.6E-1	1.4E-1		5.8E-4	8.6E-2	1.7E-2	9.4E-1
HST-17	0	2	4.3E-2	3.6E-1	9.4E-2	6.2E-3	7.8E-4	4.3E-2	1.1E-2	5.6E-1
HST-23	0	1	5.4E-2	4.3E-1	7.1E-2		8.6E-4			5.6E-1
TSB-2	0	2	3.4E-2	3.3E-1	4.4E-2	3.8E-3	3.8E-4		1.1E-2	4.2E-1
HST-16	0	2	3.6E-2	2.6E-1	4.4E-2		6.7E-4		3.1E-2	3.7E-1
HST-22D+10	0	1	1.2E-2	2.0E-1	2.0E-2	2.0E-3	1.4E-4			2.3E-1
HST-21	0	1	1.1E-2	1.0E-1	3.9E-2		1.6E-4		4.5E-3	1.5E-1
HST-23	1	2	6.9E-2		7.2E-2		9.6E-4			1.4E-1
S-99	0	2	6.5E-3	8.8E-2	1.0E-2	1.1E-3	1.1E-4	1.3E-2	1.1E-2	1.3E-1
HST-1	0	2	4.5E-3	4.2E-2	5.7E-3	3.2E-4	6.8E-5		1.1E-3	5.4E-2
HST-21	1	2			9.7E-3					9.7E-3
HST-23	1	3	3.8E-3		4.7E-3		5.9E-5			8.6E-3

Table 12-10: Summary of B(a)P Equivalent Concentrations (mg/kg) Detected in the Shallow Soil Horizon (2 to 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Benzo(a) anthracene	Benzo(a)pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3-cd)pyrene	Total B(a)P Equivalents
HST-24	2	3	7.0E-2	9.3E-1	2.3E-1		9.7E-4	1.3E-1	2.5E-2	1.4E+0
TSB-11	2.5	3.5	9.5E-2	4.7E-1	7.6E-2	6.6E-3	1.3E-3			6.5E-1
S-134	2	4	3.7E-2	4.6E-1		8.2E-3	6.3E-4		5.5E-2	5.6E-1
HST-1	2	4	8.2E-3	8.9E-2	1.2E-2	1.1E-3	1.0E-4		1.3E-3	1.1E-1
HST-25	3	5	5.1E-3	5.7E-2	1.2E-2		6.3E-5	2.0E-2	4.8E-3	9.9E-2
MW-58	2	3			8.6E-2		6.5E-4			8.7E-2
S-129	3	5		4.7E-2	2.5E-2	3.7E-4	8.1E-5		6.3E-3	7.9E-2
HST-22	3	5	3.0E-2	3.5E-2	5.9E-3		3.0E-4			7.1E-2
S-139	3	3.1		4.6E-2	8.9E-3		5.6E-5			5.5E-2
HST-23	3	5	4.5E-3	2.2E-2	6.0E-3		7.6E-5			3.3E-2
HST-21	3	5	2.0E-3		6.2E-3		3.5E-5			8.2E-3
TSB-9	2.5	3.5					3.9E-4			3.9E-4

Table 12-11: Summary of B(a)P Equivalent Concentrations (mg/kg) Detected in the Surface/Shallow Soil Horizon (0 to 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Benzo(a) anthracene	Benzo(a)pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3-cd)pyrene	Total B(a)P Equivalents
TSB-18	0	1	1.5E-1	1.5E+0	2.0E-1	2.1E-2	1.9E-3	5.0E-2	5.1E-2	2.0E+0
HST-27	0	2	1.2E-1	1.1E+0	3.0E-1		1.5E-3	3.5E-1	6.2E-2	1.9E+0
HST-24	0	1	9.6E-2	6.4E-1	4.6E-1		1.8E-3	2.5E-1	4.6E-2	1.5E+0
HST-24	2	3	7.0E-2	9.3E-1	2.3E-1		9.7E-4	1.3E-1	2.5E-2	1.4E+0
HST-24	1	2	3.8E-2	6.6E-1	1.4E-1		5.8E-4	8.6E-2	1.7E-2	9.4E-1
TSB-11	2.5	3.5	9.5E-2	4.7E-1	7.6E-2	6.6E-3	1.3E-3			6.5E-1
S-134	2	4	3.7E-2	4.6E-1		8.2E-3	6.3E-4		5.5E-2	5.6E-1
HST-17	0	2	4.3E-2	3.6E-1	9.4E-2	6.2E-3	7.8E-4	4.3E-2	1.1E-2	5.6E-1
HST-23	0	1	5.4E-2	4.3E-1	7.1E-2		8.6E-4			5.6E-1
TSB-2	0	2	3.4E-2	3.3E-1	4.4E-2	3.8E-3	3.8E-4		1.1E-2	4.2E-1
HST-16	0	2	3.6E-2	2.6E-1	4.4E-2		6.7E-4		3.1E-2	3.7E-1
HST-22D+10	0	1	1.2E-2	2.0E-1	2.0E-2	2.0E-3	1.4E-4			2.3E-1
HST-21	0	1	1.1E-2	1.0E-1	3.9E-2		1.6E-4		4.5E-3	1.5E-1
HST-23	1	2	6.9E-2		7.2E-2		9.6E-4			1.4E-1
S-99	0	2	6.5E-3	8.8E-2	1.0E-2	1.1E-3	1.1E-4	1.3E-2	1.1E-2	1.3E-1
HST-1	2	4	8.2E-3	8.9E-2	1.2E-2	1.1E-3	1.0E-4		1.3E-3	1.1E-1
HST-25	3	5	5.1E-3	5.7E-2	1.2E-2		6.3E-5	2.0E-2	4.8E-3	9.9E-2
MW-58	2	3			8.6E-2		6.5E-4			8.7E-2
S-129	3	5		4.7E-2	2.5E-2	3.7E-4	8.1E-5		6.3E-3	7.9E-2
HST-22	3	5	3.0E-2	3.5E-2	5.9E-3		3.0E-4			7.1E-2
S-139	3	3.1		4.6E-2	8.9E-3		5.6E-5			5.5E-2
HST-1	0	2	4.5E-3	4.2E-2	5.7E-3	3.2E-4	6.8E-5		1.1E-3	5.4E-2
HST-23	3	5	4.5E-3	2.2E-2	6.0E-3		7.6E-5			3.3E-2
HST-21	1	2			9.7E-3					9.7E-3
HST-23	1	3	3.8E-3		4.7E-3		5.9E-5			8.6E-3
HST-21	3	5	2.0E-3		6.2E-3		3.5E-5			8.2E-3
TSB-9	2.5	3.5					3.9E-4			3.9E-4

Table 12-12: Summary of B(a)P Equivalent Concentrations (mg/kg) Detected in the Deep Soil Horizon (greater than 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Benzo(a) anthracene	Benzo(a)pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3-cd)pyrene	Total B(a)P Equivalents
HST-24	6.5	8.5	6.9E-2	1.2E+0	2.9E-1		9.3E-4	3.6E-1	6.1E-2	2.0E+0
HST-24	4.5	6.5	5.0E-2	1.0E+0	2.3E-1		6.9E-4	3.4E-1	5.8E-2	1.7E+0
HD-14	4	6	5.7E-2	4.9E-1	2.9E-2	4.7E-3	6.5E-4	1.2E-1	2.5E-2	7.3E-1
HD-14	6	8		2.1E-1						2.1E-1
HD-17	4	6	1.3E-2	1.2E-1	1.1E-2	1.0E-3	1.6E-4	2.9E-2	8.1E-3	1.8E-1
HD-11	13	15	1.0E-2	1.1E-1	9.5E-3	8.9E-4	1.2E-4	2.7E-2	7.9E-3	1.7E-1
HD-11	4	6	5.2E-2				6.3E-4			5.3E-2
HD-3	5	7	4.9E-2				1.6E-3			5.1E-2
HD-18	4	6	4.2E-3	3.9E-2			4.8E-5		2.1E-3	4.5E-2
S-122	7.5	8.5	2.2E-3		2.8E-3	3.7E-4	4.0E-5			5.4E-3
HD-17	8	10	2.0E-3				3.2E-5			2.0E-3
HD-16	9	11					2.9E-5			2.9E-5
HD-15C	28	30					2.4E-5			2.4E-5

Table 12-13: Summary of Total PAH Concentrations (mg/kg) Detected in the Surface Soil Horizon (0 to 2 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracen	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Fluoranthene	Fluorene	Indeno(123-cd) pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH Concentration
HST-23	1	2	6.1E+1			5.1E+0	6.9E-1		7.2E-1			9.6E-1		2.7E+0	1.8E+1			1.5E+1	2.4E+0	1.1E+2
HST-23	0	1				3.5E+0	5.4E-1	4.3E-1	7.1E-1			8.6E-1			2.0E+1			1.5E+1	2.5E+0	4.4E+1
HST-23	1	3	1.6E+1	5.2E+0	1.5E+0	1.3E+0	3.8E-2		4.7E-2			5.9E-2		6.6E-1	7.2E+0		1.1E+0	8.8E+0	1.2E+0	4.3E+1
HST-16	0	2		4.1E+0		2.4E+0	3.6E-1	2.6E-1	4.4E-1	3.2E-1		6.7E-1		1.6E+0	5.2E+0	3.1E-1		8.3E+0	1.6E+0	2.6E+1
TSB-18	0	1		9.0E-2	3.0E-1	4.7E-1	1.5E+0	1.5E+0	2.0E+0	5.0E-1	2.1E+0	1.9E+0	5.0E-2	1.7E+0	1.0E-1	5.1E-1	1.1E-1	1.0E+0	2.3E+0	1.6E+1
HST-27	0	2	1.9E-1	1.5E-1	8.3E-2	2.8E-1	1.2E+0	1.1E+0	3.0E+0	5.8E-1		1.5E+0	3.5E-1	9.2E-1	1.3E-1	6.2E-1	1.3E-1	1.4E+0	2.9E+0	1.5E+1
HST-24	0	1	2.7E-1	5.5E-2	2.8E-1	3.2E-1	9.6E-1	6.4E-1	4.6E+0	3.2E-1		1.8E+0	2.5E-1	1.4E+0	5.5E-2	4.6E-1	7.9E-2	8.2E-1	1.4E+0	1.4E+1
HST-17	0	2	1.8E-1	2.2E-2	1.7E-1	2.9E-1	4.3E-1	3.6E-1	9.4E-1	7.3E-2	6.2E-1	7.8E-1	4.3E-2	7.6E-1		1.1E-1	1.6E-1	5.4E-1	5.6E-1	6.0E+0
HST-24	1	2	5.1E-2		8.0E-2	8.8E-2	3.8E-1	6.6E-1	1.4E+0	1.3E-1		5.8E-1	8.6E-2	5.7E-1	2.1E-2	1.7E-1		2.4E-1	7.2E-1	5.2E+0
TSB-2	0	2		4.8E-2		1.3E-1	3.4E-1	3.3E-1	4.4E-1	1.2E-1	3.8E-1	3.8E-1		6.9E-1	4.3E-2	1.1E-1		5.3E-1	8.2E-1	4.4E+0
HST-1	0	2	7.5E-1			1.3E-2	4.5E-2	4.2E-2	5.7E-2	1.0E-2	3.2E-2	6.8E-2		7.3E-2		1.1E-2	2.0E-1	6.8E-2	7.2E-2	1.4E+0
HST-21	0	1					1.1E-1	1.0E-1	3.9E-1	3.9E-2		1.6E-1		2.2E-1		4.5E-2		6.6E-2	2.4E-1	1.4E+0
S-99	0	2	1.1E-2		1.6E-2	1.7E-2	6.5E-2	8.8E-2	1.0E-1	8.0E-2	1.1E-1	1.1E-1	1.3E-2	1.0E-1		1.1E-1	9.0E-3	4.5E-2	7.7E-2	9.5E-1
HST-22D+	0	1					1.2E-1	2.0E-1	2.0E-1		2.0E-1	1.4E-1								8.6E-1
HST-21	1	2							9.7E-2										3.6E-2	1.3E-1

Table 12-14: Summary of Total PAH Concentrations (mg/kg) Detected in the Shallow Soil Horizon (2 to 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracen	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Fluoranthene	Fluorene	Indeno(123-cd) pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH Concentration
MW-58	2	3	4.5E+1			5.0E-1			8.6E-1			6.5E-1		1.5E+0	1.4E+0		2.0E+1	1.5E+0	1.2E+0	7.3E+1
TSB-11	2.5	3.5		6.0E+0		2.5E+0	9.5E-1	4.7E-1	7.6E-1		6.6E-1	1.3E+0		4.1E+0	1.3E+1		5.4E+0	2.0E+1	3.8E+0	5.9E+1
TSB-9	2.5	3.5				2.8E+0						3.9E-1		2.1E+0	1.4E+1			2.3E+1	3.1E+0	4.5E+1
MW-54	3	5	2.1E+1												2.6E+0		6.6E+0	4.2E+0	6.6E-1	3.5E+1
HST-23	3	5	8.1E+0	1.1E+0	3.7E-1	3.1E-1	4.5E-2	2.2E-2	6.0E-2			7.6E-2		3.1E-2	1.5E+0		2.9E-1	1.8E+0	3.0E-2	1.4E+1
HST-24	2	3	5.0E-2		1.0E-1	1.5E-1	7.0E-1	9.3E-1	2.3E+0	2.0E-1		9.7E-1	1.3E-1	1.1E+0		2.5E-1		4.4E-1	1.4E+0	8.7E+0
S-134	2	4			3.3E-1	2.1E-1	3.7E-1	4.6E-1			8.2E-1	6.3E-1		5.0E-1		5.5E-1		9.2E-1	2.1E+0	6.9E+0
HST-22	3	5	9.3E-1	2.6E-1	1.5E-1	3.8E-1	3.0E-1	3.5E-2	5.9E-2	2.3E-2		3.0E-1		1.7E-2	3.9E-1		1.0E-1	3.9E-1	1.8E-1	3.5E+0
HST-1	2	4	3.7E-1			2.9E-1	8.2E-2	8.9E-2	1.2E-1	1.4E-2	1.1E-1	1.0E-1		2.0E-1	2.0E-1	1.3E-2			1.9E-1	1.8E+0
S-129	3	5			4.0E-2	5.7E-2		4.7E-2	2.5E-1	4.3E-2	3.7E-2	8.1E-2		1.4E-1		6.3E-2		1.4E-1	1.3E-1	1.0E+0
HST-25	3	5					5.1E-2	5.7E-2	1.2E-1	5.0E-2		6.3E-2	2.0E-2	9.2E-2		4.8E-2		3.7E-2	1.1E-1	6.5E-1
S-139	3	3.1	1.8E-2					4.6E-2	8.9E-2			5.6E-2		9.3E-2			3.3E-2	5.8E-2	1.0E-1	4.9E-1
HST-21	3	5					2.0E-2		6.2E-2			3.5E-2		3.5E-2					3.4E-2	1.9E-1
HD-13	3	5				3.1E-2								4.9E-2				3.3E-2	5.6E-2	1.7E-1
S-135	3	3.5													3.1E-2					3.1E-2

