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The Port Authority of New York and New Jersey

Supplemental Remedial Investigation Report
Site 1 (VCP Site 00615-2)

HHMT – Port Ivory Facility

April 2006

40 Western Avenue, Staten Island, New York

The Port Authority of New York and New Jersey

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Issue and Revision Record:

Rev	Date	Originator	Checked	Approved	Description
A	03/20/2006	Erin Moody	Geoffrey Clark	Jennifer Kohlsaat	First Issue

Figures

Tables

Appendices

1.0 EXECUTIVE SUMMARY

The Port Authority of New York and New Jersey (Port Authority) is currently redeveloping the former Procter & Gamble (P&G) Port Ivory Facility, now known as the Howland Hook Marine Terminal (HHMT) – Port Ivory Facility. The HHMT-Port Ivory Facility is located at 40 Western Avenue in Staten Island, Richmond County, New York and consists of three parcels: Block 1309, Lot 10; Block 1338, Lot 1; and, Block 1400, Lot 1. This report addresses conditions at only the northwestern portion of Block 1400, Lot 1. This portion of the HHMT-Port Ivory Facility is also known as Site 1.

On behalf of the Port Authority, Hatch Mott MacDonald (HMM) has conducted various phases of environmental investigation at Site 1 between calendar years 2000 and 2005. The overall goal of these investigations was to determine the appropriate remedial actions, if any, for environmental media given the proposed site redevelopment for commercial (intermodal facility) purposes. The following media have been investigated at Site 1: soil; groundwater; surface water in Bridge Creek; and, sediments along the eastern bank/bed of Bridge Creek. Indoor air quality has not been investigated because no occupied buildings exist or are proposed subsequent to the redevelopment of Site 1. For the purposes of this document, an intermodal facility is defined as a commercial site where products are received via one mode of transportation and are ultimately distributed via a different mode of transportation.

HMM's environmental investigation efforts at Site 1 have included the performance of a Phase I Environmental Site Assessment (Phase I ESA) with a supplemental file review, a Site Investigation (SI), a Remedial Investigation (RI), and a Supplemental Remedial Investigation (SRI). The results of the Phase I ESA, SI, and RI are summarized in the report entitled *Site Investigation and Conceptual Remedial Action Workplan, Site 1* and dated September 2004, which has been submitted to the NYSDEC. As such, this report summarizes only the scope of work and findings of the SRI conducted at Site 1 during May 2005. Please note, information from adjacent Sites or previous investigations at Site 1 has been included herein as necessary for clarity and overall site understanding.

In the Phase I ESA, HMM identified Areas of Concern (AOCs) at Site 1. The AOCs were generally grouped into the following categories: Potential Underground Storage Tanks (USTs); Fill Material; Previously Identified Soil and Groundwater Contamination; Railroad Tracks and Siding; Groundwater; Pits and Drains; and, Former Structures. In addition, the HHMT-Port Ivory Facility, which includes Site 1, was listed in several Environmental Databases.

The HHMT-Port Ivory Facility is situated within an industrial section of Staten Island that was reclaimed from marshland by the use of fill and is bordered by railroads, ports, and roadways. Based on the industrial land use, the environmental quality of surface water, sediment, groundwater, and soil have been impacted on a regional scale. Therefore, neither the soil nor the groundwater at the HHMT-Port Ivory Facility are currently or will be used as natural resources and the surface water and sediment in Bridge Creek and the Arthur Kill are also not high quality. Therefore, while media are referred to as "impacted" throughout this report if the concentration of a regulated substance in the medium exceeds NYSDEC standards or guidance values, it is important to realize that the impacts, if any, attributable to P&G's operations only negligibly worsen already degraded environmental quality and that the "impacts" believed to be attributable to former P&G operations may be attributable instead to regional contamination.

no doubt that some impacts related to P+G.

what operations preceding P+G degraded envir quality - explain

Findings of Pre-SRI Environmental Investigations and Soil Removal Actions

Prior to the Port Authority's purchase of the property, P&G implemented a soil removal action at an AOC, identified as F1, which is located at Site 1. Because the P&G investigation efforts and soil removal actions were complete primarily in the 1990s, the Port Authority investigated soil at all AOCs and AOC categories identified during the Phase I ESA, except for Groundwater and the Environmental Databases AOC Categories, during the SI and/or RI. The Groundwater AOC was investigated through the collection of groundwater, surface water, and sediment samples during the SI. The Listing of the Site in Environmental Databases AOC was addressed by the Port Authority as part of its property acquisition activities.

not known?

Based on the results of the soil investigation component of the SI and RI, the Port Authority implemented additional soil removal actions at AOCs associated with Potential Underground Storage Tanks, Previously Identified Soil and Groundwater Contamination, and Former Structures. Based on the results of the SI and RI efforts and the post-excavation/confirmatory soil sampling, the remaining soil impacts at Site 1 are generally limited to low levels of polycyclic aromatic hydrocarbon (PAH) compounds and metals that have been detected at similar concentrations throughout the HHMT-Port Ivory Facility and are believed to be attributable to the prior placement of fill at the Facility by P&G.

Groundwater analytical data from the SI and the Surcharge Pilot Study, conducted as a component of the 2003/2004 RI, revealed minimal impacts to groundwater. Some of the organic compounds in

groundwater have decreased in concentration by approximately 60% and 67% between November 2000 and December 2002. In addition, the presence of arsenic, the primary metal of concern, in groundwater at Site 1 is attributable to the presence of treated wood chips in the Wood Yard. These wood chips were removed in 2004. It is not currently anticipated that any remedial actions are warranted with respect to groundwater at Site 1.

The quality of surface water and sediment in Bridge Creek has been adequately characterized with respect to metals and pH. The analytical data collected to date do not confirm that the groundwater impacts at Site 1 are adversely affecting surface water and/or sediment quality in Bridge Creek.

Based on the above discussion, it is believed that the remaining soil impacts (except those detected at AOC-UST2, see Summary of the SRI below) at Site 1 have been adequately characterized and do not require remedial actions other than the capping of much of Site 1 by impervious materials during redevelopment and the recording of a Deed Notice for Site 1. Groundwater impacts at Site 1 appear to be minimal and do not appear to have impacted surface water or sediment quality in Bridge Creek. Any groundwater impacts that may potentially impact surface water and/or sediment quality are anticipated to be less severe following the redevelopment of Site 1. Therefore, remedial actions are not necessary with regard to groundwater, surface water, or sediment quality. Additional surface water and sediment samples will be collected in conjunction with a groundwater monitoring program that will be initiated following the redevelopment of Site 1.

Summary of the SRI

As noted above, it was determined that petroleum-impacted soil encountered at AOC-UST2 warranted removal (i.e., excavation and off-site disposal). The excavation activities were initiated on April 18, 2005. During excavation, light, non-aqueous phase liquid (LNAPL) was observed in a larger area than anticipated based upon prior delineation efforts. As a result, the removal effort was halted so that the Port Authority could determine the extent and mobility of the LNAPL. In addition, efforts were undertaken to identify the effect of the LNAPL on soil quality, to delineate the extent of impacted soil, and to assess the potential for groundwater impacts. The Site 1 SRI effort was conducted at AOC-UST2 between May 13 and 23, 2005.

The Site 1 SRI at AOC-UST2 included an evaluation of both soil and groundwater. Specifically, the SRI consisted of the drilling of 14 soil borings, collection of seventeen soil samples from the soil borings,

conversion of six of the soil borings to temporary wells, and collection of one groundwater sample from each of the temporary wells. The temporary wells were installed in two parallel transects across AOC-UST2 such that each transect included an upgradient well, a well installed immediately downgradient of the area where LNAPL and/or impacted soil was observed (LNAPL area), and a downgradient well between the LNAPL area and Bridge Creek. Soil samples collected during the SRI were analyzed for the following parameters: volatile organic compounds (VOCs) with a 15-compound library search (VOC+15) via method 8260; semivolatile organic compounds (SVOCs) with a 25-compund library search (SVOC+25); and, total petroleum hydrocarbons (TPHC) via method 418.1. Groundwater samples were analyzed for VOC+15 via method 624 and for SVOC+25 via method 625.

Potentially impacted soil was observed at only four of the 14 soil boring locations. Specifically, discolored soil, a sheen, and/or discrete nodules of LNAPL were observed at soil boring locations TWP-1, UST-4, UST2-4A, and UST2-5. As measured using a photoionization detector (PID), the concentration of volatile organic vapors in the soil ranged from 0 (at various depths and locations) to 18 parts per million (at 6-8 feet below ground surface at location UST2-4). Based on field observations, the horizontal extent of the LNAPL and/or impacted soil is approximately 255 feet north-south by 173 feet east-west. Please note, LNAPL and/or impacted soil were present below the western portion of the soil surcharge stockpile that was located along the Site 1-Site 2A boundary.

Analytical results for soil samples collected at AOC-UST2 during the SRI revealed the presence of twelve SVOCs and two VOCs at concentrations in excess of corresponding NYSDEC Recommended Soil Cleanup Objectives (RSCOs). Except for the soil sample collected at location TWP-1A, these concentrations of SVOCs and VOCs are attributable to laboratory contamination of the samples and/or fill materials placed at the Facility by P&G. The concentration of TPHC at location UST2-4 was also elevated (it was more than four times as great at UST2-4 than at any other location), and may indicate the presence of a mobile phase of LNAPL. The elevated concentration of SVOCs at location TWP-1A and of TPHC at UST2-4 require additional investigation.

Groundwater analytical data from the SRI indicate that groundwater impacts are limited to naphthalene and phenol, both SVOCs. These compounds were detected at concentrations slightly greater than their respective NYSDEC Ambient Water Quality Standards and Guidance Values (AWQSGV) in the groundwater sample collected from temporary well TWP-1A. In addition, phenol was detected at a concentration slightly greater than its NYSDEC AWQSGV at temporary well TWP-2. No other VOCs or

SVOCs were detected at concentrations greater than their respective AWQSGV in any groundwater sample collected during the SRI. The elevated concentration of naphthalene in groundwater in the vicinity of well TWP-1A is likely due to the presence of creosoted wood at this location. However, regardless of the source, the naphthalene is delineated at TWP-2, located approximately 110 feet downgradient of TWP-1A. The elevated concentrations of phenol at TWP-1A and TWP-2 are potentially attributable to upgradient source areas, including the decay of naturally-occurring marsh deposits that have been observed beneath the fill at portions of Site 1. Regardless of the source, the phenol is delineated at TWP-3, located approximately 65 feet downgradient of TWP-2. Based on the SRI, the groundwater impacted by naphthalene and/or phenol is not anticipated to discharge into Bridge Creek. Groundwater at Site 1 is not currently, and is not anticipated to be, utilized as a source of potable water. Therefore, no investigative or remedial actions are warranted with respect to groundwater at AOC-UST2.

GW v.minor impacts

LNAPL did not accumulate within any of the temporary well points, including wells installed immediately downgradient of observed LNAPL. Therefore, except possibly at location UST2-4, the LNAPL appears to be present at a residual saturation (i.e., the LNAPL is immobile) at AOC-UST2.

Overall Conclusions - Additional Remedial Actions

Based upon the results of the SRI and of previous environmental investigations, the Port Authority has determined that further investigative efforts are warranted only for soil at locations UST2-4 and TWP-1A. Soil removal efforts conducted to date by P&G and the Port Authority have resulted in the excavation and disposal of more than 9,400 cubic yards of impacted soil from Site 1 and a layer of wood chips from the Wood Yard. Also, the Port Authority has removed two underground storage tanks, UST-5 and UST-6, which were abandoned in place by P&G.

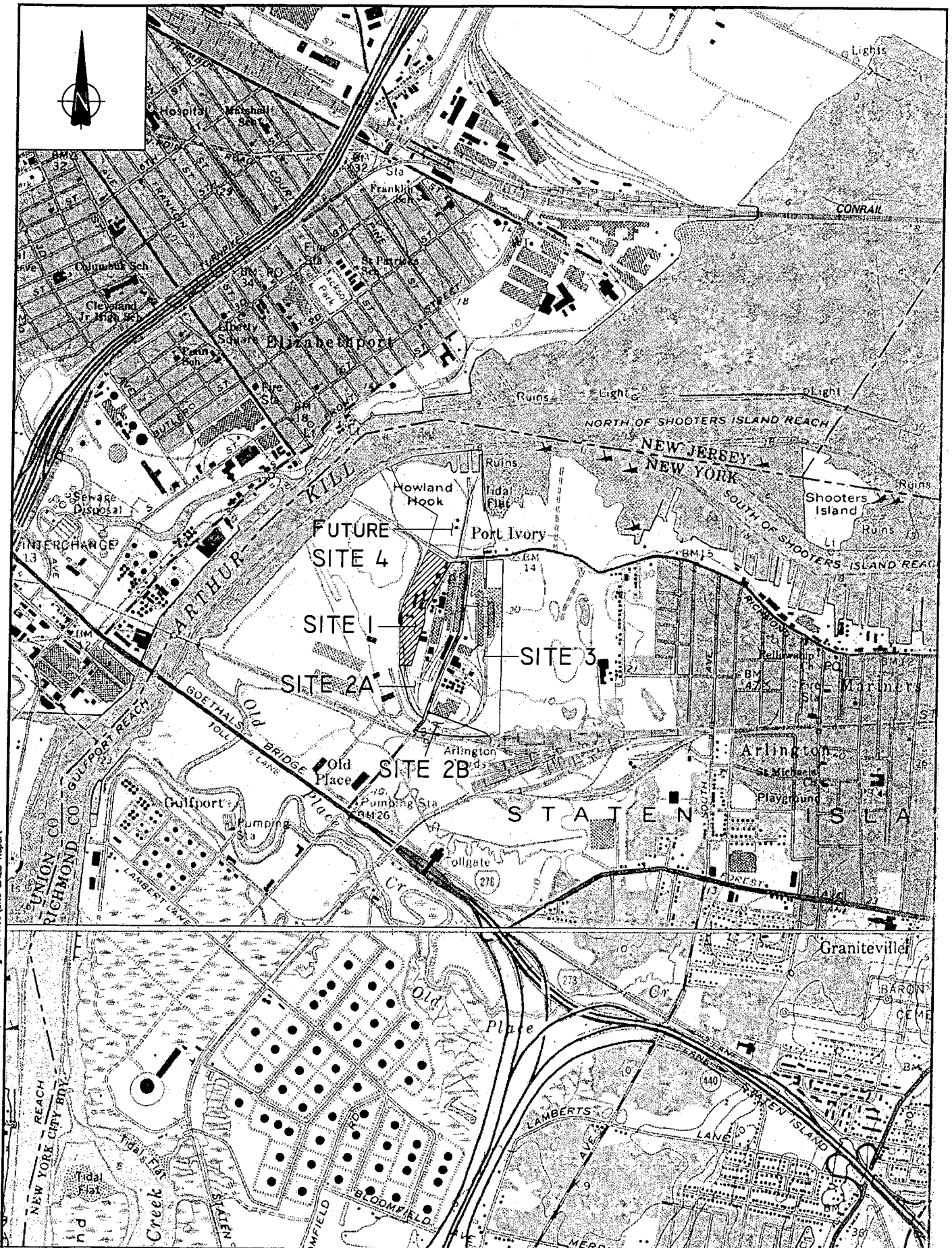
Additional remedial actions, beyond the redevelopment of Site 1 and institution of a Deed Notice at Site 1, are not warranted for any portion of Site 1 except (possibly) at locations UST2-4 and TWP-1A, both located at AOC-UST2. Subsequent groundwater monitoring, in conjunction with surface water and sediment sampling, is warranted to confirm the effectiveness of the removal efforts conducted to date at Site 1, the remedial action that will be conducted at AOC-UST2, and the redevelopment of Site 1. The remedial actions (if any) and groundwater monitoring programs are beyond the scope of this report and will be described in a forthcoming Remedial Action Work Plan.

2.0 INTRODUCTION

The Port Authority Howland Hook Marine Terminal (HHMT)-Port Ivory Facility is located at 40 Western Avenue in Staten Island, Richmond County, New York, as presented on Figure 1. The HHMT-Port Ivory Facility consists of three parcels; Block 1309, Lot 10; Block 1338, Lot 1; and Block 1400, Lot 1, which were purchased from Procter and Gamble (P&G) in 2000. The HHMT-Port Ivory Facility is bordered by Bridge Creek to the west, Arthur Kill to the north, wetlands and undeveloped land to the east, and an unnamed railway to the south. Public roadways separate the three parcels: Western Avenue separates Block 1400, Lot 1 from Block 1338, Lot 1 and Richmond Terrace separates Block 1309, Lot 10 from Block 1338, Lot 1 and Block 1400, Lot 1.

The Port Authority is in the process of redeveloping the HHMT-Port Ivory Facility for a commercial end use; specifically, the Port Authority intends to utilize the Facility as an intermodal facility. With regard to the HHMT-Port Ivory Facility, an intermodal facility is defined as a facility where cargo transported by ship is transferred to intermediate and final destinations via rail or truck. Following redevelopment, approximately 90% of the Facility will be paved or otherwise covered with impermeable or low permeability materials.

As part of the HHMT-Port Ivory Facility redevelopment, the Port Authority entered into the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program (VCP) in June 2004. The Port Authority's objective for entering into the VCP program with NYSDEC was to address the presence of contamination attributable to prior operations at the Facility. These operations were unrelated to the Port Authority. The Port Authority has established different redevelopment schedules for different portions of the HHMT-Port Ivory Facility. To accommodate the Port Authority's redevelopment schedule, the NYSDEC agreed to expedite the review of information pertaining to certain portions of the HHMT-Port Ivory Facility. Thus, the Port Authority agreed to address the HHMT-Port Ivory Facility as four "Sites" and to present assessment, investigation, and remedial action information/documentation for each individual Site. Please note, to date, the VCP agreements have been executed for only three of the four Sites; the fourth Site is referred to as a "Future Site" pending inclusion, as necessary, in a NYSDEC regulatory program. The Sites have been defined as follows: Site 1 consists of the northwestern portion of Block 1400, Lot 1; Site 2A/2B consists of the eastern and southern portions of Block 1400, Lot 1 (Site 2A) and the southern portion of Block 1338, Lot 1 (Site 2B); Site 3 consists of the central and northern portions of Block 1338, Lot 1; and, Future Site 4 consists of Block 1309, Lot 10.



SOURCE:
UNITED STATES GEOLOGICAL SURVEY
7.5 MINUTE SERIES TOPOGRAPHIC QUADRANGLES
ELIZABETH AND ARTHUR KILL, NY–NJ,
1967, PHOTOREVISED 1981

NOTES:
HHMT – PORT IVORY FACILITY
CONSISTS OF SITES 1 THROUGH 3
AND FUTURE SITE 4.

2000 0 2000 4000
SCALE IN FEET
1" = 2000'
CONTOUR INTERVAL = 10 FEET

Hatch Mott MacDonald
Certificate No. 24GA28075000

27 Bleeker Street
Millburn, New Jersey 07041

PORT AUTHORITY OF NY AND NJ
40 WESTERN AVENUE, STATEN ISLAND, NY

FIGURE 1
SITE LOCATION MAP
HHMT - PORT IVORY FACILITY

Designed	Drawn	Checked	Approved	Date
	EMM	GKC	GKC	2/7/2005

P:\232952wmd\REMEDIAL ACTIONS\Remedial Petroleum Issues Block 1338\LNAPL Investigation Res\Site 2A2B Report

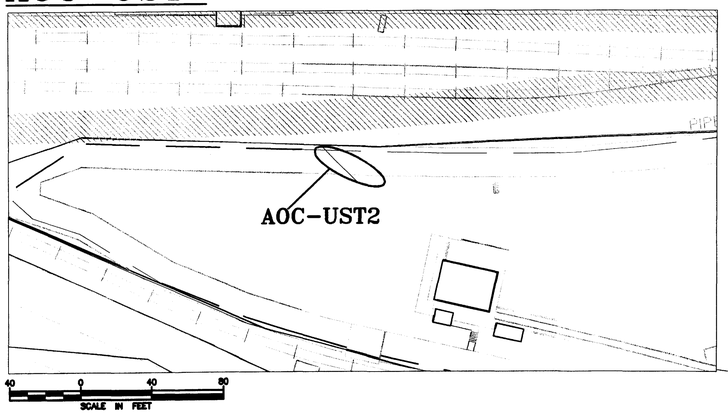
This report has been prepared as part of the ongoing compliance with the NYSDEC VCP agreement for VCP Site V-00615-2 (Site 1) and includes information associated with only Site 1. Information associated with adjacent Sites or previous assessments/investigations at Site 1 has been included as necessary for clarity and overall understanding. Figure 1 depicts the location of Site 1 in relation to the locations of Site 2A/2B, Site 3, and Future Site 4. Figure 2 depicts the easements located at the HHMT-Port Ivory Facility, including those at Site 1. Section 2.1 summarizes the results of previous investigative and soil removal efforts at Site 1. This background information is useful for understanding the scope of the SRI at Site 1. Section 2.2 summarizes the organization of this report.

2.1 Previous Environmental Investigations at Site 1

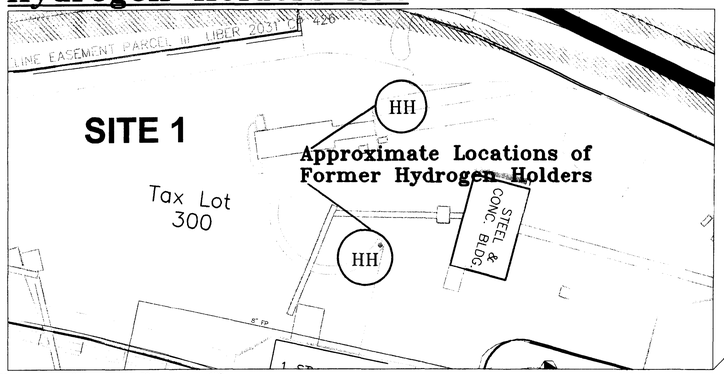
On behalf of the Port Authority, Hatch Mott MacDonald (HMM) has completed several phases of investigation at the site, including a Phase I Environmental Site Assessment with a supplemental file review (Phase I ESA), Site Investigation (SI), Remedial Investigation (RI), and Supplemental Remedial Investigation (SRI). The Phase I ESA and SI were conducted to identify and characterize Areas of Concern (AOCs) at Site 1 prior to the Port Authority's purchase of the Facility in December 2000. The RI and SRI were conducted subsequent to the transfer of the property from P&G to the Port Authority. In general, the RI focused on the investigation of petroleum-impacted soil encountered at various AOCs at Site 1 during the SI. The RI also included a study designed to determine the effect, if any, that surcharging the soil at Site 1 would have on the extent of groundwater impacts at Site 1. The Port Authority planned to surcharge soil at Site 1 in preparation for the redevelopment effort. The SRI, which is the subject of this report, included efforts to further assess the following: the potential petroleum impacts to both soil and groundwater at AOC-UST2 and the impacts, if any, to soil and/or groundwater (determined based on previous soil and groundwater analytical data) that may have resulted from P&G's former use of hydrogen holders at Site 1. The presence of the hydrogen holders was raised as a potential environmental concern by the NYSDEC during a telephone conversation of December 23, 2004 and in subsequent telephone conversations. In addition, previous groundwater and surface water data was re-evaluated subsequent to the removal of wood chips from the Wood Yard AOC.

The remainder of this section summarizes the findings of the previous environmental investigations, including the work conducted by P&G and their consultants. Previous soil and groundwater analytical results were presented in detail in the reports entitled *Site Investigation and Conceptual Remedial Action Workplan, Site 1* (dated April 2003) and *Revised-Site Investigation and Conceptual Remedial Action Workplan, Site 1* and (dated September 2004). The September 2004 document was a revision of the April

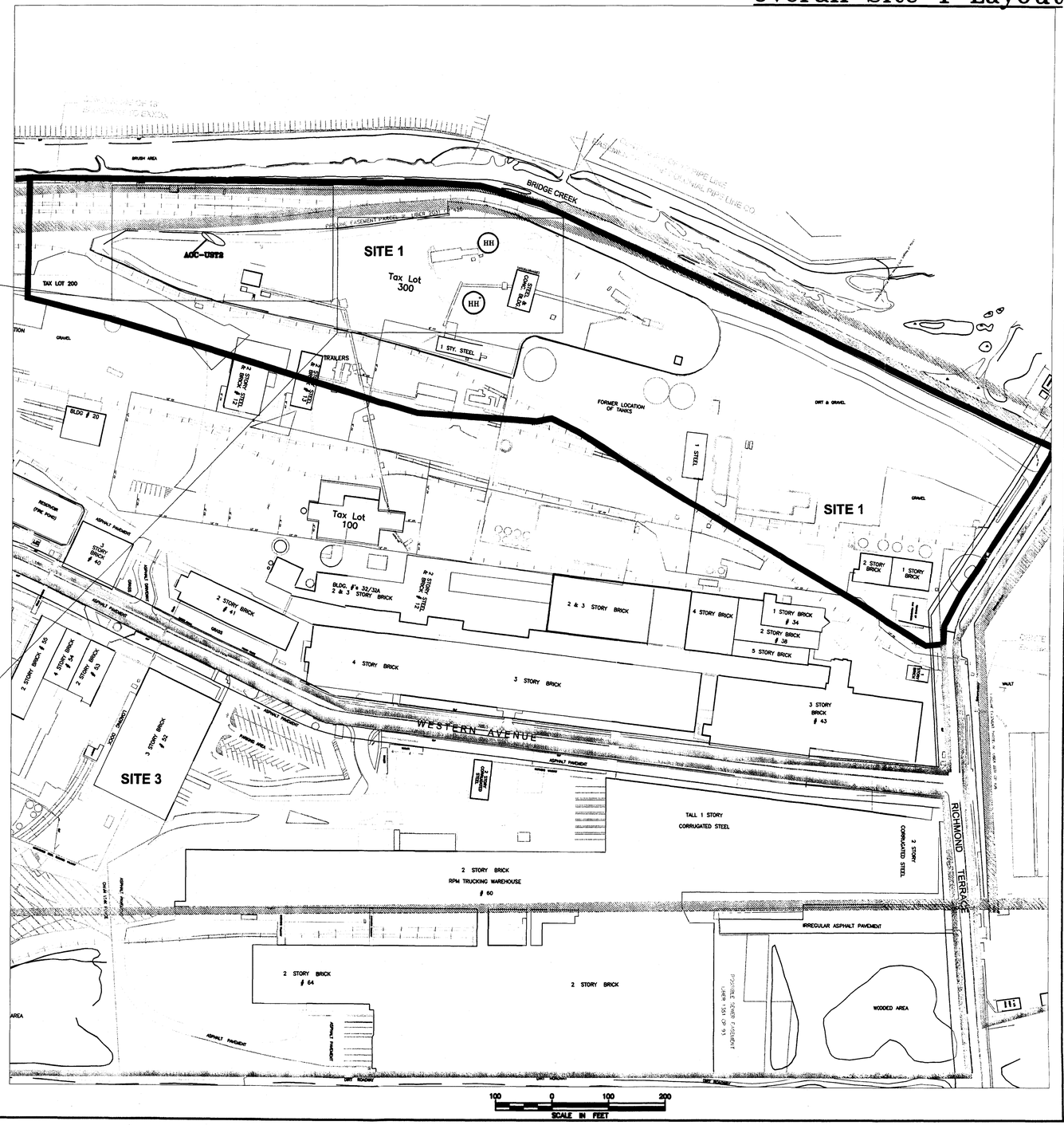
AOC-UST2



Hydrogen Holders AOC



Overall Site 1 Layout



NOTES:
1. Site Designations as per VCP.
2. Buildings and Structures depicted on this Figure were razed prior to the initiation of SRI activities at Site 1.
3. AOCs = Areas of Concern.
4. The locations of the Hydrogen Holders are based on historical (Sanborn) maps.

LEGEND

SITE BOUNDARY

P:\232952\mxd\REMEDIAL ACTIONS\LNAPL Investigation Res\Site 2A2B Report\Figures\Figure 2. Areas of Concern 6/1/05 09:21 am

Sheet 1 of 1

THE PORT AUTHORITY OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title

HOWLAND HOOK MARINE TERMINAL PORT IVORY FACILITY

CURRENT SITE 1 LAYOUT AND AOCs MAP DRAFT

Designed by EMM Drawn by Checked by

Date January 7, 2006

Contract Number

Drawing Number FIGURE 2

2003 version; the revisions were made based on an NYSDEC comment letter dated July 2, 2004. As such, analytical results from the SI and RI that are referenced below are not provided in summary tables and/or maps associated with this report.

During the Phase I ESA, HMM identified several Areas of Concern (AOCs) at Site 1. The AOCs were grouped into the following categories:

- *Potential Underground Storage Tanks (USTs);*
- *Fill Material;*
- *Previously Identified Soil and Groundwater Contamination;*
- *Railroad Tracks and Siding;*
- *Groundwater;*
- *Pits and Drains;*
- *Former Structures; and,*
- *Listing of the HHMT-Port Ivory Site in Environmental Databases*

Soil at all AOCs and AOC categories identified during the Port Authority's Phase I ESA, except for Groundwater and Listing of the Site in Environmental Databases, was investigated during the SI and/or RI. The Groundwater AOC was investigated through the collection of groundwater samples during the SI. The Listing of the Site in Environmental Databases AOC was addressed by the Port Authority as part of its property acquisition activities. Based upon the results of previous environmental investigations, the Port Authority determined that further investigative efforts were not warranted for any medium at any AOC in Site 1, although a removal effort with respect to petroleum-impacted soil was deemed to be warranted at AOC-UST2.

Removal efforts conducted by P&G and the Port Authority prior to the SRI resulted in the excavation and disposal of more than 9,400 cubic yards of impacted soil. In addition, the Port Authority removed a layer of wood chips from the Wood Yard and two AOCs, UST-5 and UST-6, associated with USTs that were abandoned in place by P&G. The scope and effectiveness of each soil removal effort are summarized below in Sections 2.1.1 through 2.1.7, organized according to AOC category.

2.1.1 Potential Underground Storage Tanks (USTs)

Historical mapping identified potential USTs at three areas at Site 1. The AOCs associated with these three potential USTs were designated AOC-UST2, AOC-UST5, and AOC-UST6. As part of the SI,

geophysical surveys, conducted using electromagnetic survey methods, were completed at each of the potential UST AOCs. The geophysical surveys were inconclusive due to interference and thus did not confirm the presence or absence of a UST at any of these three AOCs. USTs that were abandoned in place were subsequently encountered at AOC-UST5 and AOC-UST6; no UST was encountered at AOC-UST2 during the SI or RI. The UST encountered at AOC-UST5 was determined to be part of an oil-water separator system; the system, including both the UST and appurtenant tank components, was decommissioned by P&G. The UST at AOC-UST6 was determined to be a single toluene tank, contained within a concrete vault which was decommissioned by P&G. The Port Authority has removed the previously decommissioned tanks. Based on the above, no known USTs are currently located at Site 1. A summary of information pertaining to each to each potential UST area is provided below.

AOC-UST2

The presence of discolored soil, odors, and elevated concentrations of VOC vapors (as measured using a photoionization detector, or PID) were observed in soil at AOC-UST2 during the SI and RI. In addition, a sheen was observed on the groundwater surface in temporary well TMW-02. Despite these field observations, the concentrations of regulated compounds and metals detected in soil and groundwater samples were generally similar to the concentrations of the same compounds and metals detected in soil throughout the HHMT-Port Ivory Facility. The presence of these compounds/metals is associated with fill placed at the Facility, including Site 1, by P&G. Notwithstanding the above and based on field observations and measurements, the Port Authority determined that a removal effort with respect to petroleum-impacted soil would be appropriate at AOC-UST2.

The removal effort was to consist of the excavation and off-Site disposal of impacted soil, as identified based on the field observations listed above, previously encountered at soil borings. All excavated soil was to be disposed of at an appropriate off-site facility. The removal effort was initiated on April 18, 2005. However, during excavation, LNAPL and/or impacted soil was observed at locations beyond the proposed excavation limits. Therefore, the Port Authority halted the removal effort and implemented horizontal and vertical delineation activities. The delineation of soil and the investigation of groundwater impacts at AOC-UST2 is included in this report, and is detailed in Sections 4.0 et seq.

AOC-UST5

The excavation of soil at Area B and Area GW-14 (the two excavations merged into one as described Section 2.1.3, below) revealed the presence of a former oil/water separator system. The system included

three interconnected concrete structures and a UST within a concrete vault. The UST and the concrete structures were excavated in 2003. Neither visual inspection nor field screening indicated that the soils surrounding the oil-water separator system were impacted. No sampling was performed since the "closed" tank was noted to be situated within a concrete vault and field screening did not reveal any indications of contamination. The SI did not identify the presence of compounds or metals at concentrations above levels that were detected in soil samples throughout the HHMT-Port Ivory Facility. These generally low levels of compounds and metals are considered to be attributable to fill formerly placed at the Facility by P&G. Given the above, no additional investigative and/or remedial actions are/were deemed warranted at AOC-UST5.

AOC-UST6

In conjunction with site demolition in 2002, contractors retained by the Port Authority removed building footings and slabs in the vicinity of Building 17 at the northern portion of Site 1. Those efforts allowed for a review of the subsurface in the vicinity of AOC-UST6. A UST filled with inert materials (brick, stone, and sand) was situated within a concrete vault at this AOC. A review of available records revealed that the UST was used by P&G and formerly contained toluene. Based on information provided by P&G, the NYSDEC had allowed P&G to leave the tank in place and issued a spill case closure letter (August 1990) in response to P&G's decommissioning effort. Although the NYSDEC had not required P&G to remove the tank, the Port Authority elected to implement a removal effort to fully address this AOC.

In 2003, the Port Authority removed the previously decommissioned UST and surrounding concrete vault. Field observations/screenings did not reveal any indications of contamination of soil or groundwater. No soil sampling was performed based on the results of field screening and prior NYSDEC case closure approval. Analytical results from the SI did not reveal the presence of regulated compounds and metals at concentrations above the generally low levels that were detected in soil samples throughout the HHMT-Port Ivory Facility; generally the low levels of contaminants present at the Site are attributable to fill formerly placed at the Facility by P&G. Given the above, no additional investigation and/or remedial actions are/were deemed warranted at AOC-UST6.

2.1.2 Fill Material

Fill material has been encountered throughout the HHMT-Port Ivory Facility, and therefore has been investigated on a Facility-wide basis. The character of the fill is variable, and the fill at any location throughout the HHMT-Port Ivory Facility may be composed of one or more of the following materials:

soil, vegetative debris, wood, brick fragments, glass, concrete fragments, cinders, ash, slag, carbonaceous materials, and diatomaceous earth. Based on field observations, the fill materials were categorized into the following three categories: urban fill, cinder fill, and by-product fill. The cinder fill consists primarily of cinders, ash, and/or slag. The by-product fill includes calcium carbonate, spent diatomaceous earth, and spent carbonaceous filter material generated as by-products of P&G's manufacturing processes. The urban fill is comprised of all other fill materials, generally soil, vegetative debris, and construction debris. Two or all three types of fill were present in several soil borings at Site 1.

The SI and RI included characterization of the physical extent and chemical nature of the fill material. Analytical results for samples collected from fill materials indicate that the urban fill and cinder fill materials contain low concentrations of various metals and organic compounds, primarily Polycyclic Aromatic Hydrocarbons (PAHs). However, the by-product fill appears to be comprised primarily of innocuous metals such as calcium and magnesium. Based on the findings of the SI and RI, it was determined that additional investigation of the fill material was not warranted. In addition, since the low concentrations of metals and PAHs in the urban and cinder fill materials do not appear to have impacted groundwater, it was determined that no remedial actions beyond the proposed Site 1 redevelopment and the institution of a Deed Notice are warranted for the fill material.

2.1.3 Previously Identified Soil and Groundwater Contamination

Since groundwater issues are discussed separately under Section 2.1.7, below, this section will address only soil impacts at portions of Site 1 that P&G had determined to be AOCs. The following five AOCs located at Site 1 were previously identified and evaluated by P&G: Area A, Area C, Area F1, Area H/R, and the Wood Yard. Area A, the West Tank Field, was located southwest of Building 16. Area C, the Former Oleum AST and Acid Wastewater area, was located to the north of the Wood Yard. Area F1, the Spent Nickel Catalyst Drum Storage Area, was located southwest of Building 17. Area H/R indicates an overlapping AOC comprised of (initially distinct AOCs) Area H and Area R. Area H, the Former Rosin Storage Area, and Area R, the Northwest Corner of the Soap Manufacturing Area, were located in the northwestern portion of Site 1. The Wood Yard denotes the area that P&G used to store and chip wood used to fuel a wood-fueled furnace located to the west of Buildings 12 and 13. Based on the results of its environmental investigations, P&G did not perform soil removal at Area A, Area C, Area H/R, and the Wood Yard. Rather, P&G asserted that contaminants detected in soil at these AOCs are relatively immobile (i.e., the compounds and metals are neither highly soluble nor highly volatile) and that human exposure would be minimal. P&G did, however, implement removal efforts at Area F1.

Given the length of time which had elapsed since P&G's investigative and soil removal efforts at these AOCs (the majority of the investigation was completed during the early 1990s), the Port Authority included the P&G AOCs in its SI. The SI was conducted at these AOCs to confirm P&G's conclusions regarding the mobility of the remaining contaminants. Based on the results of soil and groundwater samples analyzed during the Port Authority's SI, no additional investigative or soil removal activities were required at Area C and Area H/R. However, based upon the presence of petroleum-impacted soil at Area A, Area F1, and the Wood Yard, additional investigation was deemed necessary to confirm the success of the P&G removal actions performed at these AOCs. This additional investigation was performed as part of the Port Authority's RI at Site 1.

Based on the RI data, the petroleum-impacted soil at AOCs Area A, Area F1, and the Wood Yard was successfully delineated. Soil in the vicinity of AOC Area F1, previously addressed by P&G's soil removal effort, was deemed to have limited impacts based on field observations and analytical results from the SI and RI. The Port Authority excavated potentially impacted soil at AOCs Area A and the Wood Yard. Based on the relatively low levels of contamination in soil and the general absence of organic compounds other than phenol (commonly encountered as a decay product of naturally-occurring organic matter) in groundwater, it was determined that installing impervious cover (macadam, concrete, etc.) across most of Site 1 and instituting a Deed Notice at Site 1 would constitute an adequate remedial action with regard to soil. The installation of impervious cover is currently proposed as part of the redevelopment of Site 1.

The extents and results of the P&G soil removal effort at AOC Area F1 and the Port Authority's removal efforts at AOCs Area A and the Wood Yard are summarized in the September 2004 *Revised Site Investigation and Conceptual Remedial Action Workplan,* prepared by HMM on behalf of the Port Authority. However, to facilitate review of this document, summaries of these removal efforts are presented below.

Area A (also known as Area A-5)

Approximately 3,300 cubic yards of soil were excavated from Area A-5. Although the majority of the removal effort was conducted at Site 1, a portion of the excavation extended onto Site 2A. Post-excavation soil samples were collected from the sidewalls and bottom of the excavation after completion of soil removal activities. The only compound detected at a concentration greater than its respective

RSCO was benzo(a)pyrene, which exceeded its RSCO in only one post-excavation soil sample. In addition, the concentration reported for benzo(a)pyrene in this sample was similar to concentrations of benzo(a)pyrene detected in soil throughout the HHMT-Port Ivory Facility. The presence of benzo(a)pyrene in the sample is therefore attributable to fill present at the HHMT-Port Ivory Facility.

Area F1

Area F1 is located in the north-central portion of Site 1. According to a March 1993 report, *Area F Soil Remediation Report*, prepared by Recon Systems, Inc., P&G excavated soil and performed confirmatory post-excavation soil sampling to address previously delineated PCB-impacted soil at Area F1. Excavation activities were performed in February 1993. The excavation was extended to a depth of approximately 3 feet bgs. Approximately 150 cubic yards (221 tons) of soil was excavated and nine post-excavation soil samples were collected from the resultant excavation area. PCBs were not detected in five of the post-excavation soil samples. The analytical results for the remaining four soil samples indicated the presence of the PCB Arochlor-1254. The greatest concentration of Arochlor-1254 in these four samples was 0.49 mg/kg, which is well below the RSCO for PCBs in shallow soil (1 mg/kg). Based on the analytical results, P&G did not propose any further action for this area.

Analytical results for soil samples collected at Area F1 during the Port Authority's SI and RI indicate that, although the concentrations of xylenes, dibromochloromethane, the PAH compounds benzo(a)anthracene and benzo(a)pyrene, phenol, and various metals exceed the NYSDEC RSCOs, the soil impacted by PCBs has been successfully remediated. Given the above, no additional investigation and/or remedial actions (beyond the paving of Area F1 as part of the redevelopment of Site 1 and establishment of a Deed Notice at Site 1) are/were deemed warranted at Area F1.

Wood Yard

The Port Authority removed approximately 120 cubic yards of soil from the vicinity of sample location Wood-5. Based on a visual review and analytical results from RI sampling, the soil impacts at this location appear to have been associated with residual cinder material (ubiquitous to the fill material) rather than petroleum. Thus, no confirmation samples were warranted or collected for Area Wood-5. Given the successful completion of the soil removal effort, no additional investigative or remedial activities are/were deemed warranted for soil at Wood-5.

In 2004, the Port Authority removed wood chips that P&G had previously stockpiled in the Wood Yard. Shallow soil was also removed along with the wood chips. This effort was undertaken since treated/creosoted wood sometimes contains elevated concentrations of the metals arsenic, chromium, and copper and arsenic was detected in several soil and groundwater samples collected from within and downgradient of the Wood Yard. Following the removal effort, six confirmatory soil samples were collected from the 0-0.5 foot depth interval below the new ground surface in the area where the wood chips had been stockpiled by P&G see Figure 3. Confirmatory soil sampling analytical results are summarized in Table 1. In general, the concentrations of arsenic and other metals in the confirmatory soil samples were below their respective RSCOs, or exceeded the RSCOs slightly (i.e., were within an order of magnitude of their respective RSCOs). In particular, the concentration of arsenic exceeded its RSCO (7.5 mg/kg or soil background) in only one soil sample, WC-PT1-092104-20-1, in which the arsenic concentration was 25 mg/kg. The concentrations of metals in the confirmatory soil samples were similar to those in soil samples collected at other portions of the facility; therefore, the presence of these metals in soil is considered to be attributable to the former placement of fill materials by P&G. Additional investigation and remedial/removal efforts are not warranted at the Wood Yard beyond the redevelopment of Site 1 and the institution of a Deed Notice at Site 1.

Soil Removal Efforts - Site 2A

In addition to the above-described AOCs, the Port Authority also performed soil removal at Area B, the P&G designation for an AST area at Site 2A. Although the majority (approximately three-quarters) of the excavation is located in Site 2A, the remainder (approximately one-quarter) included an area along the eastern part of Site 1. The Port Authority excavated approximately 4,350 cubic yards of soil in the vicinity of two soil borings, designated B-2 and B-3, based on potential petroleum impacts. All piping encountered during excavation also was removed as part of the removal effort. The excavation area merged with the Area GW-14 excavation; for the purposes of this summary, the two excavations will be referred to as the Area B excavation.

Post-excavation soil samples were collected from the sidewalls of the Area B excavation at the soil-ground water interface (3-3.5 feet below ground surface, or bgs). The analytical results confirmed that the excavation successfully removed the impacted soil. Only two PAH compounds were detected at concentrations greater than their respective RSCOs, and the detected concentrations for these two PAH compounds was similar to those reported for soil samples collected at other portions of the HHMT-Port Ivory Facility. The presence of these compounds is therefore attributable to fill material previously

Sample Location	NY SDEC RSCO (MG/KG)	PT-6
Units		MG/KG
Arsenic	7.5 or SB	ND
Barium	300 or SB	NE
Chromium	10 or SB	NE
Copper	25 or SB	NE
Zinc	20 or SB	ND
Mercury	0.1	ND

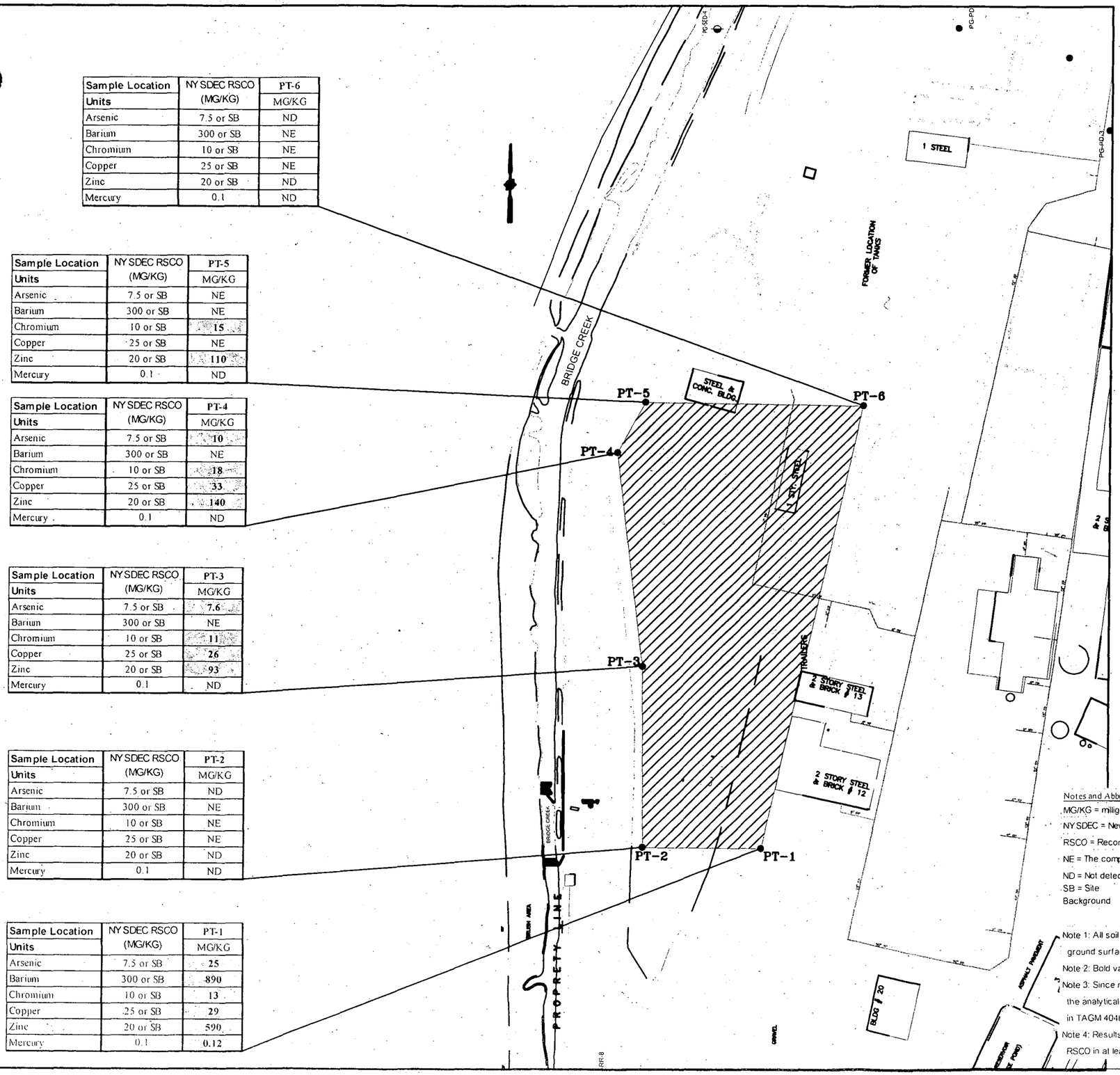
Sample Location	NY SDEC RSCO (MG/KG)	PT-5
Units		MG/KG
Arsenic	7.5 or SB	NE
Barium	300 or SB	NE
Chromium	10 or SB	15
Copper	25 or SB	NE
Zinc	20 or SB	110
Mercury	0.1	ND

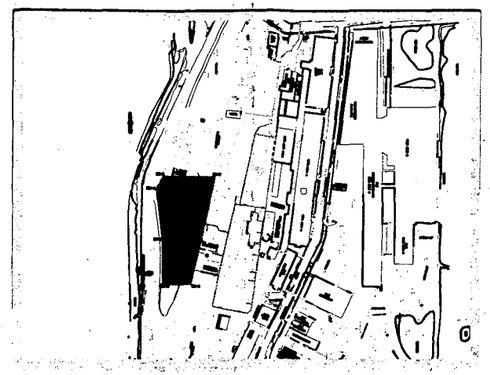
Sample Location	NY SDEC RSCO (MG/KG)	PT-4
Units		MG/KG
Arsenic	7.5 or SB	10
Barium	300 or SB	NE
Chromium	10 or SB	18
Copper	25 or SB	33
Zinc	20 or SB	140
Mercury	0.1	ND

Sample Location	NY SDEC RSCO (MG/KG)	PT-3
Units		MG/KG
Arsenic	7.5 or SB	7.6
Barium	300 or SB	NE
Chromium	10 or SB	11
Copper	25 or SB	26
Zinc	20 or SB	93
Mercury	0.1	ND

Sample Location	NY SDEC RSCO (MG/KG)	PT-2
Units		MG/KG
Arsenic	7.5 or SB	ND
Barium	300 or SB	NE
Chromium	10 or SB	NE
Copper	25 or SB	NE
Zinc	20 or SB	ND
Mercury	0.1	ND

Sample Location	NY SDEC RSCO (MG/KG)	PT-1
Units		MG/KG
Arsenic	7.5 or SB	25
Barium	300 or SB	890
Chromium	10 or SB	13
Copper	25 or SB	29
Zinc	20 or SB	590
Mercury	0.1	0.12





SCALE: 1" = 500'

LEGEND:

- PT-1 ● POST-EXCAVATION SOIL SAMPLING LOCATION
- RAILROAD TRACKS
- FORMER WOOD CHIP AREA

NOTES:

1) POST-EXCAVATION SAMPLE LOCATIONS AND FORMER WOOD CHIP AREA ARE BASED ON SURVEYING INFORMATION PROVIDED ON A PORT AUTHORITY OF NEW YORK AND NEW JERSEY DRAWING ENTITLED WOOD PILE AREA AND DATED SEPTEMBER 6, 2002.

2) ALL BUILDINGS SHOWN ON THE DRAWING HAVE BEEN RAZED.

SCALE: 1"=125'

125' 0' 125' 250'

SCALE IN FEET

Notes and Abbreviations:

MG/KG = milligrams per kilogram

NYSDEC = New York State Department of Environmental Conservation

RSCO = Recommended Soil Cleanup Objective

NE = The compound was detected, but the concentration is below the RSCO for the metal.

ND = Not detected

SB = Site Background

Note 1: All soil samples were collected from the top half foot (i.e., from 0-0.5 feet below ground surface) of the soil column after removal of the layer of wood chips.

Note 2: Bold values in shaded cells exceed the RSCO for the metal.

Note 3: Since no site background concentrations have been established for these metals, the analytical data have been compared to the Eastern USA Background value provided in TAGM 4046 when these data are available.

Note 4: Results are provided only for metals detected at concentrations above the applicable RSCO in at least one soil sample.

THE PORT AUTHORITY OF NY & NJ

ENGINEERING DEPARTMENT

Title

(BLOCK 1400, LOT 1)
HHMT-PORT IVORY FACILITY

CONFIRMATORY SOIL SAMPLE LOCATIONS, WOOD CHIPS EXCAVATION (WOOD YARD, SITE 1)

Designed by RMT Drawn by Checked by DKC

Date 1/26/2006

Contract Number

Drawing Number FIGURE 3

TABLE 1
SUMMARY OF POST-EXCAVATION SAMPLING ANALYTICAL RESULTS - WOOD CHIP EXCAVATION
HHMT - PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location	NYSDEC RSCO (MG/KG)	PT-1	PT-2	PT-3	PT-4	PT-5	PT-6
Field ID		WC-PT1-092104-20-1	WC-PT2-092104-20-1	WC-PT3-092104-20-1	WC-PT4-092104-20-1	WC-PT5-092104-20-1	WC-PT6-092104-20-1
Sampling Date		9/21/2004	9/21/2004	9/21/2004	9/21/2004	9/21/2004	9/21/2004
Matrix		Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth		Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
Units		MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
METALS		Conc	Conc	Conc	Conc	Conc	Conc
Antimony	SB	ND	ND	ND	ND	ND	ND
Arsenic	7.5 or SB	**25**	ND	**7.6**	**10**	4.9	ND
Barium	300 or SB	**890**	14	80	120	67	42
Beryllium	0.16 (HEAST) or SB	ND	ND	ND	ND	ND	ND
Cadmium	1 or SB	ND	ND	ND	ND	ND	ND
Chromium	10 or SB	**13**	8.3	**11**	**18**	**15**	6.8
Copper	25 or SB	**29**	6.5	**26**	**33**	20	9.3
Lead	500*	87	ND	110	190	76	ND
Nickel	13 or SB	7.9	ND	ND	ND	ND	ND
Selenium	2 or SB	ND	ND	ND	ND	ND	ND
Silver	SB	ND	ND	ND	ND	ND	ND
Thallium	SB	ND	ND	ND	ND	ND	ND
Zinc	20 or SB	**590**	ND	**93**	**140**	**110**	ND
Mercury	0.1	**0.12**	ND	ND	ND	ND	ND

Notes and Abbreviations:

MG/KG = milligrams per kilogram

NYSDEC = New York State Department of Environmental Conservation

RSCO = Recommended Soil Cleanup Objective

Conc = Concentration

ND = Not detected

SB = Site Background

* = No RSCO is available for the metal. The value provided is the Eastern USA Background.

Note 1: All soil samples were collected from the top half foot (i.e., from 0-0.5 feet below ground surface) of the soil column after removal of the layer of wood chips.

Note 2: Bold values in shaded cells exceed the RSCO for the metal.

Note 3: Since no site background concentrations have been established for these metals, the analytical data have been compared to the Eastern USA Background value provided in TAGM 4046 when these data are available.

emplaced at the HHMT-Port Ivory Facility. Based on the IRM, no further investigative or remedial actions were deemed warranted at Area B.

2.1.4 Railroad Tracks and Siding

Site inspections at Site 1 revealed the presence of railroad tracks and sidings, and review of historical records identified additional tracks and sidings that were formerly present at Site 1. As such, it was proposed to obtain samples from locations adjacent to portions of the current and former on-site railroad system to confirm that the railroad system had not impacted soil at Site 1. Based on the analytical results for soil samples collected along railroad sidings at Site 1 during the SI, no further investigative or remedial activities were deemed warranted with respect to the Railroad Tracks and Siding at Site 1.

2.1.5 Groundwater

Environmental investigation activities performed at Site 1 prior to the Port Authority's purchase of the HHMT-Port Ivory Facility identified the presence of contaminants and elevated pH in groundwater. As the majority of the groundwater sampling presented in the P&G reports was performed in the early 1990s, it was proposed to perform a groundwater investigation to confirm current groundwater quality. During the SI, groundwater samples were collected at eight shallow monitoring wells and two deep monitoring wells located at Site 1. Groundwater samples were also collected during a Pilot Study to determine the effects of the surcharge pile on the distribution and mobility of groundwater impacts at Site 1. The Pilot Study was conducted as part of the RI. During the SRI, groundwater samples were collected from temporary wells installed at AOC-UST2.

Both the SI and RI efforts included sampling of surface water and sediment in conjunction with the groundwater samples to characterize the chemistry of these media in close proximity to a "white material" previously observed in Bridge Creek and to confirm whether or not groundwater may potentially impact surface water quality in Bridge Creek. The groundwater samples were analyzed for PP VOCs, PP SVOCs, PP pesticides and PCBs, Target Analyte List (TAL) metals, TPHC, oil and grease (O&G), total cyanide, and total phenolics. Surface water and sediment samples were analyzed for TAL metals, and the pH of the surface water was measured using a portable pH meter.

For this project, the groundwater analytical results have been compared, as appropriate, to current NYSDEC Ambient Water Quality Standards and Guidance Values (AWQSGVs). The AWQSGVs assume that groundwater is classified as GA, a potential drinking water source. Given the location of the

Site and the high potential for water to be saline, the published AWQSGVs are not appropriate for use at this Site. However, at this time, these represent the only guidance available for ambient groundwater. Please note, the reference to these standards in this report does not represent any agreement or concurrence that the same are appropriate for use at this Site or the HHMT-Port Ivory Facility.

The analytical results for the groundwater at Site 1 indicate that the only substances detected at concentrations greater than the NYSDEC AWQSGVs were ethylbenzene, xylene, phenol, 2-benzphenanthracene, benzo(a)anthracene, and the metals arsenic and cadmium. As noted above, the surface water and sediment samples were not analyzed for organic compounds. Neither arsenic nor cadmium was detected at a concentration greater than its NYSDEC Recommended Surface Water Cleanup Standard (RSWCS) in any of the three surface water samples. All five sediment samples contained arsenic at concentrations greater than the NYSDEC Lower Effects Level (LEL) but below the Severe Effects Level (SEL). The concentration of arsenic in sediment did not increase either upstream or downstream, and the source of this metal is not known. Cadmium was detected at a concentration slightly greater than the NYSDEC LEL in only one of the five sediment samples. Based on the analytical data for metals, it does not appear that the groundwater impacted by arsenic and cadmium is affecting the quality of surface water in Bridge Creek. The sediment data are less conclusive, and the source of the arsenic and cadmium in sediment appear to be impacted sediment in Bridge Creek upstream of Site 1. The upstream sediment data are presented in Appendix B and are discussed in Section 7.2.1.

Although there are no quantitative analytical results for the concentration of organic compounds in Bridge Creek, it is not anticipated that the surface water or sediment quality is being impacted by the organic compounds detected in groundwater at Site 1. Ethylbenzene and xylene are both VOCs, and are expected to volatilize soon after entering Bridge Creek (if groundwater impacted with these compounds is discharging into the creek). Phenol, as noted above, is a common product of the degradation of organic matter, including naturally-occurring organic matter. Since marsh deposits are present throughout this portion of Staten Island, naturally-occurring organic matter is plentiful. The solubility of 2-benzphenanthracene and benzo(a)anthracene is low at neutral pH (measured to be between 7.5 and 8.2 in Bridge Creek). Although groundwater impacted by organic compounds is not anticipated to affect the quality of surface water in Bridge Creek, there are no data available to corroborate this theory.

Notwithstanding the above, the groundwater chemistry is anticipated to change following the redevelopment of Site 1, which will be implemented in the near future. As a result, the surface water

and/or sediment chemistry may also change. Therefore, a groundwater monitoring program that will include the monitoring of surface water and sediment quality, will be implemented subsequent to completion of Site 1 redevelopment.

2.1.6 Pits and Drains

Pits and drains were observed at two buildings, Building 1A and Building 17, which have since been razed by the Port Authority. Soil samples were collected as part of the SI, to investigate soil quality adjacent to these structures. In addition, a groundwater sample was collected from monitoring well PAMW-5 to investigate the quality of groundwater at this portion of Site 1.

Overall, the analytical results indicate the presence of various PAH compounds and various metals in soil samples collected to evaluate Pits and Drains. The concentrations detected were noted to be similar to those detected in soil at other portions of the HHMT-Port Ivory Facility and are attributable to the former placement of fill materials by P&G. A few non-fill related contaminants (toluene, dieldrin, endrin, and heptachlor epoxide) were detected at concentrations above their respective RSCOs at only one soil sampling location, PD-8. The pesticides may relate to fill material at this portion of the site and/or to typical usage of such materials for pest control. These types of materials were not used or generated as part of process operations by P&G and the presence of residual concentrations of same was not considered a concern at PD-8. As previously stated, P&G performed closure activities for a 10,000 gallon UST formally containing toluene. The NYSDEC issued a spill Case Closure to P&G in August of 1990. Subsequently, the Port Authority removed the decommissioned UST (UST-6); the NYSDEC allowed P&G to decommission the UST in place. The analytical results from the groundwater sample collected at PAMW-5 did not indicate that pits and drains had impacted the groundwater. Therefore, no additional investigation of soil associated with pits and drains formerly located at Site 1 was determined to be warranted.

2.1.7 Former Structures

Review of Sanborn Maps and aerial photographs identified former structures at various locations throughout Site 1. The former structures included buildings and tanks at the Wood Yard and portions of Buildings 12 and 13, as well as ASTs to the west of Buildings 12 and 13 (buildings and structures immediately north, east, and south of Buildings 12 and 13 are located at Site 2A). One building (or several smaller buildings) was located west of Buildings 12 and 13, near the southern portion of Site 1. Historical mapping indicates that this building was utilized as a metal shop. In addition, Building S-16

and a building north of S-16 were located at Site 1, along with ASTs at Area A. Building S-17 and structures extending from or immediately adjacent to Building S-17 were also located at Site 1. Railroad tracks and sidings were visible on the aerial photographs; however, the railroad tracks and sidings are addressed as a separate AOC (see Section 2.1.4). In addition, the status of Area A is discussed above in Section 2.1.3. Please note, all of the structures identified above, with the exception of parts of railroad tracks and sidings, were razed by P&G. However, Buildings 1A and 17 and aboveground conveyor belt systems and supports were removed by the Port Authority.

Soil samples were collected near the former structures during the SI in order to identify if soil had been impacted by P&G's former industrial/commercial activities at the structures. In addition, soil excavation was performed at AOCs FS-1 and the Wood Yard; the removal effort for the FS-1 AOC is summarized below and the removal effort for the Wood Yard is summarized in Section 2.1.3. Analytical results for soil samples collected in the vicinity of former structures other than FS-1 and the Wood Yard identified compounds and metals that were detected at similar concentrations in soil throughout the facility. Based on the their widespread distribution at the Facility, these soil impacts have been attributed to the former placement of historic fill at the facility. As such, no additional investigative and/or remedial activities were deemed warranted with respect to the former structures at Site 1.

Removal Action at FS-1

Soil excavation was completed in the vicinity of former sampling location FS-1 in November-December 2002. Approximately 1,500 cubic yards of soil were removed from the vicinity of FS-1. The excavation area was primarily located at Site 1 but extended onto Site 2A. Post-excavation soil samples were collected following soil excavation. The only compounds detected at concentrations greater than their respective RSCOs in the post-excavation soil samples were four PAHs considered to be attributable to fill material. The PAH compounds were detected at concentrations similar to those detected at other areas of the HHMT-Port Ivory Facility (historic fill discussion). As such, no additional investigative and/or remedial/removal efforts were deemed warranted at FS-1.

2.2 Report Objectives and Organization

This report documents the scope of work completed, methods utilized, and results of the SRI for Site 1. To facilitate review of the report, background information (e.g., Site 1 history, hydrogeology, etc.) is provided in Section 3. The scope of work completed and methods utilized during the SRI are described in Sections 4 and 5, respectively. A summary of the soil sampling and analytical program is presented in

Table 2A and the groundwater sampling and analytical program is summarized in Table 2B. The field observations and analytical data generated during the SRI are summarized in Section 6, tabulated in Tables 3A, 3B, 4A, and 4B, and presented on Figure 4. A discussion of the SRI results is presented in Section 7 and conclusions and recommendations regarding the environmental quality of soil and groundwater at Site 1, as well as the need for additional investigative and/or remedial efforts, are provided in Section 8.

Please note that the need for additional remedial actions proposed in this report is based on a predetermined end-use for Site 1. As previously stated, the Port Authority is redeveloping Site 1 for use as an intermodal facility. As such, most of Site 1 will be finished with impervious cover, precluding direct contact with underlying fill material.

3.0 BACKGROUND

This section includes general information pertaining to the location and operating history of the entire HHMT-Port Ivory Facility, specific information regarding the previous and current land use of Site 1, and a summary of regional and local hydrogeology. These three topics are discussed in Sections 3.1 through 3.3, respectively. Please note, this information was previously submitted to NYSDEC in a report entitled *Revised - Site Investigation and Conceptual Remedial Action Workplan, Site 1* and dated September 2004; however, this information is repeated in this report as a courtesy to the reader.

3.1 HHMT-Port Ivory Facility – Location and Description

The HHMT-Port Ivory Facility is located at 40 Western Avenue, Staten Island, Richmond County, New York and is comprised of the three following tax blocks/lots: Block 1309, Lot 10, Block 1338, Lot 1 and Block 1400, Lot 1. Together, these three parcels encompass 123.75 acres. The latitude/longitude of the HHMT-Port Ivory Facility, as determined from the center of the Facility, is 40 degrees 38 minutes 15 seconds North / 74 degrees 10 minutes 50 seconds West. At the time of the Phase I ESA and SI activities, the HHMT-Port Ivory Facility was owned by P&G; the Port Authority purchased the Facility from P&G in December 2000 and it is now known as the HHMT-Port Ivory Facility. Subsequent to the purchase of the HHMT-Port Ivory Facility, the Port Authority performed RI, SRI, and IRM activities.

The HHMT-Port Ivory Facility can be accessed via driveways located along Western Avenue and Richmond Terrace. Western Avenue extends in a north-south direction between Block 1400, Lot 1 (Sites

1 and 2A) and Block 1338, Lot 1 (Sites 2B and 3) and terminates at Richmond Terrace. One of the three parcels, Block 1309, Lot 10 (Future Site 4) is situated north of Richmond Terrace and the two remaining parcels, Block 1400, Lot 1 (Sites 1 and 2A) and Block 1338, Lot 1 (Sites 2B and 3), are situated south of Richmond Terrace. The overall layout of HHMT-Port Ivory Facility is presented on Figure 1.

The HHMT-Port Ivory Facility is and has been serviced by connections to the potable water and sanitary sewer system of New York City. No septic systems, potable water wells, or dry wells are reported to be or to have been located on the subject site. Stormwater generated on the site is directed via sheet flow to on-site catch basins. These catch basins discharge to pipes that comprise the HHMT-Port Ivory Facility's underground stormwater sewer system. Ultimately, stormwater discharges to permitted outfalls located along the adjacent waterways, roadways, and marshland areas. Electrical service is supplied to the subject site via connection to the Consolidated Edison system servicing this section of Staten Island.

In addition to the utility infrastructure maintained by the HHMT-Port Ivory Facility, several utility easements, both active and inactive, traverse the Facility. Colonial Pipeline and Exxon (now ExxonMobil) maintain easements that traverse Site 1. Colonial Pipeline maintains a 10-foot pipeline easement that extends in a north/south direction along the western property boundary of Site 1. The easement originates south of Site 2A, traverses through that Site entering the southwestern corner of Site 1, continues across Richmond Terrace and through the western portion of Future Site 4 (Block1309, Lot 10), and finally terminates at the northern end of Future Site 4. ExxonMobil maintains an 18-foot easement that is located east of the Colonial Pipeline easement. This easement parallels the Colonial Pipeline easement throughout Site 1; however, this easement extends in an easterly direction along the southern boundary of Future Site 4 beyond Richmond Terrace. The locations of these easements are presented on Figure 2.

3.2 Site 1 Location and History

Site 1 includes the northwestern portion of Block 1400, Lot 1 and constitutes 14.95 acres of the 123.75-acre HHMT-Port Ivory Facility. Site 1 is bordered by Site 2A to the east and south, Richmond Terrace to the north, and Bridge Creek to the west. Vehicular access to the northern portion of Site 1 is provided from Richmond Terrace; access to the remaining portion of Site 1 is provided by a paved access road which extends from Western Avenue through site 2A; of the current layout of Site 1. No structures are currently located on Site 1. Site 1 generally consists of flat, unpaved, and unvegetated land. However, a soil pile, approximately 15-16 feet high in the vicinity of AOC-UST2, is currently located along the

eastern boundary of Site 1; this soil pile was used for surcharging purposes and will be regraded or transported off site during redevelopment of Site 1.

In the early 1900s, P&G developed portions of the current HHMT-Port Ivory Facility for use as a consumer goods manufacturing Facility. The consumer goods manufactured included soap, detergent, and foodstuffs. The specific consumer goods produced at the Facility and the operations/activities performed at specific site areas changed over time based upon corporate requirements. Manufacturing operations ceased in approximately 1991.

According to representatives of P&G and information provided in reports supplied by same, P&G constructed the initial Port Ivory manufacturing Facility at this location in 1906-1907. The original 77-acre Facility included portions of Sites 1, 2A, and Future Site 4, and was developed on an open, vegetated, marshy area. Over the years, P&G acquired additional acreage (Sites 2B and 3) and emplaced fill materials at low-lying areas of Sites 1, 2A/2B, 3 and Future Site 4, expanding the original Facility to include the current site limits, as shown on Figure 1. The fill used by P&G in conjunction with site development is reported to have included the following: sand, silt, gravel mixed with debris, cinders generated from on-site coal-fired boilers, and manufacturing by-products (i.e. calcium carbonate, carbonate salts from soap productions, diatomaceous filter earth from vegetable oil refining operations, carbonaceous filter material from glycerin recovery operations, etc.). Visual review of subsurface conditions during SI, RI and IRM activities indicates that all of the above-listed types of fill materials may have been emplaced at Site 1.

Review of Sanborn Maps and aerial photographs identified former structures at various locations throughout Site 1. The former structures included buildings and tanks at the Wood Yard, portions of buildings 12 and 13, ASTs to the west of Buildings 12 and 13 (buildings and structures immediately north, east, and south of Buildings 12 and 13 are located at Site 2A), and railroad tracks siding traversing Site 1. One building (or several smaller buildings) was located west of Buildings 12 and 13, near the southern portion of Site 1. Historical maps indicate that this building was utilized as a metal shop. In addition, Building S-16 and a building north of S-16 were located at Site 1, along with ASTs at Area A. Sanborn maps indicate the locations of former hydrogen holders; the nature of these hydrogen holders is discussed below. Building S-17 and structures extending from or immediately adjacent to Building S-17 were also located at Site 1. Please note, all of the structures identified above, with the exception of parts

of railroad tracks and sidings, were razed by P&G. In addition, Buildings 1A and 17 and aboveground conveyor belt systems and supports were removed by the Port Authority.

Based on historical mapping and information provided in reports prepared by P&G, the following materials were stored in ASTs present at Site 1 and/or were maintained at storage areas at Site 1: caustics, various vegetable and fish oils, fuel oil, waste oil, hydrogen, soap, spent acids, spent nickel catalyst, grease, coke and rosin. Storage methods are not identified on the maps. A few of the ASTs on the Block 1400, Lot 1 parcel (Sites 1 and 2A) were labeled on historical Sanborn Maps as being "hydrogen holders". As discussed below, these tanks are believed to have been used for the storage of hydrogen for use in fat and oil hydrogenation.

Historical maps also identify the potential presence of tanks, possibly USTs, at the Facility, including three areas (referenced herein as AOC-UST2, AOC-UST5 and AOC-UST6) on Site 1. Historical information indicates the following tank contents: oil in one or more tanks at Areas UST2 and UST5 and toluene in a tank at Area UST6. No UST was encountered in AOC-UST2, but the Port Authority has removed the previously decommissioned tanks at AOC-UST5 and AOC-UST6.

Historical information sources indicate some variability in the operations performed at specific site locations throughout P&G's operation of the Facility. However, in general, Sites 1 and 2A (Block 1400, Lot 1) were utilized as a single Facility for soap and glycerin manufacturing and utility functions (i.e. boiler houses, wood processing for the boilers, locomotive maintenance, etc.). The activities performed specifically at Site 1 consisted primarily of wood processing and storage. However, some office, machine shop, and soap manufacturing activities may have been performed in Buildings S-16 and 17 and in an additional building formerly located north of Building S-16. The locations of the former structures are indicated on Figure 2.

As noted above, ASTs referred to as "hydrogen holders" were observed on Sanborn Maps. HMM researched the usage and storage methods of hydrogen in industrial settings and determined that hydrogen is often used in the hydrogenation of oils and fats for foodstuffs and other commercial products. This is the most likely use for hydrogen at the former P&G Facility, given the nature of former Facility operations. Hydrogen can be stored as a gas under pressure, as a liquid under near-absolute zero temperature conditions, or bonded to metal and liquid hydrides and carbon compounds. Based on prior operations, it is likely that hydrogen was stored in liquid form at the former P&G Facility. Therefore, it is

unlikely that the presence of the former hydrogen holders impacted soil or groundwater quality at Site 1. Rather, appurtenant equipment that may have been present at Site 1 to pressurize the hydrogen is more likely to have impacted soil or groundwater quality since such equipment was likely powered by fuel oil. Because the location (and even the presence) of specific equipment, if any, is not confirmed on Sanborn or other historical maps, HMM has evaluated previous analytical data for those soil and groundwater samples collected in closest proximity to the hydrogen holders.

Analytical results from soil samples collected approximately 50 to 60 feet from the former tank locations during the SI and RI did not reveal the presence of substances related to the storage/usage of hydrogen (i.e., relatively high concentrations of metals that may be bonded to hydrogen for storage purposes were not present in the vicinity of the tanks). The nearest groundwater sample was collected from well PG-PA-MW-6, which is situated downgradient of the former hydrogen holder area. Analytical results for this sample indicated that only phenol and arsenic were detected at concentrations greater than their respective AWQSGVs. The elevated concentrations of arsenic appear to be related to the wood chips previously stockpiled in the Wood Yard. As indicated in Section 2.1.5, the wood chips have been removed, and the effect of the removal of the wood chips on groundwater quality will be determined during a groundwater monitoring program subsequent to the redevelopment of Site 1. The presence of phenol in the groundwater sample collected at PG-PA-MW-6 is likely related to the decay of naturally-occurring organic material that is present in the marsh deposits observed in the soil column at several locations at the Facility, including at Site 1. As such, it does not appear that the presence of the hydrogen holders has impacted soil or groundwater quality.

3.3 Regional and Local Hydrogeologic Setting

The following sections summarize the geology and hydrogeology of Staten Island and the HHMT-Port Ivory Facility, respectively.

3.3.1 Regional Hydrogeologic Setting

Physiographic provinces within Staten Island include both the Atlantic Coastal Plain and the Triassic lowlands section of the Piedmont physiographic province. The Precambrian-Cretaceous unconformity defines the boundary between these two physiographic provinces extending northeastward from Fresh Kills to north of Stapleton and continuing eastward across Long Island. The northwestern portion of Staten Island is underlain by bedrock of the Piedmont physiographic province, while Coastal Plain sediments are present in the southeastern portion of Staten Island.

Coastal Plain sediments include interlayered clay, silt, sand, and gravel deposits of the Raritan formation that thicken downdip (i.e., to the southeast). The bedrock in the Piedmont physiographic province includes shales, mudstones, and siltstones of the Stockton, Lockatong, and Passaic formations and intrusive diabase dikes. Less frequent sandstones and conglomerates occur in the Passaic formation and occasional limestones occur in the Lockatong formation. Basement rock underlying both the Coastal Plain sediment and bedrock of the Stockton, Lockatong, and Passaic formations is metamorphic rock of the Manhattan Prong.

In the extreme northeast portion of Staten Island, bedrock of the Passaic formation is overlain by glacial outwash deposits in turn overlain by finer-grained tidal marsh deposits. The glacial outwash deposits consist chiefly of stratified fine to coarse sand and gravel. The thicknesses of the glacial outwash deposits vary from approximately 20 feet to more than 50 feet. The overlying marsh deposits consist of primarily of organic silts and clays with occasional lenses of sand that represent stream channels and/or storm deposits. The marsh deposits are generally thin (i.e., likely no thicker than 15 feet).

Groundwater flow in the Raritan formation is anticipated to be seaward. In places where silts and clays overlie sands, groundwater may exist under confined conditions; otherwise, groundwater is anticipated to be under water table (i.e., unconfined) conditions. Groundwater flow occurs through the interstices between the individual soil grains. Although silts and clays have relatively high porosities, the mobility of groundwater through the pores is limited because the pore spaces are relatively small. Therefore, groundwater flow velocity is faster through the coarser-grained deposits than through the finer-grained deposits and most groundwater flow occurs through the sand layer.

Groundwater flow through the Lockatong, Stockton, and Passaic formations is expected to be seaward and occurs primarily through secondary porosity (e.g., bedding plane partings, fractures, etc.). In sandstone and conglomerate deposits, however, groundwater flow can occur through porosity in the rock itself, particularly if the cement that holds the individual sand and gravel grains together has been weathered and eroded. Water in these formations occurs under unconfined or confined conditions, depending on the frequency of vertical fractures in the interbedded shales, mudstones, siltstones, and coarser-grained deposits. The fractures become less frequent and narrower with depth so that the likelihood of groundwater being under confined conditions also increases with depth. The diabase dikes

exhibit very low hydraulic conductivity and therefore tend to act as hydraulic barriers to groundwater flow.

Groundwater in the glacial outwash and marsh deposits that overlie bedrock in the northwestern portion of Staten Island is generally anticipated to flow seaward. However, the groundwater may also be tidally influenced, and surface water may flow into confined aquifers or aquifers that have been subjected to pumping. Groundwater flow is similar to that through the Coastal Plain sediments in that it occurs through interstices between soil grains and occurs more rapidly through deposits of coarser-grained sediments that through deposits of finer-grained sediments. Groundwater in the glacial outwash deposits can be under confined or water table conditions, depending in part upon the thickness and vertical hydraulic characteristics of the overlying deposits. The horizontal flow is estimated to range from less than 0.1 to approximately 1.5 feet/day in glacial deposits comprised of sand and gravel. Where overlying deposits are thick and have low hydraulic conductivities, groundwater in the glacial outwash deposits is more likely to be under confined conditions. Groundwater in the overlying marsh deposits is under water table conditions.

Groundwater is not currently used for public water supply on Staten Island. Estimates of groundwater recharge rates on Staten Island are comparable to Kings and Queens Counties, approximately 0.25 to 0.5 million gallons per day per square mile. Before 1970, the surface water supply from upstate New York was supplemented by pumping a maximum of 5 million gallons per day of groundwater from aquifers beneath Staten Island. Higher pumping rates induced saline groundwater infiltration. Due to saline intrusion of aquifers in the area caused by former groundwater use, future development of aquifers for potable purposes in the general area is unlikely.

3.3.2 Local Hydrogeologic Setting

As noted above, the Passaic Formation underlies Site 1 and consists of reddish-brown to grayish-red siltstone and shale with a maximum thickness of 3,600 meters. According to available technical literature, the Passaic Formation in the vicinity of Site 1 strikes approximately north 50 degrees east and dips approximately of 9 to 15 degrees to the northwest. The Port Authority installed two deep monitoring wells, PG-PA-MW-1D and PG-PA-MW-6D, at Site 1 in November 2000. Both PG-MW-1D and PG-PA-MW-6D are located adjacent to shallow wells, and each therefore represents half of a well pair. According to the boring logs, bedrock of the Passaic Formation was encountered at approximately 70 feet

below ground surface (bgs) at both deep well locations. The bedrock encountered was described as red shale, confirming that it is bedrock of the Passaic Formation.

The hydrogeologic character of the Passaic Formation is anticipated to be as described in Section 3.3.1. The depth to groundwater in the deep aquifer is approximately eight to ten feet bgs at deep wells PG-MW-1D and PG-PA-MW-6D. According to previous environmental investigations, as well as limited information from the SI, tidal fluctuations were not observed in bedrock of the Passaic Formation. Based on calculated groundwater elevations at deep wells throughout the HHMT-Port Ivory Facility, the direction of the horizontal hydraulic gradient in the deep aquifer is north to northwest. The vertical hydraulic gradient is downward, and appears to be greater in magnitude further away from surface water bodies. Because the groundwater in the bedrock aquifer is anticipated to flow through secondary porosity in the bedrock, the actual direction of groundwater flow may not be parallel to the direction of the hydraulic gradient. However, as noted above, groundwater in the bedrock aquifer is anticipated to be towards Bridge Creek and/or the Arthur Kill.

The overburden materials at Site 1, as well as the remainder of the site, include a complex of stratified drift, glacial till, and tidal marsh deposits consisting of glacial outwash, marsh deposits, and anthropogenic fill. Based on the results of the SRI and previous investigations, the following strata have been encountered at Site 1 (strata are listed from the land surface downwards): (1) fill consisting of sand, silt, clay, and gravel in a generally loose condition mixed with carbonaceous material and/or vegetative, wood, brick, concrete, and glass debris that is present throughout Site 1 with a maximum thickness of about 19.5 feet; (2) organic clays and peats, consisting of soft and highly compressible tidal marsh deposits, to a maximum thickness of approximately 27 feet; (3) sand deposits consisting of loose to medium dense sand from marine or glacio-fluvial deposits ranging in thickness from 5 to 16 feet; (4) glacial clay and silt deposits with lenses of sand and gravel ranging in thickness from less than 10 to approximately 60 feet; and, (5) weathered shale. Essentially, the SI and the RI confirmed that the soil strata of Site 1 are consistent with documented regional conditions.

The hydrogeologic character of the overburden materials is anticipated to be as described in Section 3.3.1. The depth to groundwater in the overburden aquifer is approximately three to eight feet bgs at Site 1. According to previous environmental investigations as well as limited information from the SI, tidal fluctuations were not observed in the shallow aquifer. Based on calculated groundwater elevations at shallow wells throughout the HHMT-Port Ivory Facility, the direction of the horizontal hydraulic gradient

in the shallow aquifer at Site 1 and Site 2A varies, but is generally towards the north, northwest, or west. The hydraulic gradient indicates that the shallow aquifer is influenced by the presence of Bridge Creek to a greater extent than the deep aquifer. As noted above, the vertical hydraulic gradient is downward, and appears to be greater in magnitude further away from surface water bodies. Although the groundwater flow direction may or may not be parallel to the hydraulic gradient depending on the degree of anisotropy in the overburden aquifer, groundwater in the shallow aquifer is anticipated to be towards Bridge Creek and/or the Arthur Kill.

4.0 SRI SCOPE OF WORK

As noted above, the SRI effort was targeted to the AOC-UST2 area only; however, the SRI also included an evaluation of existing groundwater, surface water, and sediment analytical data with respect to whether groundwater impacts were affecting surface water quality in Bridge Creek and, in response to the NYSDEC concern regarding the former presence of hydrogen holders at Site 1, an evaluation of existing soil and groundwater data for impacts (if any) that may be attributable to the former hydrogen holders. Based on the results of the SI and RI at Site 1, a soil removal effort consisting of soil excavation and off-site disposal or recycling was proposed for AOC-UST2. The soil excavation effort was initiated on April 18, 2005. During excavation, field observations indicated that additional delineation was required to determine the extent of soil potentially impacted by petroleum. As such, the Port Authority discontinued the soil removal efforts and initiated the horizontal and vertical delineation of the observed impacted soil (i.e., initiated the SRI). The six objectives of the SRI were as follows: 1) to determine the impact (if any) the LNAPL has on soil quality; 2) to delineate the extent of the LNAPL and impacted soil; 3) to identify if the soil is acting as a source area for groundwater impacts; 4) to delineate the groundwater impacts (if any); 5) to determine whether LNAPL could discharge into Bridge Creek; and, 6) to determine whether impacted groundwater could discharge into Bridge Creek. The scope of work for the SRI at AOC-UST2 included the sampling of soil and groundwater. Specifically, the SRI consisted of the following: advancement of 14 soil borings, the collection of seventeen soil samples from these soil boring locations, the conversion of six soil borings to temporary wells, and the collection of one groundwater sample from each temporary well. All soil samples were analyzed for VOCs, SVOCs, and TPHC. All groundwater samples were analyzed for VOCs and SVOCs. The analytical laboratory was Veritech Laboratories, Fairfield, New Jersey, a New York State-certified laboratory (New York Laboratory Certification No. 11408).

objectives of Study

The scope of work for the Site 1 SRI was designed to collect data sufficient to achieve the objectives listed above. Field observations made during drilling and the soil analytical results were evaluated in order to address the Objective Nos. 1 and 2. The presence/absence of LNAPL within the temporary wells was confirmed in order to address Objective No. 5. The groundwater analytical results were evaluated in order to address Objective Nos. 3, 4, and 6.

The methods and materials utilized during completion of field activities are summarized below in Section 5. Fieldwork was completed in accordance with applicable and relevant NYSDEC regulations and guidance. LNAPL samples were not collected because, during drilling, the LNAPL could not be separated from the soil and because LNAPL did not accumulate in any of the six temporary wells. The fieldwork was performed as proposed in the document entitled *Site Investigation Workplan Addendum – Sites 1 and 2A/2B* (Workplan Addendum) and dated March 24, 2005. Please note, the Workplan Addendum dated March 24, 2005 was a revision to a previous document of the same name dated March 9, 2005. NYSDEC issued comments regarding the March 9, 2005 Workplan Addendum, and conditionally approved the document pending minor edits. The March 9, 2005 Workplan Addendum was edited in accordance with NYSDEC requirements and resubmitted on March 24, 2005. Thus, the March 24 Workplan Addendum is considered the relevant NYSDEC approved document.

5.0 SRI – FIELD INVESTIGATION

This section describes the Site 1 SRI activities conducted between April and May 2005. As noted above, most Site 1 AOCs were investigated during the SI and RI. However, one AOC at Site 1 (AOC-UST2) required additional remedial investigation. Descriptions of the methods used to complete the SRI activities, including the performance of geophysical surveys, the drilling of soil borings, the installation of temporary wells, and the collection of soil and groundwater samples are provided below in Sections 5.1 through 5.4, respectively.

5.1 Drilling Methods – Soil Borings

Fourteen soil borings, including three step-out soil borings and six soil borings that were converted to temporary wells, were drilled at Site 1 between May 13 and 24, 2005. The step-out soil borings were drilled to delineate the presence of LNAPL and as well as to allow collection of subsurface soil samples. Each step-out boring was advanced at an interval of approximately 25 feet from the soil boring where LNAPL and/or petroleum-impacted soil were observed. Two step-out borings (UST2-4A and UST2-4B)

were drilled to the north of soil boring location UST2-4; one step-out soil boring (UST2-5A) was drilled to the east of soil boring location UST2-5; and, one soil boring (TWP-1A) was drilled to the east of soil boring location TWP-1. Figure 4 depicts the locations of soil borings drilled in AOC-UST2 during the SRI.

All soil borings were drilled in accordance with NYSDEC regulations and guidance documents. Manual drilling methods were used at all soil boring locations to a minimum depth of six feet below ground surface (bgs) for utility clearance purposes. Hollow stem auger drilling methods were used at deeper depths at all locations except for soil boring location UST2-6, where manual drilling methods were utilized to the completion depth (six feet bgs). Manual drilling methods included use of post-hole diggers and/or soil augers to advance the borehole and to collect six-inch-long soil cores for inspection.

Hollow stem auger drilling methods included the use of 4 ¼-inch augers, center rods with floating plugs, and a 3-inch inner diameter split spoon sampler. Following manual drilling to six feet bgs, the floating plug was inserted into the bottom auger, and the augers were advanced to approximately six feet bgs in order to remove all soil from the borehole advanced manually. The floating plug was removed, and the split spoon was driven two feet below the bottom of the auger using a 140-pound hammer that was repeatedly dropped approximately 30 inches onto rods connected to the split spoon. The split spoon was retrieved and the soil column was logged. The floating plug was inserted back into the augers, and the augers were advanced an additional two feet. The floating plug was removed, the split spoon was inserted into the augers, and an additional two feet of the soil column were recovered. This process continued until the soil boring was completed. Completion depths varied, but the soil borings were advanced to the shallower of the bottom of the impacted soil or at least one foot below the water table unless auger refusal was encountered. If auger refusal was encountered, the borehole was abandoned and a new soil boring was drilled adjacent to the abandoned boring location.

The soil column was logged continuously at all soil boring locations for (at a minimum) the following conditions: color; texture; moisture content; and, indications of impacted soil, including elevated concentrations of volatile organic vapors as measured using a photoionization detector (PID), discolored soil, sheen, LNAPL, and odor. Boring logs are included in Appendix A. Soil boring locations are shown on Figure 4.

not included in this release

TWP-2 Constituent Sample Depth (ft bgs)	5/19/05 mg/Kg 8'-8.5'	5/19/05 mg/Kg 9'-9.5'	5/19/05 ug/L None [1]
VOCs			
Methylene Chloride	NE	NE	ND
Trans-1,2-Dichloroethene	ND	ND	ND
SVOCs			
Anthracene	ND	ND	ND
Benzo[a]anthracene	**0.1 J**	ND	ND
Benzo[a]pyrene	**0.092 J**	ND	ND
Benzo[b]fluoranthene	NE	ND	ND
Benzo[k]fluoranthene	ND	ND	ND
Chrysene	NE	ND	ND
Dibenzofuran	ND	ND	ND
Dibenzo[a,h]Anthracene	ND	ND	ND
Fluoranthene	NE	ND	ND
Indeno[1,2,3-cd]pyrene	NE	ND	ND
Naphthalene	ND	ND	ND
Phenanthrene	NE	ND	ND
Phenol	ND	ND	**2.2**
Pyrene	NE	ND	ND

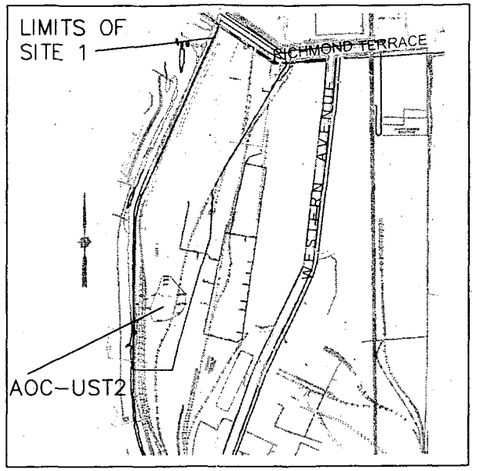
UST2-4 Constituent Sample Depth (ft bgs)	5/13/05 mg/Kg 6'-8'	5/13/05 mg/Kg 9'-10'
VOCs		
Methylene Chloride	NE	NE
Trans-1,2-Dichloroethene	ND	ND
SVOCs		
Anthracene	NE	ND
Benzo[a]anthracene	**2.8**	ND
Benzo[a]pyrene	**1.6 J**	ND
Benzo[b]fluoranthene	**1.3 J**	ND
Benzo[k]fluoranthene	NE	ND
Chrysene	**4.6**	ND
Dibenzofuran	ND	ND
Dibenzo[a,h]Anthracene	**0.61 J**	ND
Fluoranthene	NE	ND
Indeno[1,2,3-cd]pyrene	NE	ND
Naphthalene	ND	ND
Phenanthrene	NE	ND
Phenol	ND	ND
Pyrene	NE	ND

UST2-4A Constituent Sample Depth (ft bgs)	5/16/05 mg/Kg 6.5'-7'
VOCs	
Methylene Chloride	NE
Trans-1,2-Dichloroethene	ND
SVOCs	
Anthracene	ND
Benzo[a]anthracene	ND
Benzo[a]pyrene	ND
Benzo[b]fluoranthene	ND
Benzo[k]fluoranthene	ND
Chrysene	ND
Dibenzofuran	ND
Dibenzo[a,h]Anthracene	ND
Fluoranthene	ND
Indeno[1,2,3-cd]pyrene	ND
Naphthalene	ND
Phenanthrene	ND
Phenol	ND
Pyrene	ND

UST2-4B Constituent Sample Depth (bgs)	5/16/05 mg/Kg 6'-6.5'
VOCs	
Methylene Chloride	NE
Trans-1,2-Dichloroethene	ND
SVOCs	
Anthracene	ND
Benzo[a]anthracene	NE
Benzo[a]pyrene	NE
Benzo[b]fluoranthene	NE
Benzo[k]fluoranthene	ND
Chrysene	NE
Dibenzofuran	ND
Dibenzo[a,h]Anthracene	ND
Fluoranthene	NE
Indeno[1,2,3-cd]pyrene	NE
Naphthalene	ND
Phenanthrene	ND
Phenol	ND
Pyrene	NE

TWP-1* Constituent Sample Depth (ft bgs)	5/23/05 mg/Kg 6'-6.5'	5/23/05 mg/Kg 9.5'-10'
VOCs		
Methylene Chloride	NE	NE
Trans-1,2-Dichloroethene	ND	ND
SVOCs		
Anthracene	NE	NE
Benzo[a]anthracene	**0.67**	**0.37 J**
Benzo[a]pyrene	**0.46 J**	**0.36 J**
Benzo[b]fluoranthene	NE	NE
Benzo[k]fluoranthene	NE	NE
Chrysene	**0.69**	**0.45**
Dibenzofuran	NE	ND
Dibenzo[a,h]Anthracene	**0.1 J**	**0.11 J**
Fluoranthene	NE	NE
Indeno[1,2,3-cd]pyrene	NE	NE
Naphthalene	ND	ND
Phenanthrene	NE	NE
Phenol	ND	ND
Pyrene	NE	NE

TWP-1A* Constituent Sample Depth (ft bgs)	5/23/05 mg/Kg 4'-4.5'	5/23/05 ug/L None [1]
VOCs		
Methylene Chloride	NE	ND
Trans-1,2-Dichloroethene	ND	ND
SVOCs		
Anthracene	**81**	ND
Benzo[a]anthracene	**97**	ND
Benzo[a]pyrene	**73**	ND
Benzo[b]fluoranthene	**97**	ND
Benzo[k]fluoranthene	**29**	ND
Chrysene	**78**	ND
Dibenzofuran	**26**	ND
Dibenzo[a,h]Anthracene	**15**	ND
Fluoranthene	**160**	ND
Indeno[1,2,3-cd]pyrene	**43**	ND
Naphthalene	ND	**23**
Phenanthrene	**170**	ND
Phenol	ND	**3.8**
Pyrene	**190**	ND



UST2-5A* Constituent Sample Depth (ft bgs)	5/17/05 mg/Kg 1.5'-2'
VOCs	
Methylene Chloride	**0.19 J**
Trans-1,2-Dichloroethene	**0.62**
SVOCs	
Anthracene	NE
Benzo[a]anthracene	**0.81**
Benzo[a]pyrene	NE
Benzo[b]fluoranthene	**1**
Benzo[k]fluoranthene	NE
Chrysene	NE
Dibenzofuran	NE
Dibenzo[a,h]Anthracene	ND
Fluoranthene	NE
Indeno[1,2,3-cd]pyrene	NE
Naphthalene	ND
Phenanthrene	NE
Phenol	ND
Pyrene	NE

UST2-5* Constituent Sample Depth (ft bgs)	5/16/05 mg/Kg 4.5'-5'
VOCs	
Methylene Chloride	NE
Trans-1,2-Dichloroethene	ND
SVOCs	
Anthracene	NE
Benzo[a]anthracene	**0.97**
Benzo[a]pyrene	**0.75**
Benzo[b]fluoranthene	NE
Benzo[k]fluoranthene	NE
Chrysene	**0.65**
Dibenzofuran	NE
Dibenzo[a,h]Anthracene	**0.19 J**
Fluoranthene	NE
Indeno[1,2,3-cd]pyrene	NE
Naphthalene	ND
Phenanthrene	NE
Phenol	ND
Pyrene	NE

TWP-4* Constituent Sample Depth (ft bgs)	5/24/05 mg/Kg 5.5'-6'	5/24/05 ug/L None [1]
VOCs		
Methylene Chloride	NE	ND
Trans-1,2-Dichloroethene	ND	ND
SVOCs		
Anthracene	NE	ND
Benzo[a]anthracene	**0.59**	ND
Benzo[a]pyrene	**0.78**	ND
Benzo[b]fluoranthene	NE	ND
Benzo[k]fluoranthene	NE	ND
Chrysene	**0.73**	ND
Dibenzofuran	NE	ND
Dibenzo[a,h]Anthracene	**0.25 J**	ND
Fluoranthene	NE	ND
Indeno[1,2,3-cd]pyrene	NE	ND
Naphthalene	ND	ND
Phenanthrene	NE	ND
Phenol	ND	ND
Pyrene	NE	ND