Table 12-15: Summary of Total PAH Concentrations (mg/kg) Detected in the Surface/Shallow Soil Horizon (0 to 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designatio	Top	Bottom	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracen	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Fluoranthene	Fluorene	Indeno(123-cd) pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH Concentration
HST-23	1	2	6.1E+1			5.1E+0	6.9E-1		7.2E-1			9.6E-1		2.7E+0	1.8E+1			1.5E+1	2.4E+0	1.1E+2
MW-58	2	3	4.5E+1			5.0E-1			8.6E-1			6.5E-1		1.5E+0	1.4E+0		2.0E+1	1.5E+0	1.2E+0	7.3E+1
TSB-11	2.5	3.5		6.0E+0		2.5E+0	9.5E-1	4.7E-1	7.6E-1		6.6E-1	1.3E+0		4.1E+0	1.3E+1		5.4E+0	2.0E+1	3.8E+0	5.9E+1
TSB-9	2.5	3.5				2.8E+0						3.9E-1		2.1E+0	1.4E+1			2.3E+1	3.1E+0	4.5E+1
HST-23	0	1				3.5E+0	5.4E-1	4.3E-1	7.1E-1			8.6E-1			2.0E+1			1.5E+1	2.5E+0	4.4E+1
HST-23	1	3	1.6E+1	5.2E+0	1.5E+0	1.3E+0	3.8E-2		4.7E-2			5.9E-2		6.6E-1	7.2E+0		1.1E+0	8.8E+0	1.2E+0	4.3E+1
MW-54	3	5	2.1E+1												2.6E+0		6.6E+0	4.2E+0	6.6E-1	3.5E+1
HST-16	0	2		4.1E+0		2.4E+0	3.6E-1	2.6E-1	4.4E-1	3.2E-1		6.7E-1		1.6E+0	5.2E+0	3.1E-1		8.3E+0	1.6E+0	2.6E+1
TSB-18	0	1		9.0E-2	3.0E-1	4.7E-1	1.5E+0	1.5E+0	2.0E+0	5.0E-1	2.1E+0	1.9E+0	5.0E-2	1.7E+0	1.0E-1	5.1E-1	1.1E-1	1.0E+0	2.3E+0	1.6E+1
HST-27	0	2	1.9E-1	1.5E-1	8.3E-2	2.8E-1	1.2E+0	1.1E+0	3.0E+0	5.8E-1		1.5E+0	3.5E-1	9.2E-1	1.3E-1	6.2E-1	1.3E-1	1.4E+0	2.9E+0	1.5E+1
HST-23	3	5	8.1E+0	1.1E+0	3.7E-1	3.1E-1	4.5E-2	2.2E-2	6.0E-2			7.6E-2		3.1E-2	1.5E+0		2.9E-1	1.8E+0	3.0E-2	1.4E+1
HST-24	0	1	2.7E-1	5.5E-2	2.8E-1	3.2E-1	9.6E-1	6.4E-1	4.6E+0	3.2E-1		1.8E+0	2.5E-1	1.4E+0	5.5E-2	4.6E-1	7.9E-2	8.2E-1	1.4E+0	1.4E+1
HST-24	2	3	5.0E-2		1.0E-1	1.5E-1	7.0E-1	9.3E-1	2.3E+0	2.0E-1		9.7E-1	1.3E-1	1.1E+0		2.5E-1		4.4E-1	1.4E+0	8.7E+0
S-134	2	4			3.3E-1	2.1E-1	3.7E-1	4.6E-1			8.2E-1	6.3E-1		5.0E-1		5.5E-1		9.2E-1	2.1E+0	6.9E+0
HST-17	0	2	1.8E-1	2.2E-2	1.7E-1	2.9E-1	4.3E-1	3.6E-1	9.4E-1	7.3E-2	6.2E-1	7.8E-1	4.3E-2	7.6E-1		1.1E-1	1.6E-1	5.4E-1	5.6E-1	6.0E+0
HST-24	1	2	5.1E-2		8.0E-2	8.8E-2	3.8E-1	6.6E-1	1.4E+0	1.3E-1		5.8E-1	8.6E-2	5.7E-1	2.1E-2	1.7E-1		2.4E-1	7.2E-1	5.2E+0
TSB-2	0	2		4.8E-2		1.3E-1	3.4E-1	3.3E-1	4.4E-1	1.2E-1	3.8E-1	3.8E-1		6.9E-1	4.3E-2	1.1E-1		5.3E-1	8.2E-1	4.4E+0
HST-22	3	5	9.3E-1	2.6E-1	1.5E-1	3.8E-1	3.0E-1	3.5E-2	5.9E-2	2.3E-2		3.0E-1		1.7E-2	3.9E-1		1.0E-1	3.9E-1	1.8E-1	3.5E+0
HST-1	2	4	3.7E-1			2.9E-1	8.2E-2	8.9E-2	1.2E-1	1.4E-2	1.1E-1	1.0E-1		2.0E-1	2.0E-1	1.3E-2			1.9E-1	1.8E+0
HST-1	0	2	7.5E-1			1.3E-2	4.5E-2	4.2E-2	5.7E-2	1.0E-2	3.2E-2	6.8E-2		7.3E-2		1.1E-2	2.0E-1	6.8E-2	7.2E-2	1.4E+0
HST-21	0	1					1.1E-1	1.0E-1	3.9E-1	3.9E-2		1.6E-1		2.2E-1		4.5E-2		6.6E-2	2.4E-1	1.4E+0
S-129	3	5			4.0E-2	5.7E-2		4.7E-2	2.5E-1	4.3E-2	3.7E-2	8.1E-2		1.4E-1		6.3E-2		1.4E-1	1.3E-1	1.0E+0
S-99	0	2	1.1E-2		1.6E-2	1.7E-2	6.5E-2	8.8E-2	1.0E-1	8.0E-2	1.1E-1	1.1E-1	1.3E-2	1.0E-1		1.1E-1	9.0E-3	4.5E-2	7.7E-2	9.5E-1
HST-22D+	0	1					1.2E-1	2.0E-1	2.0E-1		2.0E-1	1.4E-1								8.6E-1
HST-25	3	5					5.1E-2	5.7E-2	1.2E-1	5.0E-2		6.3E-2	2.0E-2	9.2E-2		4.8E-2		3.7E-2	1.1E-1	6.5E-1
S-139	3	3.1	1.8E-2					4.6E-2	8.9E-2			5.6E-2		9.3E-2			3.3E-2	5.8E-2	1.0E-1	4.9E-1
HST-21	3	5					2.0E-2		6.2E-2			3.5E-2		3.5E-2					3.4E-2	1.9E-1
HD-13	3	5				3.1E-2								4.9E-2				3.3E-2	5.6E-2	1.7E-1
HST-21	1	2							9.7E-2										3.6E-2	1.3E-1
S-135	3	3.5													3.1E-2					3.1E-2

Table 12-16: Summary of Total PAH Concentrations (mg/kg) Detected in the Deep Soil Horizon (greater than 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designatio	Top	Bottom	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracen	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Fluoranthene	Fluorene	Indeno(123-cd) pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH Concentration
HD-8D	7	9	1.5E+2	5.9E+0											1.1E+1			2.6E+1	2.6E+0	2.0E+2
HD-20	6	8	1.3E+2	5.7E+0		2.2E+0									9.3E+0			2.1E+1		1.7E+2
HD-15C	6	8	9.4E+1	6.8E+0		2.3E+0								1.7E+0	1.2E+1			2.2E+1	1.7E+0	1.4E+2
HD-6	9	11	9.2E+1	4.4E+0		1.2E+0									7.0E+0			1.4E+1		1.2E+2
HD-5B	9	11	8.6E+1	4.9E+0		1.5E+0									7.8E+0			1.7E+1		1.2E+2
HD-11	8	10	8.0E+1	4.5E+0		1.4E+0									7.2E+0			1.2E+1	1.4E+0	1.1E+2
HD-12	6	8	7.7E+1	4.6E+0		1.8E+0									7.6E+0			1.3E+1		1.0E+2
HD-11	4	6	6.9E+1			1.8E+0	5.2E-1					6.3E-1		1.8E+0	6.4E+0			1.5E+1	1.9E+0	9.7E+1
HD-5B	15	16	6.6E+1	4.4E+0	1.5E+0	1.5E+0									6.9E+0			1.0E+1		9.0E+1
HD-7	8	10	6.0E+1	4.3E+0		1.4E+0									6.5E+0		1.2E+0	1.4E+1	8.4E-1	8.8E+1
HD-10	6	8	5.6E+1	3.8E+0		9.6E-1									6.2E+0			1.4E+1		8.1E+1
HD-10	8	10	2.7E+1	2.0E+0		7.4E-1								4.6E-1	3.8E+0		9.9E-1	6.6E+0	6.0E-1	4.2E+1
HD-9	8	10	1.7E+1	2.5E+0		5.3E-1								3.0E-1	3.7E+0			5.4E+0	4.4E-1	3.0E+1
HD-3	5	7		2.4E+0		9.2E-1	4.9E-1					1.6E+0		4.5E-1	4.3E+0			5.1E+0	1.7E+0	1.7E+1
HD-14	4	6	8.1E-2	2.6E-1	1.7E-2	3.0E-1	5.7E-1	4.9E-1	2.9E-1	2.6E-1	4.7E-1	6.5E-1	1.2E-1	1.5E+0	2.3E-1	2.5E-1	1.6E-1	2.2E+0	2.3E+0	1.0E+1
HST-24	6.5	8.5		2.2E-2	3.6E-1	2.1E-1	6.9E-1	1.2E+0	2.9E+0	5.2E-1		9.3E-1	3.6E-1	5.3E-1		6.1E-1		1.3E-1	1.4E+0	9.9E+0
HST-24	4.5	6.5		1.7E-2	2.9E-1	1.4E-1	5.0E-1	1.0E+0	2.3E+0	5.1E-1		6.9E-1	3.4E-1	3.6E-1	6.0E-3	5.8E-1	1.9E-2	8.9E-2	1.1E+0	7.9E+0
HD-4	8	10		3.3E-1		2.8E-1									6.0E-1			2.1E+0	7.3E-2	3.4E+0
HD-15C	28	30	2.3E+0			7.2E-2						2.4E-2		6.0E-2	2.4E-1			5.9E-1	7.9E-2	3.4E+0
HD-17	4	6		3.0E-1		1.1E-1	1.3E-1	1.2E-1	1.1E-1	9.5E-2	1.0E-1	1.6E-1	2.9E-2	3.5E-1		8.1E-2		9.2E-1	3.6E-1	2.9E+0
HD-2	9	11	9.5E-1	3.8E-1		9.7E-2												1.0E+0	5.6E-2	2.5E+0
HD-16	9	11	1.1E+0			3.1E-2						2.9E-2		2.9E-2	1.5E-1			2.6E-1	7.9E-2	1.7E+0
HD-11	13	15		1.6E-2	1.3E-2	2.6E-2	1.0E-1	1.1E-1	9.5E-2	9.7E-2	8.9E-2	1.2E-1	2.7E-2	2.4E-1		7.9E-2		1.9E-1	2.6E-1	1.5E+0
HD-18	4	6					4.2E-2	3.9E-2		2.7E-2		4.8E-2		6.2E-2		2.1E-2		3.2E-2	1.1E-1	3.8E-1
S-122	7.5	8.5					2.2E-2		2.8E-2		3.7E-2	4.0E-2		4.8E-2				1.5E-2	3.9E-2	2.3E-1
HD-14	6	8						2.1E-1												2.1E-1
HD-17	8	10					2.0E-2					3.2E-2		3.5E-2				4.2E-2	4.0E-2	1.7E-1
HD-8D	20	22	8.0E-2												2.3E-2			5.3E-2		1.6E-1
HD-20	10	12	9.5E-2															5.5E-2		1.5E-1
HD-12	14	16												3.6E-2				5.0E-2	2.6E-2	1.1E-1
HD-10	16	18																4.7E-2		4.7E-2
HD-9	13	15	4.7E-2																	4.7E-2
HD-15C	20	22	3.9E-2																	3.9E-2

Table 12-17: Summary of Lead Concentrations (mg/kg) Detected in the Surface Soil Horizon (0 to 2 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Concentration
S-62	0	2	1.1E+3
HST-24	0	1	9.9E+2
HST-23	0	1	6.3E+2
HST-27	0	2	5.6E+2
MW-19	0	2	5.0E+2
MW-20	0	2	4.2E+2
TSB-2	0	2	3.6E+2
HST-17	0	2	3.6E+2
S-2	0	2	3.3E+2
TSB-18	0	1	3.1E+2
HST-1	0	2	2.3E+2
HST-16	0	2	1.8E+2
HST-24	1	2	1.7E+2
HST-23	1	2	1.5E+2
S-10	0	2	1.5E+2
HST-21	0	1	1.2E+2
S-99	0	2	6.2E+1
HST-23	1	3	1.2E+1
HST-21	1	2	8.1E+0

Table 12-18: Summary of Lead Concentrations (mg/kg) Detected in the Surface/Shallow Soil Horizon (0 to 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Designation	Top	Bottom	Concentration
S-62	0	2	1.1E+3
HST-24	0	1	9.9E+2
HST-23	0	1	6.3E+2
S-134	2	4	5.9E+2
HST-27	0	2	5.6E+2
MW-58	2	3	5.3E+2
MW-19	0	2	5.0E+2
MW-20	0	2	4.2E+2
TSB-2	0	2	3.6E+2
HST-17	0	2	3.6E+2
S-2	0	2	3.3E+2
TSB-18	0	1	3.1E+2
HST-24	2	3	2.6E+2
HST-1	0	2	2.3E+2
S-64	2	3	2.1E+2
HST-16	0	2	1.8E+2
HST-24	1	2	1.7E+2
HST-23	1	2	1.5E+2
S-10	0	2	1.5E+2
HST-1	2	4	1.4E+2
HST-21	0	1	1.2E+2
TSB-11	2.5	3.5	7.1E+1
HST-22	3	5	6.9E+1
S-99	0	2	6.2E+1
S-129	3	5	4.7E+1
S-139	3	3.1	2.7E+1
HST-25	3	5	2.4E+1
TSB-9	2.5	3.5	2.1E+1
MW-54	3	5	1.9E+1
HST-23	3	5	1.8E+1
HST-23	1	3	1.2E+1
HST-21	1	2	8.1E+0
S-135	3	3.5	5.4E+0
HD-13	3	5	4.0E+0
HD-19	2	4	3.5E+0
HST-21	3	5	3.0E+0
HST-21	2	3	2.6E+0