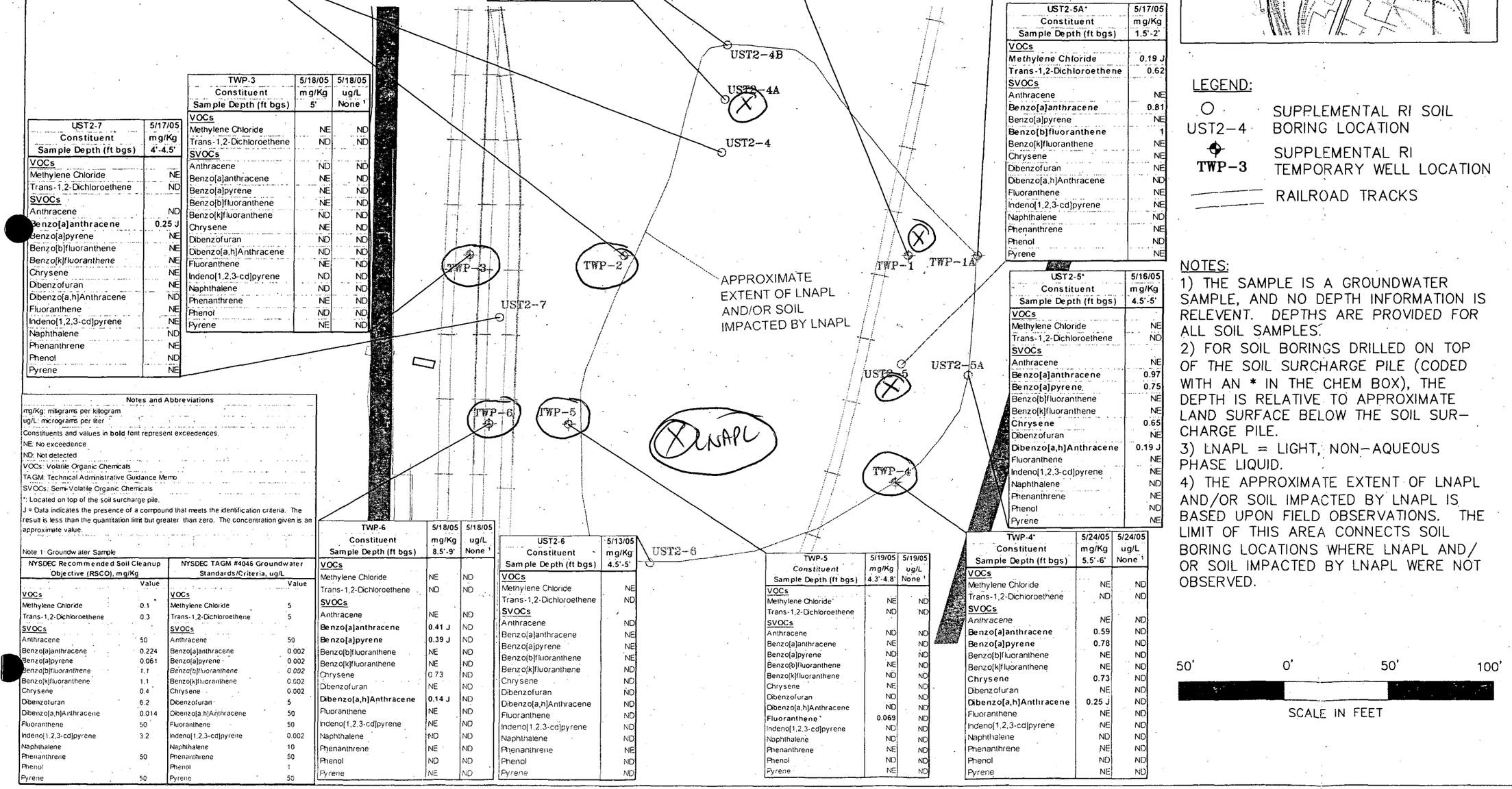
TWP-5 Constituent Sample Depth (ft bgs)	5/19/05 mg/Kg 4.3'-4.8'	5/19/05 ug/L None [1]
VOCs		
Methylene Chloride	NE	ND
Trans-1,2-Dichloroethene	ND	ND
SVOCs		
Anthracene	ND	ND
Benzo[a]anthracene	NE	ND
Benzo[a]pyrene	ND	ND
Benzo[b]fluoranthene	NE	ND
Benzo[k]fluoranthene	ND	ND
Chrysene	NE	ND
Dibenzofuran	ND	ND
Dibenzo[a,h]Anthracene	ND	ND
Fluoranthene	**0.069**	ND
Indeno[1,2,3-cd]pyrene	ND	ND
Naphthalene	ND	ND
Phenanthrene	NE	ND
Phenol	ND	ND
Pyrene	NE	ND

UST2-6 Constituent Sample Depth (ft bgs)	5/13/05 mg/Kg 4.5'-5'
VOCs	
Methylene Chloride	NE
Trans-1,2-Dichloroethene	ND
SVOCs	
Anthracene	ND
Benzo[a]anthracene	NE
Benzo[a]pyrene	NE
Benzo[b]fluoranthene	NE
Benzo[k]fluoranthene	ND
Chrysene	ND
Dibenzofuran	ND
Dibenzo[a,h]Anthracene	ND
Fluoranthene	ND
Indeno[1,2,3-cd]pyrene	ND
Naphthalene	ND
Phenanthrene	ND
Phenol	ND
Pyrene	ND

TWP-6 Constituent Sample Depth (ft bgs)	5/18/05 mg/Kg 8.5'-9'	5/18/05 ug/L None [1]
VOCs		
Methylene Chloride	NE	ND
Trans-1,2-Dichloroethene	ND	ND
SVOCs		
Anthracene	NE	ND
Benzo[a]anthracene	**0.41 J**	ND
Benzo[a]pyrene	**0.39 J**	ND
Benzo[b]fluoranthene	NE	ND
Benzo[k]fluoranthene	NE	ND
Chrysene	0.73	ND
Dibenzofuran	NE	ND
Dibenzo[a,h]Anthracene	**0.14 J**	ND
Fluoranthene	NE	ND
Indeno[1,2,3-cd]pyrene	NE	ND
Naphthalene	ND	ND
Phenanthrene	NE	ND
Phenol	ND	ND
Pyrene	NE	ND

TWP-3 Constituent Sample Depth (ft bgs)	5/18/05 mg/Kg 5'	5/18/05 ug/L None [1]
VOCs		
Methylene Chloride	NE	ND
Trans-1,2-Dichloroethene	ND	ND
SVOCs		
Anthracene	ND	ND
Benzo[a]anthracene	NE	ND
Benzo[a]pyrene	NE	ND
Benzo[b]fluoranthene	NE	ND
Benzo[k]fluoranthene	ND	ND
Chrysene	NE	ND
Dibenzofuran	ND	ND
Dibenzo[a,h]Anthracene	ND	ND
Fluoranthene	NE	ND
Indeno[1,2,3-cd]pyrene	ND	ND
Naphthalene	ND	ND
Phenanthrene	NE	ND
Phenol	ND	ND
Pyrene	NE	ND

UST2-7 Constituent Sample Depth (ft bgs)	5/17/05 mg/Kg 4'-4.5'
VOCs	
Methylene Chloride	NE
Trans-1,2-Dichloroethene	ND
SVOCs	
Anthracene	ND
Benzo[a]anthracene	**0.25 J**
Benzo[a]pyrene	NE
Benzo[b]fluoranthene	NE
Benzo[k]fluoranthene	NE
Chrysene	NE
Dibenzofuran	NE
Dibenzo[a,h]Anthracene	ND
Fluoranthene	NE
Indeno[1,2,3-cd]pyrene	NE
Naphthalene	ND
Phenanthrene	NE
Phenol	ND
Pyrene	NE



LEGEND:

- ○ — SUPPLEMENTAL RI SOIL BORING LOCATION
- UST2-4 — SUPPLEMENTAL RI SOIL BORING LOCATION
- ⌖ TWP-3 — SUPPLEMENTAL RI TEMPORARY WELL LOCATION
- ——— RAILROAD TRACKS

NOTES:

1) THE SAMPLE IS A GROUNDWATER SAMPLE, AND NO DEPTH INFORMATION IS RELEVENT. DEPTHS ARE PROVIDED FOR ALL SOIL SAMPLES.
2) FOR SOIL BORINGS DRILLED ON TOP OF THE SOIL SURCHARGE PILE (CODED WITH AN * IN THE CHEM BOX), THE DEPTH IS RELATIVE TO APPROXIMATE LAND SURFACE BELOW THE SOIL SUR-CHARGE PILE.
3) LNAPL = LIGHT, NON-AQUEOUS PHASE LIQUID.
4) THE APPROXIMATE EXTENT OF LNAPL AND/OR SOIL IMPACTED BY LNAPL IS BASED UPON FIELD OBSERVATIONS. THE LIMIT OF THIS AREA CONNECTS SOIL BORING LOCATIONS WHERE LNAPL AND/OR SOIL IMPACTED BY LNAPL WERE NOT OBSERVED.

50' 0' 50' 100'

SCALE IN FEET

Notes and Abbreviations

mg/Kg: milligrams per kilogram
ug/L: micrograms per liter
Constituents and values in **bold** font represent exceedences.
NE: No exceedence
ND: Not detected
VOCs: Volatile Organic Chemicals
TAGM: Technical Administrative Guidance Memo
SVOCs: Semi-Volatile Organic Chemicals
*: Located on top of the soil surcharge pile.
J = Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

Note 1: Groundwater Sample

NYSDEC Recommended Soil Cleanup Objective (RSCO), mg/Kg	Value	NYSDEC TAGM #4046 Groundwater Standards/Criteria, ug/L	Value
VOCs		VOCs	
Methylene Chloride	0.1	Methylene Chloride	5
Trans-1,2-Dichloroethene	0.3	Trans-1,2-Dichloroethene	5
SVOCs		SVOCs	
Anthracene	50	Anthracene	50
Benzo[a]anthracene	0.224	Benzo[a]anthracene	0.002
Benzo[a]pyrene	0.061	Benzo[a]pyrene	0.002
Benzo[b]fluoranthene	1.1	*Benzo[b]fluoranthene*	0.002
Benzo[k]fluoranthene	1.1	Benzo[k]fluoranthene	0.002
Chrysene	0.4	Chrysene	0.002
Dibenzofuran	6.2	Dibenzofuran	5
Dibenzo[a,h]Anthracene	0.014	Dibenzo[a,h]Anthracene	50
Fluoranthene	50	Fluoranthene	50
Indeno[1,2,3-cd]pyrene	3.2	Indeno[1,2,3-cd]pyrene	0.002
Naphthalene		Naphthalene	10
Phenanthrene	50	Phenanthrene	50
Phenol		Phenol	1
Pyrene	50	Pyrene	50

THE PORT AUTHORITY OF NY & NJ

ENGINEERING DEPARTMENT

Title

(BLOCK 1400, LOT 1)
HHMT-PORT IVORY FACILITY

SOIL AND GROUNDWATER SAMPLING LOCATIONS AND ANALYTICAL RESULTS-AOC-UST2

Designed by EMM Drawn by DKC Checked by

Date 11/14/2005

Contract Number

Drawing Number FIGURE 4

5.2 Soil Sampling Methods

Seventeen soil samples were collected from 14 soil borings (for rationale, see Tables 2A and 2B), including three step-out soil borings and six soil borings that were subsequently converted to temporary wells, between May 13 and 24, 2005. At soil boring locations where LNAPL impacts were not observed, one soil sample was collected from directly above the water table. At soil boring locations where LNAPL impacts were observed, a sample was collected from the zone exhibiting the greatest indications of contamination, based on field observations, and a second sample was collected from the shallowest depth interval where the soil appeared to be clean (as based on the absence of the indicators listed above).

Soil samples were collected using a stainless steel trowel that was decontaminated between samples; using the trowel, soil was transferred from the sampling device (i.e., the split spoon, hand auger, or post-hole digger) directly into sampling jars. Decontamination efforts included rinsing the trowel and the coring device between uses with laboratory-grade DI water and an Alconox-water solution. The samples were labeled and placed on ice in a cooler. All soil samples were transported to the analytical laboratory under chain-of-custody documentation and analyzed for VOC+10, SVOC+25, and TPHC.

5.3 Installation of Temporary Wells

Six soil borings drilled at Site 1 were converted to temporary wells. Temporary wells TWP-1A and TWP-2 through 6 were constructed of 2-inch diameter PVC screen and riser. The screen for each temporary well consisted of 0.020-inch slot size. In each case, the screened interval extended from approximately two feet above groundwater to the bottom of the borehole. The sand pack for each well consisted of No. 1 sand, and was installed to a depth of approximately one to two feet above the top of the screen. Bentonite pellets were installed above the sand pack in all temporary wells to prevent stormwater or perched water from entering the sand pack. In all cases, the PVC riser was allowed to remain one to three feet above ground surface.

5.4 Groundwater Sampling Methods

As indicated above, one groundwater sample was collected from each of the six temporary wells installed at Site 1. Groundwater sampling was performed in accordance with NYSDEC requirements and guidance documents.

The presence/absence of LNAPL was recorded and the depth to water in the well was measured using an electronic oil-water interface meter. The volume of water within the well was calculated. The well was

TABLE 2A
SOIL SAMPLING ANALYTICAL PROGRAM
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location	LNAPL	PID (ppm)	Depth to Water Table (ft bgs)	Sampling Depth (ft bgs)	Laboratory Analyses
UST2-4	NE	18 [1]	6.0	6-8	SVOC + 25; VOC + 10; TPHC
	NE	0		9-10	SVOC + 25; VOC + 10; TPHC
UST2-4A	6-8 ft bgs	0.6 [1]	5.0	6.5-7	SVOC + 25; VOC + 10; TPHC
UST2-4B	NE	0	6.5	6-6.5	SVOC + 25; VOC + 10; TPHC
UST2-5	Note 3	0	5.0	7.5-8	SVOC + 25; VOC + 10; TPHC
UST2-5A	NE	0	5.0	4.5-5	SVOC + 25; VOC + 10; TPHC
UST2-6	NE	0	5.0	4.5-5	SVOC + 25; VOC + 10; TPHC
UST2-7	NE	0	4.5	4-4.5	SVOC + 25; VOC + 10; TPHC
TWP-1	Note 4	0	3.5	6-6.5	SVOC + 25; VOC + 10; TPHC
	NE	0		9.5-10	SVOC + 25; VOC + 10; TPHC
TWP-1A	NE	0	4.5	4-4.5	SVOC + 25; VOC + 10; TPHC
TWP-2	Note 5	0	5.0	8-8.5	SVOC + 25; VOC + 10; TPHC
	NE	0		9-9.5	SVOC + 25; VOC + 10; TPHC
TWP-3	NE	0	5.0	4.5-5	SVOC + 25; VOC + 10; TPHC
TWP-4	NE	0	3.0	5.5-6	SVOC + 25; VOC + 10; TPHC
TWP-5	NE	0	5.0	4.3-4.8	SVOC + 25; VOC + 10; TPHC
TWP-6	NE	0	5.0	8.5-9	SVOC + 25; VOC + 10; TPHC

Notes and Abbreviations:
LNAPL: light, non-aqueous phase liquid
PID: photoionization detector
ppm: parts per million above background
ft bgs: feet below ground surface
SVOC + 25: semivolatile organic compounds with a 25-compound library search
VOC + 10: volatile organic compounds with a 10-compound library search
TPHC: total petroleum hydrocarbons
NE: not encountered
bgs: below ground surface

1: Petroleum odors also noted at approximately 7 feet bgs at these locations.
2: Soil borings UST2-5, UST2-5A, TWP-1, TWP-1A, and TWP-4 were located on top of the surcharge pile. The reference point for the depth at these locations is the land surface adjacent to the surcharge pile, considered to be approximately equivalent to the original (pre-surcharge) land surface that is now covered.
3: Sheen and odor noted at 7-8 ft bgs. Discontinuous LNAPL observed.
4: Sheen observed from 6-8 ft bgs.
5: Sheen, possibly due to decay of naturally-occurring organic matter (the sheen was thick and film-like), noted at 8-9.5 ft bgs.

TABLE 2B
GROUNDWATER SAMPLING ANALYTICAL PROGRAM
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location	LNAPL	Depth to Water (ft bgs)	Screen Interval (ft bgs)	Laboratory Analyses
TWP-1A	None observed	4.5	-1.5 to 8.5	SVOC + 25; VOC + 10; TPHC
TWP-2	None observed	5.0	3 to 10.5	SVOC + 25; VOC + 10; TPHC
TWP-3	None observed	6.5	3 to 10	SVOC + 25; VOC + 10; TPHC
TWP-4	None observed	5.0	3 to 10	SVOC + 25; VOC + 10; TPHC
TWP-5	None observed	4.5	2.5 to 11.5	SVOC + 25; VOC + 10; TPHC
TWP-6	None observed	5.0	3 to 9	SVOC + 25; VOC + 10; TPHC

Notes and Abbreviations:
LNAPL: light, non-aqueous phase liquid
ft bgs: feet below ground surface
SVOC + 25: semivolatile organic compounds with a 25-compound library search
VOC + 10: volatile organic compounds with a 10-compound library search
TPHC: total petroleum hydrocarbons
bgs: below ground surface
NE: None encountered

1: Temporary well TWP-1A was installed in a soil boring
that was a step-out location from proposed location TWP-1.
The step-out soil boring was drilled because LNAPL was
observed at soil boring location TWP-1 and the temporary
well was intended to be installed upgradient of LNAPL.
temporary well was installed at TWP-1.
2: Temporary wells TWP-1A and TWP-4 were located
on top of the surcharge pile (i.e, approximately 15 to 16 feet above surrounding grade).
The reference point for the depth at these locations is the land surface adjacent to the
surcharge pile, considered to be approximately equivalent to the
original (pre-surcharge) land surface that is now covered.

purged of three to five times the calculated volume of water using a centrifugal pump. After the water level recovered, a dedicated Teflon bailer was lowered into the well, allowed to fill with water, and was removed from the well. The groundwater sample was transferred from the bailer into laboratory-prepared sampling jars. The samples were labeled and placed on ice in a cooler. All soil samples were transported to the analytical laboratory (Veritech) under chain-of-custody documentation and analyzed for VOC+10 and SVOC+25.

6.0 SRI – RESULTS AND FIELD OBSERVATIONS

The SRI conducted at Site 1 included the following components: drilling of soil borings, collection of soil samples, installation of temporary wells, collection of groundwater samples, and evaluation of previous soil, groundwater, surface water, and sediment analytical data. The results of the fieldwork implemented during the SRI are provided in Section 6.1. During implementation of each fieldwork component, field observations and measurements were recorded. In addition, soil and groundwater samples were analyzed for the parameters specified in Section 5. The results of the fieldwork portion of the SRI are presented below in Sections 6.1.1 (field observations) and 6.1.2 (analytical results). Section 6.2 is a summary of HMM's evaluation of previous analytical data associated with the effect of impacted groundwater on the quality of surface water and sediment in Bridge Creek (Section 6.2.1) and the presence of the former hydrogen holders (Section 6.2.2).

6.1 Results of the Fieldwork Portion of the SRI

The fieldwork portion of the SRI, including the drilling of 14 soil borings, the collection and analysis of seventeen soil samples from those soil borings, the conversion of six of the soil borings to temporary wells, and the collection and analysis of one groundwater sample from each temporary well, was conducted between May 13 and 24, 2005. Fieldwork was conducted only at AOC-UST2. The results of this portion of the SRI are discussed in the sections below.

6.1.1 SRI Field Observations

The SRI included a visual examination of soil and groundwater conditions and measurements of the concentrations of volatile organic vapors in soil. Field observations were made to delineate the extent of LNAPL and impacted soil and to identify any indications that groundwater had been impacted by the LNAPL and/or impacted soil. The overburden materials encountered at this AOC during the implementation of the SRI were consistent with those previously observed throughout Site 1. In general,

fill material, including the soil surcharge pile, was encountered overlying organic clays and peat. The soil surcharge pile was present at locations UST2-5, UST2-5A, TWP-1, and TWP-1A. In these four soil boring locations, depths are provided relative to the land surface adjacent to the western side of the surcharge pile. Fill material was encountered at all locations and consisted of one or more of the following types of fill: urban fill; cinder fill; and, byproduct fill. The classification system for the fill is provided in Section 2.1.2, above. Native materials, consisting of organic fine-grained (i.e., primarily silts and clays) soil and peat, were encountered at only locations TWP-5 (at 11.5 feet bgs) and TWP-6 (at nine feet bgs).

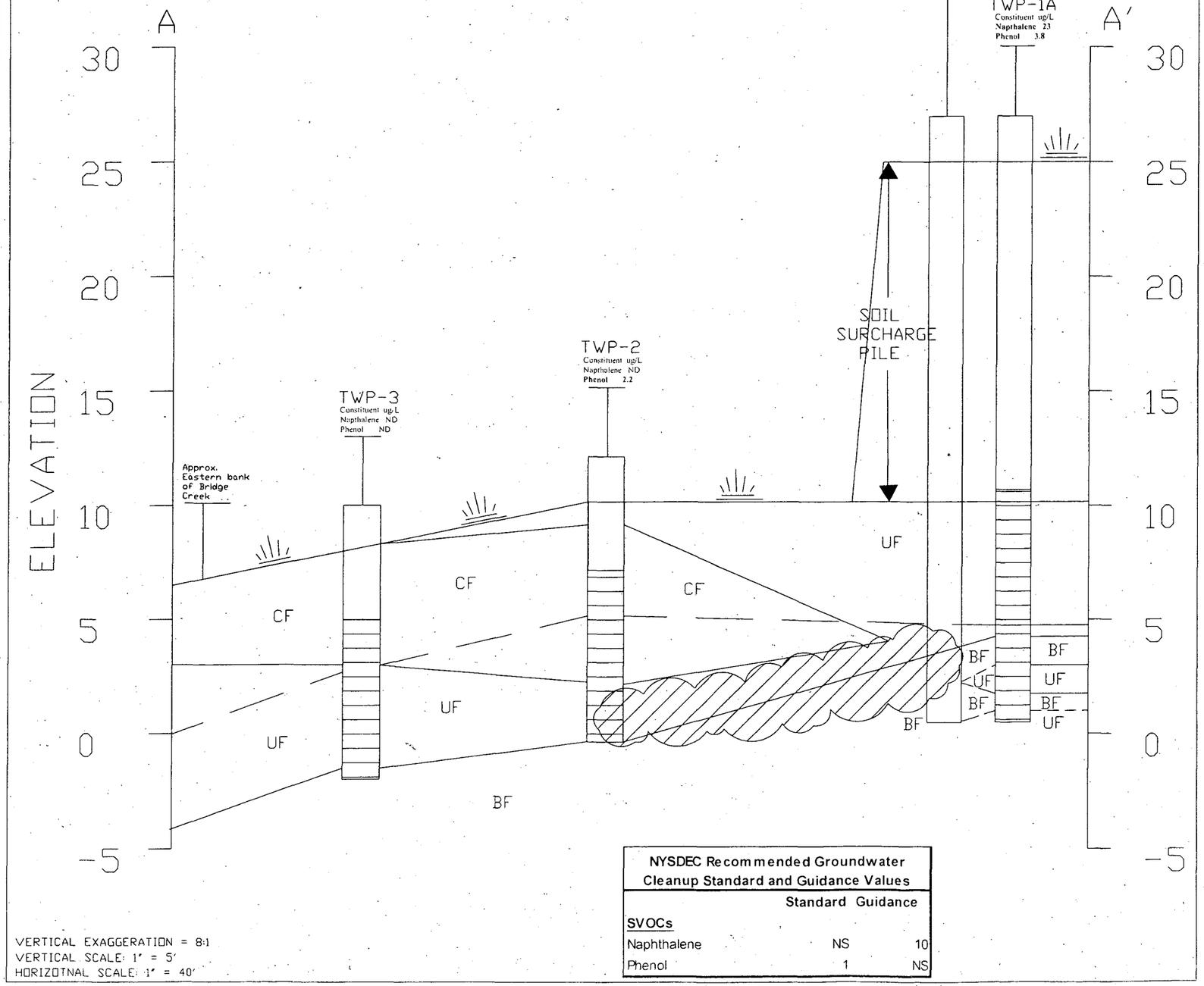
Groundwater was encountered in the temporary wells at elevations ranging from approximately sea level to 5 feet above mean sea level (AMSL). The groundwater elevations confirmed that the direction of the horizontal component of the hydraulic gradient is to the west towards Bridge Creek. The groundwater flow direction is anticipated to be approximately perpendicular to the direction of the horizontal hydraulic gradient. To provide a visual presentation of the relationship between the water table, LNAPL/impacted soil, and overburden materials encountered at AOC-UST2, HMM prepared a cross-section through AOC-UST2, which is presented as Figure 5.

UST2-4?

Potentially impacted soil was observed at only four of the 14 soil boring locations. Specifically, the presence of sheen, elevated concentrations of volatile organic vapors, petroleum odor, and/or LNAPL were observed at soil boring locations TWP-1, UST-4, UST2-4A, and UST2-5. As measured using a photoionization detector (PID), the concentration of volatile organic vapors in the soil ranged from 0 (at various depths and locations) to 18 parts per million (at 6-8 feet below ground surface at location UST2-4). The LNAPL appeared as sheen on, or as discrete nodules within, the soil and/or groundwater at locations TWP-1, UST2-4A, and UST2-5. Petroleum odor was noted at approximately seven feet bgs at UST2-4 and UST2-4A.

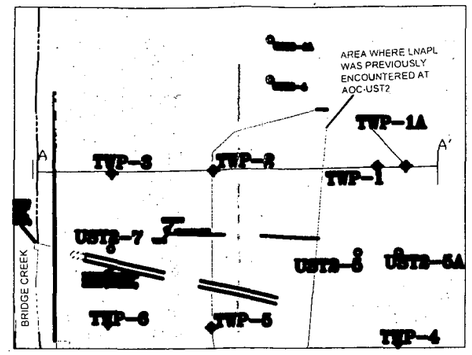
*

Based on field observations, the horizontal extent of the LNAPL and/or impacted soil is approximately 235 feet north-south by 170 feet east-west. Please note, LNAPL and/or impacted soil were present at locations UST2-5 and TWP-1, drilled at the top of the soil surcharge stockpile and immediately west of the Site 1-Site 2A boundary. Impacted soil is therefore present beneath the western portion of the soil surcharge stockpile.



VERTICAL EXAGGERATION = 8:1
VERTICAL SCALE: 1" = 5'
HORIZOTNAL SCALE: 1" = 40'

NYSDEC Recommended Groundwater Cleanup Standard and Guidance Values		
	Standard	Guidance
SVOCs		
Naphthalene	NS	10
Phenol	1	NS



SCALE: 1" = 90'

LEGEND

- PVC RISER/BOREHOLE
- WELL SCREEN
- LAND SURFACE
- --- APPROXIMATE WATER TABLE
- ___ GEOLOGIC CONTACTS (DASHED WHERE INFERRED)
- UF - URBAN FILL (C&D MATERIAL, WOOD, BRICK, GLASS, ETC.)
- BF - BYPRODUCT FILL (LIME SLUDGE)
- CF - CINDER FILL (SLAG AND ASH)
- APPROXIMATE EXTENT OF LNAPL IMPACTS

NOTES

1) TWP-1A, TWP-2, AND TWP-3 ARE TEMPORARY WELLS. TWP-1 WAS A SOIL BORING LOCATION WHERE NO TEMPORARY WELL WAS INSTALLED.
2) LOCATIONS OF TWP-1A, TWP-2, AND TWP-3 AND THE ELEVATION OF LAND SUREFACE ADJACENT TO EACH WELL ARE FROM A SURVEY CONDUCTED BY THE PORT AUTHORITY ON 12-12-05.
3) ug/L = MICROGRAMS PER LITER.
4) ALL ELEVATIONS ARE IN NGVD '29.
5) ANALYTICAL RESULTS ARE SHOWN ONLY FOR THE SVOCs NAPHTHALENE AND PHENOL BECAUSE NO VOC's OR OTHER SVOCs WERE DETECTED AT CONCENTRATIONS GREATER THAN NYSDEC CRITERIA. NO ANALYTICAL RESULTS ARE SHOWN FOR SOIL SAMPLES.
6) THE APPROXIMATE EXTENT OF LNAPL IMPACTS IS BASED UPON FIELD OBSERVATIONS, INCLUDING LNAPL (AT TEST PITS EXCAVATED BETWEEN TWP-1 AND TWP-2) AND SHEEN (AT TWP-1 AND TWP-2).

THE PORT AUTHORITY OF NY & NJ

ENGINEERING DEPARTMENT

(BLOCK 1400, LOT 1)
HHMT-PORT IVORY FACILITY

CROSS SECTION A - A'
THROUGH AOC-UST2

Designed by DSH Drawn by Checked by

Date 1/4/2006

Contract Number

Drawing Number FIGURE 5

6.1.2 SRI Analytical Results and Appropriate NYSDEC Standards and Guidance Values

Seventeen soil and six groundwater samples were collected from AOC-UST2. The analytical results for these samples are tabulated in Tables 3A and 3B (soil sampling results) and Tables 4A and 4B (groundwater sampling results) and are summarized below. The spatial distribution of compounds detected at concentrations greater than the applicable standards are shown on Figure 4.

Summary of Soil Sampling Analytical Results and Appropriate NYSDEC Guidance Values

As noted above, seventeen soil samples were collected from 14 soil borings drilled at AOC-UST2 between May 13 and May 24, 2005. The date of sample collection, depth interval sampled, and the rationale for selecting the depth interval are provided in Table 2A. Soil samples were collected to determine the impact (if any) of the LNAPL on soil quality and to delineate the extent of impacted soil. The sampling locations and a summary of the results are shown on Figure 4. A summary of the analytical results is provided in Tables 3A and 3B.

For discussion purposes, the soil sampling results have been compared to current NYSDEC regulatory criteria. The criteria utilized are the Recommended Soil Cleanup Objective (RSCO) criteria as set forth in the January 1994 NYSDEC Division of Technical and Administrative Guidance Memorandum (TAGM 4046). Please note, reference to the RSCOs in this report does not represent any agreement or concurrence that the same are appropriate for usage at this site.

The sampling program for AOC-UST2 included the collection of one soil sample from the zone directly above the water table at soil boring locations with no indications of LNAPL, and the collection of two soil samples (one from the most impacted depth interval and a deeper sample from soil that appeared clean) at soil boring locations with indications of LNAPL. All soil samples were analyzed for VOCs, SVOCs, and TPHC.

Only one of the 17 soil samples collected during the SRI contained one or more VOCs at concentrations greater than their respective RSCOs. The soil sample collected from the 1.5-2 foot bgs depth interval at location UST2-5A contained slightly elevated concentrations of methylene chloride and trans-1,2-dichloroethene. Methylene chloride, a common laboratory solvent, was detected at a concentration of 0.19 mg/kg, slightly greater than its RSCO of 0.1 mg/kg. Trans-1,2-dichloroethene was detected at a concentration of 0.62 mg/kg, slightly greater than its RSCO of 0.3 mg/kg. No other VOC was detected at a concentration greater than its respective RSCO in any soil sample collected during the SRI.

TABLE 3A
SUMMARY OF SOIL ANALYTICAL RESULTS AOC-UST2 - VOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location		UST2-4			UST2-4			UST2-4A			UST2-4B		
Field ID		PI-UST2-4-051305S013			PI-UST2-4-051305S014B			PI-UST2-4A051605SO13			PI-UST2-4B051605SO13		
Lab Sample No.	NYSDEC RSCO	AC17613-002			AC17613-003			AC17643-001			AC17643-002		
Sampling Date	(mg/Kg)	5/13/2005			5/13/2005			5/16/2005			5/16/2005		
Matrix		Soil			Soil			Soil			Soil		
Sample Depth		6'-8' bgs			9'-10' bgs			6.5'-7' bgs			6'-6.5' bgs		
Units		mg/Kg			mg/Kg			mg/Kg			mg/Kg		
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,1,1,2-Tetrachloroethane	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
1,1,1-Trichloroethane	0.8 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
1,1,2,2-Tetrachloroethane	0.6 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
1,1,2-Trichloroethane	6.0 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
1,1-Dichloroethane	0.2 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
1,1-Dichloroethene	0.4 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
1,2-Dichloroethane	0.1 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
1,2-Dichloropropane	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
2-Butanone	0.3 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
2-Chloroethylvinylether	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
2-Hexanone	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
4-Methyl-2-Pentanone	1.0 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Acetone	0.2 (Note 1)	0.16			0.064			0.056			0.034		
Acrolein	NS	ND	0.16		ND	0.045		ND	0.049		ND	0.033	
Acrylonitrile	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Benzene	0.06 (Note 1)	ND	0.0064		ND	0.0018		ND	0.002		ND	0.0013	
Bromodichloromethane	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Bromoform	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Bromomethane	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Carbon disulfide	2.7 (Note 1)	ND	0.032		0.0061		J	ND	0.0098		ND	0.0067	
Carbon tetrachloride	0.6 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Chlorobenzene	1.7 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Chloroethane	1.9 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Chloroform	0.3 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Chloromethane	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Cis-1,2-Dichloroethene	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Cis-1,3-Dichloropropene	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Dibromochloromethane	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Ethylbenzene	5.5 (Note 1)	ND	0.0064		ND	0.0018		ND	0.002		ND	0.0013	
M&p-Xylenes	1.2 (Note 1)	ND	0.013		ND	0.0036		ND	0.0039		ND	0.0027	
Methylene chloride	0.1 (Note 1)	0.094			0.04			0.034			0.018		
O-Xylene	1.2 (Note 1)	ND	0.0064		ND	0.0018		ND	0.002		ND	0.0013	
Styrene	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Tetrachloroethene	1.4 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Toluene	1.5 (Note 1)	ND	0.0064		ND	0.0018		ND	0.002		ND	0.0013	
Trans-1,2-Dichloroethene	0.3 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Trans-1,3-Dichloropropene	NS	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Trichloroethene	0.7 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Vinyl chloride	0.2 (Note 1)	ND	0.032		ND	0.0089		ND	0.0098		ND	0.0067	
Total Confident VOCs	10 (Note 2)	0.254			0.104			0.09			0.052		
Total Volatile Organic TICs	NS	11.54		J	0.196		J	11.54		J	0.1206		J
Total Petroleum Hydrocarbons (TPHC)	NS	48000			360			4100			150		

TABLE 3A
SUMMARY OF SOIL ANALYTICAL RESULTS AOC-UST2 - VOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location		UST2-5			UST2-5A			UST2-6			UST2-7		
Field ID		PI-UST2-5-051605SO04			PI-UST2-5A051705SO03			PI-UST2-6-051305S010			PI-UST2-7-051705SO09		
Lab Sample No.	NYSDEC RSCO	AC17643-003			AC17665-001			AC17613-001			AC17665-002		
Sampling Date	(mg/Kg)	5/16/2005			5/17/2005			5/13/2005			5/17/2005		
Matrix		Soil			Soil			Soil			Soil		
Sample Depth		7.5'-8' bgs			4.5'-5' bgs			4.5'-5' bgs			4'-4.5' bgs		
Units		mg/Kg			mg/Kg			mg/Kg			mg/Kg		
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,1,1,2-Tetrachloroethane	NS	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
1,1,1-Trichloroethane	0.8 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
1,1,2,2-Tetrachloroethane	0.6 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
1,1,2-Trichloroethane	6.0 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
1,1-Dichloroethane	0.2 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
1,1-Dichloroethene	0.4 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
1,2-Dichloroethane	0.1 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
1,2-Dichloropropane	NS	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
2-Butanone	0.3 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
2-Chloroethylvinylether	NS	ND	0.0077		ND	1.1		ND	0.0064		ND	0.0076	
2-Hexanone	NS	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
4-Methyl-2-Pentanone	1.0 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Acetone	0.2 (Note 1)	0.045			ND	0.43		0.032			ND	0.038	
Acrolein	NS	ND	0.038		ND	0.43		ND	0.032		ND	0.038	
Acrylonitrile	NS	ND	0.0077		0.15		J	ND	0.0064		ND	0.0076	
Benzene	0.06 (Note 1)	ND	0.0015		ND	0.43		ND	0.0013		ND	0.0015	
Bromodichloromethane	NS	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Bromoform	NS	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Bromomethane	NS	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Carbon disulfide	2.7 (Note 1)	0.01			ND	0.43		0.0022		J	0.0021		J
Carbon tetrachloride	0.6 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Chlorobenzene	1.7 (Note 1)	ND	0.0077		ND	1.1		ND	0.0064		ND	0.0076	
Chloroethane	1.9 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Chloroform	0.3 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Chloromethane	NS	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Cis-1,2-Dichloroethene	NS	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Cis-1,3-Dichloropropene	NS	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Dibromochloromethane	NS	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Ethylbenzene	5.5 (Note 1)	ND	0.0015		0.049			ND	0.0013		ND	0.0015	
M&p-Xylenes	1.2 (Note 1)	ND	0.0031		ND	0.43		ND	0.0026		ND	0.003	
Methylene chloride	0.1 (Note 1)	0.027			0.19		J	0.021			0.0096		
O-Xylene	1.2 (Note 1)	ND	0.0015		ND	0.43		ND	0.0013		ND	0.0015	
Styrene	NS	ND	0.0077		0.81	0.43		ND	0.0064		ND	0.0076	
Tetrachloroethene	1.4 (Note 1)	ND	0.0077		0.81	0.43		ND	0.0064		ND	0.0076	
Toluene	1.5 (Note 1)	ND	0.0015		1			ND	0.0013		ND	0.0015	
Trans-1,2-Dichloroethene	0.3 (Note 1)	ND	0.0077		0.62			ND	0.0064		ND	0.0076	
Trans-1,3-Dichloropropene	NS	ND	0.0077		0.41		J	ND	0.0064		ND	0.0076	
Trichloroethene	0.7 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Vinyl chloride	0.2 (Note 1)	ND	0.0077		ND	0.43		ND	0.0064		ND	0.0076	
Total Confident VOCs	10 (Note 2)	0.082			1.669			0.053			0.0096		
Total Volatile Organic TICs	NS	0.1315		J	0.0498		J	0.0354		J	0.0343		J
Total Petroleum Hydrocarbons (TPHC)	NS	4100			860			46			97		

TABLE 3A
SUMMARY OF SOIL ANALYTICAL RESULTS AOC-UST2 - VOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location		TWP-1			TWP-1			TWP-1A			TWP-2		
Field ID	NYSDEC RSCO	PI-TWP-1-052305SO20			PI-TWP-1-052305SO09			PI-TWP-1-052305SO13			PI-TWP-2-051905SO17		
Lab Sample No.	(mg/Kg)	AC17758-002			AC17758-005			AC17758-001			AC17870-001		
Sampling Date		5/23/2005			5/23/2005			5/23/2005			5/19/2005		
Matrix		Soil			Soil			Soil			Soil		
Sample Depth		6'-6.5' bgs			9.5'-10' bgs			4'-4.5' bgs			8'-8.5' bgs		
Units		mg/Kg			mg/Kg			mg/Kg			mg/Kg		
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,1,1,2-Tetrachloroethane	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
1,1,1-Trichloroethane	0.8 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
1,1,2,2-Tetrachloroethane	0.6 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
1,1,2-Trichloroethane	6.0 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
1,1-Dichloroethane	0.2 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
1,1-Dichloroethene	0.4 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
1,2-Dichloroethane	0.1 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
1,2-Dichloropropane	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
2-Butanone	0.3 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
2-Chloroethylvinylether	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
2-Hexanone	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
4-Methyl-2-Pentanone	1.0 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Acetone	0.2 (Note 1)	0.037		J	0.018		J	0.033		J	0.045		
Acrolein	NS	ND	0.046		ND	0.03		ND	0.038		ND	0.038	
Acrylonitrile	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Benzene	0.06 (Note 1)	ND	0.0019		ND	0.0012		ND	0.0015		ND	0.0015	
Bromodichloromethane	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Bromoform	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Bromomethane	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Carbon disulfide	2.7 (Note 1)	0.002		J	ND	0.006		ND	0.0077		0.01		
Carbon tetrachloride	0.6 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Chlorobenzene	1.7 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Chloroethane	1.9 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Chloroform	0.3 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Chloromethane	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Cis-1,2-Dichloroethene	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Cis-1,3-Dichloropropene	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Dibromochloromethane	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Ethylbenzene	5.5 (Note 1)	ND	0.0019		ND	0.0012		ND	0.0015		ND	0.0015	
M&p-Xylenes	1.2 (Note 1)	ND	0.0037		ND	0.0024		ND	0.0031		ND	0.0031	
Methylene chloride	0.1 (Note 1)	0.027			0.027			0.024			0.027		
O-Xylene	1.2 (Note 1)	ND	0.0019		ND	0.0012		ND	0.0015		ND	0.0015	
Styrene	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Tetrachloroethene	1.4 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Toluene	1.5 (Note 1)	ND	0.0019		ND	0.0012		ND	0.0015		ND	0.0015	
Trans-1,2-Dichloroethene	0.3 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Trans-1,3-Dichloropropene	NS	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Trichloroethene	0.7 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Vinyl chloride	0.2 (Note 1)	ND	0.0093		ND	0.006		ND	0.0077		ND	0.0077	
Total Confident VOCs	10 (Note 2)	0.027			0.027			0.024			0.082		
Total Volatile Organic TICs	NS	0.103		J	0.068		J	0.111		J	0.249		J
Total Petroleum Hydrocarbons (TPHC)	NS	2700			150			9600			580		

TABLE 3A
SUMMARY OF SOIL ANALYTICAL RESULTS AOC-UST2 - VOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location		TWP-2			TWP-3			TWP-4			TWP-5		
Field ID		PI-TWP-2-051905SO19			PI-TWP-3-051805SO10			PI-TWP-4-052405S010			PI-TWP-5-051905SO10		
Lab Sample No.	NYSDEC RSCO	AC17870-002			AC17675-001			AC17774-001			AC17870-003		
Sampling Date	(mg/Kg)	5/19/2005			5/18/2005			5/24/2005			5/19/2005		
Matrix		Soil			Soil			Soil			Soil		
Sample Depth		9'-9.5' bgs			4.5'-5' bgs			5.5'-6' bgs			4.3'-4.8' bgs		
Units		mg/Kg			mg/Kg			mg/Kg			mg/Kg		
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,1,1,2-Tetrachloroethane	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
1,1,1-Trichloroethane	0.8 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
1,1,2,2-Tetrachloroethane	0.6 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
1,1,2-Trichloroethane	6.0 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
1,1-Dichloroethane	0.2 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
1,1-Dichloroethene	0.4 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
1,2-Dichloroethane	0.1 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
1,2-Dichloropropane	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
2-Butanone	0.3 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
2-Chloroethylvinylether	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
2-Hexanone	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
4-Methyl-2-Pentanone	1.0 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Acetone	0.2 (Note 1)	0.062			0.024		J	0.035			0.044		
Acrolein	NS	ND	0.03		ND	0.03		ND	0.034		ND	0.03	
Acrylonitrile	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Benzene	0.06 (Note 1)	ND	0.0012		ND	0.0012		ND	0.0014		ND	0.0012	
Bromodichloromethane	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Bromoform	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Bromomethane	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Carbon disulfide	2.7 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Carbon tetrachloride	0.6 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Chlorobenzene	1.7 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Chloroethane	1.9 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Chloroform	0.3 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Chloromethane	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Cis-1,2-Dichloroethene	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Cis-1,3-Dichloropropene	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Dibromochloromethane	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Ethylbenzene	5.5 (Note 1)	ND	0.0012		ND	0.0012		ND	0.0014		ND	0.0012	
M&p-Xylenes	1.2 (Note 1)	ND	0.0024		ND	0.0024		ND	0.0027		ND	0.0024	
Methylene chloride	0.1 (Note 1)	0.022			0.017			0.034			0.026		
O-Xylene	1.2 (Note 1)	ND	0.0012		ND	0.0012		ND	0.0014		ND	0.0012	
Styrene	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Tetrachloroethene	1.4 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Toluene	1.5 (Note 1)	ND	0.0012		ND	0.0012		ND	0.0014		ND	0.0012	
Trans-1,2-Dichloroethene	0.3 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Trans-1,3-Dichloropropene	NS	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Trichloroethene	0.7 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Vinyl chloride	0.2 (Note 1)	ND	0.006		ND	0.006		ND	0.0068		ND	0.0061	
Total Confident VOCs	10 (Note 2)	0.084			0.017			0.069			0.07		
Total Volatile Organic TICs	NS	0.138		J	0.0593		J	0.0392		J	0.1199		J
Total Petroleum Hydrocarbons (TPHC)	NS	ND	40		150			330			ND	41	

TABLE 3A
SUMMARY OF SOIL ANALYTICAL RESULTS AOC-UST2 - VOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location		TWP-6			FB			FB			FB		
Field ID		PI-TWP-6-051805SO10			PI-FB-01-051305WQ01			PI-FB-01-051605WQ01			PI-FB-01-051705WQ01		
Lab Sample No.	NYSDEC RSCO	AC17675-002			AC17613-004			AC17643-004			AC17665-001		
Sampling Date	(mg/Kg)	5/18/2005			5/13/2005			5/16/2005			5/17/2005		
Matrix		Soil			Aqueous			Aqueous			Aqueous		
Sample Depth		8.5'-9' bgs			none			none			none		
Units		mg/Kg			mg/Kg			mg/Kg			mg/Kg		
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,1,1,2-Tetrachloroethane	NS	ND	0.007		ND	5		ND	5		ND	5	
1,1,1-Trichloroethane	0.8 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
1,1,2,2-Tetrachloroethane	0.6 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
1,1,2-Trichloroethane	6.0 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
1,1-Dichloroethane	0.2 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
1,1-Dichloroethene	0.4 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
1,2-Dichloroethane	0.1 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
1,2-Dichloropropane	NS	ND	0.007		ND	5		ND	5		ND	5	
2-Butanone	0.3 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
2-Chloroethylvinylether	NS	ND	0.007		ND	5		ND	5		ND	5	
2-Hexanone	NS	ND	0.007		ND	5		ND	5		ND	5	
4-Methyl-2-Pentanone	1.0 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
Acetone	0.2 (Note 1)	ND	0.035		ND	25		ND	25		ND	25	
Acrolein	NS	ND	0.035		ND	25		ND	25		ND	25	
Acrylonitrile	NS	ND	0.007		ND	5		ND	5		ND	5	
Benzene	0.06 (Note 1)	ND	0.0014		ND	1		ND	1		ND	1	
Bromodichloromethane	NS	ND	0.007		ND	5		ND	5		ND	5	
Bromoform	NS	ND	0.007		ND	5		ND	5		ND	5	
Bromomethane	NS	ND	0.007		ND	5		ND	5		ND	5	
Carbon disulfide	2.7 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
Carbon tetrachloride	0.6 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
Chlorobenzene	1.7 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
Chloroethane	1.9 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
Chloroform	0.3 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
Chloromethane	NS	ND	0.007		ND	5		ND	5		ND	5	
Cis-1,2-Dichloroethene	NS	ND	0.007		ND	5		ND	5		ND	5	
Cis-1,3-Dichloropropene	NS	ND	0.007		ND	5		ND	5		ND	5	
Dibromochloromethane	NS	ND	0.007		ND	5		ND	5		ND	5	
Ethylbenzene	5.5 (Note 1)	ND	0.0014		ND	1		ND	1		ND	1	
M&p-Xylenes	1.2 (Note 1)	ND	0.0028		ND	2		ND	2		ND	2	
Methylene chloride	0.1 (Note 1)	0.011			ND	5		ND	5		ND	5	
O-Xylene	1.2 (Note 1)	ND	0.0014		ND	1		ND	1		ND	1	
Styrene	NS	ND	0.007		ND	5		ND	5		ND	5	
Tetrachloroethene	1.4 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
Toluene	1.5 (Note 1)	ND	0.0014		ND	1		ND	1		ND	1	
Trans-1,2-Dichloroethene	0.3 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
Trans-1,3-Dichloropropene	NS	ND	0.007		ND	5		ND	5		ND	5	
Trichloroethene	0.7 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
Vinyl chloride	0.2 (Note 1)	ND	0.007		ND	5		ND	5		ND	5	
Total Confident VOCs	10 (Note 2)	0.011			ND			ND			ND		
Total Volatile Organic TICs	NS	0.0748		J	ND			ND			ND		
Total Petroleum Hydrocarbons (TPHC)	NS	89			NA			NA			NA		

TABLE 3A
SUMMARY OF SOIL ANALYTICAL RESULTS AOC-UST2 - VOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Notes and Abbreviations:

NYSDEC = New York State Department of Environmental Conservation
RSCO = Recommended Soil Cleanup Objective
bgs = feet below ground surface (see Note 3)
Conc = Concentration
mg/Kg = milligrams per kilogram (all units reported in mg/Kg)
MDL = Minimum detection limit
Qual = Laboratory data qualifier
NS = No standard
ND = Not detected
NA = Not analyzed
J = Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration provided is an approximate value.
VOCs = Volatile Organic Compounds
TICs = Tentatively Identified Compounds
Shaded values depicted in **bold** font exceed the NYSDEC RSCO.

Note 1: New York State Cleanup Objective is based on the Soil Cleanup Objective to Protect Groundwater Quality.
Note 2: As per TAGM #4046, the RSCO for Total Volatile Organic Compounds is 10 parts per million (equivalent to 10 mg/Kg).
Note 3: Soil borings UST2-5, UST2-5A, TWP-1, TWP-1A, and TWP-4 were located on top of the soil surcharge pile. The reference point for the depth at these locations is the land surface adjacent to the surcharge pile, considered to be approximately equivalent to the original (pre-surcharge) land surface that is now covered.

TABLE 3B
SUMMARY OF SOIL ANALYTICAL RESULTS AOC-UST2 - SVOCs
HHMT - PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location		UST2-4			UST2-4			UST2-4A			UST2-4B		
Field ID		PI-UST2-4-051305S013			PI-UST2-4-051305S014B			PI-UST2-4A051605SO13			PI-UST2-4B051605SO13		
Lab Sample No.	NYSDEC RSCO	AC17613-002			AC17613-003			AC17643-001			AC17643-002		
Sampling Date	(mg/Kg)	5/13/2005			5/13/2005			5/16/2005			5/16/2005		
Matrix		Soil			Soil			Soil			Soil		
Sample Depth		6'-8' bgs			9'-10' bgs			6.5'-7' bgs			6'-6.5' bgs		
Units		mg/Kg			mg/Kg			mg/Kg			mg/Kg		
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,2,4-Trichlorobenzene	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
1,2-Dichlorobenzene	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
1,2-Diphenylhydrazine	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
1,3-Dichlorobenzene	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
1,4-Dichlorobenzene	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
2,4,5-Trichlorophenol	0.1 (Note 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
2,4,6-Trichlorophenol	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
2,4-Dichlorophenol	0.4 (Note 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
2,4-Dimethylphenol	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
2,4-Dinitrophenol	0.200 (Notes 1,3)	ND	5.3		ND	1.5		ND	1.6		ND	1.1	
2,4-Dinitrotoluene	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
2,6-Dinitrotoluene	1 (Note 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
2-Chloronaphthalene	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
2-Chlorophenol	0.8 (Note 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
2-Methylnaphthalene	36.4 (Note 3)	1.4		J	0.11		J	ND	1.6		ND	1.1	
2-Methylphenol	0.100 (Notes 1, 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
2-Nitroaniline	0.430 (Notes 1, 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
2-Nitrophenol	0.330 (Notes 1, 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
3&4-Methylphenol	0.9 (Note 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
3,3'-Dichlorobenzidine	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
3-Nitroaniline	0.500 (Notes 1, 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
4,6-Dinitro-2-methylphenol	NS	ND	5.3		ND	1.5		ND	1.6		ND	1.1	
4-Bromophenyl-phenylether	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
4-Chloro-3-methylphenol	0.240 (Notes 1, 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
4-Chloroaniline	0.220 (Notes 1, 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
4-Chlorophenyl-phenylether	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
4-Nitroaniline	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
4-Nitrophenol	0.100 (Notes 1, 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Acenaphthene	50 (Notes 2, 3)	1.3			ND	0.6		ND	0.65		ND	0.44	
Acenaphthylene	41 (Note 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Anthracene	50 (Notes 2, 3)	1.3			ND	0.6		ND	0.65		ND	0.44	
Benzidine	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Benzo[a]anthracene	0.224 (Notes 1, 3)	2.8			ND	0.6		ND	0.65		0.049		J
Benzo[a]pyrene	0.061 (Notes 1, 3)	1.6		J	ND	0.6		ND	0.65		0.055		J
Benzo[b]fluoranthene	1.1 (Note 3)	1.3		J	ND	0.6		ND	0.65		0.092		J
Benzo[g,h,i]perylene	50 (Notes 2, 3)	1.7		J	ND	0.6		ND	0.65		0.078		J
Benzo[k]fluoranthene	1.1 (Note 3)	0.32		J	ND	0.6		ND	0.65		ND	0.44	
Benzyl alcohol	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Bis(2-Chloroethoxy)methane	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Bis(2-Chloroethyl)Ether	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Bis(2-Chloroisopropyl)ether	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Bis(2-Ethylhexyl)phthalate	50 (Notes 2, 3)	ND	2.1		0.93			ND	0.65		0.057		J
Butylbenzylphthalate	50 (Notes 2, 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Carbazole	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Chrysene	0.4 (Note 3)	4.6			ND	0.6		ND	0.65		0.065		J
Dibenzo[a,h]Anthracene	0.014 (Notes 1, 3)	0.61		J	ND	0.6		ND	0.65		ND	0.44	
Dibenzofuran	6.2 (Note 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Diethylphthalate	7.1 (Note 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Dimethylphthalate	2.0 (Note 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Di-n-butylphthalate	8.1 (Note 3)	ND	2.1		0.06		J	ND	0.65		ND	0.44	
Di-n-octylphthalate	50 (Notes 2, 3)	ND	2.1		0.17		J	ND	0.65		ND	0.44	
Fluoranthene	50 (Notes 2, 3)	1.5			ND	0.6		ND	0.65		0.08		J
Fluorene	50 (Notes 2, 3)	1.6			ND	0.6		ND	0.65		ND	0.44	
Hexachlorobenzene	0.41 (Note 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Hexachlorobutadiene	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Hexachlorocyclopentadiene	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Hexachloroethane	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Indeno[1,2,3-cd]pyrene	3.2 (Note 3)	0.53			ND	0.6		ND	0.65		0.061		J
Isophorone	4.40 (Note 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Naphthalene	13.0 (Note 3)	0.79			ND	1.5		ND	1.6		ND	1.1	
Nitrobenzene	0.200 (Notes 1, 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
N-Nitrosodimethylamine	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
N-Nitroso-Di-N-Propylamine	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
N-Nitrosodiphenylamine	NS	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Pentachlorophenol	1.0 (Notes 1, 3)	ND	5.3		ND	1.5		ND	1.6		ND	1.1	
Phenanthrene	50 (Notes 2, 3)	6.5			0.062		J	ND	0.65		ND	0.44	
Phenol	0.03 (Notes 1, 3)	ND	2.1		ND	0.6		ND	0.65		ND	0.44	
Pyrene	50 (Notes 2, 3)	6.6			ND	0.6		ND	0.65		0.071		J
Total Confident SVOCs	500 (Note 4)	27.52			0.93			0			0		
Total Semi-Volatile TICs	NS	304.80			10.41			33.86			11.75		

TABLE 3B
SUMMARY OF SOIL ANALYTICAL RESULTS AOC-UST2 - SVOCs
HHMT - PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location		UST2-5			UST2-5A			UST2-6			UST2-7		
Field ID		PI-UST2-5-051605SO04			PI-UST2-5A051705SO03			PI-UST2-6-051305S010			PI-UST2-7-051705SO09		
Lab Sample No.	NYSDEC RSCO	AC17643-003			AC17665-001			AC17613-001			AC17665-001		
Sampling Date	(mg/Kg)	5/16/2005			5/17/2005			5/13/2005			5/17/2005		
Matrix		Soil			Soil			Soil			Soil		
Sample Depth		7.5'-8' bgs			4.5'-5' bgs			4.5'-5' bgs			4'-4.5' bgs		
Units		mg/Kg			mg/Kg			mg/Kg			mg/Kg		
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,2,4-Trichlorobenzene	NS	0.22		J	ND	0.43		ND	0.43		ND	0.51	
1,2-Dichlorobenzene	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
1,2-Diphenylhydrazine	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
1,3-Dichlorobenzene	NS	0.29		J	ND	0.43		ND	0.43		ND	0.51	
1,4-Dichlorobenzene	NS	0.33		J	ND	0.43		ND	0.43		ND	0.51	
2,4,5-Trichlorophenol	0.1 (Note 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
2,4,6-Trichlorophenol	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
2,4-Dichlorophenol	0.4 (Note 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
2,4-Dimethylphenol	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
2,4-Dinitrophenol	0.200 (Notes 1,3)	ND	1.3		ND	1.1		ND	1.1		ND	1.3	
2,4-Dinitrotoluene	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
2,6-Dinitrotoluene	1 (Note 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
2-Chloronaphthalene	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
2-Chlorophenol	0.8 (Note 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
2-Methylnaphthalene	36.4 (Note 3)	ND	1.3		0.15		J	0.12		J	0.18		J
2-Methylphenol	0.100 (Notes 1, 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
2-Nitroaniline	0.430 (Notes 1, 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
2-Nitrophenol	0.330 (Notes 1, 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
3&4-Methylphenol	0.9 (Note 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
3,3'-Dichlorobenzidine	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
3-Nitroaniline	0.500 (Notes 1, 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
4,6-Dinitro-2-methylphenol	NS	ND	1.3		ND	1.1		ND	1.1		ND	1.3	
4-Bromophenyl-phenylether	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
4-Chloro-3-methylphenol	0.240 (Notes 1, 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
4-Chloroaniline	0.220 (Notes 1, 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
4-Chlorophenyl-phenylether	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
4-Nitroaniline	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
4-Nitrophenol	0.100 (Notes 1, 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Acenaphthene	50 (Notes 2, 3)	0.12		J	0.049		J	ND	0.43		ND	0.51	
Acenaphthylene	41 (Note 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Anthracene	50 (Notes 2, 3)	0.24		J	0.19		J	ND	0.43		ND	0.51	
Benzidine	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Benzo[a]anthracene	0.224 (Notes 1, 3)	0.97			0.81			0.055		J	0.25		J
Benzo[a]pyrene	0.061 (Notes 1, 3)	0.75			0.81			0.052		J	0.24		J
Benzo[b]fluoranthene	1.1 (Note 3)	0.77			1			0.075		J	0.45		J
Benzo[g,h,i]perylene	50 (Notes 2, 3)	0.59			0.62			0.048		J	0.14		J
Benzo[k]fluoranthene	1.1 (Note 3)	0.36		J	0.41		J	ND	0.43		0.18		J
Benzyl alcohol	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Bis(2-Chloroethoxy)methane	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Bis(2-Chloroethyl)Ether	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Bis(2-Chloroisopropyl)ether	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Bis(2-Ethylhexyl)phthalate	50 (Notes 2, 3)	0.23		J	0.11		J	0.051		J	0.12	0.51	
Butylbenzylphthalate	50 (Notes 2, 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Carbazole	NS	ND	0.51		0.051		J	ND	0.43		ND	0.51	
Chrysene	0.4 (Note 3)	0.65			1			ND	0.43		0.39	0.51	
Dibenzo[a,h]Anthracene	0.014 (Notes 1, 3)	0.19		J	ND	0.43		ND	0.43		ND	0.51	
Dibenzofuran	6.2 (Note 3)	0.058		J	0.058		J	ND	0.43		0.053	0.51	
Diethylphthalate	7.1 (Note 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Dimethylphthalate	2.0 (Note 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Di-n-butylphthalate	8.1 (Note 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Di-n-octylphthalate	50 (Notes 2, 3)	0.082		J	ND	0.43		ND	0.43		ND	0.51	
Fluoranthene	50 (Notes 2, 3)	2.4			1			ND	0.43		0.4		J
Fluorene	50 (Notes 2, 3)	0.065		J	0.068		J	ND	0.43		ND	0.51	
Hexachlorobenzene	0.41 (Note 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Hexachlorobutadiene	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Hexachlorocyclopentadiene	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Hexachloroethane	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Indeno[1,2,3-cd]pyrene	3.2 (Note 3)	0.47		J	0.48			ND	0.43		0.12		J
Isophorone	4.40 (Note 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Naphthalene	13.0 (Note 3)	0.32		J	0.14		J	0.058		J	0.11		J
Nitrobenzene	0.200 (Notes 1, 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
N-Nitrosodimethylamine	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
N-Nitroso-Di-N-Propylamine	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
N-Nitrosodiphenylamine	NS	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Pentachlorophenol	1.0 (Notes 1, 3)	ND	1.3		ND	1.1		ND	1.1		ND	1.3	
Phenanthrene	50 (Notes 2, 3)	0.32		J	0.86			0.13		J	0.24		J
Phenol	0.03 (Notes 1, 3)	ND	0.51		ND	0.43		ND	0.43		ND	0.51	
Pyrene	50 (Notes 2, 3)	3.3			2			ND	0.43		0.41		J
Total Confident SVOCs	500 (Note 4)	9.43			8			0			0		
Total Semi-Volatile TICs	NS	48.34			24.97			90.68			28.24		

TABLE 3B
SUMMARY OF SOIL ANALYTICAL RESULTS AOC-UST2 - SVOCs
HHMT - PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location		TWP-1			TWP-1			TWP-1A			TWP-2		
Field ID		PI-TWP-1-052305SO20			PI-TWP-1-052305SO09			PI-TWP-1-052305SO13			PI-TWP-2-051905SO17		
Lab Sample No.	NYSDEC RSCO	AC17758-002			AC17758-005			AC17758-001			AC17870-001		
Sampling Date	(mg/Kg)	5/23/2005			5/23/2005			5/23/2005			5/19/2005		
Matrix		Soil			Soil			Soil			Soil		
Sample Depth		6'-6.5' bgs			9.5'-10' bgs			4'-4.5' bgs			8'-8.5' bgs		
Units		mg/Kg			mg/Kg			mg/Kg			mg/Kg		
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,2,4-Trichlorobenzene	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
1,2-Dichlorobenzene	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
1,2-Diphenylhydrazine	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
1,3-Dichlorobenzene	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
1,4-Dichlorobenzene	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
2,4,5-Trichlorophenol	0.1 (Note 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
2,4,6-Trichlorophenol	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
2,4-Dichlorophenol	0.4 (Note 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
2,4-Dimethylphenol	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
2,4-Dinitrophenol	0.200 (Notes 1,3)	ND	3.1		ND	2		ND	51		ND	1.1	
2,4-Dinitrotoluene	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
2,6-Dinitrotoluene	1 (Note 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
2-Chloronaphthalene	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
2-Chlorophenol	0.8 (Note 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
2-Methylnaphthalene	36.4 (Note 3)	ND	0.62		ND	0.4		1.1		J	ND	2.2	
2-Methylphenol	0.100 (Notes 1, 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
2-Nitroaniline	0.430 (Notes 1, 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
2-Nitrophenol	0.330 (Notes 1, 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
3&4-Methylphenol	0.9 (Note 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
3,3'-Dichlorobenzidine	NS	ND	1.5		ND	0.4		ND	10		ND	0.43	
3-Nitroaniline	0.500 (Notes 1, 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
4,6-Dinitro-2-methylphenol	NS	ND	3.1		ND	0.99		ND	26		ND	0.43	
4-Bromophenyl-phenylether	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
4-Chloro-3-methylphenol	0.240 (Notes 1, 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
4-Chloroaniline	0.220 (Notes 1, 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
4-Chlorophenyl-phenylether	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
4-Nitroaniline	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
4-Nitrophenol	0.100 (Notes 1, 3)	ND	1.5		ND	0.4		ND	10		ND	0.43	
Acenaphthene	50 (Notes 2, 3)	0.25		J	ND	0.4		24			ND	0.43	
Acenaphthylene	41 (Note 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
Anthracene	50 (Notes 2, 3)	0.54		J	0.08		J	81			ND	0.43	
Benzidine	NS	ND	1.5		ND	0.4		ND	10		ND	0.43	
Benzo[a]anthracene	0.224 (Notes 1, 3)	0.67			0.37		J	97			0.1		J
Benzo[a]pyrene	0.061 (Notes 1, 3)	0.46		J	0.36		J	73			0.092		J
Benzo[b]fluoranthene	1.1 (Note 3)	0.59		J	0.56			97			0.074		J
Benzo[g,h,i]perylene	50 (Notes 2, 3)	0.3		J	0.31		J	46			0.13		J
Benzo[k]fluoranthene	1.1 (Note 3)	0.18		J	0.16		J	29			ND	0.43	
Benzyl alcohol	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
Bis(2-Chloroethoxy)methane	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
Bis(2-Chloroethyl)Ether	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
Bis(2-Chloroisopropyl)ether	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
Bis(2-Ethylhexyl)phthalate	50 (Notes 2, 3)	ND	1.5		0.11	0.4		ND	10		0.087		J
Butylbenzylphthalate	50 (Notes 2, 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
Carbazole	NS	ND	0.62		ND	0.4		1.5		J	ND	0.43	
Chrysene	0.4 (Note 3)	0.69			0.45			78			0.13		J
Dibenzo[a,h]Anthracene	0.014 (Notes 1, 3)	0.1		J	0.11		J	15			ND	0.43	
Dibenzofuran	6.2 (Note 3)	0.072		J	ND	0.4		26			ND	0.43	
Diethylphthalate	7.1 (Note 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
Dimethylphthalate	2.0 (Note 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
Di-n-butylphthalate	8.1 (Note 3)	ND	0.62		ND	0.4		ND	10		0.064		J
Di-n-octylphthalate	50 (Notes 2, 3)	0.066		J	0.071		J	ND	10		0.047		J
Fluoranthene	50 (Notes 2, 3)	1.9			0.54			160			0.058		J
Fluorene	50 (Notes 2, 3)	0.21		J	ND	0.4		45			ND	0.43	
Hexachlorobenzene	0.41 (Note 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
Hexachlorobutadiene	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
Hexachlorocyclopentadiene	NS	ND	0.62		ND	0.99		ND	26		ND	0.43	
Hexachloroethane	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
Indeno[1,2,3-cd]pyrene	3.2 (Note 3)	0.25		J	0.24		J	43			0.061		J
Isophorone	4.40 (Note 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
Naphthalene	13.0 (Note 3)	0.25		J	ND	0.4		2		J	ND	1.1	
Nitrobenzene	0.200 (Notes 1, 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
N-Nitrosodimethylamine	NS	ND	1.5		ND	0.4		ND	10		ND	0.43	
N-Nitroso-Di-N-Propylamine	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
N-Nitrosodiphenylamine	NS	ND	0.62		ND	0.4		ND	10		ND	0.43	
Pentachlorophenol	1.0 (Notes 1, 3)	ND	1.5		ND	0.4		ND	10		ND	0.43	
Phenanthrene	50 (Notes 2, 3)	0.83			0.35		J	170			0.065		J
Phenol	0.03 (Notes 1, 3)	ND	0.62		ND	0.4		ND	10		ND	0.43	
Pyrene	50 (Notes 2, 3)	1.4			0.7			190			0.35		J
Total Confident SVOCs	500 (Note 4)	5.49			2.25			1174			0		
Total Semi-Volatile TICs	NS	242.60			638.89			3452.20			10.0		

TABLE 3B
SUMMARY OF SOIL ANALYTICAL RESULTS AOC-UST2 - SVOCs
HHMT - PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location		TWP-2			TWP-3			TWP-4			TWP-5			TWP-6		
Field ID		PI-TWP-2-051905SO19			PI-TWP-3-051805SO10			PI-TWP-4-052405S010			PI-TWP-5-051905SO10			PI-TWP-6-051805SO10		
Lab Sample No.	NYSDEC RSCO (mg/Kg)	AC17870-002			AC17675-001			AC17774-001			AC17870-003			AC17675-002		
Sampling Date		5/19/2005			5/18/2005			5/24/2005			5/19/2005			5/18/2005		
Matrix		Soil			Soil			Soil			Soil			Soil		
Sample Depth		9'-9.5' bgs			4.5'-5' bgs			5.5'-6' bgs			4.3'-4.8' bgs			8.5'-9' bgs		
Units		mg/Kg			mg/Kg			mg/Kg			mg/Kg			mg/Kg		
SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,2,4-Trichlorobenzene	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
1,2-Dichlorobenzene	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
1,2-Diphenylhydrazine	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
1,3-Dichlorobenzene	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
1,4-Dichlorobenzene	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
2,4,5-Trichlorophenol	0.1 (Note 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
2,4,6-Trichlorophenol	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
2,4-Dichlorophenol	0.4 (Note 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
2,4-Dimethylphenol	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
2,4-Dinitrophenol	0.200 (Notes 1,3)	ND	0.99		ND	2		ND	2.3		ND	1		ND	1.2	
2,4-Dinitrotoluene	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
2,6-Dinitrotoluene	1 (Note 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
2-Chloronaphthalene	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
2-Chlorophenol	0.8 (Note 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
2-Methylnaphthalene	36.4 (Note 3)	ND	2		0.16		J	0.12		J	ND	2		1.2		
2-Methylphenol	0.100 (Notes 1, 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
2-Nitroaniline	0.430 (Notes 1, 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
2-Nitrophenol	0.330 (Notes 1, 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
3&4-Methylphenol	0.9 (Note 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
3,3'-Dichlorobenzidine	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
3-Nitroaniline	0.500 (Notes 1, 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
4,6-Dinitro-2-methylphenol	NS	ND	0.4		ND	2		ND	1.1		ND	0.41		ND	1.2	
4-Bromophenyl-phenylether	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
4-Chloro-3-methylphenol	0.240 (Notes 1, 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
4-Chloroaniline	0.220 (Notes 1, 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
4-Chlorophenyl-phenylether	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
4-Nitroaniline	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
4-Nitrophenol	0.100 (Notes 1, 3)	ND	0.4		ND	1		ND	0.45		ND	0.41		ND	0.47	
Acenaphthene	50 (Notes 2, 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Acenaphthylene	41 (Note 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		0.061		J
Anthracene	50 (Notes 2, 3)	ND	0.4		ND	0.4		0.11		J	ND	0.41		0.084		J
Benzidine	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Benzo[a]anthracene	0.224 (Notes 1, 3)	ND	0.4		0.052		J	0.59			0.044		J	0.41		J
Benzo[a]pyrene	0.061 (Notes 1, 3)	ND	0.4		0.051		J	0.78			ND	0.41		0.39		J
Benzo[b]fluoranthene	1.1 (Note 3)	ND	0.4		0.12		J	1			0.05		J	0.86		
Benzo[g,h,i]perylene	50 (Notes 2, 3)	ND	0.4		ND	0.4		1.1			ND	0.41		0.35		J
Benzo[k]fluoranthene	1.1 (Note 3)	ND	0.4		ND	0.4		0.3		J	ND	0.41		0.21		J
Benzyl alcohol	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Bis(2-Chloroethoxy)methane	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Bis(2-Chloroethyl)Ether	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Bis(2-Chloroisopropyl)ether	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Bis(2-Ethylhexyl)phthalate	50 (Notes 2, 3)	ND	0.4		0.13		J	0.17		J	0.12		J	0.25		J
Butylbenzylphthalate	50 (Notes 2, 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Carbazole	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		0.064		J
Chrysene	0.4 (Note 3)	ND	0.4		0.11		J	0.73			0.047		J	0.73		
Dibenzo[a,h]Anthracene	0.014 (Notes 1, 3)	ND	0.4		ND	0.4		0.25		J	ND	0.41		0.14		J
Dibenzofuran	6.2 (Note 3)	ND	0.4		ND	0.4		0.06		J	ND	0.41		0.23		J
Diethylphthalate	7.1 (Note 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Dimethylphthalate	2.0 (Note 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Di-n-butylphthalate	8.1 (Note 3)	ND	0.99		ND	0.4		0.085		J	ND	1		ND	0.47	
Di-n-octylphthalate	50 (Notes 2, 3)	ND	0.4		ND	1		0.06		J	ND	0.41		ND	0.47	
Fluoranthene	50 (Notes 2, 3)	ND	0.4		0.11		J	0.65			0.069		J	0.47		
Fluorene	50 (Notes 2, 3)	ND	0.4		ND	0.4		0.046		J	ND	0.41		ND	0.47	
Hexachlorobenzene	0.41 (Note 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Hexachlorobutadiene	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Hexachlorocyclopentadiene	NS	ND	0.4		ND	0.4		ND	1.1		ND	0.41		ND	0.47	
Hexachloroethane	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Indeno[1,2,3-cd]pyrene	3.2 (Note 3)	ND	0.4		ND	0.4		0.71			ND	0.41		0.3	0.47	
Isophorone	4.40 (Note 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Naphthalene	13.0 (Note 3)	ND	0.99		0.1		J	0.23		J	ND	1		0.41		J
Nitrobenzene	0.200 (Notes 1, 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
N-Nitrosodimethylamine	NS	ND	0.4		ND	2		ND	0.45		ND	0.41		ND	0.47	
N-Nitroso-Di-N-Propylamine	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
N-Nitrosodiphenylamine	NS	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Pentachlorophenol	1.0 (Notes 1, 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	1.2	
Phenanthrene	50 (Notes 2, 3)	ND	0.4		0.096		J	0.57			0.074		J	0.69		
Phenol	0.03 (Notes 1, 3)	ND	0.4		ND	0.4		ND	0.45		ND	0.41		ND	0.47	
Pyrene	50 (Notes 2, 3)	ND	0.4		0.1		J	0.95			0.089		J	0.95		
Total Confident SVOCs	500 (Note 4)	0			0			7.08			0			4.9		
Total Semi-Volatile TICs	NS	6.04			215.0			23.0			3.81			560.29		

TABLE 3B
SUMMARY OF SOIL ANALYTICAL RESULTS AOC-UST2 - SVOCs
HHMT - PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Notes and Abbreviations:

mg/Kg = milligrams per kilogram

bgs = feet below ground surface (see Note 5)

NYSDEC = New York State Department of Environmental Conservation

RSCO = Recommended Soil Cleanup Objective

Conc = Concentration

MDL = Minimum detection limit

Qual = Laboratory data qualifier

NA = Not analyzed

NS = No standard

ND = Not detected

TICs = Tentatively Identified Compounds

J = Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

Note 1: Results compared to NYSDEC RSCO or laboratory MDL, whichever value is more stringent.

Note 2: Health-based criterion exceed the 50 mg/Kg maximum for individual semi-volatile contaminants.

Note 3: NYSDEC RSCO is based on the Soil Cleanup Objective to Protect Groundwater Quality.

Note 4: As per TAGM #4046, the RSCO for Total Semi-volatile Organic Compounds is 500 ppm (equivalent to 500 mg/Kg).

Note 5: Soil borings UST2-5, UST2-5A, TWP-1, TWP-1A, and TWP-4 were located on the soil surcharge pile. The reference point for the depth at these locations is the land surface adjacent to the pile, considered to be approximately equivalent to the original (pre-surcharge) land surface that is now covered.

TABLE 4A
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS AOC-UST2 - VOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location	Recommended Groundwater Cleanup Standard/Guidance Value (RGCS/G)*	TWP-1			TWP-2			TWP-3			TWP-4		
Field ID		PI-TWP-1-052305WG01			PI-TWP-2-051905WG01			PI-TWP-3-051805WG01			PI-TWP-4-052405WG01		
Lab Sample No.		AC17758-003			AC17870-004			AC17675-003			AC17774-003		
Sampling Date		5/23/2005			5/19/2005			5/18/2005			5/24/2005		
Matrix		Aqueous			Aqueous			Aqueous			Aqueous		
Units		ug/L			ug/L			ug/L			ug/L		
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,1,1,2-Tetrachloroethane	5	ND	0.37		ND	0.44		ND	0.19		ND	0.6	
1,1,1-Trichloroethane	5	ND	0.45		ND	0.53		ND	0.44		ND	0.6	
1,1,2,2-Tetrachloroethane	5	ND	0.18		ND	0.21		ND	0.36		ND	0.6	
1,1,2-Trichloroethane	1	ND	0.39		ND	0.46		ND	0.31		ND	0.6	
1,1-Dichloroethane	5	ND	0.31		ND	0.37		ND	0.19		ND	0.6	
1,1-Dichloroethene	5	ND	1.4		ND	1.6		ND	1.7		ND	0.6	
1,2-Dichloroethane	0.6	ND	1.7		ND	2		ND	0.83		ND	0.6	
1,2-Dichloropropane	1	ND	1.2		ND	1.5		ND	1.5		ND	0.6	
2-Butanone	50	ND	1.2		ND	1.4		ND	0.93		ND	0.6	
2-Chloroethylvinylether	NS/NG	ND	0.98		ND	1.2		ND	2		ND	1.5	
2-Hexanone	NS/NG	ND	0.5		ND	0.6		ND	0.39		ND	0.6	
4-Methyl-2-Pentanone	NS/NG	ND	0.34		ND	0.4		ND	0.5		ND	0.6	
Acetone	50	ND	0.43		ND	0.51		ND	0.12		ND	0.6	
Acrolein	5	ND	0.67		ND	0.8		ND	2		ND	0.6	
Acrylonitrile	5	1	1		ND	1.2		ND	1.9		ND	1.5	
Benzene	1	ND	2.2		ND	2.7		ND	4.1		ND	0.6	
Bromodichloromethane	50	ND	1.5		ND	1.8		ND	1.4		ND	0.6	
Bromoform	50	ND	1.3		ND	1.6		ND	1.4		ND	0.6	
Bromomethane	5	ND	2.7		1.9	3.2		ND	4.1		ND	0.6	
Carbon disulfide	NS/NG	ND	4.2		ND	5		ND	1.9		ND	0.6	
Carbon tetrachloride	5	ND	2.7		ND	3.2		ND	2.8		ND	0.6	
Chlorobenzene	5	ND	1.2		ND	1.5		ND	2.1		ND	1.5	
Chloroethane	5	ND	0.49		ND	0.58		ND	0.45		ND	0.6	
Chloroform	7	ND	2		ND	2.4		ND	2.2		ND	0.6	
Chloromethane	NS/NG	ND	7		ND	8.3		ND	7.5		ND	0.6	
Cis-1,2-Dichloroethene	5	ND	0.39		ND	0.46		ND	0.31		ND	0.6	
Cis-1,3-Dichloropropene	0.4 (Total)	ND	2.4		ND	2.9		ND	1.6		ND	0.6	
Dibromochloromethane	50	ND	1.1		ND	1.4		ND	1.6		ND	0.6	
Ethylbenzene	5	2.5	0.36		ND	0.42		ND	0.18		ND	0.6	
M&p-Xylenes	5	ND	0.2		ND	0.24		ND	0.17		ND	0.6	
Methylene chloride	5	ND	0.25		ND	0.3		ND	0.22		ND	0.6	
O-Xylene	5	ND	0.58		ND	0.69		ND	11		ND	0.6	
Styrene	5	ND	0.42		ND	0.5		ND	0.15		ND	0.6	
Tetrachloroethene	5	ND	0.45		ND	0.53		ND	0.18		ND	0.6	
Toluene	5	ND	0.51		ND	0.61		ND	0.31		ND	0.6	
Trans-1,2-Dichloroethene	5	ND	0.36		ND	0.43		ND	0.16		ND	0.6	
Trans-1,3-Dichloropropene	0.4 (Total)	ND	0.46		ND	0.55		ND	0.38		ND	0.6	
Trichloroethene	5	ND	0.29		ND	0.35		ND	0.26		ND	0.6	
Vinyl chloride	2	ND	0.39		ND	0.46		ND	0.49		ND	0.6	
Total Confident VOCs	10	0			0			0			0		
Total VOC TICs	NS/NG	0			1.7		J	2.2		J	0		
Total Petroleum Hydrocarbons	NS/NG	ND	0.41		ND	0.49		ND	0.3		ND	0.6	

Notes and Abbreviations:

* = RGCS/G values are based on the New York State Title 6 CRR (Codes, Rules and Regulations) Part 703 Surface and Groundwater Quality Standards. A guidance value is used where a standard has not been adopted for a substance.
ug/L = micrograms per liter (all concentrations are given in ug/L).

VOCs = Volatile Organic Compounds

Conc = Concentration

MDL = Minimum detection limit

Qual = Laboratory data qualifier

NS = No standard

NG = No guidance value

ND = Not detected

B = The analyte was found in the laboratory blank as well as the sample, indicating possible laboratory contamination of the sample.

TICs = Tentatively Identified Compounds

J = Compound detected at a concentration lower than the reporting limit and the calibration range for the compound. Estimated concentration range is provided.

TABLE 4A
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS AOC-UST2 - VOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location	Recommended Groundwater Cleanup Standard/Guidance Value (RGCS/G)*	TWP-5			TWP-6			FB			FB		
Field ID		PI-TWP-5-051905WG01			PI-TWP-6-051805WG01			PI-FB-01-051805WQ01			PI-FB-01-051905WQ01		
Lab Sample No.		AC17870-005			AC17675-004			AC17675-005			AC17870-006		
Sampling Date		5/19/2005			5/18/2005			5/18/2005			5/19/2005		
Matrix		Aqueous			Aqueous			Aqueous			Aqueous		
Units		ug/L			ug/L			ug/L			ug/L		
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,1,1,2-Tetrachloroethane	5	ND	0.37		ND	0.19		ND	0.2		ND	0.2	
1,1,1-Trichloroethane	5	ND	0.45		ND	0.44		ND	0.19		ND	0.19	
1,1,2,2-Tetrachloroethane	5	ND	0.18		ND	0.36		ND	0.19		ND	0.19	
1,1,2-Trichloroethane	1	ND	0.39		ND	0.31		ND	0.27		ND	0.27	
1,1-Dichloroethane	5	ND	0.31		ND	0.19		ND	0.31		ND	0.31	
1,1-Dichloroethene	5	ND	1.4		ND	1.7		ND	0.24		ND	0.24	
1,2-Dichloroethane	0.6	ND	1.7		ND	0.83		ND	0.25		ND	0.25	
1,2-Dichloropropane	1	ND	1.2		ND	1.5		ND	0.29		ND	0.29	
2-Butanone	50	ND	1.2		ND	0.93		ND	0.44		ND	0.44	
2-Chloroethylvinylether	NS/NG	ND	0.98		ND	2		ND	0.39		ND	0.39	
2-Hexanone	NS/NG	ND	0.5		ND	0.39		ND	0.45		ND	0.45	
4-Methyl-2-Pentanone	NS/NG	ND	0.34		ND	0.5		ND	0.22		ND	0.22	
Acetone	50	ND	0.43		ND	0.12		ND	3.1		ND	3.1	
Acrolein	5	ND	0.67		ND	2		ND	3.1		ND	3.1	
Acrylonitrile	5	ND	1		ND	1.9		ND	0.63		ND	0.63	
Benzene	1	ND	2.2		ND	4.1		ND	0.23		ND	0.23	
Bromodichloromethane	50	ND	1.5		ND	1.4		ND	0.21		ND	0.21	
Bromoform	50	ND	1.3		ND	1.4		ND	0.33		ND	0.33	
Bromomethane	5	ND	2.7		ND	4.1		ND	0.54		ND	0.54	
Carbon disulfide	NS/NG	ND	4.2		ND	1.9		ND	0.37		ND	0.37	
Carbon tetrachloride	5	ND	2.7		ND	2.8		ND	0.24		ND	0.24	
Chlorobenzene	5	ND	1.2		ND	2.1		ND	0.19		ND	0.19	
Chloroethane	5	ND	0.49		ND	0.45		ND	0.37		ND	0.37	
Chloroform	7	ND	2		ND	2.2		ND	0.22		ND	0.22	
Chloromethane	NS/NG	ND	7		ND	7.5		ND	0.36		ND	0.36	
Cis-1,2-Dichloroethene	5	ND	0.39		ND	0.31		ND	0.18		ND	0.18	
Cis-1,3-Dichloropropene	0.4 (Total)	ND	2.4		ND	1.6		ND	0.17		ND	0.17	
Dibromochloromethane	50	ND	1.1		ND	1.6		ND	0.37		ND	0.37	
Ethylbenzene	5	ND	0.36		ND	0.18		ND	0.45		ND	0.45	
M&p-Xylenes	5	ND	0.2		ND	0.17		ND	0.47		ND	0.47	
Methylene chloride	5	ND	0.25		ND	0.22		ND	0.84		1.7	0.84	B
O-Xylene	5	ND	0.58		ND	11		ND	0.3		ND	0.3	
Styrene	5	ND	0.42		ND	0.15		ND	0.097		ND	0.097	
Tetrachloroethene	5	ND	0.45		ND	0.18		ND	0.28		ND	0.28	
Toluene	5	ND	0.51		ND	0.31		ND	0.15		ND	0.15	
Trans-1,2-Dichloroethene	5	ND	0.36		ND	0.16		ND	0.34		ND	0.34	
Trans-1,3-Dichloropropene	0.4 (Total)	ND	0.46		ND	0.38		ND	0.14		ND	0.14	
Trichloroethene	5	ND	0.29		ND	0.26		ND	0.21		ND	0.21	
Vinyl chloride	2	ND	0.39		ND	0.49		ND	0.51		ND	0.51	
Total Confident VOCs	10	0			0			0			1.7		
Total VOC TICs	NS/NG	1.4		J	2.2		J	0			0		
Total Petroleum Hydrocarb	NS/NG	ND	0.41		ND	0.3		NA			NA		

Notes and Abbreviations:

* = RGCS/G values are based on the New York State Title 6 CRR (Codes, Rules and Regulations) Part 703 Surface and Groundwater Quality Standards. A guidance value is used where a standard has not been adopted for a substance.

ug/L = micrograms per liter (all concentrations are given in ug/L).

VOCs = Volatile Organic Compounds

Conc = Concentration

MDL = Minimum detection limit

Qual = Laboratory data qualifier

NS = No standard

NG = No guidance value
ND = Not detected

B = The analyte was found in the laboratory blank as well as the sample, indicating possible laboratory contamination of the sample.

TICs = Tentatively Identified Compounds

J = Compound detected at a concentration lower than the reporting limit and the calibration range for the compound. Estimated concentration range is provided.

TABLE 4A
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS AOC-UST2 - VOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location Field ID Lab Sample No. Sampling Date Matrix Units	Recommended Groundwater Cleanup Standard/Guidance Value (RGCS/G)*	FB PI-FB-01-052305WQ01 AC17758-004 5/23/2005 Aqueous ug/L			FB PI-FB-01-052405WQ01 AC17774-002 5/24/2005 Aqueous ug/L		
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	MDL	Qual	Conc	MDL	Qual
1,1,1,2-Tetrachloroethane	5	ND	0.63		ND	0.22	
1,1,1-Trichloroethane	5	ND	0.46		ND	0.18	
1,1,2,2-Tetrachloroethane	5	ND	0.27		ND	0.24	
1,1,2-Trichloroethane	1	ND	0.33		ND	0.23	
1,1-Dichloroethane	5	ND	0.47		ND	0.25	
1,1-Dichloroethene	5	ND	0.31		ND	1	
1,2-Dichloroethane	0.6	ND	0.23		ND	0.18	
1,2-Dichloropropane	1	ND	0.57		ND	0.41	
2-Butanone	50	ND	0.75		ND	0.52	
2-Chloroethylvinylether	NS/NG	ND	0.3		ND	0.31	
2-Hexanone	NS/NG	ND	0.45		ND	0.2	
4-Methyl-2-Pentanone	NS/NG	ND	0.36		ND	0.28	
Acetone	50	ND	3.4		ND	5.6	
Acrolein	5	ND	3.6		ND	2.3	
Acrylonitrile	5	ND	1.1		ND	1.1	
Benzene	1	ND	0.24		ND	0.14	
Bromodichloromethane	50	ND	0.45		ND	0.2	
Bromoform	50	ND	0.52		ND	0.23	
Bromomethane	5	ND	0.46		ND	0.34	
Carbon disulfide	NS/NG	ND	0.51		ND	0.29	
Carbon tetrachloride	5	ND	0.91		ND	0.21	
Chlorobenzene	5	ND	0.2		ND	0.37	
Chloroethane	5	ND	0.73		ND	0.47	
Chloroform	7	ND	0.25		ND	0.36	
Chloromethane	NS/NG	ND	0.82		ND	0.36	
Cis-1,2-Dichloroethene	5	ND	0.36		ND	0.3	
Cis-1,3-Dichloropropene	0.4 (Total)	ND	0.3		ND	0.24	
Dibromochloromethane	50	ND	0.62		ND	0.27	
Ethylbenzene	5	ND	0.67		ND	0.34	
M&p-Xylenes	5	ND	0.81		ND	0.54	
Methylene chloride	5	ND	0.63		1.1	0.49	
O-Xylene	5	ND	0.17		ND	0.14	
Styrene	5	ND	0.15		ND	0.22	
Tetrachloroethene	5	ND	0.41		ND	0.28	
Toluene	5	ND	0.18		ND	0.22	
Trans-1,2-Dichloroethene	5	ND	0.52		ND	0.5	
Trans-1,3-Dichloropropene	0.4 (Total)	ND	0.37		ND	0.13	
Trichloroethene	5	ND	0.47		ND	0.37	
Vinyl chloride	2	ND	0.62		ND	0.42	
Total Confident VOCs	10	0			1.1		
Total VOC TICs	NS/NG	0			0		
Total Petroleum Hydrocarbons	NS/NG	NA			NA		

Notes and Abbreviations:

* = RGCS/G values are based on the New York State Title 6 CRR (Codes, Rules and Regulations) Part 703 Surface and Groundwater Quality Standards. A guidance value is used where a standard has not been adopted for a substance.

ug/L = micrograms per liter (all concentrations are given in ug/L).

VOCs = Volatile Organic Compounds

Conc = Concentration

MDL = Minimum detection limit

Qual = Laboratory data qualifier

NS = No standard

NG = No guidance value

ND = Not detected

B = The analyte was found in the laboratory blank as well as the sample, indicating possible laboratory contamination of the sample.

TICs = Tentatively Identified Compounds

J = Compound detected at a concentration lower than the reporting limit and the calibration range for the compound. Estimated concentration range is provided.