Table 12-19: Statistical Summaries of VOCs, SVOC, and Metals (mg/kg) Detected in the Surface Soil Horizon (0 to 2 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Analyte	CASRN	Number Detected	Total Samples	Minimum U Conc.	Maximum U Conc.	Minimum Conc.	Maximum Conc.	Average Conc.	USEPA Region III	Comparison of Average to USEPA Region III RBC
Volatile Organic Compounds										
Acetone	67641	2	3	1.1E-2	1.1E-2	2.4E-2	4.0E-2	3.2E-2	9.2E+5	
Carbon Disulfide	75150	1	3	6.0E-3	1.1E-2	1.1E-2	1.1E-2	1.1E-2	1.0E+5	
Ethylbenzene	100414	1	4	6.0E-3	1.1E-2	3.1E-2	3.1E-2	3.1E-2	1.0E+5	
Methylene chloride	75092	2	3	1.1E-2	1.1E-2	7.0E-3	1.4E-2	1.1E-2	3.8E+2	
Toluene	108883	1	4	6.0E-3	1.1E-2	1.1E-2	1.1E-2	1.1E-2	2.0E+5	
Xylenes (total)	1330207	2	5	6.0E-3	1.1E-2	1.1E-1	1.1E-1	1.1E-1	2.0E+5	
Semi-Volatile Organic Compounds										
Butylbenzyl phthalat	85687	1	3	3.8E-1	3.7E+0	3.6E-2	3.6E-2	3.6E-2	2.0E+5	
Dibenzofuran	132649	6	11	3.6E-1	3.8E+0	8.0E-3	1.1E+1	2.4E+0	2.0E+3	
Dibenzofuran	132649	6	11	3.6E-1	3.8E+0	8.0E-3	1.1E+1	2.4E+0	2.0E+3	
Diethyl phthalate	84662	1	3	3.8E-1	3.7E+0	1.1E-2	1.1E-2	1.1E-2	8.2E+5	
Di-n-butyl phthalate	84742	1	3	3.8E-1	3.7E+0	3.0E-2	3.0E-2	3.0E-2	1.0E+5	
Metals										
Aluminum	7429905	3	3			4.1E+3	9.4E+3	6.1E+3	1.0E+6	
Arsenic	7440382	3	3			3.0E+0	1.7E+1	7.6E+0	1.9E+0	Exceeds RBC
Barium	7440393	2	3	4.9E+1	4.9E+1	4.3E+1	5.1E+1	4.7E+1	7.2E+4	
Beryllium	7440417	1	3	3.6E-1	1.2E+0	2.2E-1	2.2E-1	2.2E-1	2.0E+3	
Calcium	7440702	3	3			7.5E+2	1.4E+4	5.2E+3		
Chromium	7440473	3	3			1.4E+1	3.9E+1	2.4E+1		
Cobalt	7440484	2	3	1.2E+1	1.2E+1	2.5E+0	7.5E+0	5.0E+0	2.0E+4	
Copper	7440508	3	3			5.6E+1	9.1E+1	7.4E+1	4.1E+4	
Iron	7439896	3	3			1.0E+4	2.1E+4	1.5E+4	3.1E+5	
Lead	7439921	19	20	4.0E-1	4.0E-1	8.1E+0	1.1E+3	3.5E+2		
Magnesium	7439954	3	3			1.6E+3	2.7E+3	2.2E+3		
Manganese	7439965	3	3			2.8E+2	3.2E+2	3.1E+2	1.4E+5	
Manganese	7439965	3	3			2.8E+2	3.2E+2	3.1E+2	2.0E+4	
Mercury	7439976	2	3	1.1E-1	1.1E-1	2.0E-1	3.1E-1	2.6E-1		
Nickel	7440020	3	3			1.0E+1	3.1E+1	1.8E+1	2.0E+4	
Potassium	7440097	3	4	1.2E+3	1.2E+3	4.7E+2	7.6E+2	5.8E+2		
Selenium	7782492	2	3	5.8E-1	5.8E-1	4.0E-1	1.8E+0	1.1E+0	5.1E+3	
Sodium	7440235	2	3	1.2E+3	1.2E+3	9.7E+1	6.1E+2	3.5E+2		
Vanadium	7440622	3	3			1.3E+1	3.1E+1	2.0E+1	1.0E+3	
Zinc	7440666	3	3			5.7E+1	6.7E+1	6.1E+1	3.1E+5	

Table 12-20: Statistical Summaries of VOCs, SVOC, and Metals (mg/kg) Detected in the Shallow Soil Horizon (2 to 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Analyte	CASRN	Number Detected	Total Samples	Minimum U Conc.	Maximum U Conc.	Minimum Conc.	Maximum Conc.	Average Conc.	USEPA Region III	Comparison of Average to USEPA Region III RBC
Volatile Organic Compounds										
Acetone	67641	2	9	1.2E-2	2.6E+0	1.5E-2	1.8E-1	9.8E-2	9.2E+5	
Chloroform	67663	1	9	6.0E-3	1.6E+0	2.4E-2	2.4E-2	2.4E-2	1.0E+4	
Ethylbenzene	100414	1	9	6.0E-3	1.6E+0	6.4E-1	6.4E-1	6.4E-1	1.0E+5	
Methylene chloride	75092	1	9	6.0E-3	1.6E+0	3.6E-2	3.6E-2	3.6E-2	3.8E+2	
Xylenes (total)	1330207	1	9	6.0E-3	1.6E+0	1.0E-3	1.0E-3	1.0E-3	2.0E+5	
Semi-Volatile Organic Compounds										
2,4-Dichlorophenol	120832	1	8	3.3E-1	3.7E+1	4.8E-1	4.8E-1	4.8E-1	3.1E+3	
Dibenzofuran	132649	6	14	3.3E-1	7.6E+0	1.7E-2	1.0E+0	3.3E-1	2.0E+3	
Dibenzofuran	132649	6	14	3.3E-1	7.6E+0	1.7E-2	1.0E+0	3.3E-1	2.0E+3	
Di-n-butyl phthalate	84742	3	8	3.3E-1	7.6E+0	1.8E-2	1.2E-1	5.6E-2	1.0E+5	
Metals										
Aluminum	7429905	8	8			1.6E+3	6.3E+3	3.6E+3	1.0E+6	
Antimony	7440360	2	8	4.5E+0	1.3E+1	4.8E+0	4.9E+0	4.8E+0	4.1E+2	
Arsenic	7440382	8	8			3.7E-1	8.9E+0	4.1E+0	1.9E+0	Exceeds RBC
Barium	7440393	7	8	4.2E+1	4.2E+1	3.0E+1	9.7E+1	5.8E+1	7.2E+4	
Beryllium	7440417	1	8	2.1E-1	1.1E+0	3.1E-1	3.1E-1	3.1E-1	2.0E+3	
Cadmium	7440439	3	8	4.3E-1	1.1E+0	2.1E+0	3.7E+0	2.8E+0	1.0E+3	
Calcium	7440702	8	8			2.4E+2	5.9E+3	2.1E+3		
Chromium	7440473	8	8			5.1E+0	6.6E+1	2.0E+1		
Cobalt	7440484	7	8	1.1E+1	1.1E+1	1.8E+0	6.4E+0	3.9E+0	2.0E+4	
Copper	7440508	8	8			2.2E+1	4.1E+2	1.4E+2	4.1E+4	
Iron	7439896	8	8			3.9E+3	3.9E+4	1.7E+4	3.1E+5	
Lead	7439921	18	18			2.6E+0	5.9E+2	1.1E+2		
Magnesium	7439954	8	8			8.0E+2	4.0E+3	1.8E+3		
Manganese	7439965	8	8			8.9E+1	4.5E+2	2.0E+2	2.0E+4	
Manganese	7439965	8	8			8.9E+1	4.5E+2	2.0E+2	1.4E+5	
Mercury	7439976	3	8	1.0E-1	1.2E-1	1.2E-1	3.7E-1	2.6E-1		
Nickel	7440020	8	8			4.5E+0	2.5E+1	1.4E+1	2.0E+4	
Potassium	7440097	8	8			2.9E+2	1.4E+3	5.7E+2		
Selenium	7782492	7	8	6.2E-1	6.2E-1	4.3E-1	2.2E+0	8.3E-1	5.1E+3	
Silver	7440224	1	8	4.3E-1	2.1E+0	7.9E-1	7.9E-1	7.9E-1	5.1E+3	
Sodium	7440235	7	8	1.1E+3	1.1E+3	2.9E+1	4.3E+2	1.5E+2		
Thallium	7440280	5	8	2.3E-1	2.1E+0	2.1E-1	2.4E-1	2.3E-1	7.2E+1	
Vanadium	7440622	8	8			5.9E+0	4.6E+1	2.3E+1	1.0E+3	
Zinc	7440666	8	8			3.7E+1	7.6E+2	1.9E+2	3.1E+5	

Table 12-21: Statistical Summaries of VOCs, SVOCs, and Metals (mg/kg) Detected in the Surface/Shallow Soil Horizon (0 to 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Analyte	CASRN	Number Detected	Total Samples	Minimum U Conc.	Maximum U Conc.	Minimum Conc.	Maximum Conc.	Average Conc.	USEPA Region III	Comparison of Average to USEPA Region III RBC
Volatile Organic Compounds										
Acetone	67641	4	12	1.1E-2	2.6E+0	1.5E-2	1.8E-1	6.5E-2	9.2E+5	
Carbon Disulfide	75150	1	12	6.0E-3	1.6E+0	1.1E-2	1.1E-2	1.1E-2	1.0E+5	
Chloroform	67663	1	12	6.0E-3	1.6E+0	2.4E-2	2.4E-2	2.4E-2	1.0E+4	
Ethylbenzene	100414	2	13	6.0E-3	1.6E+0	3.1E-2	6.4E-1	3.4E-1	1.0E+5	
Methylene Chloride	75092	3	12	6.0E-3	1.6E+0	7.0E-3	3.6E-2	1.9E-2	3.8E+2	
Toluene	108883	1	13	6.0E-3	1.6E+0	1.1E-2	1.1E-2	1.1E-2	2.0E+5	
Xylenes (total)	1330207	3	14	6.0E-3	1.6E+0	1.0E-3	1.1E-1	7.4E-2	2.0E+5	
Semi-Volatile Organic Compounds										
2,4-Dichlorophenol	120832	1	11	3.3E-1	3.7E+1	4.8E-1	4.8E-1	4.8E-1	3.1E+3	
Butylbenzyl phthalate	85687	1	11	3.3E-1	7.6E+0	3.6E-2	3.6E-2	3.6E-2	2.0E+5	
Dibenzofuran	132649	12	25	3.3E-1	7.6E+0	8.0E-3	1.1E+1	1.4E+0	2.0E+3	
Dibenzofuran	132649	12	25	3.3E-1	7.6E+0	8.0E-3	1.1E+1	1.4E+0	2.0E+3	
Diethyl phthalate	84662	1	11	3.3E-1	7.6E+0	1.1E-2	1.1E-2	1.1E-2	8.2E+5	
Di-n-butyl phthalate	84742	4	11	3.3E-1	7.6E+0	1.8E-2	1.2E-1	4.9E-2	1.0E+5	
Metals										
Aluminum	7429905	11	11			1.6E+3	9.4E+3	4.3E+3	1.0E+6	
Antimony	7440360	2	11	1.7E+0	1.5E+1	4.8E+0	4.9E+0	4.8E+0	4.1E+2	
Arsenic	7440382	11	11			3.7E-1	1.7E+1	5.1E+0	1.9E+0	Exceeds RBC
Barium	7440393	9	11	4.2E+1	4.9E+1	3.0E+1	9.7E+1	5.5E+1	7.2E+4	
Beryllium	7440417	2	11	2.1E-1	1.2E+0	2.2E-1	3.1E-1	2.7E-1	2.0E+3	
Cadmium	7440439	3	11	4.0E-1	1.2E+0	2.1E+0	3.7E+0	2.8E+0	1.0E+3	
Calcium	7440702	11	11			2.4E+2	1.4E+4	2.9E+3		
Chromium	7440473	11	11			5.1E+0	6.6E+1	2.1E+1		
Cobalt	7440484	9	11	1.1E+1	1.2E+1	1.8E+0	7.5E+0	4.1E+0	2.0E+4	
Copper	7440508	11	11			2.2E+1	4.1E+2	1.2E+2	4.1E+4	
Iron	7439896	11	11			3.9E+3	3.9E+4	1.6E+4	3.1E+5	
Lead	7439921	37	38	4.0E-1	4.0E-1	2.6E+0	1.1E+3	2.3E+2		
Magnesium	7439954	11	11			8.0E+2	4.0E+3	1.9E+3		
Manganese	7439965	11	11			8.9E+1	4.5E+2	2.3E+2	1.4E+5	
Manganese	7439965	11	11			8.9E+1	4.5E+2	2.3E+2	2.0E+4	
Mercury	7439976	5	11	1.0E-1	1.2E-1	1.2E-1	3.7E-1	2.6E-1		
Nickel	7440020	11	11			4.5E+0	3.1E+1	1.5E+1	2.0E+4	
Potassium	7440097	11	12	1.2E+3	1.2E+3	2.9E+2	1.4E+3	5.7E+2		
Selenium	7782492	9	11	5.8E-1	6.2E-1	4.0E-1	2.2E+0	8.9E-1	5.1E+3	
Silver	7440224	1	11	4.3E-1	2.4E+0	7.9E-1	7.9E-1	7.9E-1	5.1E+3	
Sodium	7440235	9	11	1.1E+3	1.2E+3	2.9E+1	6.1E+2	2.0E+2		
Thallium	7440280	5	11	2.3E-1	2.4E+0	2.1E-1	2.4E-1	2.3E-1	7.2E+1	
Vanadium	7440622	11	11			5.9E+0	4.6E+1	2.2E+1	1.0E+3	
Zinc	7440666	11	11			3.7E+1	7.6E+2	1.5E+2	3.1E+5	

Table 12-22: Statistical Summaries of VOCs, SVOCs, and Metals (mg/kg) Detected in the Deep Soil Horizon (greater than 4 feet bls) in OU-3, Sunnyside Yard, Queens, New York