TABLE 4B
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS AOC-UST2 - SVOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location	Recommended Groundwater Cleanup Standard/ Guidance Value (RGCS)*	TWP-1			TWP-2			TWP-3			TWP-4			TWP-5			TWP-6		
Field ID		PI-TWP-1-052305WG01			PI-TWP-2-051905WG01			PI-TWP-3-051805WG01			PI-TWP-4-052405WG01			PI-TWP-5-051905WG01			PI-TWP-6-051805WG01		
Lab Sample No.		AC17758-003			AC17870-004			AC17675-003			AC17774-003			AC17870-005			AC17675-004		
Sampling Date		5/23/2005			5/19/2005			5/18/2005			5/24/2005			5/19/2005			5/18/2005		
Matrix		Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous		
Units		ug/L			ug/L			ug/L			ug/L			ug/L			ug/L		
Semi-Volatile Organic Compound (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
1,2,4-Trichlorobenzene	5	ND	0.37		ND	0.44		ND	0.19		ND	0.6		ND	0.37		ND	0.19	
1,2-Dichlorobenzene	3	ND	0.45		ND	0.53		ND	0.44		ND	0.6		ND	0.45		ND	0.44	
1,2-Diphenylhydrazine	NS/NG	ND	0.18		ND	0.21		ND	0.36		ND	0.6		ND	0.18		ND	0.36	
1,3-Dichlorobenzene	3	ND	0.39		ND	0.46		ND	0.31		ND	0.6		ND	0.39		ND	0.31	
1,4-Dichlorobenzene	3	ND	0.31		ND	0.37		ND	0.19		ND	0.6		ND	0.31		ND	0.19	
2,4,5-Trichlorophenol	NS/NG	ND	1.4		ND	1.6		ND	1.7		ND	0.6		ND	1.4		ND	1.7	
2,4,6-Trichlorophenol	NS/NG	ND	1.7		ND	2		ND	0.83		ND	0.6		ND	1.7		ND	0.83	
2,4-Dichlorophenol	5	ND	1.2		ND	1.5		ND	1.5		ND	0.6		ND	1.2		ND	1.5	
2,4-Dimethylphenol	50	ND	1.2		ND	1.4		ND	0.93		ND	0.6		ND	1.2		ND	0.93	
2,4-Dinitrophenol	10	ND	0.98		ND	1.2		ND	2		ND	1.5		ND	0.98		ND	2	
2,4-Dinitrotoluene	5	ND	0.5		ND	0.6		ND	0.39		ND	0.6		ND	0.5		ND	0.39	
2,6-Dinitrotoluene	5	ND	0.34		ND	0.4		ND	0.5		ND	0.6		ND	0.34		ND	0.5	
2-Chloronaphthalene	10	ND	0.43		ND	0.51		ND	0.12		ND	0.6		ND	0.43		ND	0.12	
2-Chlorophenol	NS/NG	ND	0.67		ND	0.8		ND	2		ND	0.6		ND	0.67		ND	2	
2-Methylnaphthalene	NS/NG	1.0	1.0	J	ND	1.2		ND	1.9		ND	1.5		ND	1		ND	1.9	
2-Methylphenol	NS/NG	ND	2.2		ND	2.7		ND	4.1		ND	0.6		ND	2.2		ND	4.1	
2-Nitroaniline	5	ND	1.5		ND	1.8		ND	1.4		ND	0.6		ND	1.5		ND	1.4	
2-Nitrophenol	NS/NG	ND	1.3		ND	1.6		ND	1.4		ND	0.6		ND	1.3		ND	1.4	
3&4-Methylphenol	NS/NG	ND	2.7		1.9	3.2		ND	4.1		ND	0.6		ND	2.7		ND	4.1	
3,3'-Dichlorobenzidine	5	ND	4.2		ND	5		ND	1.9		ND	0.6		ND	4.2		ND	1.9	
3-Nitroaniline	5	ND	2.7		ND	3.2		ND	2.8		ND	0.6		ND	2.7		ND	2.8	
4,6-Dinitro-2-methylphenol	NS/NG	ND	1.2		ND	1.5		ND	2.1		ND	1.5		ND	1.2		ND	2.1	
4-Bromophenyl-phenylether	NS/NG	ND	0.49		ND	0.58		ND	0.45		ND	0.6		ND	0.49		ND	0.45	
4-Chloro-3-methylphenol	NS/NG	ND	2		ND	2.4		ND	2.2		ND	0.6		ND	2		ND	2.2	
4-Chloroaniline	5	ND	7		ND	8.3		ND	7.5		ND	0.6		ND	7		ND	7.5	
4-Chlorophenyl-phenylether	NS/NG	ND	0.39		ND	0.46		ND	0.31		ND	0.6		ND	0.39		ND	0.31	
4-Nitroaniline	5	ND	2.4		ND	2.9		ND	1.6		ND	0.6		ND	2.4		ND	1.6	
4-Nitrophenol	NS/NG	ND	1.1		ND	1.4		ND	1.6		ND	0.6		ND	1.1		ND	1.6	
Acenaphthene	20	2.5	0.36		ND	0.42		ND	0.18		ND	0.6		ND	0.36		ND	0.18	
Acenaphthylene	NS/NG	ND	0.2		ND	0.24		ND	0.17		ND	0.6		ND	0.2		ND	0.17	
Anthracene	50	ND	0.25		ND	0.3		ND	0.22		ND	0.6		ND	0.25		ND	0.22	
Benzidine	5	ND	0.58		ND	0.69		ND	11		ND	0.6		ND	0.58		ND	11	
Benzo[a]anthracene	0.002	ND	0.42		ND	0.5		ND	0.15		ND	0.6		ND	0.42		ND	0.15	
Benzo[a]pyrene	MDL	ND	0.45		ND	0.53		ND	0.18		ND	0.6		ND	0.45		ND	0.18	
Benzo[b]fluoranthene	0.002	ND	0.51		ND	0.61		ND	0.31		ND	0.6		ND	0.51		ND	0.31	
Benzo[g,h,i]perylene	NS/NG	ND	0.36		ND	0.43		ND	0.16		ND	0.6		ND	0.36		ND	0.16	
Benzo[k]fluoranthene	0.002	ND	0.46		ND	0.55		ND	0.38		ND	0.6		ND	0.46		ND	0.38	
Bis(2-Chloroethoxy)methane	5	ND	0.29		ND	0.35		ND	0.26		ND	0.6		ND	0.29		ND	0.26	
Bis(2-Chloroethyl)Ether	1	ND	0.39		ND	0.46		ND	0.49		ND	0.6		ND	0.39		ND	0.49	
Bis(2-Chloroisopropyl)ether	NS/NG	ND	0.3		ND	0.35		ND	0.23		1.5	0.6		ND	0.3		ND	0.23	
Bis(2-Ethylhexyl)phthalate	5	ND	0.27		1.7	0.32		2.2	0.7		ND	0.6		1.4	0.27		2.2	0.7	

TABLE 4B
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS AOC-UST2 - SVOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location	Recommended Groundwater Cleanup Standard/ Guidance Value (RGCS)*	TWP-1			TWP-2			TWP-3			TWP-4			TWP-5			TWP-6		
Field ID		PI-TWP-1-052305WG01			PI-TWP-2-051905WG01			PI-TWP-3-051805WG01			PI-TWP-4-052405WG01			PI-TWP-5-051905WG01			PI-TWP-6-051805WG01		
Lab Sample No.		AC17758-003			AC17870-004			AC17675-003			AC17774-003			AC17870-005			AC17675-004		
Sampling Date		5/23/2005			5/19/2005			5/18/2005			5/24/2005			5/19/2005			5/18/2005		
Matrix		Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous		
Units		ug/L			ug/L			ug/L			ug/L			ug/L			ug/L		
Semi-Volatile Organic Compound (SVOCs)		Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual	Conc	MDL	Qual
Butylbenzylphthalate	50	ND	0.41		ND	0.49		ND	0.3		ND	0.6		ND	0.41		ND	0.3	
Carbazole	NS/NG	ND	0.35		ND	0.42		ND	0.21		ND	0.6		ND	0.35		ND	0.21	
Chrysene	0.002	ND	0.19		ND	0.22		ND	0.31		ND	0.6		ND	0.19		ND	0.31	
Dibenzo[a,h]Anthracene	NS/NG	ND	0.5		ND	0.6		ND	0.2		ND	0.6		ND	0.5		ND	0.2	
Dibenzofuran	NS/NG	ND	1.7		ND	2.1		ND	1.4		ND	0.6		ND	1.7		ND	1.4	
Diethylphthalate	50	2.3	0.24		ND	0.28		ND	0.26		ND	0.6		ND	0.24		ND	0.26	
Dimethylphthalate	50	ND	0.5		ND	0.6		ND	0.19		ND	0.6		ND	0.5		ND	0.19	
Di-n-butylphthalate	50	ND	0.22		1.5	0.27		ND	0.22		ND	0.6		ND	0.22		ND	0.22	
Di-n-octylphthalate	50	ND	0.24		ND	0.28		ND	0.37		ND	0.6		ND	0.24		ND	0.37	
Fluoranthene	50	ND	0.36		ND	0.43		ND	0.18		ND	0.6		ND	0.36		ND	0.18	
Fluorene	50	ND	0.21		ND	0.25		ND	0.26		ND	0.6		ND	0.21		ND	0.26	
Hexachlorobenzene	0.04	ND	0.56		ND	0.67		ND	0.45		ND	0.6		ND	0.56		ND	0.45	
Hexachlorobutadiene	0.5	ND	0.34		ND	0.41		ND	0.27		ND	0.6		ND	0.34		ND	0.27	
Hexachlorocyclopentadiene	5	ND	6.2		ND	7.4		ND	3		ND	0.6		ND	6.2		ND	3	
Hexachloroethane	5	ND	0.51		ND	0.61		ND	0.38		ND	0.6		ND	0.51		ND	0.38	
Indeno[1,2,3-cd]pyrene	0.002	ND	0.72		ND	0.86		ND	0.19		ND	0.6		ND	0.72		ND	0.19	
Isophorone	50	ND	0.23		ND	0.27		ND	5.9		1.4	0.6		ND	0.23		ND	5.9	
Naphthalene	10	23	0.19		ND	0.23		ND	0.11		ND	1.5		ND	0.19		ND	0.11	
Nitrobenzene	0.4	ND	0.83		ND	0.99		ND	0.31		ND	0.6		ND	0.83		ND	0.31	
N-Nitrosodimethylamine	NS/NG	ND	6.4		ND	7.6		ND	12		ND	0.6		ND	6.4		ND	12	
N-Nitroso-Di-N-Propylamine	NS/NG	ND	0.55		ND	0.66		ND	0.35		ND	0.6		ND	0.55		ND	0.35	
N-Nitrosodiphenylamine	50	ND	0.37		ND	0.44		ND	0.3		ND	0.6		ND	0.37		ND	0.3	
Pentachlorophenol	1.0 (Total Phenols)	ND	0.96		ND	1.1		ND	1.1		ND	1.5		ND	0.96		ND	1.1	
Phenanthrene	50	ND	0.23		1.4	0.27		ND	0.24		27	0.6		ND	0.23		ND	0.24	
Phenol	1.0 (Total Phenols)	3.8	1		2.25	1.2		ND	1.8		ND	0.6		ND	1		ND	1.8	
Pyrene	50	ND	0.17		ND	0.2		ND	0.25		ND	0.6		ND	0.17		ND	0.25	
Total Confident SVOCs	NS/NG	26.8			2.2			0			0			0			0		
Total SVOC TICs	NS/NG	1044.80		J	354.0		J	127.30		J	335.10		J	16.0		J	104.70		

Notes and Abbreviations:

ug/L = micrograms per liter (all concentrations are given in ug/L).

* = RGCS/G values are based on New York State Title 6 CRR (Codes, Rules and Regulations) Part 703. The guidance value is utilized where a standard value has not been adopted for a substance.

SVOCs = Semi-volatile Organic Compounds

Conc = Concentration

MDL = Minimum detection limit

Qual = Laboratory data qualifier

NS = No standard

ND = Not detected

TICs = Tentatively Identified Compounds

NG = No guidance value

J = Compound detected at a concentration lower than the reporting limit and the calibration range for the compound. Estimated concentration range is provided.

One or more PAH compounds, a subset of SVOCs, were detected at concentrations in excess of their respective RSCOs in ten of the 17 soil samples collected at AOC-UST2. No SVOCs other than PAH compounds were detected at concentrations greater than their respective RSCOs. The soil samples collected from the 9-10 foot bgs depth interval at location UST2-4, the 6.5-7 foot bgs depth interval at location UST2-4A, the 6-6.5 ft bgs depth interval at UST2-4B, the 4.5-5 foot bgs depth interval at location UST2-6, the 9-9.5 foot bgs depth interval at location TWP-2, the 5-5.5 foot bgs depth interval at location TWP-3, and the 4.3-4.8 foot bgs depth interval at location TWP-5 did not contain any PAH compounds, or other SVOCs, at concentrations greater than their respective RSCOs. In addition, except for the soil sample collected from the 4-4.5 foot bgs depth interval at location TWP-1A, the soil samples contained concentrations of PAH compounds that are similar to the concentrations of those compounds throughout the Facility.

The concentration of TPHC ranged from non-detect in the soil samples collected at locations TWP-2 and TWP-5 to 48,000 mg/kg in the soil sample collected from the 6-8 foot bgs depth interval at soil boring location UST2-4. No RSCO has been established for TPHC in soil.

Quality Assurance/Quality Control Samples Associated with Soil Samples

To monitor the effectiveness of field decontamination procedures, the Port Authority prepared three field blanks by running laboratory-grade SI water over the stainless steel trowel used in the collection of soil samples. All three field blanks were analyzed for VOCs. No VOCs were detected in any of the three field blanks; therefore, field decontamination procedures were effective.

Summary of Groundwater Sampling Analytical Results and Appropriate NYSDEC Standards

As noted above, six soil borings were converted to temporary wells between May 13 and 24, 2005. The temporary wells were installed to confirm whether LNAPL was mobile, to access an LNAPL sample (if LNAPL migrated into one or more of the temporary wells), and to access a groundwater sample. Based upon measurements made using an oil/water indicator, LNAPL had not migrated into any temporary well as of May 24, 2005. Therefore, LNAPL samples could not be collected because a sufficient volume of LNAPL could not be separated from other matrices and it was concluded that the LNAPL in the vicinity of the temporary wells was immobile.

Groundwater samples were collected to determine whether LNAPL and/or impacted soils, known to be present in several areas in the vicinity of AOC-UST2, was/were acting as a source area for groundwater impacts. In order to confirm whether the LNAPL was acting as a source area, the six temporary wells were installed in two east-west lines. Each line of temporary wells included an upgradient temporary well, a temporary well located immediately downgradient of the LNAPL area, and a downgradient temporary well. The northern transect consisted of upgradient temporary well TWP-1A, LNAPL area temporary well TWP-2, and downgradient temporary well TWP-3. The southern transect consisted of upgradient temporary well TWP-4, LNAPL area temporary well TWP-5, and downgradient temporary well TWP-6. All groundwater samples were analyzed for PP VOCs, PP SVOCs, and TPHC. The analytical results are tabulated in Tables 4A and 4B and summarized below. Temporary well locations are shown on Figure 4.

For discussion purposes, the results have been compared, as appropriate, to current NYSDEC AWQSGVs. The NYSDEC AWQSGVs assume that groundwater is classified as GA, a potential drinking water source. Given the location of the Facility and the potential for water to be saline, the published AWQSGVs are not appropriate. However, at this time, these represent the only standards and guidance values available for ambient groundwater. Please note that the reference of these standards in this report does not represent any agreement or concurrence that the same are appropriate for usage at this site.

No targeted VOCs were detected in the groundwater samples. The concentration of VOC TICs ranged from non-detect at both downgradient temporary wells (TWP-3 and 6) and LNAPL area temporary well TWP-5 to 39.1 ug/L at upgradient temporary well TWP-1A.

Several targeted SVOCs were detected in the groundwater samples; however, the only SVOCs detected at concentrations greater than their respective AWQSGVs were naphthalene and phenol. Naphthalene was detected at a concentration greater than its AWQSGV at upgradient temporary well TWP-1A. Phenol was detected at a concentration greater than its AWQSGV at LNAPL area temporary well TWP-2 and upgradient temporary well TWP-1A. The concentration of total SVOC TICs ranged from 16 ug/L at LNAPL area temporary well TWP-5 to 1044.8 ug/L at upgradient temporary well TWP-1A.

TPHC was not detected in the groundwater samples collected from downgradient temporary wells TWP-3 and TWP-6, LNAPL area temporary well TWP-5, or upgradient well TWP-4. The concentration of

TPHC at upgradient well TWP-1A was 26.8 ug/L, while the concentration of TPHC at LNAPL area well TWP-2 was 2.2 ug/L.

Quality Assurance/Quality Control Associated with Groundwater Samples

To monitor the effectiveness of the field decontamination procedures, the Port Authority prepared and analyzed four field blanks. The field blanks were analyzed for TCL VOCs and were prepared by running laboratory-grade DI water over the sampling equipment.

The targeted VOC methylene chloride was detected in field blanks PI-FB-01-052405WQ01 and PI-FB-01-051905WQ01 (see Table 4A for a summary of the QA/QC results). Methylene chloride is a common laboratory contaminant, and the reported concentration for this compound in one of the field blanks was flagged with a "B," indicating that the compound was detected in an associated method blank. It is likely that the presence of this compound in the field blanks was due to laboratory contamination.

No other VOC was detected in either field blank.

6.2 Data Evaluation Portion of the SRI

Although fieldwork was not performed to evaluate the effect of groundwater impacts at Site 1 on the quality of surface water and sediment in Bridge Creek or to evaluate soil and groundwater quality in the vicinity of the hydrogen holders, HMM reviewed previous analytical data pertaining to these environmental issues. These data have been reported in the September 2004 report entitled *Revised – Site Investigation and Conceptual Remedial Workplan*; however, a summary of the relevant data are summarized in the following sections for the reader's convenience.

6.2.1 Previous Groundwater, Surface Water, and Sediment Analytical Results

Groundwater sampling was conducted at selected Site 1 wells during the SI and the Surcharge Pilot Study, conducted as part of the RI. Groundwater samples collected during both the SI and the RI were analyzed for PP VOCs, PP SVOCs, PP pesticides and PCBs, TAL metals, TPHC, oil and grease, total cyanide, and total phenolics. One groundwater sample was collected from each of eight monitoring wells during the SI and each of six monitoring wells during the Surcharge Pilot Study. Please note, the wells sampled during the SI were located throughout Site 1, but the wells sampled during the Surcharge Pilot Study were located in exclusively in the northern half of Site 1. The groundwater analytical results are tabulated in Appendix C and are shown on the Figures provided in the same Appendix.

Surface water and sediment sampling was conducted concurrently with the groundwater sampling effort during the SI. Surface water samples, but not sediment samples, were collected concurrently with groundwater samples during the RI as well. The SI surface water and sediment sampling locations were selected based on their proximity to wells where groundwater samples were also collected and to a "white material" previously observed at Bridge Creek. The RI surface water samples were located in Bridge Creek adjacent to the surcharge soil stockpile. All surface water and sediment samples were analyzed for TAL metals. In addition, the surface water samples were analyzed for pH using portable pH meters. The surface water and sediment sampling results are tabulated in Appendix C.

The analytical results for the SI groundwater sampling effort indicates that the only substances detected at concentrations greater than their respective NYSDEC AWQSGVs were ethylbenzene, xylene, phenol, 1,2-benzphenanthracene, benzo(a)anthracene, and the metals arsenic and cadmium. The concentration of ethylbenzene and xylene exceeded their respective AWQSGVs only in the sample from PG-CS-7. The concentrations of 1,2-benzphenanthracene and benzo(a)anthracene were greater than their respective AWQSGVs only in the groundwater samples collected at well PG-EW-3. Cadmium was detected at a concentration greater than its AWQSGV only in the groundwater sample collected from well PG-RS-2. Phenol was the only compound, and arsenic was the only metal, that was detected at a concentration greater than its AWQSGV in more than one groundwater sample. Phenol was detected at a concentration greater than its AWQSGV in the groundwater sample collected at wells PG-PA-MW-6, PG-CS-7, PG-EW-6, and PG-PA-MW-1. With the exception of PG-PA-MW-6, these wells are all located in the northern half of Site 1. Well PG-PA-MW-6 is located on the western side of Site 1, approximately at the north-south midpoint of Site 1. Arsenic was detected at concentrations greater than its AWQSGV in four groundwater samples collected from wells in the southern portion of Site 1.

As previously noted, the surface water and sediment samples were not analyzed for organic compounds. Lead and magnesium were detected at concentrations greater than their respective RSWCS in all three surface water samples. Mercury was detected at a concentration greater than its RSWCS in only the upstream surface water sample. Arsenic, cadmium, chromium, copper, iron, manganese, and nickel were detected at concentrations greater than their respective RSWCS and beryllium and zinc at concentrations greater than their respective Recommended Surface Water Cleanup Guidance Values (an RSWCS is available for neither of these two metals) only in the downstream surface water sample. The pH of Bridge Creek was measured to be between 7.5 and 8.2. Arsenic and cadmium were the only two metals detected at concentrations greater than their respective AWQSGVs in groundwater samples collected

during the SI. Groundwater impacted by arsenic was generally present in the southern portion of Site 1. However, this area is more than 400 feet upstream of the surface water sample (SW-3) that exhibited an elevated concentration of arsenic. Neither of the two surface water samples collected downstream of the area where groundwater was impacted by arsenic and upstream of surface water sample SW-3 contained arsenic at concentrations greater than its RSWCO. The same is true for cadmium: the area where groundwater impacted by cadmium would discharge into Bridge Creek (based on groundwater elevation contour lines generated during the SI) is upstream of surface water samples that didn't contain elevated concentrations of cadmium, but downstream surface water sample SW-3 did contain an elevated level of cadmium. The source of the elevated concentrations of metals, including arsenic and cadmium, in downstream surface water sample SW-3 is therefore unclear.

All five sediment samples contained one or more of the following metals at concentrations greater than their respective NYSDEC Lower Effects Level (LEL) but below the Severe Effects Level (SEL): arsenic, cadmium, chromium, and mercury. Lead and zinc were detected at concentrations greater than their NYSDEC SELs at all sediment sampling locations. Iron, mercury, nickel, and silver were detected at concentrations greater than their respective NYSDEC SELs in at least one of the sediment samples collected during the SI. Please note, the SI sediment sampling analytical results do not exhibit a pattern of increasing or decreasing concentration in a downstream direction in Bridge Creek for any metal analyzed.

The analytical results for the RI groundwater sampling effort indicates that the only substances detected at concentrations greater than their respective NYSDEC AWQSGVs were xylene, phenol, and the metals antimony, arsenic, beryllium, iron, manganese, nickel, sodium, and thallium. The concentration of xylene exceeded its AWQSGVs at PG-CS-7 only. Phenol was detected at a concentration greater than its AWQSGV only in the groundwater sample collected from well PG-RS-1. Arsenic, iron, and sodium were the only metals that were detected at concentrations greater than their respective AWQSGVs in more than one groundwater sample. Arsenic was detected at concentrations greater than its AWQSGV only in the samples collected from wells PG-PA-MW-1S and PG-PA-MW-4S. Iron and sodium were detected at concentrations greater than their respective AWQSGVs at all wells sampled during the RI with the exception of well PG-CS-7, where sodium was the only metal detected at a concentration greater than its AWQSGV. The metals antimony, beryllium, and thallium were detected at concentrations greater than their respective AWQSGVs only in the sample collected from well PG-PA-MW-4S. Manganese was detected at concentrations greater than its AWQSGV only in the sample collected from well PG-PA-

MW-4D. Nickel was detected at a concentration greater than its AWQSGV only in the sample collected from well PG-PA-MW-1S.

As noted above, the surface water samples were not analyzed for organic compounds. The only metals detected at concentrations greater than their respective RSWCS or Guidance Values in any RI surface water sample were iron, magnesium, silver, and sodium. Of these four metals, iron and sodium were the only metals detected at concentrations greater than their respective AWQSGVs in groundwater samples collected during the RI. Magnesium was detected at a concentration greater than its RSWCS in all five surface water samples. Silver was detected at a concentration greater than its RSWCS in the upstream surface water sample. Iron was detected at a concentration greater than its Recommended Surface Water Cleanup Guidance Value (an RSWCS is not available for iron) in two of the five RI surface water samples. Sodium was detected at a concentration greater than its RSWCS in all surface water samples except the upstream surface water sample.

6.2.2 Previous Soil and Groundwater Analytical Results – Former Hydrogen Holders

The soil sampling locations nearest to the former hydrogen holders are PG-Wood-03, PG-Wood-3, PG-Wood-05, PG-PA-MW-6, and PG-PA-MW-6D. All five sampling locations are located within 100 feet of at least one of the two former hydrogen holders. As noted above, the concern regarding the hydrogen holders is not that the holders themselves could have discharged regulated substances, but rather that appurtenant equipment (air compressors, e.g.) could have discharged these substances. HMM's review of available records could not confirm the presence or location of any potential appurtenant equipment.

Seventeen soil samples were collected from the five locations situated nearest the locations of the former hydrogen holders, as based on Sanborn maps. All soil samples were analyzed for PP VOCs, PP SVOCs, PP pesticides and PCBs, TAL metals, total cyanide, total phenolics, O&G, TPHC, and PCBs. The analytical results are tabulated in Tables 5A through 5D and are depicted on Figure 6.

The soil sampling analytical results indicate that no targeted VOCs, pesticides, PCBs, total cyanide, or total phenolics were detected at concentrations greater than their respective RSCOs. The SVOC benzo(b)fluoranthene was detected at a concentration greater than its RSCO in only two of the 17 soil samples evaluated. The SVOC phenol was also detected at a concentration greater than its RSCO in only two of the soil samples. The following metals were detected at concentrations greater than their

PG-PA-MW-6 Sample Depth (ft bgs) / Constituent (mg/Kg)	11/07/00 1.5-3	11/07/00 3-4.5	11/07/00 4.5-6	11/07/00 6-8	11/07/00 8.5-10	11/27/00 None [1]
METALS						
Arsenic	150	36	24	16	ND	83
Calcium Metal	NE	NE	NE	ND	ND	NE
Chromium	28	32	13	NE	ND	ND
Copper	58	46	36	NE	NE	ND
Lead	NE	NE	NE	NE	ND	ND
Magnesium	NE	NE	ND	ND	6800	NE
Manganese	NE	NE	NE	ND	ND	ND
Nickel	26	NE	26	NE	ND	ND
Selenium	ND	NE	NE	NE	ND	ND
Zinc	120	NE	NE	ND	ND	ND
Iron	NE	NE	NE	NE	ND	NE
Sodium	NE	NE	NE	NE	NE	900,000
Mercury	0.28	0.22	ND	ND	ND	ND
TOTAL PCBS	NE	NE	ND	ND	ND	ND
SVOCs						
Benzo(b)fluoranthene	2.2	NE	NE	ND	NE	ND
Phenol	ND	ND	ND	ND	ND	2.1

PG-WOOD-03 Sample Depth (ft bgs) / Constituent (mg/Kg)	11/10/00 0.5-2	11/10/00 2-4
METALS		
Arsenic	NE	310
Calcium Metal	NE	NE
Chromium	NE	NE
Copper	NE	210
Lead	NE	NE
Magnesium	18,000	NE
Manganese	NE	NE
Nickel	NE	170
Selenium	ND	5
Zinc	NE	700
Iron	NE	NE
Sodium	ND	ND
Mercury	ND	0.38
TOTAL PCBS	NE	ND
SVOCs		
Benzo(b)fluoranthene	NE	2.5
Phenol	ND	ND

PG-WOOD-3 Sample Depth (ft bgs) / Constituent (mg/Kg)	11/29/00 2-4	11/29/00 6-8
METALS		
Arsenic	29	ND
Calcium Metal	NE	400,000
Chromium	110	ND
Copper	110	ND
Lead	580	ND
Magnesium	NE	NE
Manganese	NE	NE
Nickel	53	ND
Selenium	NE	ND
Zinc	250	ND
Iron	NE	ND
Sodium	ND	NE
Mercury	0.48	ND
TOTAL PCBS	ND	ND
SVOCs		
Benzo(b)fluoranthene	NE	ND
Phenol	ND	ND

PG-PA-MW-6D Constituent (mg/Kg)	11/30/00
METALS	
Arsenic	ND
Calcium Metal	NE
Chromium	ND
Copper	ND
Lead	ND
Magnesium	430,000
Manganese	1,200
Nickel	ND
Selenium	ND
Zinc	ND
Iron	15,000
Sodium	4,000,000
Mercury	ND
TOTAL PCBS	ND
SVOCs	
Benzo(b)fluoranthene	ND
Phenol	ND

PG-WOOD-05 Sample Depth (ft bgs) / Constituent (mg/Kg)	11/07/00 0-2	11/07/00 2-4	11/07/00 4-6	11/07/00 6-8	11/07/00 8-10	11/07/00 14-16
METALS						
Arsenic	ND	27	NE	28	NE	ND
Calcium Metal	ND	NE	ND	ND	NE	NE
Chromium	NE	12	ND	NE	ND	24
Copper	NE	59	34	37	NE	ND
Lead	NE	NE	ND	NE	ND	ND
Magnesium	ND	NE	ND	ND	NE	6200
Manganese	NE	NE	ND	NE	NE	NE
Nickel	ND	NE	NE	NE	NE	NE
Selenium	ND	ND	ND	ND	ND	ND
Zinc	NE	190	NE	94	56	360
Iron	NE	NE	NE	NE	NE	NE
Sodium	ND	ND	ND	ND	NE	NE
Mercury	ND	0.41	ND	ND	ND	ND
TOTAL PCBS	ND	1.1	ND	NE	ND	ND
SVOCs						
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND
Phenol	ND	1.2	ND	ND	ND	ND

BRIDGE CR

PG-PA-MW-6

PG-PA-MW-6D

HH

HH

PG-WOOD-03/3

STEEL & CONC. BLDG.

1 STY. STEEL

8" FP

PG-WOOD-05

Chembox Notes and Abbreviations

mg/Kg: milligrams per kilogram

ug/L: micrograms per liter

MDL: Laboratory's Minimum Detection Limit

Values in **bold** font represent exceedences.

SB: Site Background

*: *Site Background levels for lead vary widely.* Average background levels for urban areas or near highways range from 200-500 ppm.

NE: No exceedence

ND: Not detected

TAGM: Technical Administrative Guidance Memo

SVOCs: Semi-Volatile Organic Chemicals

PCBs: Polychlorinated Biphenyls

NYSDEC: New York State Department of Environmental Corrections

J = Data indicates the presence of a compound that meets the identification criteria: The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

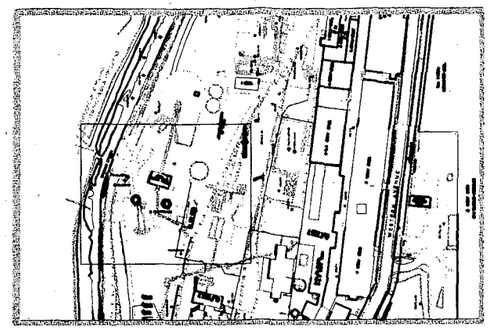
Note 1: Groundwater Sample

Note 2: The objective for this compound is the greater of the RSCO or New York State's background concentration.

Note 3: 1 mg/Kg is the RSCO for PCBs detected in surface soil samples. 10 mg/Kg is the RSCO for PCBs detected in subsurface samples.

NYSDEC Recommended Soil Cleanup Objective (RSCO), mg/Kg	Value
METALS	
Arsenic	7.5 or 3-12 [2]
Calcium Metal	130-35,000 (SB)
Chromium	10 or 1.5-40 [2]
Copper	25 or 1-50 [2]
Lead	200-500*
Magnesium	100-5,000 (SB)
Manganese	50-5,000 (SB)
Nickel	13 or 0.5-25 [2]
Selenium	2 or 0.1-3.9 [2]
Zinc	20 or 9-50 [2]
Iron	2,000 or 2,000-550,000 [2]
Sodium	6,000-8,000
Mercury	0.1
TOTAL PCBS	1 or 10 [3]
SVOCs	
Benzo(b)fluoranthene	1.1
Phenol	0.03 or MDL

NYSDEC TAGM #4046 Groundwater Standards/Criteria, ug/L	Value
METALS	
Arsenic	25
Calcium Metal	NS
Chromium	50
Copper	200
Lead	25
Magnesium	35,000
Manganese	300
Nickel	100
Selenium	10
Zinc	2,000
Iron	300
Sodium	20,000
Mercury	0.7
TOTAL PCBS	0.09
SVOCs	
Benzo(b)fluoranthene	0.002
Phenol	1



AREA ENLARGED

LEGEND:

PG-PA-MW-6D — SI SOIL SAMPLING LOCATION

PG-WOOD-03/3 — SI MONITORING WELL LOCATION

RAILROAD TRACKS

HH — FORMER HYDROGEN HOLDER TANK LOCATION

NOTES:

1) ADDITIONAL UNDERGROUND UTILITIES MAY OR MAY NOT EXIST IN THIS VICINITY.
2) PORTIONS OF THE RAILROAD TRACKS ARE VISIBLE AT LAND SURFACE AND PORTIONS OF THE RAILROAD TRACKS ARE BELOW GRADE OR HAVE BEEN REMOVED. THE FIGURE SHOWS THE ORIGINAL EXTENT OF THE RAILROAD TRACKS.
3) SOIL SAMPLING RESULTS ARE PROVIDED ONLY FOR SOIL SAMPLES COLLECTED WITHIN 100 FEET OF AT LEAST ONE OF THE TWO FORMER HYDROGEN HOLDERS.
4) GROUNDWATER SAMPLING RESULTS ARE PROVIDED ONLY FOR SAMPLES COLLECTED FROM WELLS LOCATED DOWNGRADIENT OF THE FORMER HYDROGEN HOLDERS.

SCALE: 1"=30'

30' 0' 30' 60'

SCALE IN FEET

Sheet of

THE PORT AUTHORITY OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

(BLOCK 1400, LOT 1) HHMT-PORT IVORY FACILITY

SOIL AND GROUNDWATER SAMPLING LOCATIONS AND ANALYTICAL RESULTS-HYDTROGEN HOLDERS AOC

Designed by EMM Drawn by Checked by

Date 12/27/2005

Contract Number

Drawing Number FIGURE 6

TABLE 5A
SUMMARY OF SOIL ANALYTICAL RESULTS-VOCS
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location	NYSDEC	PG-WOOD-03		PG-WOOD-03		PG-WOOD-3		PG-WOOD-3		PG-WOOD-05		PG-WOOD-05	
Field ID	RSCO	PG-WD-03		PG-WD-03		PG-WD-3		PG-WD-3		PG-WD-05		PG-WD-05	
Sampling Date	(mg/Kg)	11/10/2000		11/10/2000		11/29/2000		11/29/2000		11/7/2005		11/7/2000	
Matrix		Soil		Soil		Soil		Soil		Soil		Soil	
Sample Depth		0.5-2 ft bgs		2-4 ft bgs		2-4 ft bgs		6-8 ft bgs		0-2 ft bgs		2-4 ft bgs	
Units		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual
1,1,1-Trichloroethane	0.8	ND		ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	0.6	ND		ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	3.4	ND		ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	0.8 [1]	ND		ND		ND		ND		ND		ND	
1,1-Dichloroethane	0.2	ND		ND		ND		ND		ND		ND	
1,1-Dichloroethene	0.4	ND		ND		ND		ND		ND		ND	
1,2-Dichloroethane	0.1	ND		ND		ND		ND		ND		ND	
1,2-Dichloropropane	0.3 [2]	ND		ND		ND		ND		ND		ND	
2-Chloroethyl vinyl ether	NS	ND		ND		ND		ND		ND		ND	
Acrolein	NS	ND		ND		ND		ND		ND		ND	
Acrylonitrile	NS	ND		ND		ND		ND		ND		ND	
Benzene	0.06	ND		ND		ND		ND		ND		ND	
Bromodichloromethane	NS	ND		ND		ND		ND		ND		ND	
1,2-Dichlorobenzene	7.9	ND		ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	8.5	ND		ND		ND		ND		ND		ND	
Bromoform	NS	ND		ND		ND		ND		ND		ND	
Bromomethane	NS	ND		ND		ND		ND		ND		ND	
Carbon Tetrachloride	0.6	ND		ND		ND		ND		ND		ND	
Chlorobenzene	1.7	ND		ND		ND		ND		ND		ND	
Chloroethane	1.9	ND		ND		ND		ND		ND		ND	
Chloroform	0.3	ND		ND		ND		ND		ND		ND	
Chloromethane	NS	ND		ND		ND		ND		ND		ND	
Cis-1,3-Dichloropropene	NS	ND		ND		ND		ND		ND		ND	
Dibromochloromethane	NS	ND		ND		ND		ND		ND		ND	
Dichloromethane	0.1	0.0028	J,B	0.0025	J,B	0.0058	J,B	0.0089	J,B	ND		ND	
Ethylbenzene	5.5	ND		ND		ND		ND		ND		ND	
M&P-Xylenes	1.2	ND		ND		ND		ND		ND		ND	
Methylbenzene	NS	ND		ND		ND		ND		ND		ND	
O-Xylene	1.2	ND		ND		ND		ND		ND		ND	
Tetrachloroethylene	1.4	ND		ND		ND		ND		ND		ND	
trans-1,2-Dichloroethylene	0.3	ND		ND		ND		ND		ND		ND	
trans-1,3-Dichloropropene	NS	ND		ND		ND		ND		ND		ND	
Trichloroethylene	0.7	ND		ND		ND		ND		ND		ND	
Vinyl chloride	0.2	ND		ND		ND		ND		ND		ND	
Total Confident VOCs		0		0		0		0		0		0	

Notes and Abbreviations
NYSDEC: New York State Department of Environmental Conservation
RSCO: Recommended Soil Cleanup Objective
VOC: Volatile Organic Compound
Conc: Concentration
mg/kg: milligrams per kilogram
Qual: Laboratory data qualifier
Ft. bgs: Feet below ground surface
NS: No standard
ND: Not detected
B: The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
J: Compound detected at a concentration lower than the reporting limit and the calibration range for the compound. Estimated concentration range is provided.

1: This RSCO is for 1,1,1-Trichloroethane.
2: This RSCO is for 1,3-Dichloropropane.
3: Results are shown only for those soil samples collected within 100 feet of the former Hydrogen Holders.

TABLE 5A
SUMMARY OF SOIL ANALYTICAL RESULTS-VOCS
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location **Field ID** **Sampling Date** **Matrix** **Sample Depth** **Units**	NYSDEC RSCO (mg/Kg)	PG-WOOD-05 PG-WD-05 11/7/2000 Soil 4-6 ft bgs mg/Kg		PG-WOOD-05 PG-WD-05 11/7/2000 Soil 6-8 ft bgs mg/Kg		PG-WOOD-05 PG-WD-05 11/7/2000 Soil 8-10 ft bgs mg/Kg		PG-WOOD-05 PG-WD-05 11/7/2000 Soil 14-16 ft bgs mg/Kg	
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual
1,1,1-Trichloroethane	0.8	ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	0.6	ND		ND		ND		ND	
1,2,4-Trichlorobenzene	3.4	ND		ND		ND		ND	
1,1,2-Trichloroethane	0.8 [1]	ND		ND		ND		ND	
1,1-Dichloroethane	0.2	ND		ND		ND		ND	
1,1-Dichloroethene	0.4	ND		ND		ND		ND	
1,2-Dichloroethane	0.1	ND		ND		ND		ND	
1,2-Dichloropropane	0.3 [2]	ND		ND		ND		ND	
2-Chloroethyl vinyl ether	NS	ND		ND		ND		ND	
Acrolein	NS	ND		ND		ND		ND	
Acrylonitrile	NS	ND		ND		ND		ND	
Benzene	0.06	ND		ND		ND		ND	
Bromodichloromethane	NS	ND		ND		ND		ND	
1,2-Dichlorobenzene	7.9	ND		ND		ND		ND	
1,4-Dichlorobenzene	8.5	ND		ND		ND		ND	
Bromoform	NS	ND		ND		ND		ND	
Bromomethane	NS	ND		ND		ND		ND	
Carbon Tetrachloride	0.6	ND		ND		ND		ND	
Chlorobenzene	1.7	ND		ND		ND		0.018	
Chloroethane	1.9	ND		ND		ND		ND	
Chloroform	0.3	ND		ND		ND		ND	
Chloromethane	NS	ND		ND		ND		ND	
Cis-1,3-Dichloropropene	NS	ND		ND		ND		ND	
Dibromochloromethane	NS	ND		ND		ND		ND	
Dichloromethane	0.1	0.0043	J	0.0079		ND		0.0086	J,B
Ethylbenzene	5.5	ND		ND		ND		0.0084	
M&P-Xylenes	1.2	ND		ND		ND		0.0047	J
Methylbenzene	NS	ND		ND		ND		0.024	
O-Xylene	1.2	ND		ND		ND		ND	
Tetrachloroethylene	1.4	ND		ND		ND		ND	
trans-1,2-Dichloroethylene	0.3	ND		ND		ND		ND	
trans-1,3-Dichloropropene	NS	ND		ND		ND		ND	
Trichloroethylene	0.7	ND		ND		ND		ND	
Vinyl chloride	0.2	ND		ND		ND		ND	
Total Confident VOCs		0		0.0079		0		0.05	

Notes and Abbreviations
NYSDEC: New York State Department of Environmental Conservation
RSCO: Recommended Soil Cleanup Objective
VOC: Volatile Organic Compound
Conc: Concentration
mg/kg: milligrams per kilogram
Qual: Laboratory data qualifier
Ft. bgs: Feet below ground surface
NS: No standard
ND: Not detected
B: The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
J: Compound detected at a concentration lower than the reporting limit and the calibration range for the compound. Estimated concentration range is provided.
1: This RSCO is for 1,1,1-Trichloroethane.
2: This RSCO is for 1,3-Dichloropropane.
3: Results are shown only for those soil samples collected within 100 feet of the former Hydrogen Holders.

TABLE 5A
SUMMARY OF SOIL ANALYTICAL RESULTS-VOCS
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location		PG-PA-MW-6		PG-PA-MW-6		PG-PA-MW-6		PG-PA-MW-6		PG-PA-MW-6	
Field ID		PG-MWPA-06		PG-MWPA-06		PG-MWPA-06		PG-MWPA-06		PG-MWPA-06	
Sampling Date	NYSDEC RSCO	11/7/2000		11/7/2000		11/7/2000		11/7/2000		11/7/2000	
Matrix	(mg/Kg)	Soil		Soil		Soil		Soil		Soil	
Sample Depth		1.5-3 ft bgs		3-4.5 ft bgs		4.5-6 ft bgs		6-8 ft bgs		8.5-10 ft bgs	
Units		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	Qual	Conc	Qual	Conc	Qual	Conc	Oual	Conc	Qual
1,1,1-Trichloroethane	0.8	ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	0.6	ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	3.4	ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	0.8 [1]	ND		ND		ND		ND		ND	
1,1-Dichloroethane	0.2	ND		ND		ND		ND		ND	
1,1-Dichloroethene	0.4	ND		ND		ND		ND		ND	
1,2-Dichloroethane	0.1	ND		ND		ND		ND		ND	
1,2-Dichloropropane	0.3 [2]	ND		ND		ND		ND		ND	
2-Chloroethyl vinyl ether	NS	ND		ND		ND		ND		ND	
Acrolein	NS	ND		ND		ND		ND		ND	
Acrylonitrile	NS	ND		ND		ND		ND		ND	
Benzene	0.06	ND		ND		ND		ND		ND	
Bromodichloromethane	NS	ND		ND		ND		ND		ND	
1,2-Dichlorobenzene	7.9	ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	8.5	ND		ND		ND		ND		ND	
Bromoform	NS	ND		ND		ND		ND		ND	
Bromomethane	NS	ND		ND		ND		ND		ND	
Carbon Tetrachloride	0.6	ND		ND		ND		ND		ND	
Chlorobenzene	1.7	ND		ND		ND		ND		ND	
Chloroethane	1.9	ND		ND		ND		ND		ND	
Chloroform	0.3	ND		ND		ND		ND		ND	
Chloromethane	NS	ND		ND		ND		ND		ND	
Cis-1,3-Dichloropropene	NS	ND		ND		ND		ND		ND	
Dibromochloromethane	NS	ND		ND		ND		ND		ND	
Dichloromethane	0.1	0.0041	J	0.0036	J	0.004	J,B	0.005	J	0.0059	J
Ethylbenzene	5.5	ND		ND		ND		ND		ND	
M&P-Xylenes	1.2	ND		ND		ND		ND		ND	
Methylbenzene	NS	ND		ND		ND		ND		ND	
O-Xylene	1.2	ND		ND		ND		ND		ND	
Tetrachloroethylene	1.4	ND		ND		ND		ND		ND	
trans-1,2-Dichloroethylene	0.3	ND		ND		ND		ND		ND	
trans-1,3-Dichloropropene	NS	ND		ND		ND		ND		ND	
Trichloroethylene	0.7	ND		ND		ND		ND		ND	
Vinyl chloride	0.2	ND		ND		ND		ND		ND	
Total Confident VOCs		0		0		0		0		0	

Notes and Abbreviations
NYSDEC: New York State Department of Environmental Conservation
RSCO: Recommended Soil Cleanup Objective
VOC: Volatile Organic Compound
Conc: Concentration
mg/kg: milligrams per kilogram
Qual: Laboratory data qualifier
Ft. bgs: Feet below ground surface
NS: No standard
ND: Not detected
B: The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
J: Compound detected at a concentration lower than the reporting limit and the calibration range for the compound.
1: This RSCO is for 1,1,1-Trichloroethane.
2: This RSCO is for 1,3-Dichloropropane.
3: Results are shown only for those soil samples collected within 100 feet of the former Hydrogen Holders.