Analyte	CASRN	Number Detected	Total Samples	Minimum U Conc.	Maximum U Conc.	Minimum Conc.	Maximum Conc.	Average Conc.	USEPA Region III	Comparison of Average to USEPA Region III RBC
Volatile Organic Compounds										
1,2-Dichloroethene, cis-	156592	1	20	5.0E-3	5.7E+0	1.0E-3	1.0E-3	1.0E-3	1.0E+4	
2-Butanone	78933	3	22	9.0E-3	2.7E+0	2.6E-2	4.1E+0	1.4E+0	6.1E+5	
Acetone	67641	3	22	9.0E-3	2.7E+0	7.0E-3	5.3E-2	2.9E-2	9.2E+5	
Carbon Disulfide	75150	4	22	5.0E-3	5.7E+0	3.0E-3	1.0E-2	5.0E-3	1.0E+5	
Ethylbenzene	100414	4	22	5.0E-3	2.7E+0	1.1E-1	2.5E+0	8.1E-1	1.0E+5	
Methylene chloride	75092	3	22	5.0E-3	2.7E+0	1.4E-2	6.3E-1	2.4E-1	3.8E+2	
Toluene	108883	3	22	5.0E-3	5.7E+0	6.0E-4	7.6E-3	3.1E-3	2.0E+5	
Xylenes (total)	1330207	5	22	5.0E-3	2.7E+0	2.0E-3	1.8E+1	4.0E+0	2.0E+5	
Semi-Volatile Organic Compounds										
Bis(2-ethylhexyl)phthalat	117817	7	20	3.5E-1	3.6E+1	4.8E-2	9.4E-1	2.7E-1	2.0E+2	
Dibenzofuran	132649	2	23	3.5E-1	3.6E+1	2.3E-2	2.9E+0	1.5E+0	2.0E+3	
Dibenzofuran	132649	2	23	3.5E-1	3.6E+1	2.3E-2	2.9E+0	1.5E+0	2.0E+3	
Di-n-butyl phthalate	84742	2	20	3.5E-1	3.6E+1	1.5E-2	4.0E-2	2.8E-2	1.0E+5	
Metals										
Aluminum	7429905	17	17			2.1E+3	7.0E+3	4.1E+3	1.0E+6	
Arsenic	7440382	3	17	1.2E+0	1.1E+1	1.6E+0	5.0E+0	3.1E+0	1.9E+0	Exceeds RBC
Barium	7440393	17	17			1.4E+1	4.2E+2	8.0E+1	7.2E+4	
Beryllium	7440417	2	17	2.4E+0	3.0E+0	4.6E-1	6.3E-1	5.5E-1	2.0E+3	
Cadmium	7440439	1	17	7.6E-1	4.5E+0	7.2E-1	7.2E-1	7.2E-1	1.0E+3	
Calcium	7440702	17	17			7.7E+2	9.6E+3	3.6E+3		
Chromium	7440473	17	17			4.4E+0	1.6E+1	1.0E+1		
Cobalt	7440484	17	17			2.2E+0	6.6E+0	4.3E+0	2.0E+4	
Copper	7440508	17	17			3.9E+0	9.6E+1	2.0E+1	4.1E+4	
Iron	7439896	17	17			5.0E+3	1.7E+4	1.0E+4	3.1E+5	
Lead	7439921	41	41			1.5E+0	1.8E+2	1.5E+1		
Magnesium	7439954	17	17			1.6E+3	7.2E+3	3.2E+3		
Manganese	7439965	17	17			5.3E+1	1.5E+3	3.6E+2	1.4E+5	
Manganese	7439965	17	17			5.3E+1	1.5E+3	3.6E+2	2.0E+4	
Mercury	7439976	2	17	4.3E-2	2.2E+0	9.7E-2	1.7E-1	1.3E-1		
Nickel	7440020	17	17			6.1E+0	1.4E+1	9.4E+0	2.0E+4	
Potassium	7440097	17	17			2.7E+2	1.4E+3	7.1E+2		
Sodium	7440235	17	17			9.2E+1	4.0E+2	1.7E+2		
Vanadium	7440622	17	17			6.8E+0	3.2E+1	1.6E+1	1.0E+3	
Zinc	7440666	17	17			9.5E+0	1.9E+2	3.7E+1	3.1E+5	

Table 12-23: Average Concentrations of Total PCBs, Total B(a)P Equivalents, Total cPAHs, and Total PAHs (mg/kg) Detected in the Four Soil Horizons Samples in OU-3, Sunnyside Yard, Queens, New York

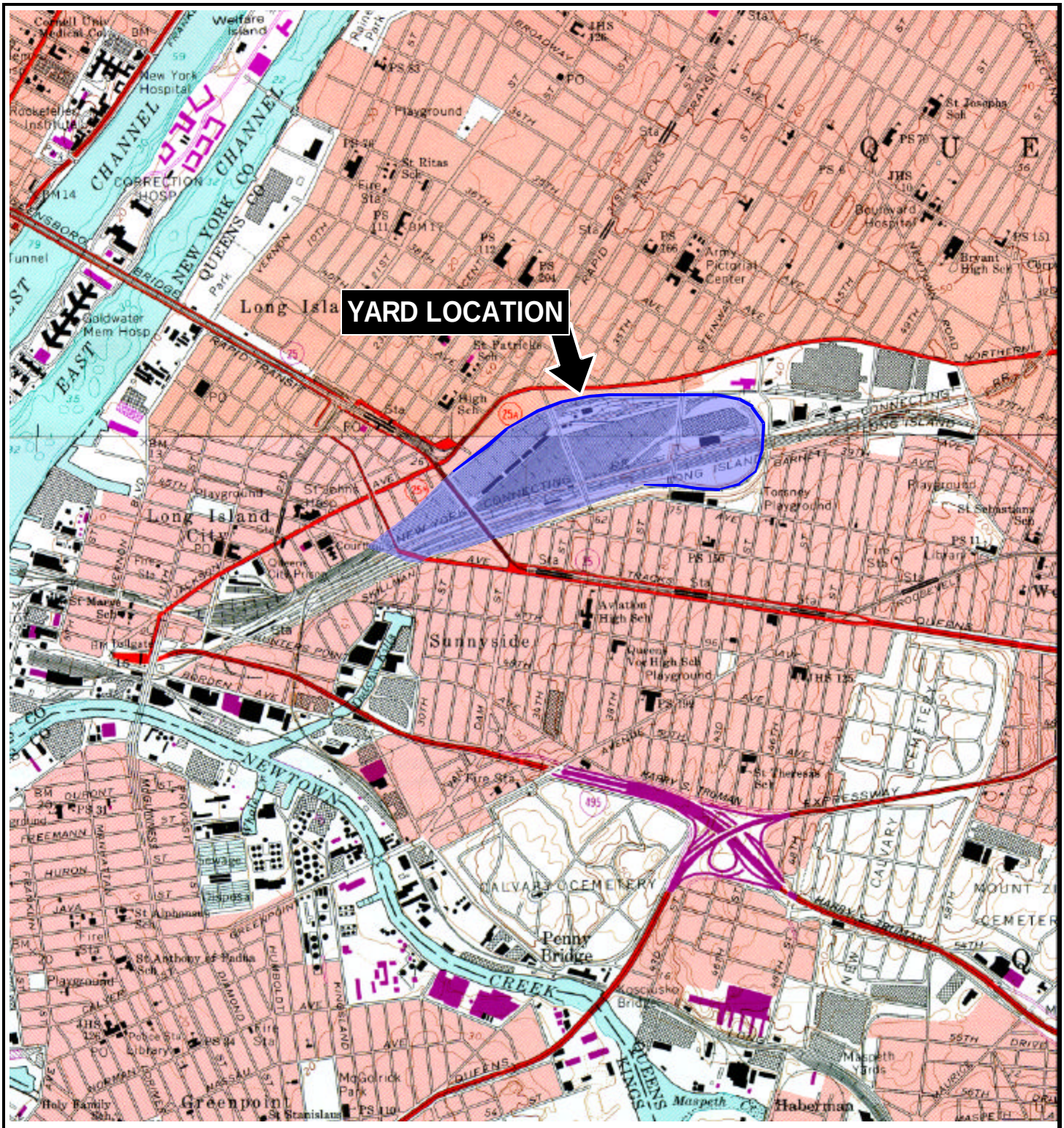
Analyte	Surface	Shallow	Surface/Shallow	Deep
Total PCBs	2.9E+0	1.0E+0	2.3E+0	5.8E-1
Total Benzo(a)pyrene Equivalents	6.0E-1	2.6E-1	4.5E-1	3.9E-1

Note:
The averages shown in this table are derived from the individual locations shown in Tables 12-1 to 12-16

Table 12-23: Average Concentrations of Total PCBs, Total B(a)P Equivalents, Total cPAHs, and Total PAHs (mg/kg) Detected in the Four Soil Horizons Samples in OU-3, Sunnyside Yard, Queens, New York

Analyte	Surface	Shallow	Surface/Shallow	Deep
Total cPAHs	3.0E+0	1.4E+0	2.3E+0	1.5E+0
Total PAHs	1.9E+1	1.7E+1	4.4E+1	1.8E+1

Note:
The averages shown in this table are derived from the individual locations shown in Tables 12-1 to 12-16



SOURCE:
CENTRALPARKANDBROOKLYN,NEWYORK
QUADRANGLE7.5MINUTESERIES(TOPOGRAPHIC)

QUADRANGLE LOCATION

N

0 2000'

Title:

LOCATIONOFSITE

FINALOU-3RIREPORT
SUNNYSIDEYARD,QUEENS,NEWYORK

Preparedfor:

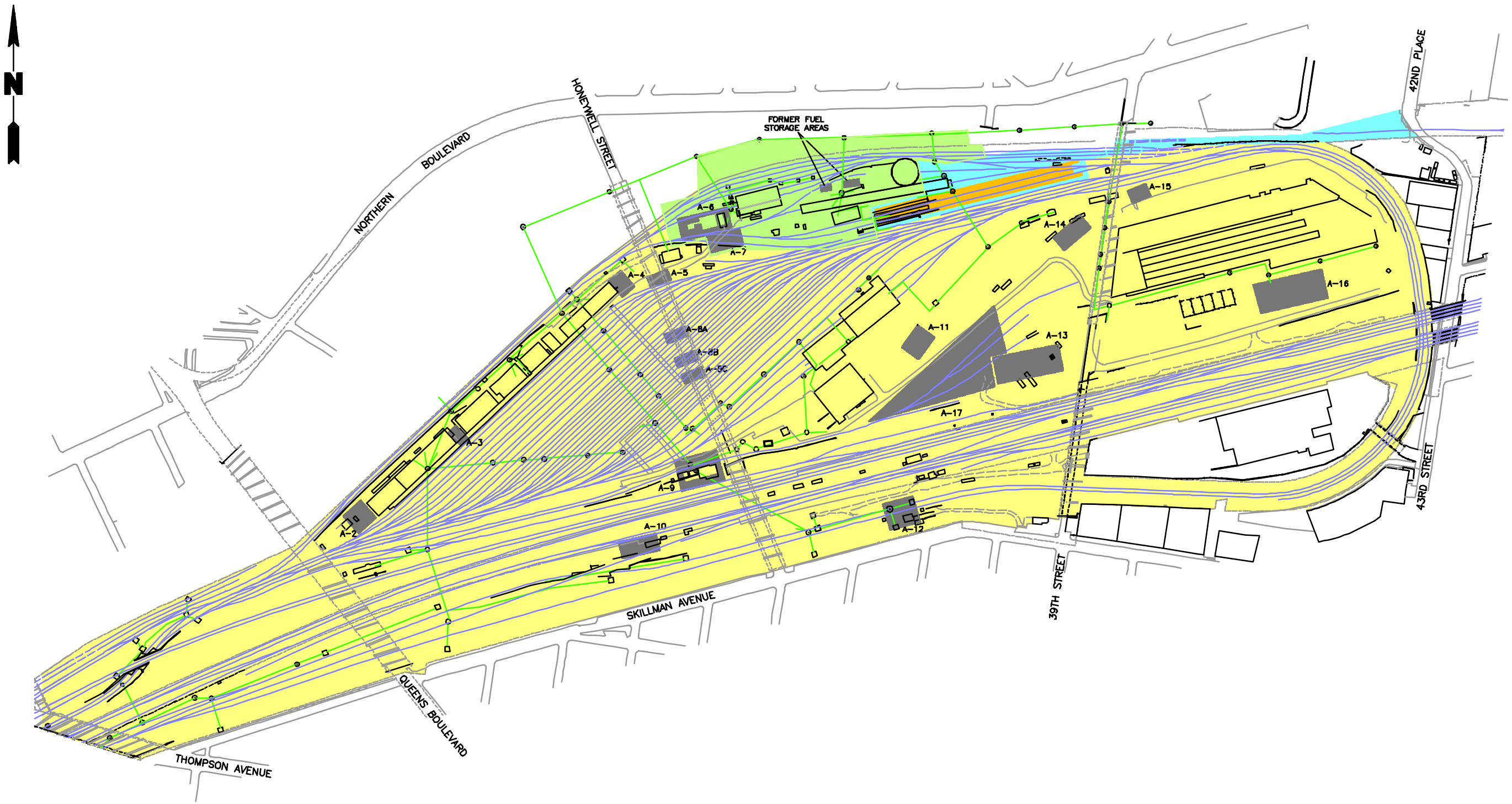
AMTRAK

ROUX

ROUXASSOCIATES,INC.
EnvironmentalConsulting &Management

Compiledby: H.G.	Date: 28DEC04	FIGURE
Preparedby: R.K.	Scale: 1"=2000'	1-1
ProjectMgr.: H.G.	Office: NY	
FileNo.: AM4517805.CDR	ProjectNo.: 05545Y08	

N:\PROJECTS\AMTRAK\SUNNYSIDEYARD\NY\176\AM4517805.CDR



LEGEND

- LOCATION OF RAILROAD TRACK
- APPROXIMATE LOCATION OF SEWER
- GRATE COVER CATCH BASIN LOCATION
- SOLID COVER MANHOLE LOCATION
- GRATE COVER MANHOLE LOCATION
- A-2 LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN
- APPROXIMATE PROPERTY BOUNDARY
- OU-1
- OU-2
- OU-3
- OU-4
- OU-5

NOTES:

1. LOCATIONS OF SEWER COMPONENTS BASED UPON A REVIEW OF AMTRAK-SUPPLIED ENGINEERING DIAGRAMS AND LIMITED FIELD SURVEY.
2. OU-6, GROUND WATER BENEATH THE YARD, IS NOT SHOWN.
3. RI - REMEDIAL INVESTIGATION
4. LIRR - LONG ISLAND RAIL ROAD

Title:

AMTRAK YARD LAYOUT

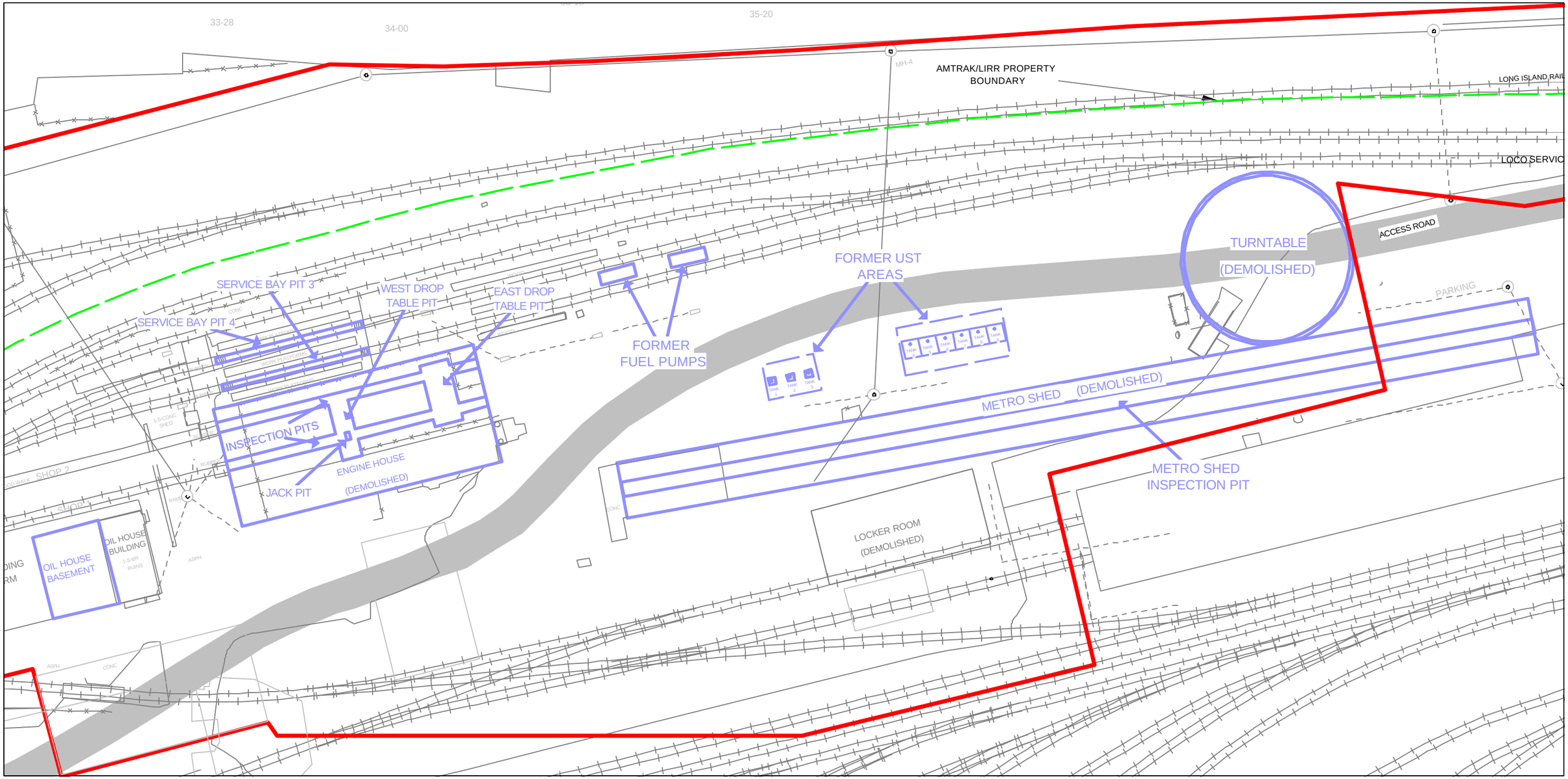
FINAL OU-3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:
AMTRAK