TABLE 5B
SUMMARY OF SOIL ANALYTICAL RESULTS-SVOCS
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location	NYSDEC	PG-WOOD-03		PG-WOOD-03		PG-WOOD-3		PG-WOOD-3		PG-WOOD-05	
Field ID	RSCO	PG-WD-03		PG-WD-03		PG-WD-3		PG-WD-3		PG-WD-05	
Sampling Date	(mg/Kg)	11/10/2000		11/10/2000		11/29/2000		11/29/2000		11/7/2005	
Matrix		Soil		Soil		Soil		Soil		Soil	
Sample Depth		0.5-2 ft bgs		2-4 ft bgs		2-4 ft bgs		6-8 ft bgs		0-2 ft bgs	
Units		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
SVOCs		Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual
1,2-Benzphenanthracene	Note 1	0.06	J	1.1		0.15	J	ND		ND	
1,2-Diphenylhydrazine	Note 1	ND		ND		ND		ND		ND	
2,4,6-Trichlorophenol	0.1[2]	ND		ND		ND		ND		ND	
2,4-Dichlorophenol	0.4	ND		ND		ND		ND		ND	
2,4-Dimethyphenol	Note 1	ND		ND		ND		ND		ND	
2,4-Dinitrophenol	MDL	ND		ND		ND		ND		ND	
2,4-Dinitrotoluene	Note 1	ND		ND		ND		ND		ND	
2,6-Dinitrotoluene	1	ND		ND		ND		ND		ND	
2-Chlornaphthalene	Note 1	ND		ND		ND		ND		ND	
2-Chlorophenol	0.8	ND		ND		ND		ND		ND	
2-Nitrophenol	MDL	ND		ND		ND		ND		ND	
3,3'-Dichlorobenzidine	Note 1	ND		ND		ND		ND		ND	
4,6-Dinitro-o-cresol	Note 1	ND		ND		ND		ND		ND	
4-Bromophenylphenyl ether	Note 1	ND		ND		ND		ND		ND	
4-Chloro-3-methylphenol	0.240 or MDL	ND		ND		ND		ND		ND	
4-Chlorophenylphenyl ether	Note 1	ND		ND		ND		ND		ND	
4-Nitrophenol	MDL	ND		ND		ND		ND		ND	
Acenaphthene	Note 1	ND		0.088	J	ND		ND		ND	
Acenaphthylene	41	ND		0.14	J	ND		ND		ND	
Anthracene	Note 1	ND		0.32		ND		ND		ND	
Benzidine	Note 1	ND		ND		ND		ND		ND	
Benzo(a)anthracene	MDL	0.047	J	0.95		0.10	J	ND		ND	
Benzo(a)pyrene	MDL	0.039	J	0.97		0.11	J	ND		ND	
Benzo(b)fluoranthene	1.1	0.086	J	2.5		0.18	J	ND		ND	
Benzo(g,h,I)perylene	Note 1	ND		0.31		0.11	J	ND		ND	
Benzo(k)fluoranthene	1.1	ND		ND		0.073	J	ND		ND	
Benzyl butyl phthalate	Note 1	ND		ND		ND		ND		ND	
Bis(2-chloroethoxy)methane	Note 1	ND		ND		ND		ND		ND	
Bis(2-chloroethyl)ether	Note 1	ND		ND		ND		ND		ND	
Bis(2-Chloroisopropyl)ether	Note 1	ND		ND		ND		ND		ND	
Bis(2-ethylhexyl)phthalate	Note 1	0.4	B	0.23	B	0.17	J,B	0.34	B	0.21	
Di-n-butyl phthalate	8.1	ND		ND		ND		ND		0.20	
Di-n-octyl phthalate	Note 1	0.052	J	0.089	J	ND		0.067	J	0.097	J,B
Dibenz(a,h)anthracene	MDL	ND		ND		ND		ND		ND	
Diethyl phthalate	7.1	ND		ND		ND		ND		ND	
Dimethyl phthalate	2	ND		ND		ND		ND		ND	
Fluoranthene	MDL	0.09	J	1.6		0.14	J	ND		ND	
Fluorene	MDL	ND		0.11	J	ND		ND		ND	
Hexachloro-1,3-butadiene	NS	ND		ND		ND		ND		ND	
Hexachlorobenzene	0.41	ND		ND		ND		ND		ND	
Hexachlorocyclopentadiene	Note 1	ND		ND		ND		ND		ND	
Hexachloroethane	Note 1	ND		ND		ND		ND		ND	
Indeno(1,2,3-CD)pyrene	3.2	ND		0.33		0.096	J	ND		ND	
Isophorone	4.4	ND		ND		ND		ND		ND	
M-Dichlorobenzene	Note 1	ND		ND		ND		ND		ND	
N-Nitroso-di-n-propylamine	Note 1	ND		ND		ND		ND		ND	
N-Nitrosodimethylamine	Note 1	ND		ND		ND		ND		ND	
N-Nitrosodiphenylamine	Note 1	ND		ND		ND		ND		ND	
Naphthalene	13	ND		0.20		0.07	J	ND		ND	
Nitrobenzene	MDL	ND		ND		ND		ND		ND	
Pentachlorophenol	1.0 or MDL	ND		ND		ND		ND		ND	
Phenanthrene	Note 1	0.07	J	1.1		0.12	J	ND		ND	
Phenol	0.03 or MDL	ND		ND		ND		ND		ND	
Pyrene	Note 1	0.1	J	1.5		0.15	J	ND		ND	
Total Confident SVOCs	500	0		10.88		0		0		0.41	

TABLE 5B
SUMMARY OF SOIL ANALYTICAL RESULTS-SVOCS
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location		PG-WOOD-05		PG-WOOD-05		PG-WOOD-05		PG-WOOD-05		PG-WOOD-05		PG-PA-MW-6	
Field ID		PG-WD-05		PG-WD-05		PG-WD-05		PG-WD-05		PG-WD-05		PG-MWPA-06	
Sampling Date		11/7/2000		11/7/2000		11/7/2000		11/7/2000		11/7/2000		11/7/2000	
Matrix		Soil		Soil		Soil		Soil		Soil		Soil	
Sample Depth		2-4 ft bgs		4-6 ft bgs		6-8 ft bgs		8-10 ft bgs		14-16 ft bgs		1.5-3 ft bgs	
Units	NYSDEC RSCO (mg/Kg)	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
SVOCs		Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual
1,2-Benzphenanthracene	Note 1	ND		ND		ND		ND		ND		1.3	
1,2-Diphenylhydrazine	Note 1	ND		ND		ND		ND		ND		ND	
2,4,6-Trichlorophenol	0.1 [2]	ND		ND		ND		ND		ND		ND	
2,4-Dichlorophenol	0.4	ND		ND		ND		ND		ND		ND	
2,4-Dimethyphenol	Note 1	ND		ND		ND		ND		ND		ND	
2,4-Dinitrophenol	MDL	ND		ND		ND		ND		ND		ND	
2,4-Dinitrotoluene	Note 1	ND		ND		ND		ND		ND		ND	
2,6-Dinitrotoluene	1	ND		ND		ND		ND		ND		ND	
2-Chlornaphthalene	Note 1	ND		ND		ND		ND		ND		ND	
2-Chlorophenol	0.8	ND		ND		ND		ND		ND		ND	
2-Nitrophenol	MDL	ND		ND		ND		ND		ND		ND	
3,3'-Dichlorobenzidine	Note 1	ND		ND		ND		ND		ND		ND	
4,6-Dinitro-o-cresol	Note 1	ND		ND		ND		ND		ND		ND	
4-Bromophenylphenyl ethe	Note 1	ND		ND		ND		ND		ND		ND	
4-Chloro-3-methylphenol	0.240 or MDL	ND		ND		ND		ND		ND		ND	
4-Chlorophenylphenyl ethe	Note 1	ND		ND		ND		ND		ND		ND	
4-Nitrophenol	MDL	ND		ND		ND		ND		ND		ND	
Acenaphthene	Note 1	ND		ND		ND		ND		ND		0.38	
Acenaphthylene	41	ND		ND		ND		ND		ND		0.16	J
Anthracene	Note 1	ND		ND		ND		ND		ND		2.7	
Benzidine	Note 1	ND		ND		ND		ND		ND		ND	
Benzo(a)anthracene	MDL	ND		ND		ND		ND		ND		1.1	
Benzo(a)pyrene	MDL	ND		ND		ND		ND		ND		1.2	
Benzo(b)fluoranthene	1.1	ND		ND		ND		ND		ND		2.2	
Benzo(g,h,I)perylene	Note 1	ND		ND		ND		ND		ND		0.43	
Benzo(k)fluoranthene	1.1	ND		ND		ND		ND		ND		ND	
Benzyl butyl phthalate	Note 1	ND		ND		ND		ND		ND		ND	
Bis(2-chloroethoxy)methan	Note 1	ND		ND		ND		ND		ND		ND	
Bis(2-chloroethyl)ether	Note 1	ND		ND		ND		ND		ND		ND	
Bis(2-Chloroisopropyl)ethe	Note 1	ND		ND		ND		ND		ND		ND	
Bis(2-ethylhexyl)phthalate	Note 1	ND		ND		ND		ND		ND		ND	
Di-n-butyl phthalate	8.1	ND		ND		ND		0.16	J	0.29	J	ND	
Di-n-octyl phthalate	Note 1	ND		0.05	J,B	ND		ND		0.16	J,B	0.038	J
Dibenz(a,h)anthracene	MDL	ND		ND		ND		ND		ND		0.28	
Diethyl phthalate	7.1	ND		ND		ND		ND		ND		ND	
Dimethyl phthalate	2	ND		ND		ND		ND		ND		ND	
Fluoranthene	MDL	ND		ND		ND		ND		ND		2.2	
Fluorene	MDL	ND		ND		ND		ND		ND		0.26	
Hexachloro-1,3-butadiene	NS	ND		ND		ND		ND		ND		ND	
Hexachlorobenzene	0.41	ND		ND		ND		ND		ND		ND	
Hexachlorocyclopentadiene	Note 1	ND		ND		ND		ND		ND		ND	
Hexachloroethane	Note 1	ND		ND		ND		ND		ND		ND	
Indeno(1,2,3-CD)pyrene	3.2	ND		ND		ND		ND		ND		0.47	
Isophorone	4.4	ND		ND		ND		ND		ND		ND	
M-Dichlorobenzene	Note 1	ND		ND		ND		ND		ND		ND	
N-Nitroso-di-n-propylamine	Note 1	ND		ND		ND		ND		ND		ND	
N-Nitrosodimethylamine	Note 1	ND		ND		ND		ND		ND		ND	
N-Nitrosodiphenylamine	Note 1	ND		ND		ND		ND		ND		ND	
Naphthalene	13	ND		ND		ND		0.13	J	ND		0.33	
Nitrobenzene	MDL	ND		ND		ND		ND		ND		ND	
Pentachlorophenol	1.0 or MDL	ND		ND		ND		ND		ND		ND	
Phenanthrene	Note 1	ND		ND		ND		ND		ND		1.6	
Phenol	0.03 or MDL	1.2		ND		ND		ND		ND		ND	
Pyrene	Note 1	ND		ND		ND		ND		ND		2.0	
Total Confident SVOCs	500	1.2		0		0		0		0		16.45	

TABLE 5B
SUMMARY OF SOIL ANALYTICAL RESULTS-SVOCS
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location **Field ID** **Sampling Date** **Matrix** **Sample Depth** **Units**	NYSDEC RSCO (mg/Kg)	PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 3-4.5 ft bgs mg/Kg		PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 4.5-6 ft bgs mg/Kg		PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 6-8 ft bgs mg/Kg		PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 8.5-10 ft bgs mg/Kg	
SVOCs		Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual
1,2-Benzphenanthracene	Note 1	0.22		0.12	J	0.08	J	0.12	J
1,2-Diphenylhydrazine	Note 1	ND		ND		ND		ND	
2,4,6-Trichlorophenol	0.1 [2]	ND		ND		ND		ND	
2,4-Dichlorophenol	0.4	ND		ND		ND		ND	
2,4-Dimethyphenol	Note 1	ND		ND		ND		ND	
2,4-Dinitrophenol	MDL	ND		ND		ND		ND	
2,4-Dinitrotoluene	Note 1	ND		ND		ND		ND	
2,6-Dinitrotoluene	1	ND		ND		ND		ND	
2-Chlornaphthalene	Note 1	ND		ND		ND		ND	
2-Chlorophenol	0.8	ND		ND		ND		ND	
2-Nitrophenol	MDL	ND		ND		ND		ND	
3,3'-Dichlorobenzidine	Note 1	ND		ND		ND		ND	
4,6-Dinitro-o-cresol	Note 1	ND		ND		ND		ND	
4-Bromophenylphenyl ethe	Note 1	ND		ND		ND		ND	
4-Chloro-3-methylphenol	0.240 or MDL	ND		ND		ND		ND	
4-Chlorophenylphenyl ethe	Note 1	ND		ND		ND		ND	
4-Nitrophenol	MDL	ND		ND		ND		ND	
Acenaphthene	Note 1	ND		ND		ND		ND	
Acenaphthylene	41	ND		ND		ND		ND	
Anthracene	Note 1	0.052	J	ND		ND		ND	
Benzidine	Note 1	ND		ND		ND		ND	
Benzo(a)anthracene	MDL	0.14	J	0.072	J	ND		0.061	J
Benzo(a)pyrene	MDL	0.12	J	0.049	J	ND		ND	
Benzo(b)fluoranthene	1.1	0.20		0.059	J	ND		0.063	J
Benzo(g,h,I)perylene	Note 1	0.065	J	ND		ND		ND	
Benzo(k)fluoranthene	1.1	ND		0.049	J	ND		ND	
Benzyl butyl phthalate	Note 1	ND		ND		ND		ND	
Bis(2-chloroethoxy)methan	Note 1	ND		ND		ND		ND	
Bis(2-chloroethyl)ether	Note 1	ND		ND		ND		ND	
Bis(2-Chloroisopropyl)ether	Note 1	ND		ND		ND		ND	
Bis(2-ethylhexyl)phthalate	Note 1	0.055	J	ND		ND		0.076	J
Di-n-butyl phthalate	8.1	0.06	J	0.072	J	0.063	J	0.068	J
Di-n-octyl phthalate	Note 1	0.06	J	0.079	J	ND		ND	
Dibenz(a,h)anthracene	MDL	0.04	J	ND		ND		ND	
Diethyl phthalate	7.1	ND		ND		ND		ND	
Dimethyl phthalate	2	ND		ND		ND		ND	
Fluoranthene	MDL	0.18	J	0.094	J	ND		0.085	J
Fluorene	MDL	ND		ND		ND		ND	
Hexachloro-1,3-butadiene	NS	ND		ND		ND		ND	
Hexachlorobenzene	0.41	ND		ND		ND		ND	
Hexachlorocyclopentadiene	Note 1	ND		ND		ND		ND	
Hexachloroethane	Note 1	ND		ND		ND		ND	
Indeno(1,2,3-CD)pyrene	3.2	0.059	J	ND		ND		ND	
Isophorone	4.4	ND		ND		ND		ND	
M-Dichlorobenzene	Note 1	ND		ND		ND		ND	
N-Nitroso-di-n-propylamine	Note 1	ND		ND		ND		ND	
N-Nitrosodimethylamine	Note 1	ND		ND		ND		ND	
N-Nitrosodiphenylamine	Note 1	ND		ND		ND		ND	
Naphthalene	13	0.22		0.15	J	ND		ND	
Nitrobenzene	MDL	ND		ND		ND		ND	
Pentachlorophenol	1.0 or MDL	ND		ND		ND		ND	
Phenanthrene	Note 1	0.46		0.26		ND		0.093	J
Phenol	0.03 or MDL	ND		ND		ND		ND	
Pyrene	Note 1	0.21		0.10	J	ND		0.11	J
Total Confident SVOCs	500	1.3		0.26		0		0	

TABLE 5B
SUMMARY OF SOIL ANALYTICAL RESULTS-SVOCS
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Notes and Abbreviations
NYSDEC: New York State Department of Environmental Conservation
TAGM: Technical Administrative Guidance Memo #4046
RSCO: Recommended Soil Cleanup Objective
Conc: Concentration
mg/kg: milligrams per kilogram
Qual: Laboratory data qualifier
Ft. bgs: Feet below ground surface
ND: Not detected

B: The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
J: Compound detected at a concentration lower than the reporting limit and the calibration range for the compound. Estimated concentration range is provided.
Shaded values depicted in **bold** font exceed the NYSDEC RSCO.

1: As per TAGM #4046, the RSCO for individual SVOCs is 50 ppm.
2: This RSCO is for 2,4,5-Trichlorophenol
3: Results are shown only for those soil samples collected within 100 feet of the former Hydrogen Holders.
4: Shaded values depicted in **bold** font exceed the NYSDEC RSCO.

TABLE 5C
SUMMARY OF SOIL ANALYTICAL RESULTS-PESTICIDES AND PCBS
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location **Field ID** **Sampling Date** **Matrix** **Sample Depth** **Units**	NYSDEC RSCO (mg/Kg)	PG-WOOD-03 PG-WD-03 11/10/2000 Soil 0.5-2 ft bgs mg/Kg		PG-WOOD-03 PG-WD-03 11/10/2000 Soil 2-4 ft bgs mg/Kg		PG-WOOD-3 PG-WD-3 11/29/2000 Soil 2-4 ft bgs mg/Kg		PG-WOOD-3 PG-WD-3 11/29/2000 Soil 6-8 ft bgs mg/Kg		PG-WOOD-05 PG-WD-05 11/7/2005 Soil 0-2 ft bgs mg/Kg		PG-WOOD-05 PG-WD-05 11/7/2000 Soil 2-4 ft bgs mg/Kg	
PESTICIDES		Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual
4,4'-DDD	2.9	ND		ND		ND		ND		ND		ND	
4,4'-DDE	2.1	ND		ND		ND		ND		ND		ND	
4,4'-DDT	2.1	0.012		ND		ND		ND		ND		0.13	
Aldrin	0.041	ND		ND		ND		ND		ND		ND	
Alpha-BHC	0.11	ND		ND		ND		ND		ND		ND	
Beta-BHC	0.2	ND		ND		ND		ND		ND		ND	
Chlordane	0.54	ND		ND		ND		ND		ND		ND	
Delta-BHC	0.3	ND		ND		ND		ND		ND		ND	
Dieldrin	0.044	ND		ND		ND		ND		ND		0.027	
Endosulfan I	0.9	ND		ND		ND		ND		ND		0.0047	
Endosulfan II	0.9	ND		ND		ND		ND		ND		ND	
Endosulfan Sulfate	1	ND		ND		ND		ND		ND		ND	
Endrin	0.1	ND		ND		ND		ND		ND		0.0089	
Endrin Aldehyde	NS	ND		ND		ND		ND		ND		ND	
Endrin Ketone	NS	ND		ND		ND		ND		ND		0.0099	
Lindane (Gamma-BHC)	0.06	ND		ND		ND		ND		ND		ND	
Heptachlor	0.1	ND		ND		ND		ND		ND		ND	
Heptachlor Epoxide	0.02	ND		ND		ND		ND		ND		0.0065	
Methoxychlor	Note 1	ND		ND		ND		ND		ND		ND	
Toxaphene	NS	ND		ND		ND		ND		ND		ND	
PCBs													
Aroclor 1016	NS	ND		ND		ND		ND		ND		ND	
Aroclor 1221	NS	ND		ND		ND		ND		ND		ND	
Aroclor 1232	NS	ND		ND		ND		ND		ND		ND	
Aroclor 1242	NS	ND		ND		ND		ND		ND		ND	
Aroclor 1248	NS	ND		ND		ND		ND		ND		ND	
Aroclor 1254	NS	ND		ND		ND		ND		ND		1.1	
Aroclor 1260	NS	0.16		ND		ND		ND		ND		ND	
Total PCBs	1 or 10[2]	0.16		ND		ND		ND		ND		1.1	

Notes and Abbreviations
NYSDEC: New York State Department of Environmental Conservation
TAGM: Technical Administrative Guidance Memo #4046
RSCO: Recommended Soil Cleanup Objective
Conc: Concentration
mg/kg: milligrams per kilogram
Qual: Laboratory data qualifier
Ft. bgs.: Feet below ground surface
NS: No standard
ND: Not detected

1: As per TAGM #4046 the RSCO for total VOCs is less than 10 mg/Kg.
2: 1 mg/Kg is the RSCO for PCBs detected in surface soil (0-2 ft. bgs) samples. 10 mg/Kg is the RSCO for PCBs detected in subsurface samples.
3: Results are shown only for those soil samples collected within 100 feet of the former Hydrogen Holders.
4: Shaded values depicted in **bold** font exceed the NYSDEC RSCO.

TABLE 5C
SUMMARY OF SOIL ANALYTICAL RESULTS-PESTICIDES AND PCBS
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location		PG-WOOD-05		PG-WOOD-05		PG-WOOD-05		PG-WOOD-05		PG-PA-MW-6		PG-PA-MW-6	
Field ID		PG-WD-05		PG-WD-05		PG-WD-05		PG-WD-05		PG-MWPA-06		PG-MWPA-06	
Sampling Date	NYSDEC	11/7/2000		11/7/2000		11/7/2000		11/7/2000		11/7/2000		11/7/2000	
Matrix	RSCO (mg/Kg)	Soil		Soil		Soil		Soil		Soil		Soil	
Sample Depth		4-6 ft bgs		6-8 ft bgs		8-10 ft bgs		14-16 ft bgs		1.5-3 ft bgs		3-4.5 ft bgs	
Units		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
PESTICIDES		Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual
4,4'-DDD	2.9	ND		ND		ND		ND		ND		ND	
4,4'-DDE	2.1	ND		ND		ND		ND		ND		0.0058	
4,4'-DDT	2.1	ND		ND		ND		ND		0.019		0.017	
Aldrin	0.041	ND		ND		ND		ND		ND		ND	
Alpha-BHC	0.11	ND		ND		ND		ND		ND		ND	
Beta-BHC	0.2	ND		ND		ND		ND		ND		ND	
Chlordane	0.54	ND		ND		ND		ND		ND		ND	
Delta-BHC	0.3	ND		ND		ND		ND		ND		ND	
Dieldrin	0.044	ND		ND		ND		ND		ND		ND	
Endosulfan I	0.9	ND		ND		ND		ND		ND		ND	
Endosulfan II	0.9	ND		ND		ND		ND		ND		ND	
Endosulfan Sulfate	1	ND		ND		ND		ND		ND		ND	
Endrin	0.1	ND		ND		ND		ND		ND		ND	
Endrin Aldehyde	NS	ND		ND		ND		ND		0.0054		ND	
Endrin Ketone	NS	ND		ND		ND		ND		ND		ND	
Lindane (Gamma-BHC)	0.06	ND		ND		ND		ND		ND		ND	
Heptachlor	0.1	ND		ND		ND		ND		ND		ND	
Heptachlor Epoxide	0.02	ND		ND		ND		ND		ND		ND	
Methoxychlor	Note 1	ND		ND		ND		ND		ND		ND	
Toxaphene	NS	ND		ND		ND		ND		ND		ND	
PCBs													
Aroclor 1016	NS	ND		ND		ND		ND		ND		ND	
Aroclor 1221	NS	ND		ND		ND		ND		ND		ND	
Aroclor 1232	NS	ND		ND		ND		ND		ND		ND	
Aroclor 1242	NS	ND		ND		ND		ND		ND		ND	
Aroclor 1248	NS	ND		ND		ND		ND		ND		ND	
Aroclor 1254	NS	ND		0.049		ND		ND		ND		ND	
Aroclor 1260	NS	ND		ND		ND		ND		0.095		0.077	
Total PCBs	1 or 10 [2]	ND		0.049		ND		ND		0.095		0.077	

Notes and Abbreviations
NYSDEC: New York State Department of Environmental Conservation
TAGM: Technical Administrative Guidance Memo #4046
RSCO: Recommended Soil Cleanup Objective
Conc: Concentration
mg/kg: milligrams per kilogram
Qual: Laboratory data qualifier
Ft. bgs.: Feet below ground surface
NS: No standard
ND: Not detected

1: As per TAGM #4046 the RSCO for total VOCs is less than 10 mg/Kg.
2: 1 mg/Kg is the RSCO for PCBs detected in surface soil (0-2 ft. bgs) samples.
10 mg/Kg is the RSCO for PCBs detected in subsurface samples.
3: Results are shown only for those soil samples collected within 100 feet of the former Hydrogen Holders.
4: Shaded values depicted in **bold** font exceed the NYSDEC RSCO.

TABLE 5C
SUMMARY OF SOIL ANALYTICAL RESULTS-PESTICIDES AND PCBS
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location **Field ID** **Sampling Date** **Matrix** **Sample Depth** **Units**	NYSDEC RSCO (mg/Kg)	PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 4.5-6 ft bgs mg/Kg		PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 6-8 ft bgs mg/Kg		PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 8.5-10 ft bgs mg/Kg	
PESTICIDES		Conc	Qual	Conc	Qual	Conc	Qual
4,4'-DDD	2.9	ND		ND		ND	
4,4'-DDE	2.1	ND		ND		ND	
4,4'-DDT	2.1	ND		ND		ND	
Aldrin	0.041	ND		ND		ND	
Alpha-BHC	0.11	ND		ND		ND	
Beta-BHC	0.2	ND		ND		ND	
Chlordane	0.54	ND		ND		ND	
Delta-BHC	0.3	ND		ND		ND	
Dieldrin	0.044	ND		ND		ND	
Endosulfan I	0.9	ND		ND		ND	
Endosulfan II	0.9	ND		ND		ND	
Endosulfan Sulfate	1	ND		ND		ND	
Endrin	0.1	ND		ND		ND	
Endrin Aldehyde	NS	ND		ND		ND	
Endrin Ketone	NS	ND		ND		ND	
Lindane (Gamma-BHC	0.06	ND		ND		ND	
Heptachlor	0.1	ND		ND		ND	
Heptachlor Epoxide	0.02	ND		ND		ND	
Methoxychlor	Note 1	ND		ND		ND	
Toxaphene	NS	ND		ND		ND	
PCBs							
Aroclor 1016	NS	ND		ND		ND	
Aroclor 1221	NS	ND		ND		ND	
Aroclor 1232	NS	ND		ND		ND	
Aroclor 1242	NS	ND		ND		ND	
Aroclor 1248	NS	ND		ND		ND	
Aroclor 1254	NS	ND		ND		ND	
Aroclor 1260	NS	ND		ND		ND	
Total PCBs	1 or 10 [2]	ND		ND		ND	

Notes and Abbreviations
NYSDEC: New York State Department of Environmental Conservation
TAGM: Technical Administrative Guidance Memo #4046
RSCO: Recommended Soil Cleanup Objective
Conc: Concentration
mg/kg: milligrams per kilogram
Qual: Laboratory data qualifier
Ft. bgs.: Feet below ground surface
NS: No standard
ND: Not detected

1: As per TAGM #4046 the RSCO for total VOCs is less than 10 mg/Kg.
2: 1 mg/Kg is the RSCO for PCBs detected in surface soil (0-2 ft. bgs) samples. 10 mg/Kg is the RSCO for PCBs detected in subsurface samples.
3: Results are shown only for those soil samples collected within 100 feet of the former Hydrogen Holders.
4: Shaded values depicted in **bold** font exceed the NYSDEC RSCO.

TABLE 5D
SUMMARY OF SOIL ANALYTICAL RESULTS-METALS, TPH
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location		PG-WOOD-03		PG-WOOD-03		PG-WOOD-3		PG-WOOD-3		PG-WOOD-05	
Field ID	NYSDEC RSCO	PG-WD-03		PG-WD-03		PG-WD-3		PG-WD-3		PG-WD-05	
Sampling Date	(mg/Kg)	11/10/2000		11/10/2000		11/29/2000		11/29/2000		11/7/2000	
Matrix		Soil		Soil		Soil		Soil		Soil	
Sample Depth		0.5-2 ft bgs		2-4 ft bgs		2-4 ft bgs		6-8 ft bgs		0-2 ft bgs	
Units		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
METALS		Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual
Aluminum (fume or dust)	33,000 or SB	ND		4,500		3,900		ND		1500	
Antimony	NS	ND		2.3		2.6		ND		ND	
Arsenic	7.5 [1]	2.8		**310**		**29**		ND		ND	
Barium	300 [1]	15		260		120		38		21	
Beryllium	0.16 [1]	ND		1.3		1		ND		ND	
Cadmium	1 [1]	ND		0.47		0.37		ND		ND	
Calcium metal	35,000 of SB	31,000		22,000		35,000		**400,000**		ND	
Chromium	10 [1]	6.3		20		**110**		ND		7.4	
Cobalt	30 [1]	ND		15		5.2		ND		ND	
Copper	25 [1]	15		**210**		**110**		ND		8.1	
Iron	2000 or SB	3,800		44,000		31,000		ND		4000	
Lead	200-500*	20		460		**580**		ND		13	
Magnesium	100-5,000 (SB)	**18,000**		4,700		4,200		4,000		ND	
Manganese	50-5,000(SB)	47		200		220		69		28	
Nickel	13 or 0.5-25 [1]	3.2		**170**		**53**		ND		ND	
Potassium	8,500-43,000 (SB)	ND		ND		310		490		ND	
Selenium	2 or 0.1-3.9 [1]	ND		**5**		3.9		ND		ND	
Silver	NS	ND		0.62		ND		ND		ND	
Sodium	6,000-8,000 (SB)	ND		ND		ND		2,300		ND	
Thallium	NS	ND		ND		ND		ND		ND	
Vanadium	150 or 1-300 [1]	20		39		28		ND		24	
Zinc	20 or 9-50 [1]	17		**700**		**250**		ND		21	
Mercury	0.1	ND		**0.38**		**0.48**		ND		ND	
TPHC	NS	710		73		140		ND		ND	
Oil and Grease	NS	2,800		1,200		1,300		130		ND	
Cyanide	NS	ND		ND		16		3.2		ND	
pH	NS	7.4		7.7		8.2		9.0		7.2	
Total Phenolics	500 [2]	ND		ND		1.6		3.7		ND	

Notes and Abbreviations
NYSDEC: New York State Department of Environmental Conservation
TAGM: Technical Administrative Guidance Memo #4046
RSCO: Recommended Soil Cleanup Objective
Conc: Concentration
mg/kg: milligrams per kilogram
Qual: Laboratory data qualifier
NS: No standard
ND: Not detected
SB: Site Background
*: As per TAGM #4046, background lead levels vary widely. A typical range for metropolitan, suburban, or highway areas is 200-500 ppm. The analytical results are therefore compared to an RSCO of 500 mg/kg.

1) The objective for this compound is the greater of the RSCO or New York State's background concentration.
2) Value based on TAGM #4046, standard for total SVOCs.
3) Results are show only for those soil samples collected within 100 feet of the former Hydrogen Holders.
4) Shaded values depicted in **bold** font exceed the NYSDEC RSCO.
5) Site background concentrations have not been established for any metals. Therefore, for metals without RSCOs, the maximum New York State background concentration is provided.

TABLE 5D
SUMMARY OF SOIL ANALYTICAL RESULTS-METALS, TPH
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location Field ID Sampling Date Matrix Sample Depth Units	NYSDEC RSCO (mg/Kg)	PG-WOOD-05 PG-WD-05 11/7/2000 Soil 2-4 ft bgs mg/Kg		PG-WOOD-05 PG-WD-05 11/7/2000 Soil 4-6 ft bgs mg/Kg		PG-WOOD-05 PG-WD-05 11/7/2000 Soil 6-8 ft bgs mg/Kg		PG-WOOD-05 PG-WD-05 11/7/2000 Soil 8-10 ft bgs mg/Kg		PG-WOOD-05 PG-WD-05 11/7/2000 Soil 14-16 ft bgs mg/Kg		PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 1.5-3' mg/Kg	
METALS		Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual	Conc	Qual
Aluminum (fume or dus	33,000 or SB	1300		1300		2500		2000		14000		4300	
Antimony	NS	2.8		ND		ND		ND		ND		1.7	
Arsenic	7.5 [1]	**27**		11		**28**		8.7		ND		**150**	
Barium	300 [1]	250		33		54		36		ND		120	
Beryllium	0.16 [1]	ND		ND		ND		ND		ND		ND	
Cadmium	1 [1]	ND		ND		ND		ND		ND		ND	
Calcium metal	35,000 of SB	7400		ND		ND		11000		7700		13000	
Chromium	10 [1]	**12**		ND		6		ND		**24**		**28**	
Cobalt	30 [1]	ND		2.5		6.6		6.7		ND		7	
Copper	25 [1]	**59**		**34**		**37**		20		ND		**58**	
Iron	2000 or SB	8200		3300		7500		6600		19000		24000	
Lead	200-500*	130		ND		32		22		ND		73	
Magnesium	100-5,000 (SB)	2000		ND		ND		ND		**6200**		3800	
Manganese	50-5,000(SB)	55		ND		27		38		110		200	
Nickel	13 or 0.5-25 [1]	12		7.6		15		17		19		**26**	
Potassium	8,500-43,000 (SB)	150		270		320		320		2600		190	
Selenium	2 or 0.1-3.9 [1]	ND		ND		ND		ND		ND		ND	
Silver	NS	ND		ND		ND		ND		ND		.68	
Sodium	6,000-8,000 (SB)	ND		ND		ND		810		6000		370	
Thallium	NS	ND		ND		ND		ND		ND		ND	
Vanadium	150 or 1-300 [1]	16		ND		ND		ND		40		38	
Zinc	20 or 9-50 [1]	**190**		19		**94**		**56**		**360**		**120**	
Mercury	0.1	**0.41**		ND		ND		ND		ND		**0.28**	
TPHC	NS	1000		47		95		ND		110		72	
Oil and Grease	NS	13,000		250		18,000		ND		410		ND	
Cyanide	NS	ND		ND		ND		ND		ND		0.52	
pH	NS	7.1		7.1		6.8		7.5		7.7		6.9	
Total Phenolics	500 [2]	ND		ND		ND		ND		ND		ND	

Notes and Abbreviations
NYSDEC: New York State Department of Environmental Conservation
TAGM: Technical Administrative Guidance Memo #4046
RSCO: Recommended Soil Cleanup Objective
Conc: Concentration
mg/kg: milligrams per kilogram
Qual: Laboratory data qualifier
NS: No standard
ND: Not detected
SB: Site Background
*: As per TAGM #4046, background lead levels vary widely. A typical range for metropolitan, suburban, or highway areas is 200-500 ppm. The analytical results are therefore compared to an RSCO of 500 mg/kg.

1) The objective for this compound is the greater of the RSCO or New York State's background concentration.
2) Value based on TAGM #4046, standard for total SVOCs.
3) Results are show only for those soil samples collected within 100 feet of the former Hydrogen Holders.
4) Shaded values depicted in **bold** font exceed the NYSDEC RSCO.
5) Site background concentrations have not been established for any metals. Therefore, for metals without RSCOs, the maximum New York State background concentration is provided.

TABLE 5D
SUMMARY OF SOIL ANALYTICAL RESULTS-METALS, TPH
HYDROGEN HOLDERS AOC
HHMT-PORT IVORY FACILITY SITE 1
STATEN ISLAND, NEW YORK

Sample Location **Field ID** **Sampling Date** **Matrix** **Sample Depth** **Units**	NYSDEC RSCO (mg/Kg)	PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 3-4.5' mg/Kg		PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 4.5-6' mg/Kg		PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 6-8' mg/Kg		PG-PA-MW-6 PG-MWPA-06 11/7/2000 Soil 8.5-10' mg/Kg	
METALS		Conc	Qual	Conc	Qual	Conc	Oual	Conc	Qual
Aluminum (fume or dust)	33,000 or SB	7800		6000		ND		ND	
Antimony	NS	ND		ND		ND		ND	
Arsenic	7.5 [1]	**36**		**24**		**16**		ND	
Barium	300 [1]	180		170		50		53	
Beryllium	0.16 [1]	0.49		ND		ND		ND	
Cadmium	1 [1]	ND		ND		ND		ND	
Calcium metal	35,000 of SB	11000		4300		ND		ND	
Chromium	10 [1]	**32**		**13**		5.1		ND	
Cobalt	30 [1]	6.8		10		2.7		ND	
Copper	25 [1]	**46**		**36**		15		7.7	
Iron	2000 or SB	30000		28000		19000		ND	
Lead	200-500*	31		17		6.8		ND	
Magnesium	100-5,000 (SB)	810		ND		ND		**6800**	
Manganese	50-5,000(SB)	92		140		ND		ND	
Nickel	13 or 0.5-25 [1]	17		**26**		8.1		ND	
Potassium	8,500-43,000 (SB)	320		330		460		ND	
Selenium	2 or 0.1-3.9 [1]	3.3		3.9		3.5		ND	
Silver	NS	ND		ND		ND		1.8	
Sodium	6,000-8,000 (SB)	350		290		260		3000	
Thallium	NS	ND		ND		ND		ND	
Vanadium	150 or 1-300 [1]	24		20		ND		ND	
Zinc	20 or 9-50 [1]	34		48		ND		ND	
Mercury	0.1	**0.22**		ND		ND		ND	
TPHC	NS	74		87		ND		ND	
Oil and Grease	NS	ND		190		180		ND	
Cyanide	NS	4.4		3.5		2.9		18	
pH	NS	7.0		5.5		4.5		10	
Total Phenolics	500 [2]	ND		ND		ND		ND	

Notes and Abbreviations
NYSDEC: New York State Department of Environmental Conservation
TAGM: Technical Administrative Guidance Memo #4046
RSCO: Recommended Soil Cleanup Objective
Conc: Concentration
mg/kg: milligrams per kilogram
Qual: Laboratory data qualifier
NS: No standard
ND: Not detected
SB: Site Background
*: As per TAGM #4046, background lead levels vary widely. A typical range for metropolitan, suburban, or highway areas is 200-500 ppm. The analytical results are therefore compared to an RSCO of 500 mg/kg.

1) The objective for this compound is the greater of the RSCO or New York State's background concentration.
2) Value based on TAGM #4046, standard for total SVOCs.
3) Results are show only for those soil samples collected within 100 feet of the former Hydrogen Holders.
4) Shaded values depicted in **bold** font exceed the NYSDEC RSCO.
5) Site background concentrations have not been established for any metals. Therefore, for metals without RSCOs, the maximum New York State background concentration is provided.

respective RSCOs in at least one soil sample: arsenic, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel, selenium, sodium, and zinc.

As shown on Figure 6, the SI groundwater sampling location nearest to the former hydrogen holders is well PG-PA-MW-6; please note, a groundwater sample was not collected at deep well PG-PA-MW-6D during the SI. Well PG-PA-MW-6 is located within 100 feet of both hydrogen holders. The well is also approximately downgradient of the eastern hydrogen holder and downgradient/sidegradient of the western hydrogen holder. The groundwater sample collected at well PG-PA-MW-6 during the SI was analyzed for PP VOCs, PP SVOCs, PP pesticides and PCBs, Target Analyte List (TAL) metals, TPHC, oil and grease (O&G), total cyanide, and total phenolics. The analytical results, summarized in Tables 6A through 6D for the groundwater sample collected at well PG-PA-MW-6 indicate that only one SVOC, phenol, and one metal, arsenic, slightly exceeded their respective AWQSGVs.

7.0 DISCUSSION OF DATA

The following is a discussion of the data gathered and evaluated during the SRI. The SRI was completed with the overall goal of determining whether remediation was warranted at any open AOC or with respect to any open issue at Site 1. As noted above, the open AOC is AOC-UST2, and the open issues are the effect (if any) of impacted groundwater on surface water and sediment quality within Bridge Creek, and the effect (if any) of the former hydrogen holders on soil and groundwater quality. Section 7.1 is a discussion of data associated with AOC-UST2. Section 7.2 is a discussion of data associated with the two open issues identified above. These discussions are the basis for the conclusions and recommendations presented in Section 8.0.

7.1 Discussion of Data – AOC-UST2

As presented in Section 4, the objectives for the investigation of AOC-UST2 were as follows: 1) to determine the impact (if any) the LNAPL has on soil quality; 2) to delineate the extent of the LNAPL and impacted soil; 3) to identify if the soil is acting as a source area for groundwater impacts; 4) to delineate the groundwater impacts (if any); 5) to determine whether LNAPL could discharge into Bridge Creek; and, 6) to determine whether impacted groundwater could discharge into Bridge Creek. The following discussion addresses each of the objectives.

TABLE 6A
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS HYDROGEN HOLDERS AOC-VOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location Sampling Date Matrix Units	Recommended Groundwater Cleanup Standard/Guidance Value (RGCS/G)*	PG-PA-MW-6 11/27/2000 Aqueous ug/L		PG-PA-MW-6D 11/30/2000 Aqueous ug/L	
VOLATILE ORGANIC COMPOUNDS (VOCs)		Conc	Qual	Conc	Qual
1,2,4-TRICHLOROBENZENE	5	ND		ND	
1,2-DICHLOROBENZENE	3	ND		ND	
1,4-DICHLOROBENZENE	3	ND		ND	
1,1,1-TRICHLOROETHANE	5	ND		ND	
1,1,2,2-TETRACHLOROETHANE	5	ND		ND	
1,1,2-TRICHLOROETHANE	1	ND		ND	
1,1-DICHLOROETHANE	5	ND		ND	
1,1-DICHLOROETHYLENE	5	ND		ND	
1,2-DICHLOROETHANE	0.6	ND		ND	
1,2-DICHLORORPROPANE	1	ND		ND	
2-CHLOROETHYL VINYL ETHER	NS/NG	ND		ND	
ACROLEIN	5	ND		ND	
ACRYLONITRILE	5	ND		ND	
BENZENE	1	ND		ND	
BROMODICHLOROMETHANE	50	ND		ND	
BROMOFORM	50	ND		ND	
BROMOMETHANE	5	ND		ND	
CARBON TETRACHLORIDE	5	ND		ND	
CHLOROBENZENE	5	ND		ND	
CHLOROETHANE	5	ND		ND	
CHLOROFORM	7	ND		ND	
CHLOROMETHANE	NS/NG	ND		ND	
CIS-1,3-DICHLOROPROPENE	0.4 (Total)	ND		ND	
DIBROMOCHLOROMETHANE	50	ND		ND	
DICHLOROMETHANE	NS/NG	ND		ND	
ETHYLBENZENE	5	ND		ND	
M&P-XYLENES	5	ND		ND	
METHYLBENZENE	NS/NG	ND		ND	
O-XYLENE	5	ND		ND	
TETRACHLOROETHYLENE	5	ND		ND	
TRANS-1,2-DICHLOROETHYLENE	5	ND		ND	
TRANS-1,3-DICHLOROPROPENE	0.4 (Total)	ND		ND	
TRICHLOROETHYLENE	5	ND		ND	
VINYL CHLORIDE	2	ND		ND	
Total Confident VOCs	NS/NG	0		0	
Total VOC TICs	NS/NG	0		0	

Notes and Abbreviations:
ug/L = micrograms per liter (all concentations are provided in ug/L)
* = RGCS/G values are based on New York State Title 6 CRR (Codes, Rules and Regulations) Part 703. The guidance value is utilized where a standard has not been adopted for a substance.
Conc = Concentration
Qual = Laboratory data qualifier
NS = No standard
ND = Not detected
TICs = Tentatively Identified Compounds
NG = No guidance value
MDL = Minimum detection limit

1) Results are shown only for groundwater samples collected from wells that are downgradient of the location of the former hydrogen holders.

TABLE 6B
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS HYDROGEN HOLDERS AOC-SVOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location **Sampling Date** **Matrix** **Units**	Recommended Groundwater Cleanup Standards/ Guidance Value (RGCS/G)*	**PG-PA-MW-6** **11/27/2000** **Aqueous** **ug/L**		**PG-PA-MW-6D** **11/30/2000** **Aqueous** **ug/L**	
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)		Conc	Qual	Conc	Qual
Acenaphthene	20	ND		ND	
Acenaphthylene	NS/NG	ND		ND	
Anthracene	50	ND		ND	
1,2-Benzphenanthracene	NS/NG	ND		ND	
Benzidine	5	ND		ND	
Benzo[a]anthracene	0.002	ND		ND	
Benzo[a]pyrene	MDL	ND		ND	
Benzo[b]fluoranthene	0.002	ND		ND	
Benzo[g,h,i]perylene	NS/NG	ND		ND	
Benzo[k]fluoranthene	0.002	ND		ND	
Butylbenzylphthalate	50	ND		ND	
Bis(2-Chloroethoxy)methane	5	ND		ND	
Bis(2-Chloroethyl)Ether	1	ND		ND	
Bis(2-Chloroisopropyl)ether	NS/NG	ND		ND	
Bis(2-Ethylhexyl)phthalate	5	ND		2.3	B
4-Bromophenyl-phenylether	NS	ND		ND	
2-Chloronaphthalene	10	ND		ND	
2-Chlorophenol	NS/NG	ND		ND	
4-Chloro-3-methylphenol	NS/NG	ND		ND	
4-Chlorophenyl-phenylether	NS/NG	ND		ND	
1,2-Diphenylhydrazine	NS/NG	ND		ND	
2,4-Dichlorophenol	5	ND		ND	
2,4-Dimethylphenol	50	ND		ND	
2,4-Dinitrophenol	10	ND		ND	
2,4-Dinitrotoluene	5	ND		ND	
2,6-Dinitrotoluene	5	ND		ND	
3,3'-Dichlorobenzidine	5	ND		ND	
4,6-Dinitro-O-Cresol	NS/NG	ND		ND	
Di-n-butylphthalate	50	ND		1.5	
DI-n-octylphthalate	50	ND		1.3	
Dibenzo[a,h]Anthracene	NS/NG	ND		ND	
Diethylphthalate	50	ND		ND	
Dimethylphthalate	50.0	ND		ND	
m-Dichlorobenzene	3	ND		ND	
Fluoranthene	50	ND		ND	
Fluorene	50	ND		ND	
Hexachloro-1,3-Butadiene	0.5	ND		ND	
Hexachlorobenzene	0.04	ND		ND	
Hexachlorocyclopentadiene	5	ND		ND	
Hexachloroethane	5	ND		ND	
Indeno[1,2,3-cd]pyrene	0.002	ND		ND	
Isophorone	50	ND		ND	
2-Nitrophenol	NS/NG	ND		ND	
4-Nitrophenol	NS/NG	ND		ND	
N-Nitroso-Di-N-Propylamine	NS/NG	ND		ND	
N-Nitrosodimethylamine	NS/NG	ND		ND	
N-Nitrosodiphenylamine	50	ND		ND	
Naphthalene	10	ND		ND	
Nitrobenzene	0.4	ND		ND	
Pentachlorophenol	1.0 (Total Phenols)	ND		ND	
Phenanthrene	50	ND		ND	
Phenol	1.0 (Total Phenols)	2.1		ND	
Pyrene	50	ND		ND	
2,4,6-Trichlorophenol	NS/NG	ND		ND	
Total Confident SVOCs	NS/NG	2.1		2.8	
Total SVOC TICs	NS/NG	0		2.3	

TABLE 6B
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS HYDROGEN HOLDERS AOC-SVOCs
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Notes and Abbreviations:
ug/L = micrograms per liter (all concentrations are provided in ug/L)
* = RGCS/G values are based on New York State Title 6 CRR (Codes, Rules and Regulations) Part 703. The guidance value has been used where a standard has not been adopted for a substance.
Conc = Concentration
Qual = Laboratory data qualifier
MDL = Laboratory's minimum detection limit
Shaded values in **bold** font represent exceedances of the RGCS/G.
B: The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
NS = No standard
ND = Not detected
TICs = Tentatively Identified Compounds
NG = No guidance value

1) Results are shown only for groundwater samples collected from wells that are downgradient of the location of the former hydrogen holders.

TABLE 6C
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS HYDROGEN HOLDERS AOC - PESTICIDES AND PCBS
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location **Sampling Date** **Matrix** **Units**	Recommended Groundwater Cleanup Standard/Guidance Value (RGCS/G)*	**PG-PA-MW-6** 11/27/2000 Aqueous ug/L		**PG-PA-MW-6D** 11/30/2000 Aqueous ug/L	
PCBs		Conc	Qual	Conc	Qual
AROCLOR 1016	0.09**	ND		ND	
AROCLOR 1221	0.09**	ND		ND	
AROCLOR 1232	0.09**	ND		ND	
AROCLOR 1242	0.09**	ND		ND	
AROCLOR 1248	0.09**	ND		ND	
AROCLOR 1254	0.09**	ND		ND	
AROCLOR 1260	0.09**	ND		ND	
PESTICIDES					
ALDRIN	0.01	ND		ND	
ALPHA-BHC	0.01	ND		ND	
BETA-BHC	0.01	ND		ND	
CHLORDANE	0.05	ND		ND	
4,4'-DDD	0.3	ND		ND	
4,4'-DDE	0.2	ND		ND	
4,4'-DDT	0.2	ND		ND	
DELTA-BHC	0.01	ND		ND	
DIELDRIN	0.004	ND		ND	
ENDOSULFAN I	NS/NG	ND		ND	
ENDOSULFAN II	NS/NG	ND		ND	
ENDOSULFAN SULFATE	0.1	ND		ND	
ENDRIN	0.01	ND		ND	
ENDRIN ALDEHYDE	5	ND		ND	
ENDRIN KETONE	5	ND		ND	
GAMMA-BHC (LINDANE)	NS/NG	ND		ND	
HEPTACHLOR	0.04	ND		ND	
HEPTACHLOR EPOXIDE	0.01	ND		ND	
METHOXYCHLOR	35	ND		ND	
TOXAPHENE	0.06	ND		ND	

Notes and Abbreviations:
ug/L = micrograms per liter (all concentrations are provided in ug/L)
* = RGCS/G values are based on New York State Title 6 CRR (Codes, Rules and Regulations) Part 703. The guidance value is utilized where a standard has not been adopted for a substance.
** = value provided is for total PCBs (Aroclors)
Conc = Concentration
Qual = Laboratory data qualifier
NS = No standard
ND = Not detected
NG = No guidance value
PCBs = Polychlorinated biphenyls

1) Results are shown only for groundwater samples collected from wells that are

TABLE 6D
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS HYDROGEN HOLDERS AOC-METALS
HHMT-PORT IVORY FACILITY, SITE 1
STATEN ISLAND, NEW YORK

Sample Location **Sampling Date** **Matrix** **Units**	Recommended Groundwater Cleanup Standard/Guidance Value (RGCS/G)*	**PG-PA-MW-6** 11/27/2000 Aqueous ug/L		**PG-PA-MW-6D** 11/30/2000 Aqueous ug/L	
METALS		Conc	Qual	Conc	Qual
ALUMINUM (FUME OR DUST)	NS/NG	430		260	
ANTIMONY	3	ND		ND	
ARSENIC	25	**83**		ND	
BARIUM	1000	ND		68	
BERYLLIUM	3	ND		ND	
CADMIUM	5	ND		ND	
CALCIUM METAL	NS/NG	1,900		180,000	
CHROMIUM	50	ND		ND	
COBALT	NS	ND		ND	
COPPER	200	ND		ND	
IRON	300	120		**15,000**	
LEAD	25	ND		ND	
MAGNESIUM	35000	5,500		**430,000**	
MANGANESE	300	ND		**1200**	
MERCURY	0.7	ND		ND	
NICKEL	100	ND		ND	
POTASSIUM	NS/NG	100,000		81,000	
SELENIUM	10	ND		ND	
SILVER	50	ND		ND	
SODIUM	20000	**900,000**		**4,000,000**	
THALLIUM	1	ND		ND	
VANADIUM	NS	50		ND	
ZINC	2000	ND		ND	
TPHC	100	ND		ND	
OIL & GREASE	100	13		21	
CYANIDE	200	0.013		ND	
***pH**	NS/NG	11.36		7.08	
TOTAL PHENOLICS	1.0	ND		ND	

Notes and Abbreviations:
ug/L = micrograms per liter (all concentrations are provided in ug/L)
* = RGCS/G values are based on New York State Title 6 CRR (Codes, Rules and Regulations) Part 703. The guidance value is utilized where a standard has not been adopted for a substance.
TPHC = Total Petroleum Hydrocarbons
Conc = Concentration
Qual = Laboratory data qualifier
Shaded values in **bold** font represent exceedances of the RGCS/G values.
NS = No standard
ND = Not detected
NG = No guidance value

1)Results are shown only for groundwater samples collected from wells that are downgradient of the location of the former hydrogen holders.

7.1.1 Data Related to Objective 1

Objective 1, to determine the impact (if any) the LNAPL has on soil quality, was evaluated by the collection and analysis of seventeen soil samples from 14 soil borings. All soil samples were analyzed for VOC+15, SVOC+25, and TPHC. The analytical data indicate that soil impacts were limited to two VOCs (methylene chloride and 1,2-dichloroethene) and a few PAH compounds, a subset of SVOCs. Methylene chloride was also detected in an associated method blank; therefore, it is likely that the presence of this compound is attributable to laboratory contamination of the soil sample. The concentration (0.19 mg/kg) of trans-1,2-dichloroethene was detected at a concentration slightly greater than its RSCO (0.1 mg/kg) in only a single soil sample, the sample collected from the 1.5-2 feet bgs depth interval at location UST2-5A. This isolated and relatively low concentration of trans-1,2-dichloroethene is not a concern, particularly given the Port Authority's redevelopment plan that includes the placement of pavement and other impervious cover at the majority of Site 1 and the recording of a Deed Notice for all of Site 1.

At least one PAH compound was detected at a concentration greater than its RSCO in ten of the 17 soil samples collected during the SRI. The concentrations of PAH compounds in all samples, except for the sample collected from the 4-4.5 foot bgs depth interval at location TWP-1A, were similar to or less than those detected throughout the Facility (concentrations of total PAH compounds generally between 0 and 10 mg/kg), and are likely attributable to the former placement of historic fill by P&G. This impacted soil will be addressed through the physical redevelopment of Site 1 and the recording of a Deed Notice. The total concentration of PAH compounds in the soil sample collected at TWP-1A was more than 1,000 mg/kg. The presence of cinders was noted in the 4.25-4.5 foot bgs depth interval at location TWP-1A (i.e., within the depth interval of the sample collected at TWP-1A). The presence of cinders and absence of indications of petroleum-impacted soil suggests that cinders were included in the soil sample and that the elevated concentration of PAHs in the sample is attributable to the presence of these cinder(s). However, additional soil investigation is required to confirm this assertion.

Several VOC and SVOC TICs were detected in the soil samples collected during the SRI. However, none of the TICs were compounds that are included in the definition of Principal Organic Contaminants, as defined in the NYSDEC document entitled *Recommended Groundwater Cleanup Guidance and the Recommended Groundwater Cleanup Standard* and dated June 1998. Therefore, no remedial action is warranted with respect to soil where TICs were detected.

Although TAGM 4046 does not include an RSCO for TPHC, the concentration of TPHC is a relative measure of the LNAPL saturation. The greater the concentration of TPHC in the soil, the greater the saturation of LNAPL. The concentration of LNAPL in the soil sample collected from the 6-8 foot bgs depth interval at location UST2-4 was 48,000 mg/kg. The TPHC concentration in this soil sample is more than five times as great as in the sample with the next greatest concentration. Additional investigation is warranted at UST2-4 to confirm the presence or absence of mobile LNAPL.

7.1.2 Data Related to Objective 2

Objective 2, to delineate the extent of LNAPL and impacted soil based on field observations, was evaluated based on field observations and the SRI soil sampling results. LNAPL and/or impacted soil was encountered at four soil boring locations: UST2-4, UST2-4A, UST2-5, and TWP-1. In addition, LNAPL was observed in the area to the north of location UST2-6, to the east of location TWP-2, to the south of location UST2-4, and to the west of location UST2-5 during initial soil removal efforts at AOC-UST2 in April 2005. LNAPL was not encountered at the following locations: UST2-4B, UST2-5A, UST2-6, TWP-1A, and TWP-2 through TWP-6. Therefore, as shown on Figure 3, the extent of LNAPL and/or impacted soil (as based on field observations) at AOC-UST2 is bounded by location UST2-6 to the south, location TWP-2 to the west, location UST2-4B to the north, and TWP-1A and UST2-5A to the east. This area is approximately 235 feet north-south by 170 feet east-west, with a footprint of 30,750 square feet.

The petroleum impacts observed at locations UST2-4, UST2-4A, UST2-5, and TWP-1 were encountered at depths of between four and eight feet bgs. The petroleum impacts were delineated vertically at depths of between six and nine feet bgs; for locations UST2-5 and TWP-1, these depths are relative to the original land surface prior to the construction of the soil stockpile. Since the water table was measured to be at approximately five to seven feet bgs, the LNAPL is not anticipated to have impacted soil quality much deeper than seven feet bgs, which is consistent with the maximum observed depth for LNAPL and/or soil impacts (i.e., eight feet bgs). In addition, organic marsh deposits and clay-like by-product fill, effective barriers to the vertical migration of the LNAPL, were encountered at various locations during the SRI. Organic marsh deposits were observed at approximately 11.5 feet bgs at location TWP-5 and nine feet bgs at location TWP-6, while clay-like by-product fill was observed at approximately 10.5 and 9.5 feet bgs at locations TWP-2 and TWP-3, respectively.

The analytical results for the soil samples collected during the SRI indicate that soil at AOC-UST2 is impacted by relatively low concentrations of PAH compounds except for the soil sample collected from the 4-4.5 foot bgs depth interval at location TWP-1A. The low concentrations of PAH compounds are similar to those detected in soil samples throughout the Facility, and are attributable to the former placement of historic fill by P&G. The concentration of PAH compounds at location TWP-1A is most likely due to the inclusion of cinders in the soil sample; however, additional soil sampling is required at and in the vicinity of TWP-1A.

Soil at sampling location UST2-4 contains a relatively high concentration (48,000 mg/kg) of TPHC in the 6-8 foot bgs depth interval. While an RSCO has not been established for TPHC, the greater the concentration of TPHC, the greater the saturation of petroleum in the subsurface. Although field observations suggest that the LNAPL at this location is immobile, the relatively high concentration of TPHC in soil at UST2-4 suggests that petroleum may be mobile at this location. Therefore, HMM proposes that additional investigation of soil and groundwater quality be conducted at and in the vicinity of location UST2-4.

7.1.3 Data Related to Objective 3

Objective 3, to identify if the soil is acting as a source area for groundwater impacts, was evaluated using the groundwater analytical data generated during the SRI. One groundwater sample was collected from each of six temporary wells, identified as TWP-1 through TWP-6. The six temporary wells were installed in two transects, each consisting of an upgradient well, a well immediately downgradient of the LNAPL area, and a downgradient well. Both transects were oriented approximately east-west, perpendicular to the eastern bank of Bridge Creek. The northern transect consisted of temporary wells (from upgradient to downgradient) TWP-1A, TWP-2, and TWP-3. The southern transect consisted of temporary wells (from upgradient to downgradient) TWP-4, TWP-5, and TWP-6. All groundwater samples were analyzed for VOC+15, SVOC+25, and TPHC.

The groundwater analytical data indicate that only two groundwater samples contained any of the targeted compounds at concentrations greater than their respective AWQSGVs. These samples were collected at temporary wells TWP-1A and TWP-2. Two SVOCs, naphthalene and phenol, were detected at concentrations greater than their respective AWQSGVs in temporary well TWP-1A, while phenol was the only compound detected at a concentration greater than its AWQSGV in temporary well TWP-2. Since the concentration of naphthalene decreased downgradient of well TWP-1A, it is concluded that the

LNAPL and impacted soil at AOC-UST2 did not impact groundwater with respect to naphthalene. The source of the dissolved naphthalene is unclear. However, creosoted wood observed in the soil boring later converted to temporary well TWP-1A is a potential source. Regardless of the source, the groundwater impact does not extend to the nearest downgradient receptor, Bridge Creek.

The concentrations of phenol were elevated only in groundwater samples collected at temporary wells TWP-1A and TWP-2. The concentration of phenol decreased downgradient of temporary well TWP-1A; thus, the LNAPL and impacted soil at AOC-UST2 are not source areas for phenol. Rather, the elevated concentrations of phenol are likely attributable to the decay of naturally-occurring organic material (from the underlying marsh deposits, e.g.). Regardless of the source, the groundwater impact does not extend to the nearest downgradient receptor, Bridge Creek.

Please note, no remedial actions are warranted with respect to groundwater at AOC-UST2. Groundwater recharge rates are anticipated to decrease following the construction of impervious surfaces as part of the redevelopment of Site 1. Also, as established below, groundwater impacts do not extend to Bridge Creek, the nearest downgradient receptor, having been delineated at temporary well TWP-3.

7.1.4 Data Related to Objective 4

Objective 4, to delineate groundwater impacts (if any), was evaluated using the groundwater analytical data generated primarily during the SRI as well as data for a groundwater sample collected from well PG-EW-3 during the SI. As noted above, one groundwater sample was collected from each of six temporary wells, identified as TWP-1 through TWP-6. All groundwater samples were analyzed for VOC+15, SVOC+25, and TPHC.

Groundwater analytical data indicate that only two samples, the samples collected at temporary wells TWP-1A and TWP-2, contained any of the targeted compounds at concentrations greater than their respective AWQSGVs. The two SVOCs, naphthalene and phenol, were detected at concentrations greater than their respective AWQSGVs in temporary well TWP-1A, while phenol was the only compound detected at a concentration greater than its AWQSGV in temporary well TWP-2. Therefore, the groundwater impacted by naphthalene is delineated to the south (i.e., sidegradient) at temporary well TWP-4 and to the west (i.e., downgradient) at temporary well TWP-2. This groundwater impact has not been delineated to the east (i.e., upgradient) or north (i.e., sidegradient); however, well PG-EW-3, located approximately 100 feet to the north of TWP-1, was sampled during the SI. The analytical results did not

reveal that groundwater has been impacted by naphthalene; therefore, well PG-EW-3 can also be used as a delineation point with respect to groundwater impacted by naphthalene. The groundwater impacted by phenol has been delineated to the south (i.e., sidegradient) at temporary wells TWP-4 and TWP-5 and to the east (i.e., downgradient) by temporary well TWP-3. The SI groundwater sampling results for well PG-EW-3 also can be used as a delineation point with respect to groundwater impacted by phenol.

Please note, no remedial actions are warranted with respect to groundwater at AOC-UST2. Groundwater recharge rates are anticipated to decrease following the construction of impervious surfaces as part of the redevelopment of Site 1. Also, groundwater impacts have been delineated at temporary well TWP-3, located downgradient of the groundwater impacts and upgradient of Bridge Creek.

7.1.5 Data Related to Objective 5

Objective 5, to determine whether LNAPL could discharge into Bridge Creek, was evaluated using field observations and measurements made during the SRI. As noted above, six temporary wells, identified as TWP-1A and TWP-2 through TWP-6, were installed at AOC-UST2 during the SRI. As part of the groundwater investigation, the presence or absence of LNAPL in each temporary well was confirmed using an oil-water indicator. LNAPL was not present in any of the six temporary wells as of May 24, 2005. Therefore, the LNAPL does not appear to be mobile in the vicinity of any of the six temporary wells.

In addition, the boring logs for UST2-4, UST2-4A, UST2-5, and TWP-1, the only soil boring locations where petroleum impacts were observed, describe faint odors, relatively low concentrations of volatile organic vapors (maximum 18 ppm) in soil, and trace quantities of petroleum in soil. However, the relatively high concentration of TPHC at location UST2-4 suggests that LNAPL may potentially be mobile at this location. Therefore, as noted above, additional investigation is proposed in the vicinity of UST2-4.

Because the LNAPL is immobile throughout most, if not all, of AOC-UST2, and because, in the years since its release, the LNAPL has not migrated to wells TWP-3 and TWP-6 (i.e., to within 50 feet of Bridge Creek) since the release occurred, it appears unlikely that the LNAPL can migrate into Bridge Creek.

7.1.6 Data Related to Objective 6

Objective 6, to determine whether impacted groundwater could discharge into Bridge Creek, was evaluated using groundwater analytical data generated during the SRI. Six temporary wells were installed at AOC-UST2 during the SRI; these temporary wells were identified as TWP-1A and TWP-2 through TWP-6. The six temporary wells were installed in two transects, each consisting of an upgradient temporary well, an LNAPL area temporary well, and a downgradient temporary well. Both transects were approximately perpendicular to Bridge Creek. The northern transect consisted of temporary wells (from upgradient to downgradient) TWP-1A, TWP-2, and TWP-3. The southern transect consisted of (from upgradient to downgradient) temporary wells TWP-4, TWP-5, and TWP-6. As noted above, one groundwater sample was collected from each of the six temporary wells. All samples were analyzed for VOC+15, SVOC+25, and TPHC.

The analytical results for temporary wells in the southern transect, identified as TWP-4, TWP-5, and TWP-6, did not indicate any groundwater impacts. However, the analytical results for wells in the northern transect, identified as TWP-1, TWP-2, and TWP-3, indicated that groundwater was impacted by the SVOCs naphthalene and phenol. Based on the analytical results for the groundwater sample collected at temporary wells TWP-3, TWP-4, and TWP-5 and those for the groundwater sample collected at well PG-EW-3 during the SI, the groundwater impacts have been completely delineated. Therefore, groundwater impacts in the vicinity of AOC-UST2 do not discharge into or impact surface water quality in Bridge Creek.

7.2 Discussion of Data – Open Areas/Issues

The following is a discussion of data evaluated during the SRI with respect to the three open AOCs/issues at Site 1. These AOCs/issues include AOC-UST2 (the subject of Section 7.1, above), the effect of impacted groundwater on surface water and sediment quality within Bridge Creek, and the former hydrogen holders. Please note, the use of the term "impacts" in the sections below requires additional explanation. The HHMT-Port Ivory Facility is situated in an industrial section of Staten Island that was reclaimed from marshland by the use of fill and is bordered by railroads, ports, and roadways. Based on the industrial land use, it is reasonable to anticipate impacted surface water, sediment, soil, and groundwater on a regional scale. In fact, the NYSDEC detected sediment impacted by pesticides and metals at several locations along Bridge Creek that are upgradient of the Facility (see Appendix B). The following is an excerpt from the U.S. Fish and Wildlife Service document entitled Significant Habitats and Habitat Complexes of the New York Bight Watershed and dated November 1997:

"This unique and regionally significant wetlands and heronry [Arthur Kill] complex is within one of the most intensively industrialized and urbanized corridors in the northeastern United States, and is subject to both physical and qualitative losses of habitat due to chemical (including heavy metals, [the pesticide] DDT, and petrochemicals) and nutrient pollution stresses, stormwater and sewerage discharges, stream channelization, nonpoint source runoff, illegal filling and dumping activities, fragmentation and loss of connecting corridors, loss of upland buffers, ... This area was the site of several recent oil spills and discharges, resulting in direct wildlife losses and decreased productivity. In 1990, 684 spills dumped a volume of ... (1.5 million gallons) of oil into the waterways and wetlands of New York Harbor; 70% of this volume contaminated the Arthur Kill and Kill van Kull."

Due to the presence of these regional impacts, neither the soil nor the groundwater at the HHMT-Port Ivory Facility are currently or will be utilized as natural resources. In addition, the sediment and surface water quality in adjacent surface water bodies (i.e., Bridge Creek and the Arthur Kill) is also not high quality. Therefore, while media are described as "impacted" if the concentration of a regulated compound or metal is present in the medium exceeds NYSDEC standards/guidance values, it is important to realize that the impacts attributable to P&G's operations, if any, only negligibly worsen already degraded environmental quality and that "impacts" believed to be attributable to former P&G operations at the Facility may actually be attributable to the regional contamination.

must certainly some impacts related to P+G.

Section 7.2.1 is a discussion of data that HMM evaluated to determine whether groundwater impacts have affected surface water and/or sediment quality in Bridge Creek. Section 7.2.2 is a discussion of data associated with the former hydrogen holders. These discussions are the basis for the conclusions and recommendations presented in Section 8.0.

7.2.1 Data Related to the Effect of Groundwater Impacts on Bridge Creek

HMM used groundwater, surface water, and sediment analytical data from the SI as well as groundwater and surface water data from the Surcharge Pilot Test, a component of the RI, to determine whether groundwater has adversely impacted surface water and sediment quality in Bridge Creek. One groundwater sample was collected from each of eight wells located throughout Site 1 during the SI. During the RI, one groundwater sample was collected from each of six wells located in the northern half of Site 1. All groundwater samples collected during the SI and RI were analyzed for PP VOCs, PP SVOCs, PP pesticides and PCBs, TAL metals, TPHC, O&G, total cyanide, and total phenolics.

Surface water and sediment sampling was conducted concurrently with the groundwater sampling effort during the SI, and surface water sampling, but not sediment sampling, was conducted concurrently with the groundwater sampling during the RI. The surface water and sediment sampling locations were selected based upon their proximity to wells where groundwater samples were also collected and to a "white material" previously observed along the banks of Bridge Creek. All surface water and sediment samples were analyzed for TAL metals. In addition, the surface water samples collected during the SI were analyzed for pH using portable pH meters.

As indicated on the figure and tables in Appendix B, sediment quality is impacted in Bridge Creek upgradient of the Facility. NYSDEC collected 18 sediment/soil samples and combined these soil samples into four composite samples. All samples were analyzed for VOCs, SVOCs, pesticides and PCBs, and the metals arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. For all metals listed above except barium and selenium, the analytical results indicate that the concentration of these metals in sediment exceed the NYSDEC SEL and/or LEL. NYSDEC has not established LELs or SELs for barium or selenium. In addition, storm water runoff eneters Bridge Creek at where it flows under Western Avenue. Due to these potential impacts, for the purposes of the discussion below, HMM attributes surface water and/or sediment impacts in Bridge Creek to groundwater impacts at the Facility only if there is a clear connection (i.e., a groundwater plume and surface water and/or sediment in an adjacent stretch of Bridge Creek are both impacted by the same substance).

Based on the SI analytical data, groundwater was impacted by the following organic compounds: the VOCs ethylbenzene and xylene (at well PG-CS-7 only); the PAH compounds 1,2-benzphenanthracene and benzo(a)pyrene (at well PG-EW-3); and, the SVOC (and non-PAH compound) phenol (at wells PG-PA-MW-6, PG-CS-7, PG-EW-6, and PG-PA-MW-1). Based on the RI analytical data, groundwater was impacted by the following organic compounds: xylene (at well PG-CS-7 only) and phenol (at well PG-RS-1 only). Alkaline pH levels (above 10) have also been detected in groundwater.

The fact that the ethylbenzene and xylene concentrations decreased at well PG-CS-7 by over 60% between November 2000 and November 2002 indicates that these VOCs are attenuating via natural processes. Further, it is anticipated that the relatively low concentration of xylene, if the compound remains in groundwater near well PG-CS-7, would volatilize quickly upon discharging into Bridge Creek.

8043
8029

A groundwater sample was not collected from well PG-EW-3 during the RI. Therefore, concentration trends cannot be established for the PAHs 1,2-benzphenanthracene and benzo(a)pyrene that were detected at concentrations greater than their respective AWQSGVs during the SI. However, the well is located more than 200 feet upgradient of Bridge Creek, and it is unlikely that the low concentrations of these PAH compounds would reach Bridge Creek. It is more likely that these compounds would attenuate naturally prior to reaching Bridge Creek.

The elevated concentrations of phenol that were detected at wells PG-PA-MW-6, PG-CS-7, PG-EW-6, PG-PA-MW-1, and PG-RS-1 during the SI and the RI are likely attributable to the decay of naturally-occurring organic compounds. The fact that similar concentrations of phenol have been detected throughout the northern two-thirds of Site 1 supports this assertion. Therefore, whether or not surface water in Bridge Creek is impacted by phenol, the source of the phenol does not appear to be related to a former release or an onsite industrial source.

Although pH values of almost 10 have been detected in groundwater at Site 1, the pH of surface water in Bridge Creek has ranged from 7.5 to 8.2. Thus, the elevated pH of groundwater at Site 1 does not seem to have affected the pH of the surface water in Bridge Creek. Please note, this result is expected because the hydronium ions in groundwater discharging to surface water will be diluted in Bridge Creek and because compounds (e.g., bicarbonate) that are present at equilibrium conditions in the groundwater at Site 1 will volatilize from the surface water (e.g., as carbon dioxide).

Based on the groundwater analytical data, therefore, groundwater at Site 1 has not been impacted extensively by organic compounds and that those few minor groundwater impacts that exist are attenuating naturally and/or are unlikely to impact the surface water or sediment quality in Bridge Creek. As noted above, the presence of phenol is likely related to the decay of naturally-occurring organic compounds.

Since groundwater, surface water, and sediment samples were collected concurrently and were analyzed for TAL metals, the metals results for samples in these three media can be evaluated to determine if the quality of surface water or sediment in Bridge Creek have been impacted by groundwater. Analytical data for samples collected during the SI indicate that the only metals that were detected in both groundwater and surface water at concentrations greater than their respective standards and/or guidance values were arsenic and cadmium. Arsenic was detected at a concentration greater than its AWQSGV in

groundwater samples collected from four wells (at wells PG-PA-MW-5, PG-TMW-2, PG-EW-3, and PG-PA-MW-6) in the vicinity of the Wood Yard. The elevated concentrations of arsenic appear to be related to the wood chips previously stockpiled in the Wood Yard. As indicated in Section 2.1.5, the wood chips have been removed. Analytical results for confirmatory, post-excavation soil samples indicate that two of the samples contained arsenic at non-detect levels, one sample contained arsenic at a concentration lower than its RSCO, and three samples contained arsenic at concentrations (7.6 to 25 mg/kg) slightly greater than the RSCO for arsenic (7.5 mg/kg). The effect of the removal of the wood chips on groundwater quality will be determined during a groundwater monitoring program initiated subsequent to the redevelopment of Site 1. In addition, arsenic was detected at a concentration greater than its RSWCS at surface water sampling location PG-SW-3, located approximately 400 feet downstream of the Wood Yard. The surface water sample closest to the Wood Yard (i.e., the upstream surface water sample PG-SW-1) did not contain arsenic at a concentration greater than its AWQSGV. Therefore, the groundwater at the Wood Yard that is impacted by arsenic has not affected the quality of surface water in Bridge Creek.

Cadmium was detected at a concentration greater than its AWQSGV in only the SI groundwater sample collected from well PG-RS-2. This metal was detected at a concentration greater than its RSWCS in only one surface water sample, PG-SW-3, the downstream surface water sample. Based upon the groundwater contour map, the groundwater impacted by cadmium should discharge to a location approximately 400 feet upstream of PG-SW-3. However, neither of the surface water samples collected upstream of sample PG-SW-3 contained cadmium at a concentration greater than the RSWCS for cadmium. Therefore, the groundwater at well PG-RS-2 that is impacted by cadmium did not affect the quality of surface water in Bridge Creek.

Analytical data for samples collected during the RI indicate that the only metals detected at concentrations greater than their respective AWQSGVs in groundwater and their respective RSWCOs/Recommended Surface Water Guidance Values in surface water are iron, magnesium, and sodium. Because Bridge Creek is tidally influenced, the elevated concentrations of iron, magnesium, and sodium in the surface water samples collected from Bridge Creek are attributable to the concentration of those dissolved cations in the Arthur Kill. During recent sampling efforts unrelated to the Site 1 SI, RI, and SRI efforts, the concentrations of iron, magnesium, and sodium (323, 615000, and 7,790,000 mg/L, respectively) in the Arthur Kill adjacent to the Facility have been comparable to the analytical results for the SI and RI surface water samples.

As noted above, sediment samples were collected during the SI and were analyzed for metals. Based on the analytical results, arsenic and cadmium were the only metals detected at concentrations greater than their respective AWQSGVs in groundwater and their respective NJDEP LELs/SELs in sediment. Arsenic was detected at a concentration greater than its AWQSGV in groundwater samples collected from four wells (at wells PG-PA-MW-5, PG-TMW-2, PG-EW-3, and PG-PA-MW-6) in the vicinity of the Wood Yard. Arsenic was detected at a concentration greater than its NYSDEC LEL (but less than its SEL) at all five sediment sampling locations (PG-SED-1 through PG-SED-5). Sediment sampling location PG-SED-1, although the furthest upstream sediment sampling location in Bridge Creek, is more than 300 feet downstream of the Wood Yard. Based on these results, the groundwater impacted by arsenic could have impacted sediment quality in Bridge Creek. However, the concentration of arsenic in sediment samples remained relatively constant downstream of PG-SED-1. If sediment quality were impacted by groundwater in the Wood Yard, the concentration of arsenic in sediment would decrease downstream of the Wood Yard. Since this is not the case, there is no indication that groundwater at Site 1 that is impacted by arsenic has affected sediment quality in Bridge Creek.

Cadmium was detected at a concentration greater than its AWQSGV in only the SI groundwater sample collected from well PG-RS-2. This metal was detected at a concentration greater than its NJDEP LEL in only sediment sample PG-SED-2. Based upon the groundwater contour map, the groundwater impacted by cadmium should discharge to a location more than 300 feet upstream of PG-SED-2. However, the analytical results for the sediment sample collected upstream of sample PG-SED-2 did not contain cadmium at a concentration greater than its NJDEP LEL. Therefore, the groundwater at well PG-RS-2 that is impacted by cadmium did not affect the quality of sediment in Bridge Creek.

Based on the above discussion, the minimal groundwater impacts at Site 1 do not appear to have impacted the quality of surface water or sediment in Bridge Creek. The Port Authority previously indicated that additional groundwater, surface water, and/or sediment samples would be collected at Site 1 and Bridge Creek; however, because of the changes that will potentially occur to contaminant migration pathways following the redevelopment of Site 1, it was determined that the additional groundwater, surface water, and sediment sampling efforts would be included in a post-redevelopment monitoring plan. Details of the monitoring plan are beyond the scope of this report, and will be included in a future Remedial Action Work Plan.

7.2.2 Data Related to Former Hydrogen Holders

As part of the SRI, HMM reviewed analytical data for groundwater and soil samples collected in the vicinity of the former hydrogen holders. The soil sampling locations located within 100 feet of at least one of the two former hydrogen holders (as referenced on Sanborn maps) are PG-Wood-03, PG-Wood-3, PG-Wood-05, PG-PA-MW-6, and PG-PA-MW-6D. As noted above, the concern regarding the hydrogen holders is not that the holders themselves could have discharged regulated substances to soil and/or groundwater, but rather that appurtenant equipment (air compressors, e.g.) could have discharged these substances. Seventeen soil samples were collected from these five locations. All soil samples were analyzed for PP VOCs, PP SVOCs, PP pesticides and PCBs, TAL metals, total cyanide, total phenolics, O&G, TPHC, and PCBs.

The soil sampling analytical results indicate that soil impacts in the vicnity of the former hydrogen holders are limited to the PAH compound benzo(b)fluoranthene, the SVOC (and non-PAH) phenol, and the metals arsenic, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel, selenium, sodium, and zinc. The elevated concentration of benzo(b)fluoranthene is the only compound or metal that is listed above and that could be related to the presence of the former hydrogen holders and appurtenant equipment (if any). However, the concentrations of benzo(b)fluoranthene were similar to those detected in soil throughout the Facility. As such, the elevated concentrations of benzo(b)fluoranthene appear to be related to the former placement of historic fill at the Facility by P&G. No remedial action is warranted with respect to the soil in the vicinity of the former hydrogen holders.

Groundwater downgradient (i.e., at well PG-PA-MW-6) of the locations of the former Hydrogen Holders is impacted only by phenol and arsenic. The elevated concentrations of arsenic appear to be related to the wood chips previously stockpiled in the Wood Yard. As indicated in Section 2.1.5, the wood chips have been removed. Analytical results for confirmatory, post-excavation soil samples indicate that two of the samples contained arsenic at non-detect levels; one sample contained arsenic at a concentration lower than its RSCO, and three samples contained arsenic at concentrations (7.6 to 25 mg/kg) slightly greater than the RSCO for arsenic (7.5 mg/kg). The effect of the removal of the wood chips on groundwater quality will be determined during a groundwater monitoring program initiated subsequent to the redevelopment of Site 1. The presence of phenol in the groundwater sample collected at PG-PA-MW-6 is likely related to the decay of naturally-occurring organic material that is present in the marsh deposits observed in the soil column at several locations at the Facility, including at Site 1. As such, it does not appear that the presence of the hydrogen holders has impacted groundwater quality.

The elevated concentrations of arsenic appear to be related to the wood chips previously stockpiled in the Wood Yard. As indicated in Section 2.1.5, the wood chips have been removed, and the effect of the removal of the wood chips on groundwater quality will be determined through the proposed groundwater monitoring program. The presence of phenol in the groundwater sample collected at PG-PA-MW-6 is likely related to the decay of naturally-occurring organic material that is present in the marsh deposits observed in the soil column at several locations at the Facility, including at Site 1. As such, it does not appear that the presence of the hydrogen holders has impacted soil or groundwater quality.

near dup of previous paragraph

8.0 CONCLUSIONS AND RECOMMENDATIONS

The SRI was conducted to close all open AOCs and issues at Site 1 and to determine whether remediation of any medium was warranted. However, based on the findings, limited investigation is required at two locations at Site 1: the vicinity of soil boring location UST2-4 and the vicinity of temporary well point TWP-1A. At this time and pending the outcome of those investigations, no remedial action is warranted at Site 1 beyond the redevelopment of Site 1, including the installation of impervious surfaces, and the recording of a Deed Notice at Site 1. In addition, a groundwater monitoring program will be initiated subsequent to the completion of Site 1 redevelopment.

The HHMT-Port Ivory Facility is situated within an industrial section of Staten Island that was reclaimed from marshland by the use of fill and is bordered by railroads, ports, and roadways. Based on the industrial land use, the environmental quality of surface water, sediment, groundwater, and soil have been impacted on a regional scale. Therefore, neither the soil nor the groundwater at the HHMT-Port Ivory Facility are currently or will be used as natural resources and the surface water and sediment in Bridge Creek and the Arthur Kill are also not high quality. Therefore, while media are referred to as "impacted" throughout this report if the concentration of a regulated substance in the medium exceeds NYSDEC standards or guidance values, it is important to realize that the impacts, if any, attributable to P&G's operations only negligibly worsen already degraded environmental quality and that the "impacts" believed to be attributable to former P&G operations may be attributable instead to regional contamination.

P&G has been here 100 yrs - how much previous history contributed to regional contamination?

Based on the results and discussion provided in Sections 6 and 7 above, the following conclusions have been drawn for Site 1.

- The soil apparently impacted by PAHs in the vicinity of SRI temporary well location TWP-1A warrants additional investigation. The additional investigation will include the collection of soil samples to confirm that the soil is impacted by PAHs (and that the elevated concentration of PAHs was not due to inclusion of cinders in the soil sample) and soil samples to delineate the impacted soil (if necessary). Depending on the extent of the impacted soil, a groundwater investigation may also be warranted.

- The soil containing elevated concentrations of TPHC (i.e., soil in the vicinity of soil boring location UST2-4) also warrants additional investigation. The goal of the additional investigation will be to determine whether LNAPL in the vicinity of UST2-4 is mobile.

- LNAPL is present at AOC-UST2 within a footprint with an area of 30,750 square feet. However, the presence of the LNAPL, believed to be petroleum-based, has not significantly impacted soil or groundwater with respect to regulated organic compounds. The LNAPL is present within the soil at residual quantities and is immobile throughout most or all of AOC-UST2. Except as described above, neither additional investigation nor any remedial action is required in AOC-UST2.

- With the exception of groundwater impacted by xylene at well PG-CS-7, groundwater impacts at Site 1 have not impacted the quality of surface water and/or sediment in Bridge Creek. The effect of the impacted groundwater at well PG-CS-7 on the quality of surface water and/or sediment in Bridge Creek is not currently known. Moreover, the xylene impacts in groundwater at well PG-CS-7 appear to be attenuating naturally. A groundwater monitoring program that includes the collection of surface water samples in Bridge Creek will be initiated subsequent to the redevelopment of Site 1.

- Neither soil nor groundwater has been impacted by the former hydrogen holders and appurtenant equipment.

- No human receptors have been identified for any contaminated medium at Site 1 following redevelopment. Impacted soil will be capped with impermeable materials, reducing the mobility of impacted soil and the flux of substances to groundwater. Neither groundwater nor surface water in Bridge Creek is currently utilized as a source of potable water; due to the salinity and

generally poor quality of these potential resources, neither is likely to be used as a source of potable water in the near future. Inhabited buildings are not currently located and are not planned at Site 1.

HMM recommends that additional investigation be conducted in the vicinity of soil boring UST2-4 and TWP-1A to confirm that remedial actions are not warranted with respect to LNAPL and impacted soil, respectively. The details of this investigation will be included in a Targeted Supplemental Remedial Investigation Workplan that will be submitted to NYSDEC and NYSDOH for approval. HMM further recommends that, with the exception of the two referenced areas at AOC-UST2, the only remedial actions warranted at Site 1 are the capping of impacted soils and the establishment of a Deed Notice. The effectiveness of these remedial actions will be monitored in a groundwater monitoring program that includes the collection of surface water samples and that will be initiated subsequent to the redevelopment of Site 1. Details related to the proposed remedial actions and groundwater monitoring program will be included in a Remedial Action Work Plan for Site 1, which will be submitted to the NYSDEC and NYSDOH for approval.

APPENDIX A

SOIL BORING LOGS
(SUBMITTED UNDER SEPARATE COVER)

APPENDIX B

SUMMARY OF NYSDEC SAMPLING LOCATIONS AND ANALYTICAL DATA, BRIDGE CREEK

Clark, Geoffrey K

From: Kohlsaat, Jennifer N
Sent: Tuesday, January 17, 2006 9:26 AM
To: Clark, Geoffrey K
Subject: FW:


SedData2.PDF (86 KB)


Bridge ek_sample_sites2.p(


SedData1.PDF (146 KB)


4L276PCB.PDF (110 KB)

-----Original Message-----
From: Aldrich, Ed [mailto:ealdrich@panynj.gov]
Sent: Wednesday, September 22, 2004 9:01 AM
To: Kohlsaat, Jennifer
Subject: FW:

Jen,

Here is the data from Steve Zahn for his wetland rehab project.

Ed

-----Original Message-----
From: Steve Zahn [mailto:smzahn@gw.dec.state.ny.us]
Sent: Wednesday, September 22, 2004 8:44 AM
To: Aldrich, Ed
Subject: Re:

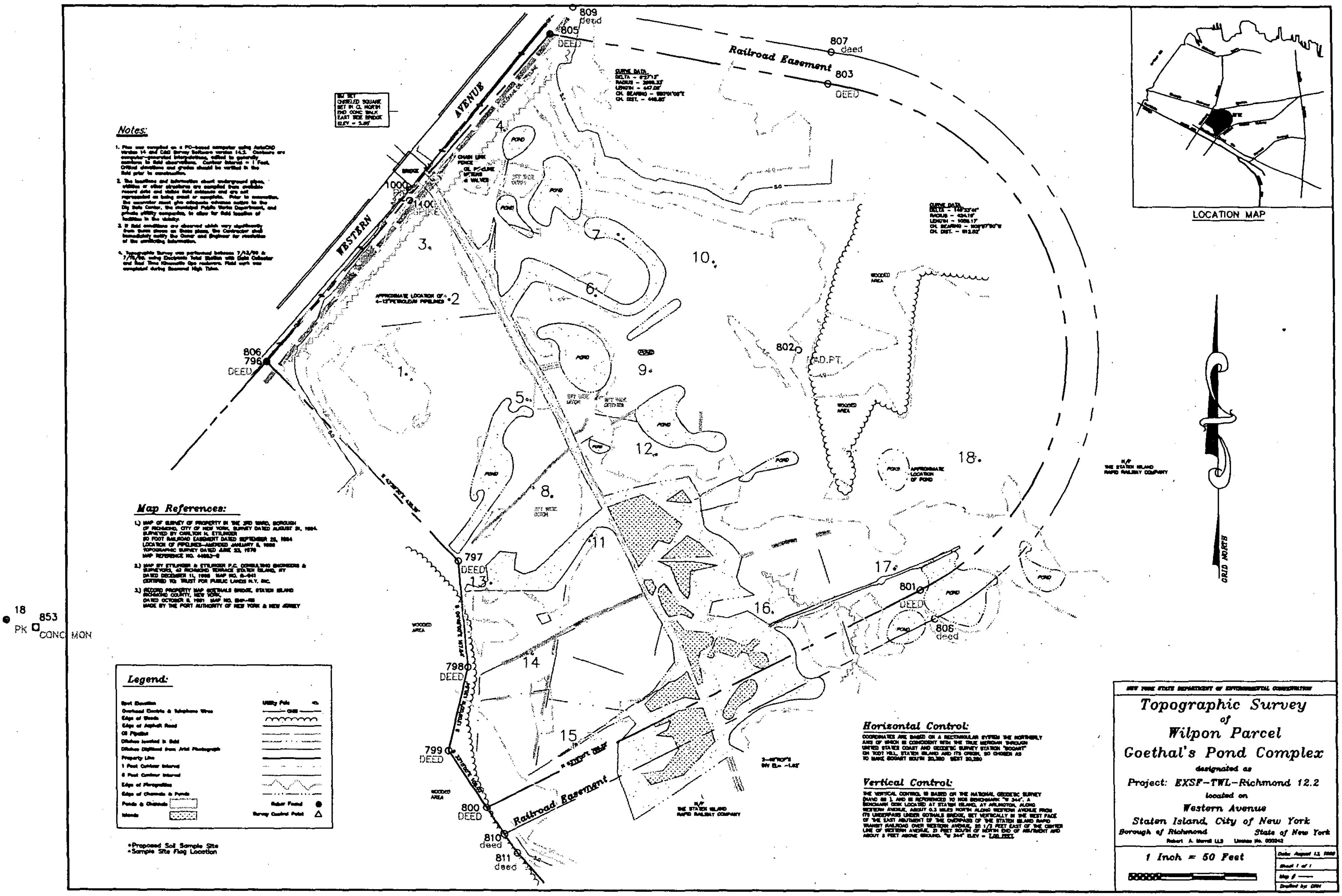
Ed,
Attached are the bulk numbers from our initial survey and a copy of the sample locations. The 4 samples are composites of 4-5 of the locations as follows:
BCW-01: 1,2, 3, 5
BCW-02: 8, 11, 13, 14, 15
BCW-03: 12, 16, 17, 18
BCW-04: 4, 6, 7, 9, 10
The pesticdes, PCBs, VOCs and SVOCs were not a concern here, only metals were a problem. Sample location 1 turned out to be our "hot-spot".
Steve

>>> "Aldrich, Ed" <ealdrich@panynj.gov> 09/21/2004 11:41:38 AM >>>
Steve,

Can I get a copy of the analytical data from your wetland restoration project? Your data may help explain the presence of some metals we found in our sediment sampling. If it's not a problem, please e-mail me the data or fax it to me at 973-565-7649.

Thanks,

Ed Aldrich


Topographic Survey
of
Wilpon Parcel
Goethal's Pond Complex
designated as
Project: EXSF-TWL-Richmond 12.2
located on
Western Avenue
Staten Island, City of New York
Borough of Richmond
State of New York
1 Inch = 50 Feet
Notes:
Map References:
Legend:
Horizontal Control:
Vertical Control:
LOCATION MAP
GRID NORTH
WESTERN AVENUE
Railroad Easement
Railroad Easement
*Proposed Soil Sample Site
*Sample Site Flag Location
809 deed
805 DEED
807 deed
803 DEED
806 796 DEED
802
797 DEED
798 DEED
799 DEED
800 DEED
810 deed
811 deed
801 DEED
806 deed
18 PK
853 CONC MON
1000
1100
1. 2 3. 4. 5. 6. 7. 8. 9. 10. 11 12. 13. 14 15 16. 17. 18.

Lionville Laboratory, Inc.
Volatiles by GC/MS, TCLP Leachate
Report Date: 04/21/04 07:19

RFW Batch Number: **0404L276** Client: **NYSDEC** Work Order: 01667601001 Page: 1a

	Cust ID:	BCW-01	BCW-02	BCW-03	BCW-04	BCW-04	BCW-04
Sample Information	RFW#:	001	002	003	004	004 MS	004 MSD
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.09	1.16	1.00	1.06	1.11	0.926
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Toluene-d8	99 %	101 %	103 %	112 %	100 %	102 %
	Bromofluorobenzene	108 %	110 %	118 %	123 * %	125 * %	122 %
	1,2-Dichloroethane-d4	95 %	87 %	104 %	104 %	92 %	89 %
Vinyl Chloride		52 U	25 J	85 U	44 U	140 %	143 %
1,1-Dichloroethene		26 U	40 U	42 U	22 U	93 %	96 %
Chloroform		26 U	10 J	42 U	22 U	106 %	111 %
1,2-Dichloroethane		26 U	40 U	42 U	22 U	100 %	99 %
2-Butanone		52 U	210	95	170	44 * %	7 * %
Carbon Tetrachloride		26 U	13 J	42 U	22 U	88 %	83 %
Trichloroethene		26 U	14 J	42 U	22 U	93 %	90 %
Benzene		26 U	12 J	42 U	22 U	108 %	108 %
Tetrachloroethene		26 U	17 J	42 U	22 U	93 %	95 %
Chlorobenzene		26 U	12 J	42 U	22 U	101 %	102 %

*= Outside of EPA CLP QC limits.

Lionville Laboratory, Inc.

Volatiles by GC/MS, TCLP Leachate

Report Date: 04/21/04 07:19

RFW Batch Number: **0404L276** Client: **NYSDEC** Work Order: 01667601001 Page: 2a

	Cust ID:	VBLKCS	VBLKCS BS	VBLKCT	VBLKCT BS
Sample Information	RFW#:	04LVG112-MB1	04LVG112-MB1	04LVG114-MB1	04LVG114-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Toluene-d8	90 %	89 %	89 %	92 %
	Bromofluorobenzene	93 %	94 %	94 %	100 %
	1,2-Dichloroethane-d4	90 %	90 %	90 %	96 %
Vinyl Chloride		10 U	111 %	10 U	114 %
1,1-Dichloroethene		5 U	84 %	5 U	92 %
Chloroform		5 U	93 %	5 U	99 %
1,2-Dichloroethane		5 U	94 %	5 U	105 %
2-Butanone		10 U	52 %	10 U	82 %
Carbon Tetrachloride		5 U	91 %	5 U	95 %
Trichloroethene		5 U	96 %	5 U	100 %
Benzene		5 U	100 %	5 U	110 %
Tetrachloroethene		5 U	91 %	5 U	97 %
Chlorobenzene		5 U	97 %	5 U	103 %

*= Outside of EPA CLP QC limits.

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, TCLP Leachate — Report Date: 04/28/04 10:21

RFW Batch Number: **0404L276** Client: **NYSDEC** Work Order: 01667601001

	Cust ID:	BCW-01		BCW-02		BCW-03		BCW-04		BCW-04		BCW-04	
Sample Information	RFW#:	001		002		003		004		004 MS		004 MSD	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	D.F.:	2.00		2.00		2.00		2.00		2.00		2.00	
	Units:	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Surrogate Recovery	Nitrobenzene-d5	64	%	62	%	45	%	65	%	62	%	54	%
	2-Fluorobiphenyl	62	%	61	%	47	%	61	%	63	%	54	%
	p-Terphenyl-d14	64	%	80	%	63	%	65	%	71	%	58	%
	Phenol-d5	72	%	79	%	60	%	77	%	75	%	67	%
	2-Fluorophenol	75	%	74	%	56	%	78	%	75	%	66	%
	2,4,6-Tribromophenol	73	%	80	%	66	%	76	%	80	%	69	%
Pyridine		3200	U	4600	U	5600	U	2800	U	24	%	15	%
1,4-Dichlorobenzene		3200	U	4600	U	5600	U	2800	U	53	%	45	%
2-Methylphenol		3200	U	4600	U	5600	U	2800	U	64	%	60	%
3- and/or 4-Methylphenol		3200	U	4600	U	5600	U	2800	U	74	%	69	%
Hexachloroethane		3200	U	4600	U	5600	U	2800	U	29	%	20	%
Nitrobenzene		3200	U	4600	U	5600	U	2800	U	59	%	53	%
Hexachlorobutadiene		3200	U	4600	U	5600	U	2800	U	53	%	46	%
2,4,6-Trichlorophenol		3200	U	4600	U	5600	U	2800	U	71	%	61	%
2,4,5-Trichlorophenol		7900	U	11000	U	14000	U	6900	U	76	%	64	%
2,4-Dinitrotoluene		3200	U	4600	U	5600	U	2800	U	69	%	58	%
Hexachlorobenzene		3200	U	4600	U	5600	U	2800	U	66	%	57	%
Pentachlorophenol		7900	U	11000	U	14000	U	6900	U	80	%	70	%

*= Outside of EPA CLP QC limits.

	Cust ID:	**SBLKNT**		**SBLKNT BS**	
Sample Information	RFW#:	**04LE0472-MB1**		**04LE0472-MB1**	
	Matrix:	SOIL		SOIL	
	D.F.:	1.00		1.00	
	Units:	UG/KG		UG/KG	
	Nitrobenzene-d5	78	%	74	%
Surrogate	2-Fluorobiphenyl	68	%	66	%
Recovery	p-Terphenyl-d14	89	%	85	%
	Phenol-d5	93	%	88	%
	2-Fluorophenol	89	%	84	%
	2,4,6-Tribromophenol	64	%	73	%
Pyridine		330	U	50	%
1,4-Dichlorobenzene		330	U	66	%
2-Methylphenol		330	U	76	%
3- and/or 4-Methylphenol		330	U	82	%
Hexachloroethane		330	U	72	%
Nitrobenzene		330	U	71	%
Hexachlorobutadiene		330	U	63	%
2,4,6-Trichlorophenol		330	U	68	%
2,4,5-Trichlorophenol		830	U	74	%
2,4-Dinitrotoluene		330	U	77	%
Hexachlorobenzene		330	U	72	%
Pentachlorophenol		830	U	70	%

*= Outside of EPA CLP QC limits.

Lionville Laboratory, Inc.
Herbicides, Special List
Report Date: 04/21/04 21:31

RFW Batch Number: **0404L276** Client: **NYSDEC** Work Order: 01667601001 Page: 1

	Cust ID:	BCW-01	BCW-02	BCW-03	BCW-03	BCW-03	BCW-04
Sample Information	RFW#:	001	002	003	003 MS	003 MSD	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	DCAA	59 %	59 %	49 %	83 %	64 %	56 %
2,4-D		160 U	230 U	280 U	136 %	119 %	140 U
2,4,5-TP (Silvex)		79 U	110 U	140 U	128 %	96 %	69 U

	Cust ID:	PBLKGO	PBLKGO BS	PBLKGO BSD
Sample Information	RFW#:	04LE0471-MB1	04LE0471-MB1	04LE0471-MB1
	Matrix:	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG
Surrogate:	DCAA	73 %	54 %	61 %
2,4-D		33 U	80 %	100 %
2,4,5-TP (Silvex)		17 U	85 %	96 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Lionville Laboratory, Inc.

PCBs by GC

Report Date: 04/29/04 10:28

RFW Batch Number: **0404L276** Client: **NYSDEC** Work Order: 01667601001 Page: 1

	Cust ID:	**BCW-01**	**BCW-01**	**BCW-01**	**BCW-02**	**BCW-03**	**BCW-04**
Sample Information	RFW#:	**001**	**001 MS**	**001 MSD**	**002**	**003**	**004**
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	80 %	60 %	85 %	70 %	80 %	60 %
	Decachlorobiphenyl	70 %	60 %	90 %	70 %	75 %	55 %
Aroclor-1016		160 U	57 %	87 %	230 U	280 U	140 U
Aroclor-1221		160 U	160 U	160 U	230 U	280 U	140 U
Aroclor-1232		160 U	160 U	160 U	230 U	280 U	140 U
Aroclor-1242		160 U	160 U	160 U	230 U	280 U	140 U
Aroclor-1248		160 U	160 U	160 U	230 U	280 U	140 U
Aroclor-1254		260	I	I	230 U	280 U	140 U
Aroclor-1260		160 U	64 %	114 %	230 U	280 U	140 U

	Cust ID:	**PBLKGK**	**PBLKGK BS**
Sample Information	RFW#:	**04LE0453-MB1**	**04LE0453-MB1**
	Matrix:	SOIL	SOIL
	D.F.:	1.00	1.00
	Units:	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	100 %	90 %
	Decachlorobiphenyl	110 %	100 %
Aroclor-1016		33 U	80 %
Aroclor-1221		33 U	33 U
Aroclor-1232		33 U	33 U
Aroclor-1242		33 U	33 U
Aroclor-1248		33 U	33 U
Aroclor-1254		33 U	33 U
Aroclor-1260		33 U	87 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Lionville Laboratory, Inc.