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: H.G.	Date: 28DEC04	FIGURE 1-2
Prepared by: R.K.	Scale: AS SHOWN	
Project Mgr: H.G.	Office: NY	
File No: AM4517804	Project: 05545Y08	

N:\Projects\05545Y08.AMTRAK\AM4517804\dwg\AM4517804.DWG



EXPLANATION

EXTENT OF SUBSURFACE STRUCTURE

OU-3 BOUNDARY

NOTE:
THE LOCATIONS OF THE ENGINE HOUSE AND METRO SHED PITS, AND THE OIL HOUSE BASEMENT WERE DETERMINED BASED ON DRAWINGS SUPPLIED BY AMTRAK

N

60' 0 60'

Title:

LOCATIONS OF SUBSURFACE STRUCTURES

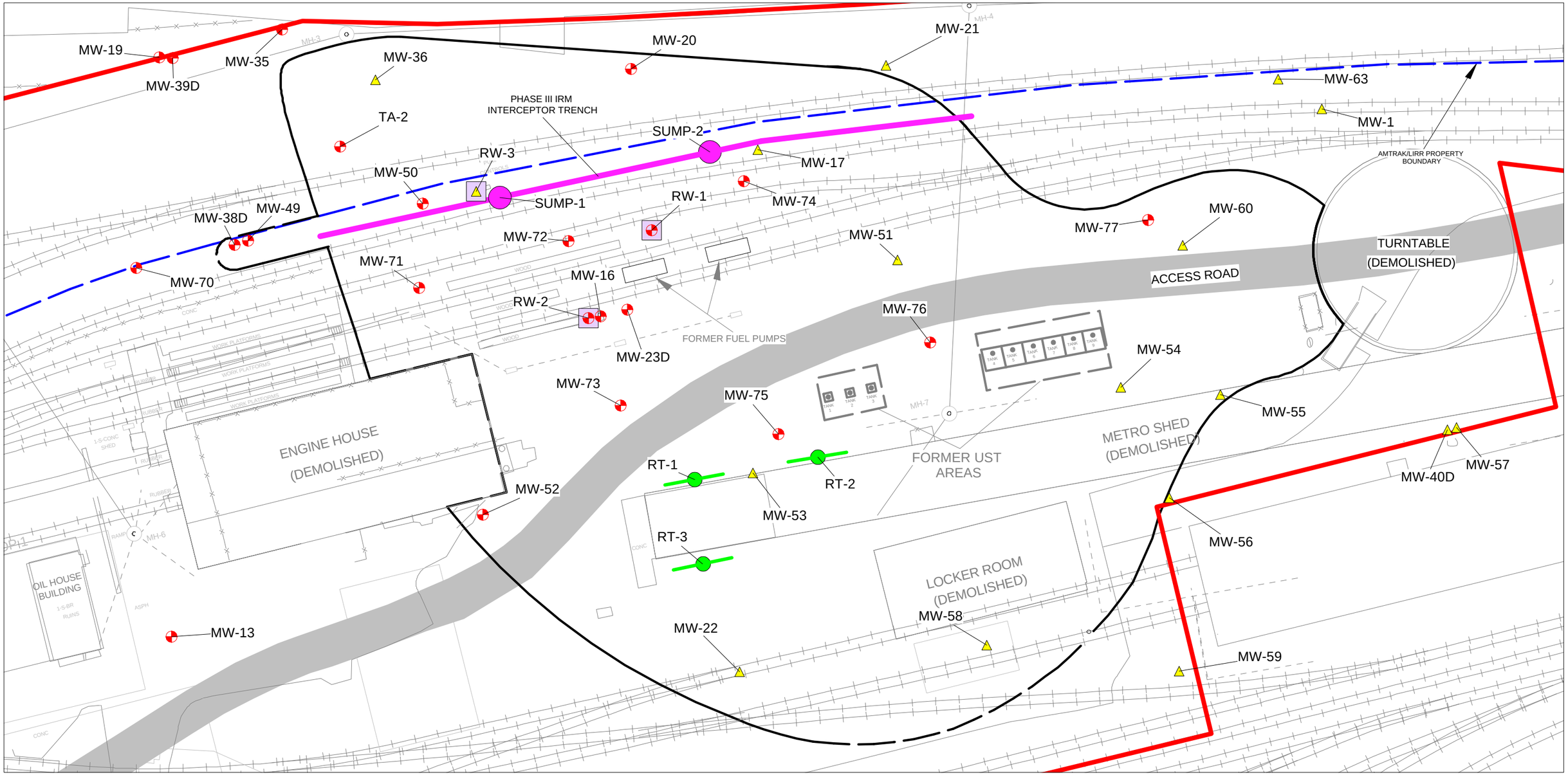
FINAL OU-3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 5/10/2005	FIGURE
Prepared by: RSK	Scale: SHOWN	5-1
Project Mgr: HG	Office: NY	
File No: AM4517816.WOR	Project: 05545Y08	



RT-1 — LOCATION AND DESIGNATION OF PHASE I IRM RECOVERY TRENCH (SUMPS SHOWN)

RW-1 — LOCATION AND DESIGNATION OF PHASE II IRM RECOVERY WELLS

LOCATION OF PHASE III IRM INTERCEPTOR TRENCH (SUMPS SHOWN)

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

OU-3 BOUNDARY

MW-16 — LOCATION AND DESIGNATION OF MONITORING WELL

MW-54 — LOCATION AND DESIGNATION OF FORMER (ABANDONED OR DESTROYED) MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC.

NOTES

IRM - INTERIM REMEDIAL MEASURE

SPH - SEPARATE-PHASE HYDROCARBON

OU-3 - OPERABLE UNIT 3

RI - REMEDIAL INVESTIGATION

LIRR - LONG ISLAND RAIL ROAD

50' 0 50'

N

Title:

LOCATIONS OF PREVIOUS AND EXISTING SPH IRMs

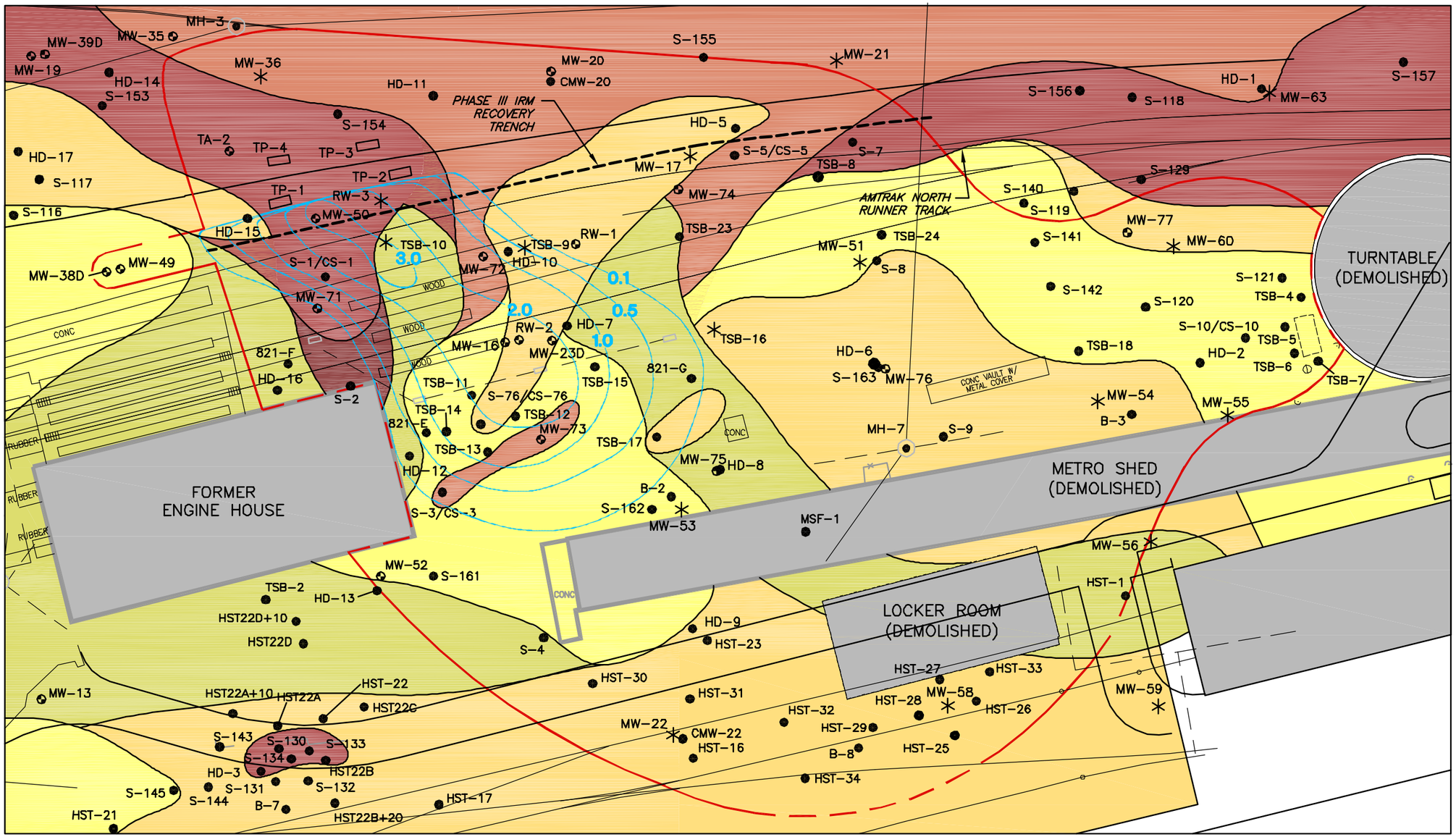
FINAL OU-3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 9/8/2004	FIGURE
Prepared by: RSK	Scale: SHOWN	6-1
Project Mgr: HG	Office: NY	
File No: AM4517813.WOR	Project: 05545Y08	



LEGEND

- HD-15 ● LOCATION AND DESIGNATION OF OU-3 SOIL BORING
- MW-50 ⊕ LOCATION AND DESIGNATION OF EXISTING OU-3 MONITORING WELL
- MW-17 ✳ LOCATION AND DESIGNATION OF FORMER ROUX MONITORING WELL IN OU-3
- TP-4 ▭ LOCATION AND DESIGNATION OF TEST PIT NEAR FORMER HUMP TRACK
- LOCATION OF PHASE III IRM RECOVERY TRENCH
- —2.0— CURRENT LINE OF EQUAL SEPARATE-PHASE PETROLEUM ACCUMULATION APPARENT THICKNESS
- FOOTPRINT OF EXISTING OR FORMER BUILDING STRUCTURE

NOTES:

1. GEOLOGIC CONTACTS ARE INFERRED FROM SOIL BORING LOGS.
2. GEOLOGIC DATA IS FROM THE DEPTH OF THE WATER TABLE, AT THE TIME EACH BORING WAS COMPLETED. GEOLOGIC DATA ON THIS FIGURE IS NOT FROM A UNIFORM VERTICAL DATUM.
3. SEPARATE-PHASE HYDROCARBON ACCUMULATION CONTOURS REPRESENT MONITORING DATA COLLECTED ON MAY 20, 2004.
4. IRM – INTERIM REMEDIAL MEASURE
5. OU-3 – OPERABLE UNIT 3
6. SPH – SEPARATE-PHASE HYDROCARBON

GEOLOGIC UNITS

- SAND
- GRAVELLY SAND
- GRAVELLY/SILTY SAND
- SILTY SAND
- CLAYEY/SILTY SAND
- SANDY CLAY

Title:

GENERALIZED GEOLOGY AT THE WATER TABLE IN THE VICINITY OF OU-3 SPH PLUME

FINAL OU3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:
AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.K.	Date: 07FEB05	FIGURE
Prepared by: G.M.	Scale: 1" = 50'	7-1
Project Mgr: J.D.	Office: NY	
File No: AM4517808	Project: 05545Y08	

MW-19
MW-39D
MW-35
MW-20
TA-2
TP-4
TP-3
TP-2
TP-1
MW-38D
MW-49
MW-50
RW-1
MW-74
MW-77
MW-72
MW-70
MW-71
MW-16
RW-2
MW-23D
MW-73
MW-75
MW-76
MW-52
MW-13
3
2
1
0.5
0.1
AMTRAK/LIRR PROPERTY BOUNDARY
TURNTABLE (DEMOLISHED)
ACCESS ROAD
FORMER FUEL PUMPS
FORMER UST AREAS
ENGINE HOUSE (DEMOLISHED)
METRO SHED (DEMOLISHED)
LOCKER ROOM (DEMOLISHED)
OIL HOUSE BUILDING
MH-3
MH-4
MH-6
MH-7

MW-16 — LOCATION AND DESIGNATION OF MONITORING WELL

TP-1 — LOCATION AND DESIGNATION OF TEST PIT NEAR FORMER HUMP TRACK

OU-3 BOUNDARY

3 — CURRENT LINE OF EQUAL APPARENT SEPARATE-PHASE PETROLEUM THICKNESS

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

NOTES

APPARENT SEPARATE-PHASE PETROLEUM THICKNESS CONTOURS REPRESENT MONITORING DATA COLLECTED ON MAY 20, 2004

SPH - SEPARATE-PHASE HYDROCARBON

IRM - INTERIM REMEDIAL MEASURE

OU-3 - OPERABLE UNIT 3

LIRR - LONG ISLAND RAIL ROAD

RI - REMEDIAL INVESTIGATION

N

50' 0 50'

Title:

CONFIGURATION OF SPH PLUME ON MAY 20, 2004

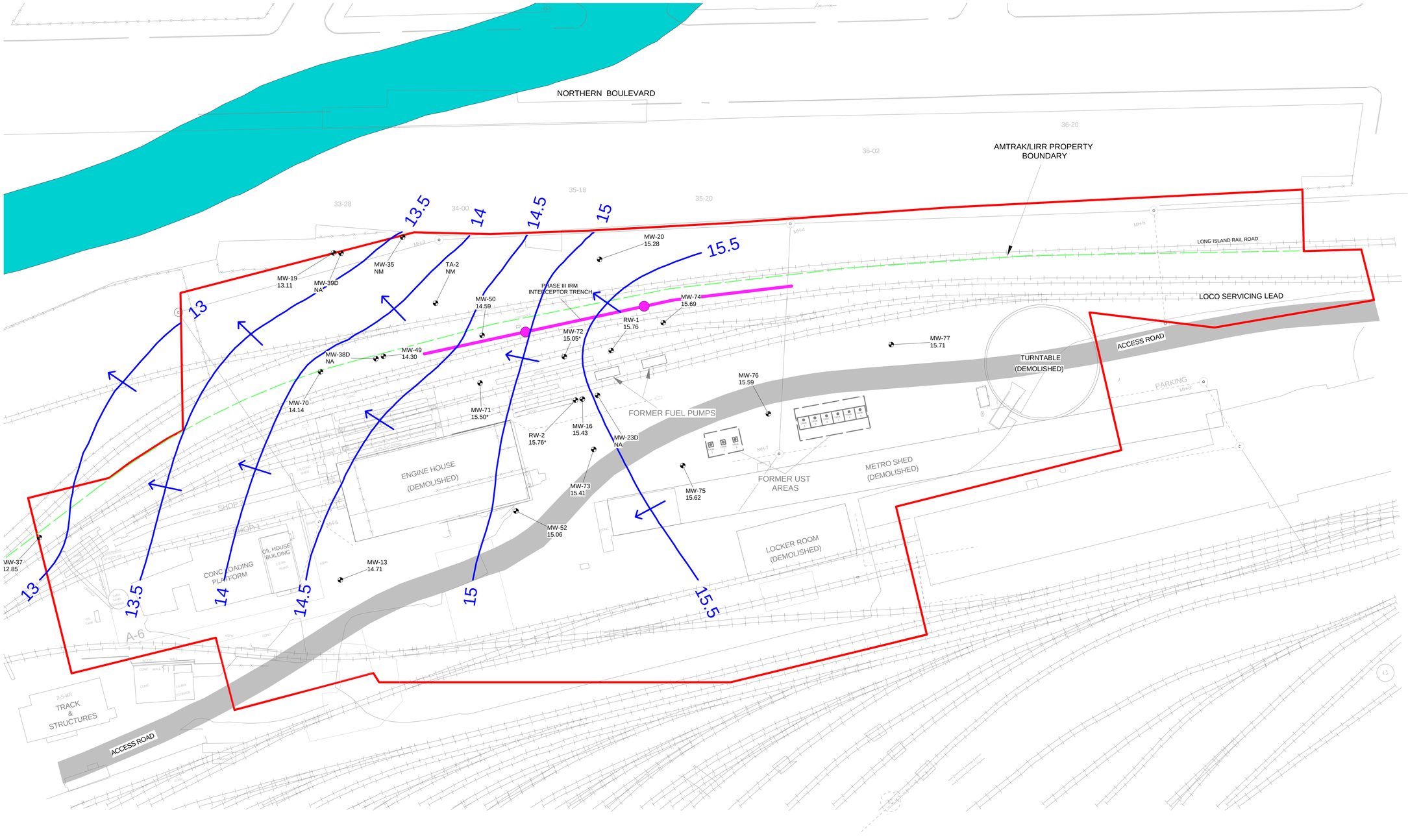
FINAL OU-3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 2/4/2005	FIGURE
Prepared by: RSK	Scale: SHOWN	8-1
Project Mgr: HG	Office: NY	
File No: AM4517814.WOR	Project: 05545Y08	



MW-16
15.43
LOCATION AND DESIGNATION OF MONITORING WELL

GROUNDWATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL

15.5 CONTOUR OF EQUAL GROUNDWATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL

INFERRED DIRECTION OF GROUNDWATER FLOW

APPROXIMATE 1890 FLOW PATH OF DUTCH KILLS CREEK

OU-3 BOUNDARY

LOCATION OF PHASE III IRM INTERCEPTOR TRENCH

NOTES:

WATER LEVEL MEASUREMENTS WERE COLLECTED ON AUGUST 5, 2004

IF APPLICABLE, GROUNDWATER ELEVATIONS WERE CORRECTED FOR THE PRESENCE OF SEPARATE PHASE HYDROCARBON

* - INDICATES WATER LEVEL WAS NOT USED IN THE CONSTRUCTION OF CONTOURS DUE TO ANOMOLOUS READING

NA - INDICATES WATER LEVEL WAS NOT USED IN THE CONSTRUCTION OF CONTOURS BECAUSE WELL SCREEN IS SET IN THE DEEP ZONE

NM - NOT MEASURED

OU-3 - OPERABLE UNIT 3

RI - REMEDIAL INVESTIGATION

LIRR - LONG ISLAND RAIL ROAD

SPH - SEPARATE-PHASE HYDROCARBON

40' 0 40'

N

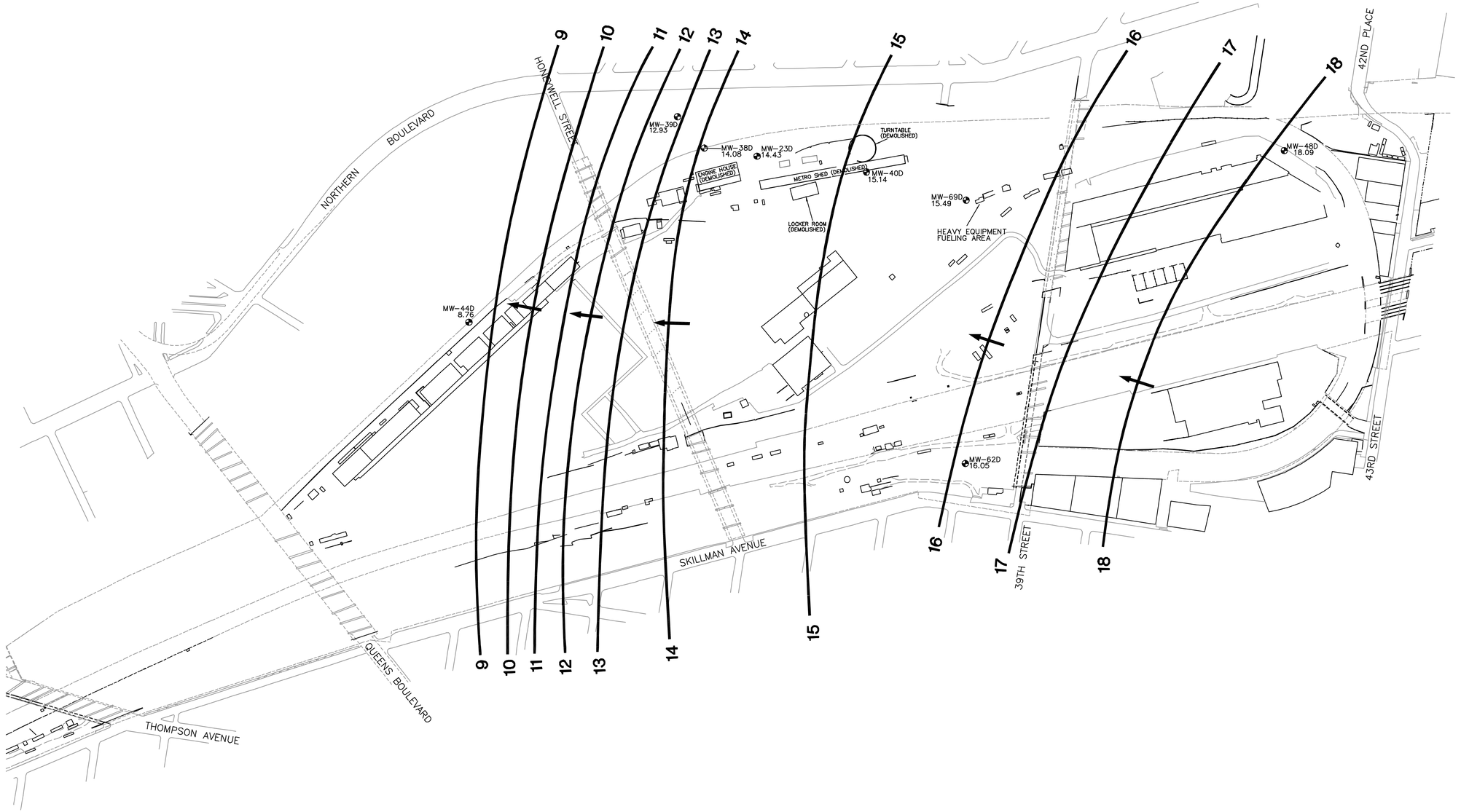
Title:
GROUNDWATER ELEVATIONS IN THE SHALLOW ZONE (AUGUST 5, 2004)

FINAL OU-3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:
AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 12/27/2004	PLATE	
Prepared by: RSK	Scale: AS SHOWN		
Project Mgr: HG	Office: NY		2-1
File No: AAM117B1Z.WOR	Project: 0554SY08		



LEGEND

MW-44D	LOCATION AND DESIGNATION OF EXISTING DEEP GROUND-WATER MONITORING WELL
8.76	WATER-LEVEL ELEVATION ON JUNE 17-19, 1997, IN FEET RELATIVE TO MEAN SEA LEVEL
9	LINE OF EQUAL WATER-LEVEL ELEVATION
	DIRECTION OF GROUND-WATER FLOW

200' 0 200'

Title:

GROUNDWATER ELEVATIONS IN THE DEEP ZONE JUNE 17-19, 1997

FINAL OU-3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.K.	Date: 11MAY05	PLATE
Prepared by: G.M.	Scale: AS SHOWN	
Project Mgr: H.G.	Office: NY	2-2
File No: AM4517814	Project: 05545Y08	

CS-1	LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING
TSB-9	LOCATION AND DESIGNATION OF SOIL BORING AND TEMPORARY GEOPROBE GROUNDWATER SAMPLING POINT
HD-1	LOCATION AND DESIGNATION OF SUPPLEMENTAL RI SOIL BORING
MW-50	LOCATION AND DESIGNATION OF SPH SAMPLE
MHS-3 MHW-3	LOCATION AND DESIGNATION OF SEWER SEDIMENT ("S") AND WATER ("W") SAMPLE
MHW-6	LOCATION AND DESIGNATION OF SEWER WATER SAMPLE
CB-4	LOCATION AND DESIGNATION OF CATCH BASIN WATER SAMPLE
MW-16	LOCATION AND DESIGNATION OF MONITORING WELL
MW-54	LOCATION AND DESIGNATION OF FORMER MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC.
A — A'	LINE OF CROSS SECTION
RT-1	LOCATION AND DESIGNATION OF PHASE I IRM RECOVERY TRENCH
RW-1	LOCATION AND DESIGNATION OF PHASE II IRM RECOVERY WELLS
	LOCATION OF PHASE III IRM INTERCEPTOR TRENCH
	APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)
	AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)
	AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)
	AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)
	OU-3 BOUNDARY
	LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION
	LOCATION AND DESIGNATION OF TEST PIT
	SEWER LINE (DASHED WHERE INFERRED), WITH MANHOLE DESIGNATION (OU-5)
	APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

NOTES

IRM - INTERIM REMEDIAL MEASURE
SPH - SEPARATE-PHASE HYDROCARBON
OU-3 - OPERABLE UNIT 3
RI - REMEDIAL INVESTIGATION
HST - HIGH SPEED TRAINSET
SMP - STANDARD MOTOR PRODUCTS
LIRR - LONG ISLAND RAIL ROAD

N

Title:

SAMPLE LOCATIONS AND LINES OF SECTION

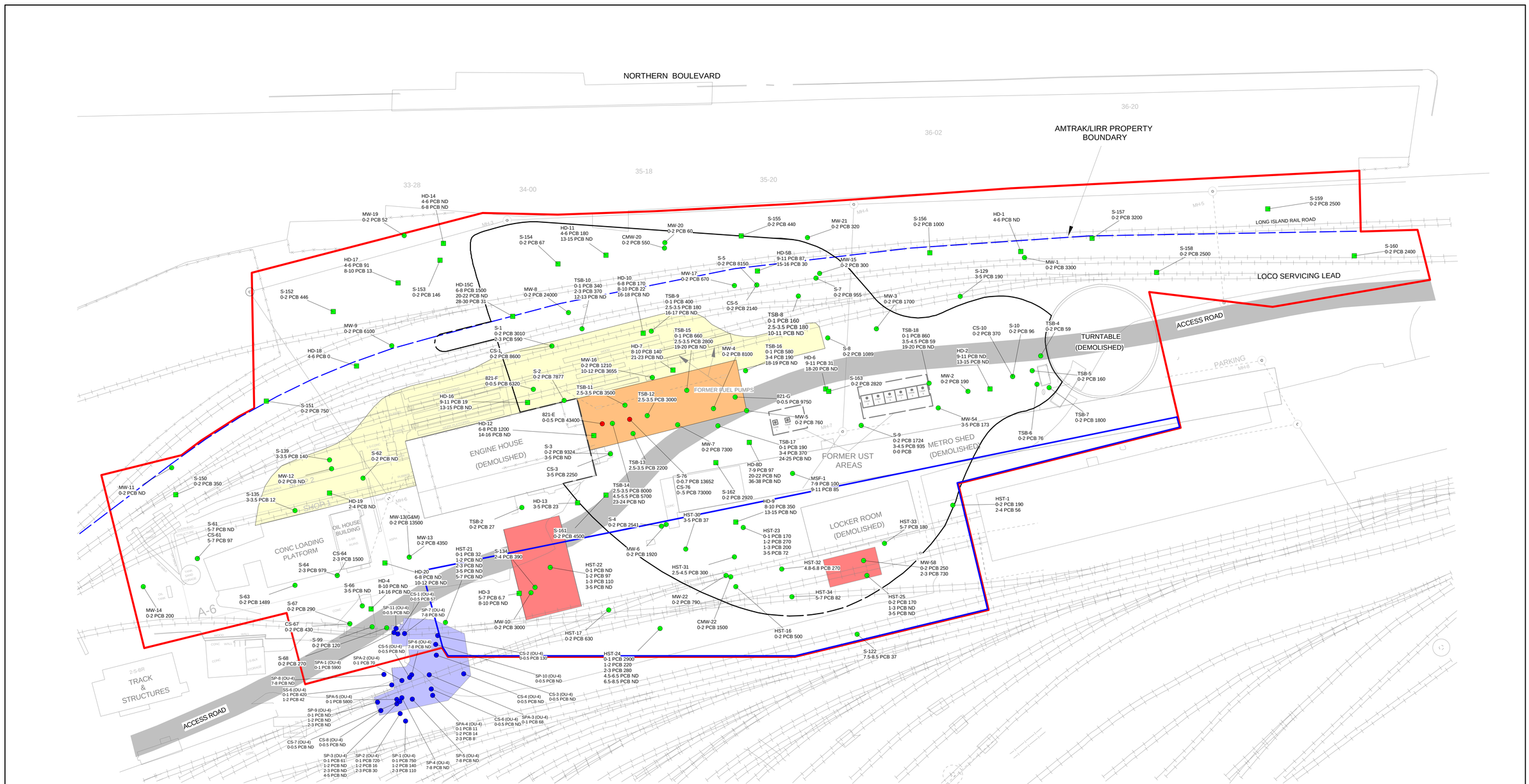
FINAL OU-3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 12/28/2004	PLATE
Prepared by: RSK	Scale: AS SHOWN	3-1
Project Mgr: HG	Office: NY	
File No: AM4517808.WOR	Project: 05545Y08	



SOIL SAMPLE EXPLANATION

DESIGNATION

HD-10	
6-8	PCB 170
8-10	PCB 22
16-18	PCB 0

TOTAL PCB CONCENTRATION IN SOIL (UG/KG)

SAMPLE DEPTH (FT BLS)

HD-1 — LOCATION AND DESIGNATION OF SUPPLEMENTAL RI SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR PCBs

S-61 — LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR PCBs

821-E — LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ONE SAMPLE INTERVAL EXCEEDING THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR PCBs

SP-1 (OU-4) — LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING COLLECTED IN ASSOCIATION WITH THE AREA 7 SOIL EXCAVATION WITH ALL SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR PCBs

EXPLANATION

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)

AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)

AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)

OU-3 BOUNDARY

LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION

MH-4 — SEWER LINE (DASHED WHERE INFERRED), WITH MANHOLE DESIGNATION

APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

NOTES

NYSDEC RECOMMENDED CLEANUP LEVEL FOR PCBs - 25,000 UG/KG

NYSDEC - NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPH - SEPARATE-PHASE HYDROCARBON

OU-3 - OPERABLE UNIT 3

PCB - POLYCHLORINATED BIPHENYL

UG/KG - MICROGRAM PER KILOGRAM

FT BLS - FEET BELOW LAND SURFACE

RI - REMEDIAL INVESTIGATION

LIRR - LONG ISLAND RAIL ROAD

HST - HIGH SPEED TRAINSET

ND - NOT DETECTED

40' 0 40'

N

Title:

TOTAL PCB CONCENTRATIONS IN SOIL

FINAL OU-3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 9/3/2004	PLATE
Prepared by: RSK	Scale: AS SHOWN	3-2
Project Mgr: HG	Office: NY	
File No: AM457809.WOR	Project: 05545Y08	

NORTHERN BOULEVARD

AMTRAK/LIRR PROPERTY BOUNDARY

LONG ISLAND RAIL ROAD

LOCO SERVICING LEAD

ACCESS ROAD

TURNTABLE (DEMOLISHED)

PARKING

FORMER FUEL PUMPS

FORMER UST AREAS

ENGINE HOUSE (DEMOLISHED)

METRO SHED (DEMOLISHED)

LOCKER ROOM (DEMOLISHED)

CONC LOADING PLATFORM

OIL HOUSE BUILDING

SHOP 1

SHOP 2

A-6

TRACK & STRUCTURES

ACCESS ROAD

36-20

36-02

35-18

35-20

34-00

33-28

HD-1
4-6 CPAH ND

HD-2
9-11 CPAH ND
13-15 CPAH ND

HD-3
5-7 CPAH 2090
8-10 CPAH ND
20-22 CPAH ND

HD-4
8-10 CPAH ND
14-16 CPAH ND

HD-5B
9-11 CPAH ND
15-16 CPAH ND

HD-6
9-11 CPAH ND
18-20 CPAH ND

HD-7
8-10 CPAH ND
21-23 CPAH ND

HD-8D
7-9 CPAH ND
20-22 CPAH ND
36-38 CPAH ND

HD-9
8-10 CPAH ND
13-15 CPAH ND

HD-10
6-8 CPAH ND
8-10 CPAH ND
16-18 CPAH ND

HD-11
4-6 CPAH 1150
8-10 CPAH ND
13-15 CPAH 620

HD-12
6-8 CPAH ND
14-16 CPAH ND

HD-13
3-5 CPAH ND

HD-14
4-6 CPAH 2840
6-8 CPAH 210

HD-15C
6-8 CPAH ND
20-22 CPAH ND
28-30 CPAH 24

HD-16
9-11 CPAH 29
13-15 CPAH ND

HD-17
4-6 CPAH 730
8-10 CPAH 52

HD-18
4-6 CPAH 150

HD-19
2-4 CPAH ND

HD-20
6-8 CPAH ND
10-12 CPAH ND

HST-1
0-2 CPAH 255
2-4 CPAH 514

HST-16
0-2 CPAH 2040

HST-17
0-2 CPAH 3283

HST-22
0-1 CPAH 13790
1-2 CPAH 453
1-3 CPAH 1086
3-5 CPAH 694

HST-22A
0-1 CPAH 33500

HST-22A+10
0-1 CPAH 7260

HST-22B
0-1 CPAH 108200

HST-22B+20
0-1 CPAH 2390

HST-22C
0-1 CPAH 1743

HST-22D
0-1 CPAH 22700

HST-22D+10
0-1 CPAH 860

HST-21
0-1 CPAH 805
1-2 CPAH 97
2-3 CPAH ND
3-5 CPAH 117
5-7 CPAH ND

HST-23
0-1 CPAH 2540
1-2 CPAH 2370
1-3 CPAH 144
3-5 CPAH 203

HST-24
0-1 CPAH 8710
1-2 CPAH 3276
2-3 CPAH 5280
4.5-6.5 CPAH 5410
6.5-8.5 CPAH 6690

HST-25
0-2 CPAH 5650
1-3 CPAH 1708
3-5 CPAH 359

HST-26
0-2 CPAH 1847

HST-27
0-2 CPAH 7770

HST-28
0-2 CPAH 3900

HST-29
0-2 CPAH ND

MW-54
3-5 CPAH ND

MW-58
0-2 CPAH 2517
2-3 CPAH 1510

S-61
5-7 CPAH ND

S-62
0-2 CPAH ND

S-64
2-3 CPAH ND

S-99
CPAH 596

S-122
7.5-8.5 CPAH 127

S-129
3-5 CPAH 478

S-134
2-4 CPAH 2830

S-135
3-3.5 CPAH ND

S-139
3-3.5 CPAH 191

SS-6 (OU-4)
0-1 CPAH 369
1-2 CPAH 143

TSB-2
0-2 CPAH 1949

TSB-9
2.5-3.5 CPAH 390

TSB-11
2.5-3.5 CPAH 4140

TSB-18
0-1 CPAH 9080

SOIL SAMPLE EXPLANATION

DESIGNATION

HD-10

6-8	CPAH ND
8-10	CPAH ND
16-18	CPAH ND

TOTAL CPAH CONCENTRATION IN SOIL (UG/KG)

SAMPLE DEPTH (FT BLS)

HD-1 — LOCATION AND DESIGNATION OF SUPPLEMENTAL RI SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR CPAHs

S-61 — LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR CPAHs

HST-22A — LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ONE SAMPLE INTERVAL EXCEEDING THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR CPAHs

EXPLANATION

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)

AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)

AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)

OU-3 BOUNDARY

LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION

MH-4 — SEWER LINE (DASHED WHERE INFERRED), WITH MANHOLE DESIGNATION

APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

NOTES

NYSDEC RECOMMENDED CLEANUP LEVEL FOR CPAHs - 25,000 UG/KG

SPH - SEPARATE-PHASE HYDROCARBON

NYSDEC - NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

OU-3 - OPERABLE UNIT 3

CPAH - SEVEN SPECIFIC POLYCYCLIC AROMATIC HYDROCARBONS CONSIDERED BY THE NYSDEC TO BE CARCINOGENIC

HST - HIGH SPEED TRAINSET

UG/KG - MICROGRAM PER KILOGRAM

FT BLS - FEET BELOW LAND SURFACE

RI - REMEDIAL INVESTIGATION

LIRR - LONG ISLAND RAIL ROAD

ND - NOT DETECTED

40' 0 40'

N

Title:

TOTAL CPAH CONCENTRATIONS IN SOIL

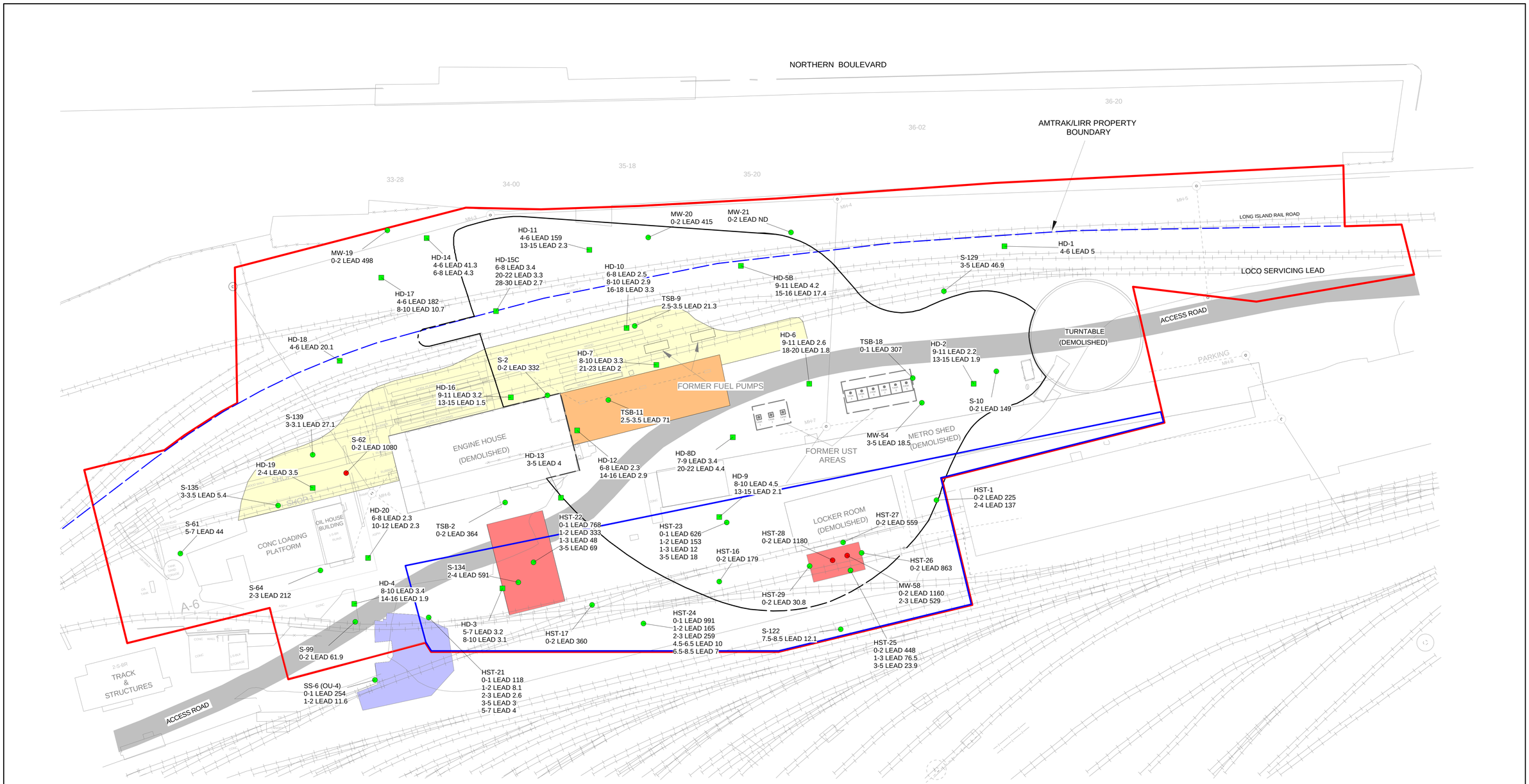
FINAL OU-3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 9/3/2004	PLATE	
Prepared by: RSK	Scale: AS SHOWN		
Project Mgr: HG	Office: NY	3-3	
File No: AM451781G WOR	Project: 05545Y08		



SOIL SAMPLE EXPLANATION

DESIGNATION

HD-10	
6-8	LEAD 2.5
8-10	LEAD 2.9
16-18	LEAD 3.3

LEAD CONCENTRATION IN SOIL (MG/KG)

SAMPLE DEPTH (FT BLS)

HD-1 — LOCATION AND DESIGNATION OF SUPPLEMENTAL RI SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR LEAD

S-61 — LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ALL COLLECTED SAMPLE INTERVALS LESS THAN THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR LEAD

HST-28 — LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING WITH ONE SAMPLE INTERVAL EXCEEDING THE NYSDEC APPROVED SOIL CLEANUP LEVEL FOR LEAD

EXPLANATION

- APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)
- AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)
- AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)
- AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)
- OU-3 BOUNDARY
- LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION
- MH-4 — SEWER LINE (DASHED WHERE INFERRED), WITH MANHOLE DESIGNATION
- APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

NOTES

NYSDEC RECOMMENDED CLEANUP LEVEL FOR LEAD - 1,000 MG/KG

NYSDEC - NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

OU-3 - OPERABLE UNIT 3

MG/KG - MICROGRAM PER KILOGRAM

FT BLS - FEET BELOW LAND SURFACE

SPH - SEPARATE-PHASE HYDROCARBON

RI - REMEDIAL INVESTIGATION

LIRR - LONG ISLAND RAIL ROAD

ND - NOT DETECTED

HST - HIGH SPEED TRAINSET

N

40' 0 40'

Title:

TOTAL LEAD CONCENTRATIONS IN SOIL

FINAL OU-3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

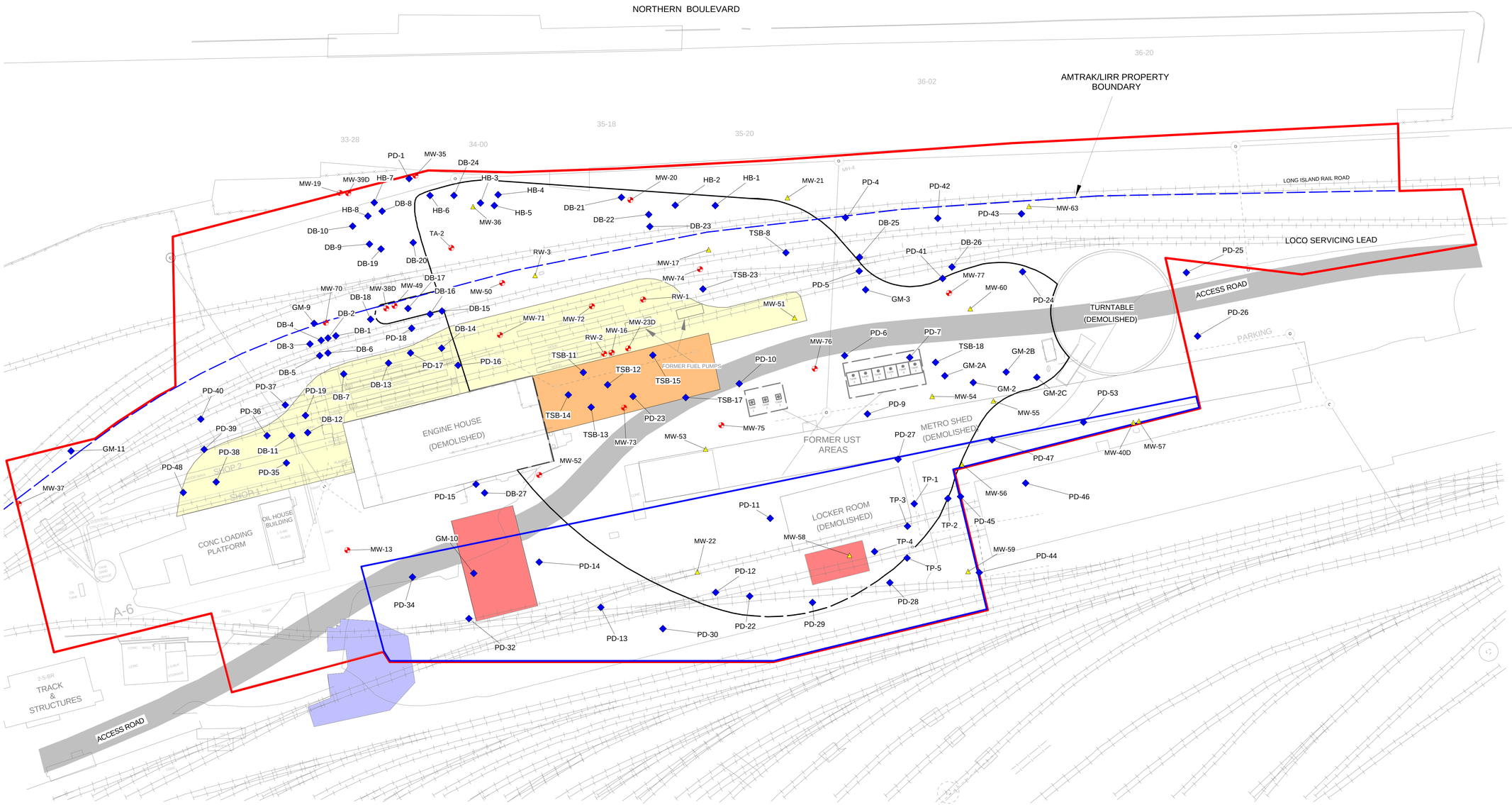
Prepared For:

AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 9/3/2004
Prepared by: RSK	Scale: AS SHOWN
Project Mgr: HG	Office: NY
File No: AM617911.WOR	Project: 05545Y08

PLATE 3-4



DB-18 ◆ LOCATION AND DESIGNATION OF HAND BORING COMPLETED FOR SPH DELINEATION PURPOSES

MW-16 ◆ LOCATION AND DESIGNATION OF MONITORING WELL

MW-54 △ LOCATION AND DESIGNATION OF FORMER MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC.

AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)

AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)

AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)

OU-3 BOUNDARY

LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION

APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

NOTES

HB - HAND BORINGS COMPLETED IN 1991
PD - HAND BORINGS COMPLETED IN 1993
GM - HAND BORINGS COMPLETED IN 1993
TP - HAND BORINGS COMPLETED IN 1996
DB - HAND BORINGS COMPLETED IN 1999
TSB - BORINGS COMPLETED IN 2000

OU-3 - OPERABLE UNIT 3
RI - REMEDIAL INVESTIGATION
HST - HIGH SPEED TRAINSET
LIRR - LONG ISLAND RAIL ROAD

40' 0 40'

N

Title:

SPH OBSERVATION BORINGS

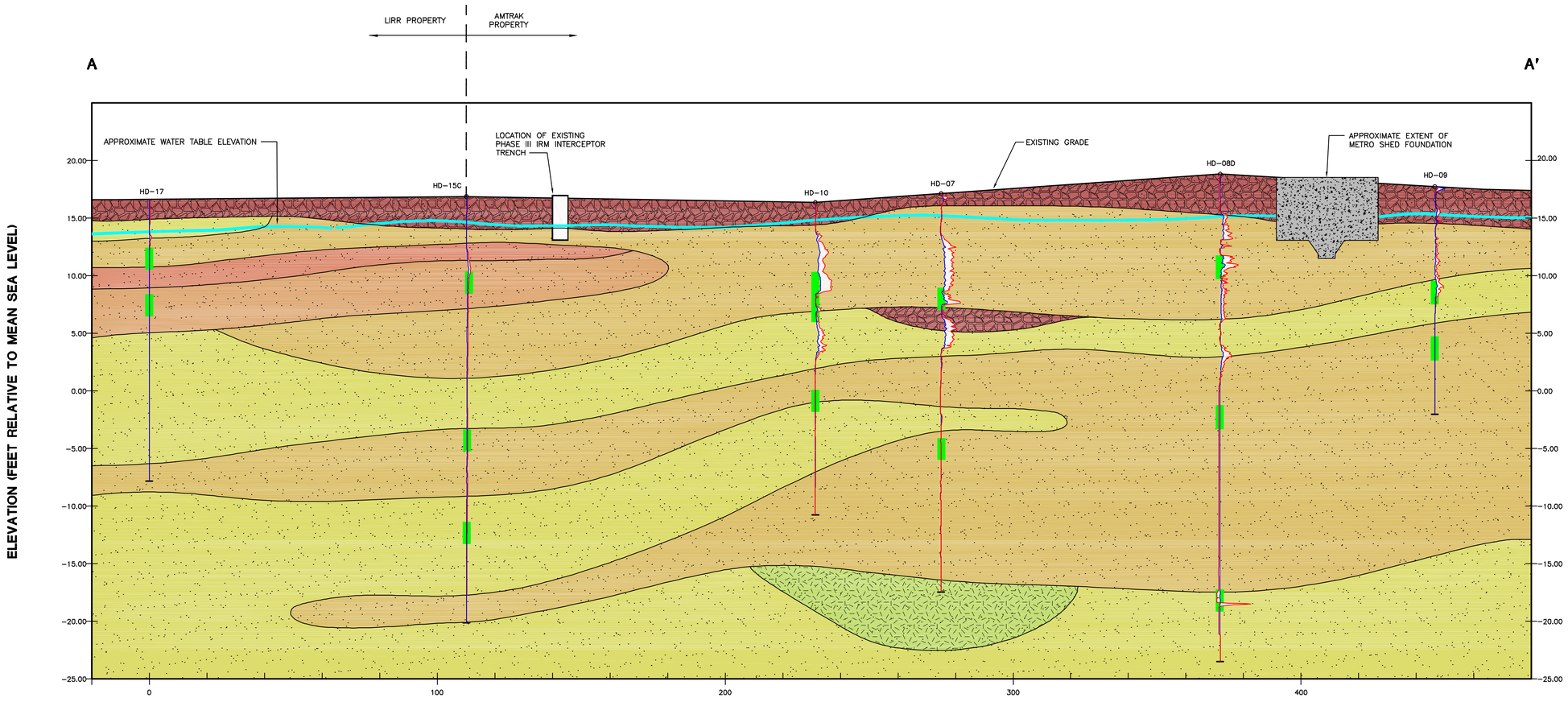
FINAL OU-3 RI REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES INC.
Environmental Consulting & Management

Compiled by: RSK	Date: 5/6/2005	PLATE	
Prepared by: RSK	Scale: AS SHOWN		3-5
Project Mgr: HG	Office: NY		
File No: AM4317817.WOR	Project: 05545Y08		



NOTES:

1. GEOLOGIC CONTACTS INFERRED FROM CPT AND ADJACENT SOIL BORING LOGS.
2. WATER TABLE ELEVATIONS WERE ESTIMATED BY PROJECTING WATER LEVEL DATA FROM MONITORING WELLS MW-19, MW-49, TA-2, MW-50, MW-72, MW-16, MW-73 AND MW-76 ON TO CROSS-SECTION.
3. WATER LEVEL MEASUREMENTS COLLECTED ON MAY 20, 2004 WERE USED IN THIS CROSS-SECTION.
4. LIRR - LONG ISLAND RAIL ROAD
5. UVIF - ULTRA VIOLET INDUCED FLUORESCENCE
6. CPT - CONE PENETROMETER TESTING
7. FFD - FUEL FLUORESCENCE DETECTOR
8. IRM - INTERIM REMEDIAL MEASURE

HORIZONTAL SCALE: 1" = 20 FEET (20' 0 20')

VERTICAL SCALE: 1" = 5 FEET (5' 0 5')

FFD SCALE (HORIZONTAL): 1" = 5 VOLTS (5V 0 5V)

LEGEND

HD-17 — LOCATION AND DESIGNATION OF CPT BORING

LIGHT FUEL FLUORESCENCE DETECTOR RESPONSE CURVE (MAGNITUDE IN VOLTS, AS MEASURED HORIZONTALLY FROM CPT BORING LINE)

HEAVY FUEL FLUORESCENCE DETECTOR RESPONSE CURVE (MAGNITUDE IN VOLTS, AS MEASURED HORIZONTALLY FROM CPT BORING LINE)

APPROXIMATE ELEVATION OF WATER TABLE IN FEET ABOVE MEAN SEA LEVEL

VERTICAL EXTENT OF SOIL SAMPLE COLLECTED AS PART OF THE ADDENDUM TO THE OU-3 RI (ALL SAMPLE RESULTS WERE LESS THAN THE SITE SPECIFIC CRITERIA FOR ALL COMPOUNDS OF CONCERN)

APPROXIMATE EXTENT OF REMAINING SUBSURFACE PORTION OF THE METRO SHED

GEOLOGIC UNITS

- SAND
- GRAVELLY SAND
- SILTY SAND
- CLAYEY/SILTY SAND
- GRAVELLY/SILTY SAND
- SANDY SILT

Title: **GENERALIZED HYDROGEOLOGIC CROSS SECTION A-A' SHOWING UVIF RESPONSE CURVES**

FINAL OU-3 RI REPORT
AMTRAK SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For: AMTRAK

ROUX ASSOCIATES, INC. *Environmental Consulting & Management*

Compiled by: R.S.K.	Date: 28DEC04	PLATE
Prepared by: R.K.	Scale: AS SHOWN	4-1
Project Mgr: H.G.	Office: NY	
File No: AM4517806	Project: 05545Y08	

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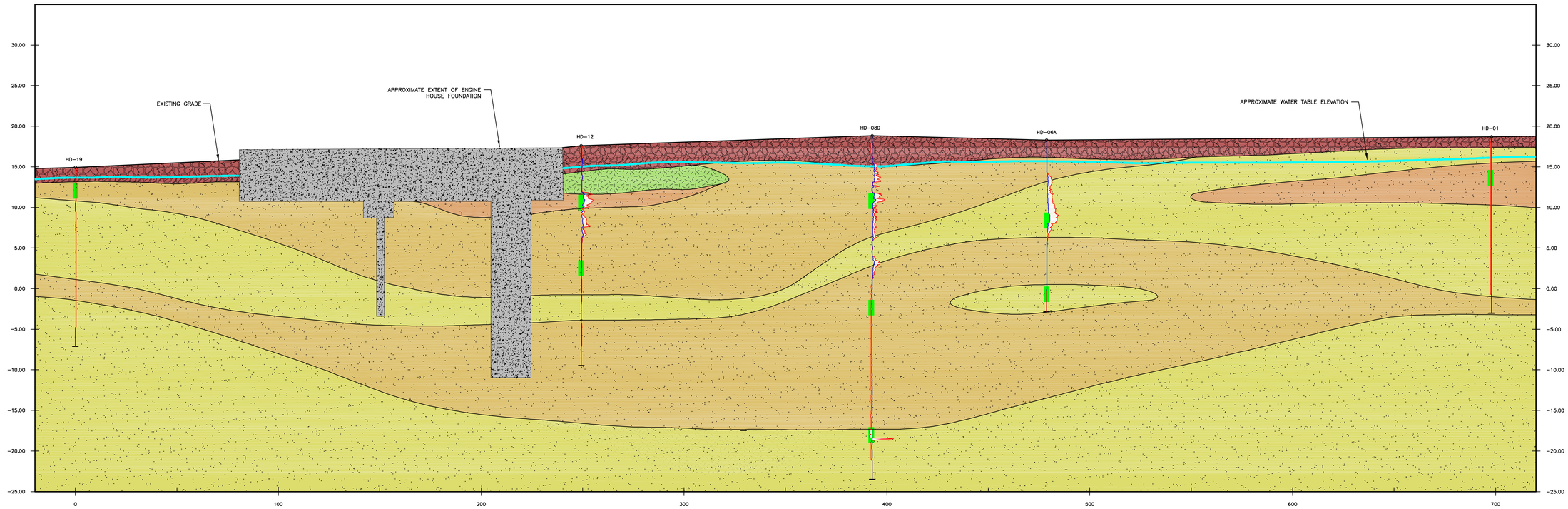
B

B'



HORIZONTAL DISTANCE (FEET)

NOTES:

1. GEOLOGIC CONTACTS INFERRED FROM CPT AND ADJACENT SOIL BORING LOGS.
2. WATER TABLE ELEVATIONS WERE ESTIMATED BY PROJECTING WATER LEVEL DATA FROM MONITORING WELLS MW-72, MW-16 MW-73, MW-75 AND MW-76 ON TO CROSS-SECTION
3. WATER LEVEL MEASUREMENTS COLLECTED ON MAY 20, 2004 WERE USED IN THIS CROSS-SECTION.
4. LIRR - LONG ISLAND RAIL ROAD
5. UVIF - ULTRA VIOLET INDUCED FLUORESCENCE
6. CPT - CONE PENETROMETER TESTING
5. FFD - FUEL FLUORESCENCE DETECTOR

HORIZONTAL SCALE: 1" = 20 FEET (20' 0 20')

VERTICAL SCALE: 1" = 5 FEET (5' 0 5')

FFD SCALE (HORIZONTAL): 1" = 5 VOLTS (5V 0 5V)

LEGEND

HD-01 — LOCATION AND DESIGNATION OF CPT BORING

LIGHT FUEL FLUORESCENCE DETECTOR RESPONSE CURVE (MAGNITUDE IN VOLTS, AS MEASURED HORIZONTALLY FROM CPT BORING LINE)

HEAVY FUEL FLUORESCENCE DETECTOR RESPONSE CURVE (MAGNITUDE IN VOLTS, AS MEASURED HORIZONTALLY FROM CPT BORING LINE)

APPROXIMATE ELEVATION OF WATER TABLE IN FEET ABOVE MEAN SEA LEVEL

VERTICAL EXTENT OF SOIL SAMPLE COLLECTED AS PART OF THE ADDENDUM TO THE OU-3 RI (ALL SAMPLE RESULTS WERE LESS THAN THE SITE SPECIFIC CRITERIA FOR ALL COMPOUNDS OF CONCERN)

APPROXIMATE EXTENT OF REMAINING SUBSURFACE PORTION OF THE ENGINE HOUSE

GEOLOGIC UNITS

- SAND
- GRAVELLY SAND
- SILTY SAND
- SILT
- GRAVELLY/SILTY SAND

Title: **GENERALIZED HYDROGEOLOGIC CROSS SECTION B-B' SHOWING UVIF RESPONSE CURVES**

FINAL OU-3 RI REPORT
AMTRAK SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For: AMTRAK

ROUX ASSOCIATES, INC. *Environmental Consulting & Management*

Compiled by: R.S.K.	Date: 28DEC04	PLATE	
Prepared by: R.K.	Scale: AS SHOWN		
Project Mgr: H.G.	Office: NY		4-2
File No: AM4517B07	Project: 05545Y08		

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