Pesticides/PCB by GC, Special List — Report Date: 04/29/04 11:59

RFW Batch Number: **0404L276** Client: **NYSDEC** Work Order: 01667601001 Page: 1

	Cust ID:	BCW-01	BCW-01	BCW-02	BCW-02	BCW-02	BCW-02
Sample Information	RFW#:	001	001 RE	002	002 RE	002 MS	002 MS
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	5.00	1.00	5.00	1.00	5.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate: Decachlorobiphenyl		110 %	D %	70 %	D %	105 %	D %
Tetrachloro-m-xylene		70 %	D %	85 %	D %	90 %	D %
Heptachlor		7.9 U	40 U	11 U	57 U	75 %	D %
alpha-Chlordane		9.5	40 U	11 U	57 U	60 %	D %
gamma-Chlordane		11	19 J	11 U	57 U	90 %	D %
gamma-BHC (Lindane)		7.9 U	40 U	11 U	110 .I	30 * %	D %
Endrin		16 U	79 U	23 U	110 U	25 * %	D %
Methoxychlor		79 U	400 U	110 U	570 U	6 * %	D %
Toxaphene		160 U	790 U	230 U	1100 U	230 U	1100 U
Heptachlor Epoxide		7.9 U	40 U	11 U	57 U	30 * %	D %

	Cust ID:	BCW-02	BCW-02	BCW-03	BCW-03	BCW-04	BCW-04
Sample Information	RFW#:	002 MSD	002 MSD	003	003 RE	004	004 RE
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	5.00	1.00	5.00	1.00	5.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate: Decachlorobiphenyl		100 %	D %	80 %	D %	75 %	D %
Tetrachloro-m-xylene		80 %	D %	95 %	D %	50 %	D %
Heptachlor		65 %	D %	14 U	45 J	6.9 U	35 U
alpha-Chlordane		50 %	D %	14 U	71 U	6.9 U	35 U
gamma-Chlordane		80 %	D %	14 U	71 U	6.9 U	35 U
gamma-BHC (Lindane)		30 * %	D %	14 U	71 U	6.9 U	35 U
Endrin		20 * %	D %	28 U	140 U	6.9 J	69 U
Methoxychlor		2 * %	D %	140 U	710 U	69 U	350 U
Toxaphene		230 U	1100 U	280 U	1400 U	140 U	690 U
Heptachlor Epoxide		20 * %	D %	14 U	71 U	6.9 U	35 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

	Cust ID:	**PBLKGK**	**PBLKGK RE**	**PBLKGK BS**	**PBLKGK BS**
Sample Information	RFW#:	**04LE0453-MB1**	**04LE0453-MB1**	**04LE0453-MB1**	**04LE0453-MB1**
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Decachlorobiphenyl	130 * %	135 * %	120 %	125 * %
	Tetrachloro-m-xylene	105 %	120 * %	100 %	105 %
Heptachlor		1.7 U	1.7 U	70 %	110 %
alpha-Chlordane		1.7 U	1.7 U	50 %	90 %
gamma-Chlordane		1.7 U	1.7 U	50 %	100 %
gamma-BHC (Lindane)		1.7 U	1.7 U	30 * %	90 %
Endrin		3.3 U	3.3 U	10 * %	130 %
Methoxychlor		17 U	17 U	2 * %	122 %
Toxaphene		33 U	33 U	33 U	33 U
Heptachlor Epoxide		1.7 U	1.7 U	20 * %	100 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/19/04

CLIENT: NYSDEC

LVL LOT #: 0404L276

WORK ORDER: 01667-601-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	BCW-01	Silver, Total	1.4	MG/KG	0.27	1.0
		Arsenic, Total	23.3	MG/KG	1.5	1.0
		Barium, Total	4640	MG/KG	0.09	1.0
		Cadmium, Total	3.7	MG/KG	0.18	1.0
		Chromium, Total	223	MG/KG	0.22	1.0
		Mercury, Total	3.5	MG/KG	0.07	1.0
		Lead, Total	3570	MG/KG	0.89	1.0
		Selenium, Total	4.3	MG/KG	1.5	1.0
-002	BCW-02	Silver, Total	1.5	MG/KG	0.33	1.0
		Arsenic, Total	34.2	MG/KG	1.9	1.0
		Barium, Total	618	MG/KG	0.11	1.0
		Cadmium, Total	3.8	MG/KG	0.22	1.0
		Chromium, Total	266	MG/KG	0.28	1.0
		Mercury, Total	4.5	MG/KG	0.08	1.0
		Lead, Total	510	MG/KG	1.1	1.0
		Selenium, Total	5.3	MG/KG	1.9	1.0
03	BCW-03	Silver, Total	1.8	MG/KG	0.43	1.0
		Arsenic, Total	29.1	MG/KG	2.4	1.0
		Barium, Total	366	MG/KG	0.14	1.0
		Cadmium, Total	2.8	MG/KG	0.28	1.0
		Chromium, Total	99.9	MG/KG	0.36	1.0
		Mercury, Total	1.9	MG/KG	0.12	1.0
		Lead, Total	450	MG/KG	1.4	1.0
		Selenium, Total	7.3	MG/KG	2.4	1.0
-004	BCW-04	Silver, Total	1.1	MG/KG	0.21	1.0
		Arsenic, Total	29.1	MG/KG	1.2	1.0
		Barium, Total	475	MG/KG	0.07	1.0
		Cadmium, Total	2.8	MG/KG	0.14	1.0
		Chromium, Total	166	MG/KG	0.17	1.0
		Mercury, Total	3.7	MG/KG	0.05	1.0
		Lead, Total	406	MG/KG	0.69	1.0
		Selenium, Total	3.4	MG/KG	1.2	1.0

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/19/04

CLIENT: NYSDEC

LVL LOT #: 0404L276

WORK ORDER: 01667-601-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	04L0245-MB1	Silver, Total	0.06 u	MG/KG	0.06	1.0
		Arsenic, Total	0.34 u	MG/KG	0.34	1.0
		Barium, Total	0.04	MG/KG	0.02	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.05 u	MG/KG	0.05	1.0
		Lead, Total	0.20 u	MG/KG	0.20	1.0
		Selenium, Total	0.34 u	MG/KG	0.34	1.0
BLANK1	04C0085-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/19/04

CLIENT: NYSDEC

LVL LOT #: 0404L276

WORK ORDER: 01667-601-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	BCW-01	Silver, Total	24.0	1.4	23.3	97.0	1.0
		Arsenic, Total	904	23.3	934	94.3	1.0
		Barium, Total	5180	4640	934	57.6*	1.0
		Cadmium, Total	26.9	3.7	23.3	99.6	1.0
		Chromium, Total	294	223	93.4	75.8	1.0
		Lead, Total	3720	3570	233	65.7*	1.0
		Selenium, Total	858	4.3	934	91.4	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/19/04

CLIENT: NYSDEC LVL LOT #: 0404L276

WORK ORDER: 01667-601-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	BCW-01	Silver, Total	1.4	1.6	13.3	1.0
		Arsenic, Total	23.3	23.4	0.43	1.0
		Barium, Total	4640	5450	16.1	1.0
		Cadmium, Total	3.7	3.6	2.7	1.0
		Chromium, Total	223	263	16.6	1.0
		Lead, Total	3570	4950	32.6	1.0
		Selenium, Total	4.3	3.5	20.5	1.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/19/04

CLIENT: NYSDEC LVL LOT #: 0404L276

WORK ORDER: 01667-601-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	04L0245-LC1	Silver, LCS	49.9	50.0	MG/KG	99.8
		Arsenic, LCS	968	1000	MG/KG	96.8
		Barium, LCS	504	500	MG/KG	100.9
		Cadmium, LCS	24.9	25.0	MG/KG	99.6
		Chromium, LCS	50.5	50.0	MG/KG	101.0
		Lead, LCS	248	250	MG/KG	99.4
		Selenium, LCS	939	1000	MG/KG	93.9
LCS1	04C0085-LC1	Mercury, LCS	6.2	6.2	MG/KG	99.5

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/22/04

CLIENT: NYSDEC LVL LOT #: 0404L276

WORK ORDER: 01667-601-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	BCW-01	% Solids	21.0	%	0.01	1.0
		Cyanide, Reactive	0.91 u	MG/KG	0.91	1.0
		pH	6.6	SOIL PH	0.01	1.0
		Sulfide, Reactive	133	MG/KG	72.8	1.0
-002	BCW-02	% Solids	14.5	%	0.01	1.0
		Cyanide, Reactive	0.41 u	MG/KG	0.41	1.0
		pH	6.9	SOIL PH	0.01	1.0
		Sulfide, Reactive	47.2	MG/KG	33.1	1.0
-003	BCW-03	% Solids	11.8	%	0.01	1.0
		Cyanide, Reactive	0.37 u	MG/KG	0.37	1.0
		pH	7.3	SOIL PH	0.01	1.0
		Sulfide, Reactive	42.3	MG/KG	29.6	1.0
-004	BCW-04	% Solids	24.0	%	0.01	1.0
		Cyanide, Reactive	0.48 u	MG/KG	0.48	1.0
		pH	6.8	SOIL PH	0.01	1.0
		Sulfide, Reactive	51.1	MG/KG	38.5	1.0

Ignitability — Samples did not ignite.
mjp 4-22-04

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/22/04

CLIENT: NYSDEC LVL LOT #: 0404L276

WORK ORDER: 01667-601-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-004REP	BCW-04	Cyanide, Reactive	0.48u	0.51u	NC	1.0
		pH	6.9	6.9	0.0	1.0
		Sulfide, Reactive	51.1	66.9	26.7	1.0

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/22/04

CLIENT: NYSDEC LVL LOT #: 0404L276

WORK ORDER: 01667-601-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	04LRC16-MB1	Cyanide, Reactive	0.50 u	MG/KG	0.50	1.0
BLANK10	04LRS016-MB1	Sulfide, Reactive	40.0 u	MG/KG	40.0	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/22/04

CLIENT: NYSDEC

LVL LOT #: 0404L276

WORK ORDER: 01667-601-001-9999-00

SAMPLE	SITE ID	ANALYTE		SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
LCSS1	04LRC16-LCS1	Cyanide, Reactive		2.44	0.14	5.00	45.9	1.0
LCSS2	04LRC16-LCS2	Cyanide, Reactive	MSD	1.49	0.14	5.00	27.0	1.0
BLANK10	04LRS016-MB1	Sulfide, Reactive		89.2	40.0 u	361	24.7	1.0
		Sulfide, Reactive	MSD	161	40.0 u	361	44.7	1.0

Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 04/22/04

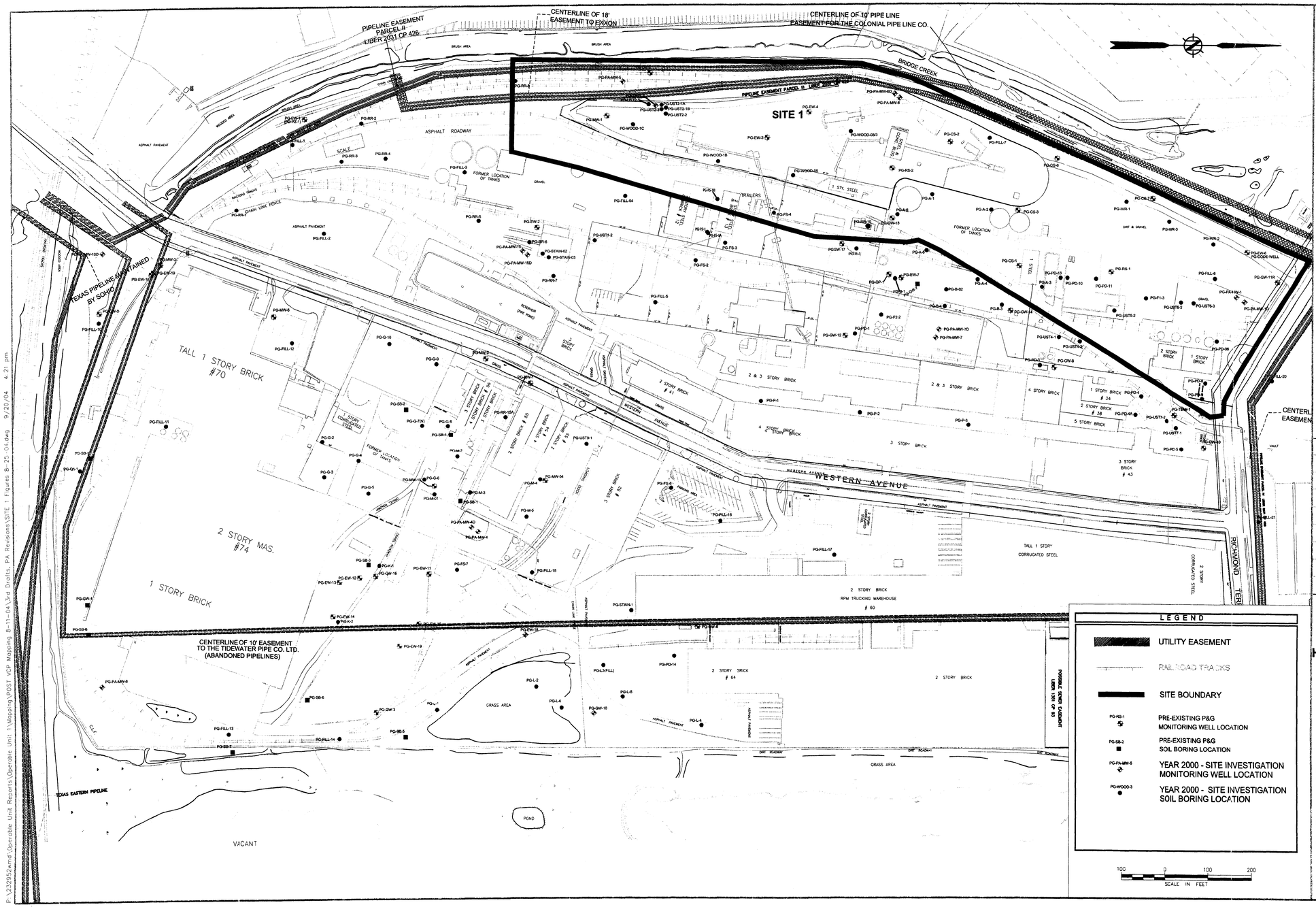
CLIENT: NYSDEC LVL LOT #: 0404L276

WORK ORDER: 01667-601-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
LCSS2	04LRC16-LCS2	Cyanide, Reactive	45.9	27.0	51.7
BLANK10	04LRS016-MB1	Sulfide, Reactive	24.7	44.7	57.6

APPENDIX C

SUMMARY OF PREVIOUS GROUNDWATER, SURFACE WATER, AND SEDIMENT SAMPLING LOCATIONS AND ANALYTICAL DATA, SITE 1



LEGEND

- UTILITY EASEMENT
- RAILROAD TRACKS
- SITE BOUNDARY
- PG-RS-1 — PRE-EXISTING P&G MONITORING WELL LOCATION
- PG-SB-2 — PRE-EXISTING P&G SOIL BORING LOCATION
- PG-PA-MW-6 — YEAR 2000 - SITE INVESTIGATION MONITORING WELL LOCATION
- PG-WOOD-3 — YEAR 2000 - SITE INVESTIGATION SOIL BORING LOCATION

Sheet of

THE PORT AUTHORITY OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title

(BLOCK 1400, LOT 1)
HHMT-PORT IVORY FACILITY

SITE 1
SITE INVESTIGATION
SAMPLE LOCATION PLAN

Designed by Drawn by Checked by

Date

Contract Number

Drawing Number: FIGURE 7

P:\23952wmd\Operable Unit Reports\Operable Unit 1\Mapping\POST WCP Mapping 8-11-04\3rd Drafts, PA Revisions\SITE 1 Figures 8-25-04.dwg 9/20/04 4:21 pm

Table

Groundwater Analytical Results
Volatile Organic Compounds
Site 1 HHMT-Port Ivory Facility

Location Sample Date Concentration in UG/L	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	PG-CS-7 11/24/2000 UG/L	PG-EW-3 11/24/2000 UG/L	PG-EW-6 11/24/2000 UG/L	PG-PA-MW-1D 11/29/2000 UG/L	PG-PA-MW-1 11/28/2000 UG/L	PG-PA-MW-5 11/24/2000 UG/L	PG-PA-MW-6 11/27/2000 UG/L	PG-PA-MW-6D 11/30/2000 UG/L	PG-RS-1 11/24/2000 UG/L	PG-RS-2 11/24/2000 UG/L	PG-TMW-02 12/2/2000 UG/L
1,1,1-TRICHLOROETHANE	5	NG	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.88 U	0.44 U	0.44 U	0.44 U	0.44 U
1,1,2,2-TETRACHLOROETHANE	5	NG	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.84 U	0.42 U	0.42 U	0.42 U	0.42 U
1,1,2-TRICHLOROETHANE	1	NG	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-DICHLOROETHANE	5	NG	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.70 U	0.35 U	0.35 U	0.35 U	0.35 U
1,1-DICHLOROETHYLENE	5	NG	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.82 U	0.41 U	0.41 U	0.41 U	0.41 U
1,2-DICHLOROETHANE	0.6	NG	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.88 U	0.44 U	0.44 U	0.44 U	0.44 U
1,2-DICHLORORPROPANE	1	NG	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.88 U	0.44 U	0.44 U	0.44 U	0.44 U
2-CHLOROETHYL VINYL ETHER	NS	NG	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U
ACROLEIN	5	NG	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	6.0 U	3.0 U	3.0 U	3.0 U	3.0 U
ACRYLONITRILE	5	NG	6.6 U	6.6 U	6.6 U	6.6 U	6.6 U	6.6 U	13 U	6.6 U	6.6 U	6.6 U	6.6 U
BENZENE	1	NG	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.64 U	0.32 U	0.32 U	0.32 U	0.32 U
BROMODICHLOROMETHANE	NS	50	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.60 U	0.30 U	0.30 U	0.30 U	0.30 U
BROMOFORM	NS	50	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.64 U	0.32 U	0.32 U	0.32 U	0.32 U
BROMOMETHANE	5	NG	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	1.1 U	0.55 U	0.55 U	0.55 U	0.55 U
CARBON TETRACHLORIDE	5	NG	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.46 U	0.23 U	0.23 U	0.23 U	0.23 U
CHLOROBENZENE	5	NG	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U	0.25 U	0.25 U	0.25 U
CHLOROETHANE	5	NG	0.52 U	0.52 U	0.52 U	0.52 U	0.52 U	0.52 U	1.0 U	0.52 U	0.52 U	0.52 U	0.52 U
CHLOROFORM	7	NG	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.90 U	0.45 U	0.45 U	0.45 U	0.45 U
CHLOROMETHANE	5	NG	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.64 U	0.32 U	0.32 U	0.32 U	0.32 U
CIS-1,3-DICHLOROPROPENE	5	NG	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.70 U	0.35 U	0.35 U	0.35 U	0.35 U
DIBROMOCHLOROMETHANE	NS	50	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.82 U	0.41 U	0.41 U	0.41 U	0.41 U
DICHLOROMETHANE	5	NG	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	1.7 U	0.85 U	0.85 U	0.85 U	0.85 U
ETHYLBENZENE	5	NG	6.7	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.30 U	0.15 U	0.15 U	0.15 U	0.15 U
M&P-XYLENES	5&5	NG	18(total M&P)	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U	1.6 U	0.81 U	0.81 U	0.81 U	0.81 U
METHYLBENZENE	5	NG	4.9	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.48 U	0.24 U	2.4	0.24 U	0.24 U
O-XYLENE	5	NG	3.3	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.72 U	0.36 U	0.36 U	0.36 U	0.36 U
TETRACHLOROETHYLENE	5	NG	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.68 U	0.34 U	0.34 U	0.34 U	0.34 U
TRAMS-1,2-DICHLOROETHYLENE	5	NG	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.92 U	0.46 U	0.46 U	0.46 U	0.46 U
TRANS-1,3-DICHLOROPROPENE	NS	NG	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.48 U	0.24 U	0.24 U	0.24 U	0.24 U
TRICHLOROETHYLENE	5	NG	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.74 U	0.37 U	0.37 U	0.37 U	0.37 U
VINYL CHLORIDE	2	NG	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	1.3 U	0.67 U	0.67 U	0.67 U	0.67 U

U Undetectable Levels

NS No Standard

NG No Guidance

Table
Groundwater Analytical Results
Semi-Volatile Organic Compounds
Site 1 HHMT-Port Ivory Facility

Location Sample Date Concentration in UG/L	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	PG-CS-7 11/24/2000 UG/L	PG-EW-3 11/24/2000 UG/L	PG-EW-6 11/24/2000 UG/L	PG-PA-MW-1D 11/29/2000 UG/L	PG-PA-MW-1 11/28/2000 UG/L	PG-PA-MW-5 11/24/2000 UG/L	PG-PA-MW-6 11/27/2000 UG/L	PG-PA-MW-6D 11/30/2000 UG/L	PG-RS-1 11/24/2000 UG/L	PG-RS-2 11/24/2000 UG/L	PG-TMW-02 12/2/2000 UG/L
1,2,4-TRICHLOROBENZENE	5	NG	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
1,2-BENZPHENANTHRACENE	NS	0.002	0.30 U	1.2	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U
1,2-DICHLOROBENZENE	3	NG	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
1,2-DIPHENYLHYDRAZINE	NS	NG	0.24 U	1.2	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
1,4-DICHLOROBENZENE	3	NG	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,4,6-TRICHLOROPHENOL	NS	NG	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
2,4-DICHLOROPHENOL	5	NG	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-DIMETHYLPHENOL	NS	50	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
2,4-DINITRPHENOL	NS	10	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
2,4-DINITROTOLUENE	5	NG	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
2,6-DINITROTOLUENE	5	NG	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
2-CHLORONAPHTHALENE	NS	10	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
2-CHLOROPHENOL	NS	NG	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
2-NITROPHENOL	NS	NG	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
3,3'-DICHLOROBENZIDINE	5	NG	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U
4,6-DINITRO-O-CRESOL	NS	NG	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
4-BROMOPHENYLPHENYL ETHER	NS	NG	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
4-CHLORO-3-METHYLPHENOL	NS	NG	1.9 U	1.9 J	1.9 J	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
4-CHLORORPHENLYPHENYL ETHER	NS	NG	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
4-NITROPHENOL	NS	NG	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
ACENAPHTHENE	NS	20	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
ACENAPHTHYLENE	NS	NG	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
ANTHRACENE	NS	50	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
BENZIDINE	5	NG	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U
BENZO(A)ANTHRACENE	NS	0.002	0.20 U	1.2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
BENZO(A)PYRENE	ND	NG	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
BENZO(B)FLOURANTHENE	NS	0.002	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U
BENZO(G,H,I)PERYLENE	NS	NG	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
BENZO(K)FLOURANTHENE	NS	0.002	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
BENZYL BUTYL PHTHALATE	NS	50	0.29 U	1.1	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
BIS(2-CHLOROETHOXY)METHANE	5	NG	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
BIS(2-CHLOROETHYL)ETHER	1	NG	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
BIS(2-CHLOROISOPROPYL)ETHER	5	NG	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
BIS(2-ETHYLHEXYL)PHTHALATE	5	NG	2.1	2.6	0.37 U	8.2	5.3 B	1.9	0.37 U	2.3 B	2.1	1.6	4.6 B
DI-N-BUTYL PHTHALATE	50	NG	0.26 U	1.0	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	1.5	0.26 U	0.26 U	0.26 U
DI-N-OCTYL PHTHALATE	NS	50	0.80 U	1.3	0.80 U	0.80 U	2.0 B	0.80 U	0.80 U	1.3	0.80 U	0.80 U	1.1 B
DIBENZ[A,H]ANTHRACENE	NS	NG	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
DIETHYL PHTHALATE	NS	50	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
DIMETHYL PHTHALATE	NS	50	0.24 U	0.24 U	1.6	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
FLUORANTHENE	NS	50	0.29 U	1.4	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
FLUORENE	NS	50	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
HEXACHLORO-1,3-BUTADIENE	0.5	NG	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
HEXACHLOROBENZENE	0.04	NG	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
HEXACHLOROCYCLOPENTADIENE	5	NG	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
HEXACHLOROETHANE	5	NG	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U

Groundwater Analytical Results
Semi-Volatile Organic Compounds
Site 1 HHMT-Port Ivory Facility

Location Sample Date Concentration in UG/L	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	PG-CS-7 11/24/2000 UG/L	PG-EW-3 11/24/2000 UG/L	PG-EW-6 11/24/2000 UG/L	PG-PA-MW-1D 11/29/2000 UG/L	PG-PA-MW-1 11/28/2000 UG/L	PG-PA-MW-5 11/24/2000 UG/L	PG-PA-MW-6 11/27/2000 UG/L	PG-PA-MW-6D 11/30/2000 UG/L	PG-RS-1 11/24/2000 UG/L	PG-RS-2 11/24/2000 UG/L	PG-TMW-02 12/2/2000 UG/L
INDENO[1,2,3-CD]PYRENE	NS	0.002	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
ISOPHORONE	NS	50	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
M-DICHLOROBENZENE	3	NG	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
N-NITROSO-DI-N-PROPYLAMINE	NS	NG	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
N-NITROSODIMETHYLAMINE	NS	NG	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
N-NITROSODIPHENYLAMINE	NS	50	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
NAPHTHALENE	NS	10	2.0	0.36 U	0.36 U	0.36 U	1.0	0.36 U	0.36 U	0.36 U	9.6	0.36 U	0.36 U
NITROBENZENE	0.4	NG	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
PENTACHLOROPHENOL	1(Total Phenols)	NG	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
PHENANTHRENE	NS	50	0.27 U	1.6	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
PHENOL	1(Total Phenols)	NG	1.8	1.2 U	29	1.2 U	33	1.2 U	2.1	1.2 U	16	1.2 U	1.2 U
PYRENE	NS	50	0.27 U	1.4	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U

U Undetectable Levels
NS No Standard
NG No Guidance

Tab
Groundwater Analytical Results
Pesticides and PCB's
Site 1 HHMT-Port Ivory Facility

Location Sample Date Concentration in UG/L	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	PG-CS-7 11/24/2000 UG/L	PG-EW-3 11/24/2000 UG/L	PG-EW-6 11/24/2000 UG/L	PG-PA-MW-1D 11/29/2000 UG/L	PG-PA-MW-1 11/28/2000 UG/L	PG-PA-MW-5 11/24/2000 UG/L	PG-PA-MW-6 11/27/2000 UG/L	PG-PA-MW-6D 11/30/2000 UG/L	PG-RS-1 11/24/2000 UG/L	PG-RS-2 11/24/2000 UG/L	PG-TMW-02 12/2/2000 UG/L
4,4'-DDD	0.3	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
4,4'-DDE	0.2	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
4,4'-DDT	0.2	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
ALDRIN	NS	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
ALPHA-BHC	NS	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
AROCLOR 1016	0.09**	NG	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR 1221	0.09**	NG	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR 1232	0.09**	NG	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR 1242	0.09**	NG	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR 1248	0.09**	NG	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR 1254	0.09**	NG	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR 1260	0.09**	NG	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BETA-BHC	0.04	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
CHLORDANE	0.05	NG	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DELTA-BHC	0.04	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
DIELDRIN	0.004	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
ENDOSULFAN I	NS	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
ENDOSULFAN II	NS	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
ENDOSULFAN SULFATE	NS	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
ENDRIN	NS	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
ENDRIN ALDEHYDE	5	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
ENDRIN KETONE	5	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
GAMMA-BHC (LINDANE)	0.05	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
HEPTACHLOR	0.04	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
HEPTACHLOR EPOXIDE	0.03	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
METHOXYCHLOR	35	NG	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
TOXAPHENE	0.06	NG	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

U Undetectable Levels
NS No Standard
NG No Guidance
** Total PCBs

D

Groundwater Analytical Results
Metals
Site 1 HHMT-Port Ivory Facility

Location Sample Date Concentration in UG/L	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	**PG-CS-7** 11/24/2000 UG/L	**PG-EW-3** 11/24/2000 UG/L	**PG-EW-6** 11/24/2000 UG/L	**PG-PA-MW-1D** 11/29/2000 UG/L	**PG-PA-MW-1** 11/28/2000 UG/L	**PG-PA-MW-5** 11/24/2000 UG/L	**PG-PA-MW-6** 11/27/2000 UG/L	**PG-PA-MW-6D** 11/30/2000 UG/L	**PG-RS-1** 11/24/2000 UG/L	**PG-RS-2** 11/24/2000 UG/L	**PG-TMW-02** 12/2/2000 UG/L
ALUMINUM (FUME OR DUST)	NS	NG	180	170	130	58 U	610	500	430	260	260	2200	58 U
ANTIMONY	3	NG	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U
ARSENIC	25	NG	3.6 U	**26**	3.6 U	13	3.6 U	**55**	**83**	3.6 U	17	3.7	**54**
BARIUM	1000	NG	23	160	160	62	75	34	23 U	68	23 U	110	23 U
BERYLLIUM	NS	3	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
CADMIUM	5	NG	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	**16**	1.4 U
CALCIUM METAL	NS	NG	14000	39000	460000	36000	230000	96000	1900	180000	22000	22000	140000
CHROMIUM	50	NG	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
COBALT	NS	NG	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U
COPPER	200	NG	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
IRON	300***	NG	**310**	**1200*** **	88 U	**5100*** **	88 U	**3200*** **	120	**15000*** **	88 U	**12000*** **	**690*** **
LEAD	25	NG	3.4 U	3.4 U	4.6	3.4 U	3.4 U	6.2	3.4 U	3.4 U	3.4 U	9.9	3.4 U
MAGNESIUM	NS	35000	13000	**99000**	400	**79000**	260 U	14000	5500	**430000**	13000	10000	**58000**
MANGANESE	300***	NG	12 U	**28*** **	12 U	**90*** **	12 U	**290*** **	12 U	**1200*** **	12 U	**120*** **	**140*** **
NICKEL	100	NG	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
POTASSIUM	NS	NG	19000	46000	20000	39000	40000	6100	100000	81000	25000	77000	17000
SELENIUM	10	NG	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
SILVER	50	NG	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U	5.2 U
SODIUM	20000	NG	**230000**	**220000**	**770000**	**840000**	**210000**	**55000**	**900000**	**4000000**	**150000**	**330000**	**400000**
THALLIUM	NS	0.5	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
VANADIUM	NS	NG	4.8	6.8	4.3 U	12	4.3 U	4.8	50	4.3 U	5.9	21	10
ZINC	NS	2000	20 U	26	20 U	20 U	20 U	55	20 U	20 U	20 U	70	25
MERCURY	0.7	NG	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U

U Undetectable Levels

NS No Standard

NG No Guidance

*** Total for Iron and Maganese is > 500

Table

Groundwater Analytical Results
TPHC, Oil and Grease, pH, Cyanide and Total Phenolics
Site 1 HHMT-Port Ivory Facility

Location **Sample Date**		Recommended Groundwater Cleanup Standard	Recommended Groundwater Cleanup Guidance	**PG-CS-7** 11/24/2000	**PG-EW-3** 11/24/2000	**PG-EW-6** 11/24/2000	**PG-PA-MW-1D** 11/28/2000	**PG-PA-MW-1** 11/29/2000	**PG-PA-MW-5** 11/24/2000
PETROLEUM HYDROCARBONS	MG/L	NS	NG	1.0 U	1.2	1.1 U	2.4	1.0 U	1.0 U
OIL & GREASE	ug/L	15,000MAX	NG	22	22	15	0.66	0.15	1.0 U
CYANIDE	MG/L	0.2	NG	0.01 U	0.01 U	0.01 U	0.01 U	0.016	0.01 U
*pH	pH units	NS	NG	9.16	8.23	12.82	12.35	7.07	6.76
TOTAL PHENOLICS	MG/L	0.001	NG	0.05 U	0.05 U	0.05 U	0.22	0.05 U	0.05 U

U Undetectable Levels

NS No Standard

NG No Guidance

Note: pH listed is the pH recorded in the field

Table

Groundwater Analytical Results
TPHC, Oil and Grease, pH, Cyanide and Total Phenolics
Site 1 HHMT-Port Ivory Facility

Location **Sample Date**		Recommended Groundwater Cleanup Standard	Recommended Groundwater Cleanup Guidance	**PG-PA-MW-6** 11/27/2000	**PG-PA-MW-6D** 11/30/2000	**PG-RS-1** 11/24/2000	**PG-RS-2** 11/24/2000	**PG-TMW-02** 12/2/2000
PETROLEUM HYDROCARBONS	MG/L	NS	NG	1.0 U	1.0 U	1.0 U	1.0 U	10
OIL & GREASE	ug/L	15,000MAX	NG	13	21	21	14	7.8
CYANIDE	MG/L	0.2	NG	0.013	0.01 U	0.01 U	0.01 U	0.01 U
*pH	pH units	NS	NG	11.36	7.08	11.24	8.54	7.1
TOTAL PHENOLICS	MG/L	0.001	NG	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

U Undetectable Levels

NS No Standard

NG No Guidance

Note: pH listed is the pH recorded in the field

PG-SED-SW-1 (PG-SED-1)

ANALYTE	RESULTS (MG/KG)
ARSENIC	16
CHROMIUM	52
IRON (%)*	20,000
LEAD*	160
MERCURY	1.1
NICKEL	48
SILVER	1.8
ZINC*	610

(PG-SW-1)

ANALYTE	RESULTS (ug/L)
LEAD	2,900
MAGNESIUM	360,000
MERCURY	0.93

PG-SED-SW-2 (PG-SED-2)

ANALYTE	RESULTS (MG/KG)
ARSENIC	19
CADMIUM	0.64
CHROMIUM	49
IRON (%)*	23,000
LEAD*	380
MERCURY	92
NICKEL*	90
SILVER*	4.3
ZINC*	600

(PG-SW-2)

ANALYTE	RESULTS (ug/L)
LEAD	3,800
MAGNESIUM	380,000

PG-SED-SW-3 (PG-SED-3)

ANALYTE	RESULTS (MG/KG)
ARSENIC	14
CHROMIUM	30
LEAD*	310
MERCURY	29
NICKEL	33
ZINC*	510

(PG-SW-3)

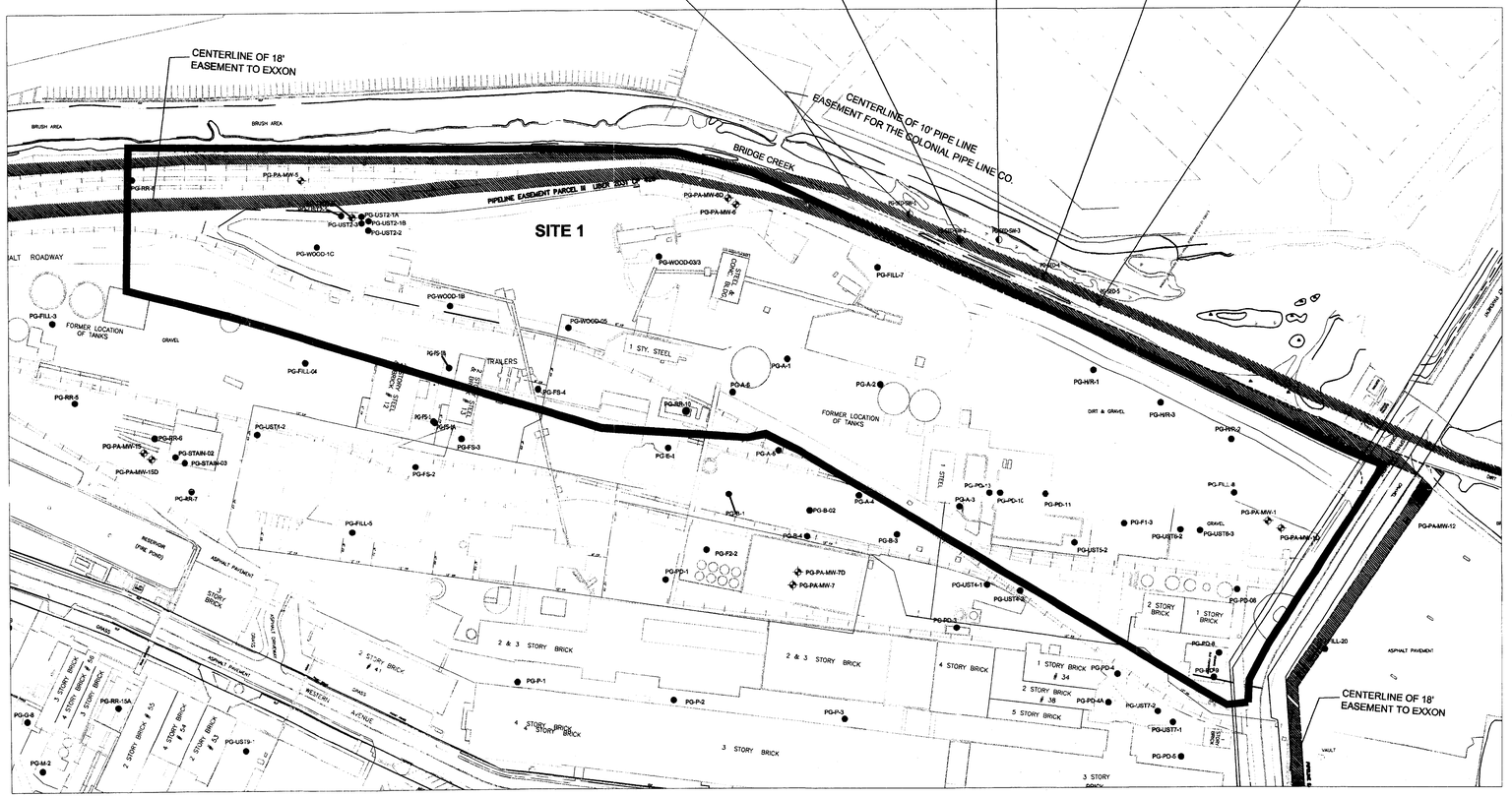
ANALYTE	RESULTS (ug/L)
ARSENIC	57
BERYLLIUM**	4.1
CADMIUM	9.8
CHROMIUM	220
COPPER	790
IRON	63,000
LEAD	650
MAGNESIUM	320,000
MANGANESE	690
NICKEL	140
ZINC**	2,500

PG-SED-4

ANALYTE	RESULTS (MG/KG)
ARSENIC	11
CHROMIUM	78
IRON (%)*	23,000
LEAD*	200
MERCURY*	2.6
NICKEL*	53
SILVER*	2.5
ZINC*	650

PG-SED-5

ANALYTE	RESULTS (MG/KG)
ARSENIC	12
CHROMIUM	82
IRON (%)	25,000
LEAD*	190
MERCURY*	2.6
NICKEL	45
SILVER*	2.5
ZINC*	560



NYSDEC SEDIMENT CLEANUP CRITERIA
LOWER EFFECT LEVEL (LEL)
SEVERE EFFECT LEVEL (SEL)

ANALYTE	LEL (ug/g)	SEL (ug/g)
ARSENIC	6.0	33
CADMIUM	0.6	9
CHROMIUM	26	110
IRON (%)*	2% (20,000)	4% (40,000)
LEAD*	31	110
MERCURY	0.2	1.3
NICKEL*	16	50
SILVER*	1.0	2.2
ZINC*	120	270

MG/KG = ug/g

NYSDEC RECOMENDED SURFACE WATER CLEANUP STANDARDS AND CLEANUP GUIDANCE VALUES (RSCS AND RSCG)

ANALYTE	RSCS (ug/L)	RSCG (ug/L)
ARSENIC	50	NG
BERYLLIUM**	NS	3
CADMIUM	5	NG
CHROMIUM	50	NG
COPPER	200	NG
IRON	300	NG
LEAD	50	NG
MAGNESIUM	35,000	NG
MANGANESE	300	NG
NICKEL	100	NG
ZINC**	NS	NG
MERCURY	0.7	2,000

NS - NO STANDARD
NG - NO GUIDANCE VALUE

100 0 100 200
SCALE IN FEET

NOTES:
* – INDICATES VALUES WERE DETECTED ABOVE THE LOWEST EFFECTIVE LEVEL (LEL) AS WELL AS ABOVE THE SEVERE EFFECTIVE LEVEL (SEL). ALL OTHER SEDIMENT RESULTS WERE FOUND ABOVE LEL LEVELS ONLY.
** – INDICATES THAT SURFACE WATER RESULTS ONLY EXCEED THE RECOMENDED SURFACE WATER CLEANUP GUIDANCE (RSCG).
1. SEDIMENT RESULTS ARE RECORDED IN mg/kg. SURFACE WATER RESULTS ARE RECORDED IN ug/L.
2. THIS MAP PRESENTS CONCENTRATIONS OF METALS THAT EXCEED NYSDEC RSCS AND RSCG VALUES.
3. pH RESULTS ARE IN STANDARD pH UNITS.
4. NYSDEC DOES NOT HAVE A STANDARD OR GUIDANCE VALUE FOR pH IN SOIL. RESULTS PRESENTED ON THE MAP REFLECT pH READINGS EQUAL TO OR ABOVE 10 AND EQUAL TO OR BELOW NO VALUES OF pH WERE DETECTED AT THESE LEVELS.

LEGEND

- UTILITY EASEMENT
- RAILROAD TRACKS
- SITE BOUNDARY
- PG-PA-MW-5 — YEAR 2000 SITE INVESTIGATION MONITORING WELL LOCATION
- PG-WOOD-3 — YEAR 2000 SITE INVESTIGATION SOIL BORING LOCATION
- PG-SED-SW5 — YEAR 2000 SITE INVESTIGATION SEDIMENT AND SURFACE WATER SAMPLE LOCATION
- ANALYTE — INDICATES COMPOUND FOR WHICH LABORATORY ANALYSIS WAS CONDUCTED

Sheet of

THE PORT AUTHORITY OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title

(BLOCK 1400, LOT 1)
HHMT-PORT IVORY FACILITY

SITE 1
ANALYTICAL RESULTS, SEDIMENT AND SURFACE WATER, SITE INVESTIGATION

Designed by Drawn by Checked by

Date

Contract Number

Drawing Number **FIGURE 17**

Table 7
Sediment Analytical Results
Metals
Site 1 HHMT-Port Ivory Facility

Location	Sediment Criteria	Sediment Criteria	SED-1	SED-2	SED-3	SED-4	SED-5
Sample Date	Lowest Effect Level	Severe Effect Level	11/21/2000	11/21/2000	11/21/2000	11/21/2000	11/21/2000
Concentration	ug/g	ug/g	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
ALUMINUM (FUME OR DUST)	NS	NS	4100	3400	1900	5800	5700
ANTIMONY	2.0	25.0	3.2 U	2.7 U	2.3 U	5 U	5.2 U
ARSENIC	6.0	33.0	16	19	14	11	12
BARIUM	NS	NS	72	70	32	96	98
BERYLLIUM	NS	NS	0.89 U	0.74 U	0.63 U	1.4 U	1.4 U
CADMIUM	0.6	9.0	0.67 U	0.64	0.53	1 U	1.1 U
CALCIUM METAL	NS	NS	2700	3500	2700	4600	5200
CHROMIUM	26.0	110.0	52	49	30	78	82
COBALT	NS	NS	4.9	5.8	3.4	6	5.9 U
COPPER	NS	NS	130	160	61	180	190
IRON (%)	2% (20,000)	4% (40,000)	20000	23000	18000	23000	25000
LEAD	31.0	110.0	160	380	310	200	190
MAGNESIUM	NS	NS	5100	6400	2700	5200	5900
MANGANESE	460.0	1100.0	130	120	100	160	180
MERCURY	0.2	1.3	1.1	.92	.29	2.6	2.6
NICKEL	16.0	50.0	48	90	33	53	45
POTASSIUM	NS	NS	1200	740 U	630 U	1400 U	1900
SELENIUM	NS	NS	5.6 U	4.6 U	4 U	8.6 U	8.9 U
SILVER	1.0	2.2	1.8	4.3	0.79 U	2.5	2.5
SODIUM	NS	NS	8000	2200	1300	5300	13000
THALLIUM	NS	NS	2.7 U	2.2 U	1.9 U	4.1 U	4.3 U
VANADIUM	NS	NS	24	27	18	43	36 U
ZINC	120.0	270.0	610	600	510	650	560

NS No Standard
U Undetectable Levels
Above LEL
Above SEL
ug/g = MG/KG

Table 8
Surface Water Analytical Results
Metals and pH
Site 1 HHMT-Port Ivory Facility

Location **Date** **Concentration**	Recommended Surface Water Cleanup Standard ug/l	Recommended Surface Water Cleanup Guidance ug/l	**SW-1** 11/21/2000 ug/l	**SW-2** 11/21/2000 ug/l	**SW-3** 11/21/2000 ug/l
ALUMINUM	NS	NG	1400	1700	25000
ANTIMONY	3	NG	3.3U	3.3U	3.3U
ARSENIC	50	NG	3.6	5.2	57
BARIUM	1000	NG	71	70	440
BERYLLIUM	NS	3	2.5U	2.5U	4.1
CADMIUM	5	NG	1.4U	1.4U	9.8
CALCIUM	NS	NG	150000	150000	160000
CHROMIUM	50	NG	16U	16U	220
COBALT	NS	NG	4.6U	4.6U	16
COPPER	200	NG	43	51	790
IRON	300	NG	2900	3800	63000
LEAD	50	NG	21	29	650
MAGNESIUM	35000	NG	360000	380000	320000
MANGANESE	300	NG	190	180	690
NICKEL	100	NG	15U	15U	140
POTASSIUM	NS	NG	130000	140000	110000
SELENIUM	10	NG	20U	20U	20U
SILVER	50	NG	5.2U	5.2U	5.2U
SODIUM	NS	NG	3500000	3600000	2800000
THALLIUM	NS	0.5	3.1U	3.1U	3.1U
VANADIUM	NS	NG	4.3U	4.3U	100
ZINC	NS	2000	130	130	2500
pH (150.1)	NS	NS	8.1	8.2	7.5
MERCURY (245.1)	0.7	NG	0.93	0.54	0.55

NG No Guidance
NS No Standard
U Undetectable Levels

PG-ST-SW-1

DATE SAMPLED	10/21/2002
MATRIX	SURFACE WATER
ANALYTE	RESULTS (ug/L)
METALS	
IRON	610***
MAGNESIUM	600,000
SILVER	4,800,000

PG-ST-SW-2

DATE SAMPLED	10/21/2002
MATRIX	SURFACE WATER
ANALYTE	RESULTS (ug/L)
METALS	
MAGNESIUM	630,000
SODIUM	5,100,000

PG-ST-MW-4D

DATE SAMPLED	11/8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
IRON (unfiltered)	22,000***
IRON (filtered)	19,000***
MANGANESE (unfiltered)	5,200***
MANGANESE (filtered)	4,800***
SODIUM (unfiltered)	2,100,000
SODIUM (filtered)	2,000,000

PG-ST-MW-4S

DATE SAMPLED	11/8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
ANTIMONY (filtered)	75
ARSENIC (filtered)	69
BERYLLIUM (filtered)	40
IRON (unfiltered)	3,300***
IRON (filtered)	550***
SODIUM (unfiltered)	400,000
SODIUM (filtered)	470,000
THALLIUM (filtered)	42

PG-ST-SW-3

DATE SAMPLED	SURFACE WATER
MATRIX	RESULTS (ug/L)
ANALYTE	
METALS	790***
IRON	130,000
MAGNESIUM	1,300,000
SODIUM	

PG-ST-SW-4

DATE SAMPLED	10/21/2002
MATRIX	SURFACE WATER
ANALYTE	RESULTS (ug/L)
METALS	
MAGNESIUM	610,000
SODIUM	4,900,000

PG-ST-SW-5

DATE SAMPLED	SURFACE WATER
MATRIX	RESULTS (ug/L)
ANALYTE	
METALS	630,000
MAGNESIUM	5,000,000
SODIUM	

PG-CS-7

DATE SAMPLED	10/15/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
SODIUM (unfiltered)	79,000
SODIUM (filtered)	89,000

DATE SAMPLED	11/8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
SODIUM (unfiltered)	130,000
SODIUM (filtered)	130,000

DATE SAMPLED	12/2/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
BTEX	
M&P-XYLENES	7

PG-ST-MW-1S

DATE SAMPLED	11/8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
ARSENIC (unfiltered)	90
ARSENIC (filtered)	53
IRON (unfiltered)	2,200***
NICKEL (filtered)	110
SODIUM (unfiltered)	1,500,000
SODIUM (filtered)	1,600,000

PG-ST-MW-1D

DATE SAMPLED	11/8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
IRON (unfiltered)	5,200***
IRON (filtered)	3,500***
SODIUM (unfiltered)	660,000
SODIUM (filtered)	720,000

PG-RS-1

DATE SAMPLED	10/15/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
IRON (unfiltered)	20,000***
IRON (filtered)	380***
SODIUM (unfiltered)	29,000
SODIUM (filtered)	28,000
ACID EXTRACTABLES	
TOTAL PHENOLS	1.1

DATE SAMPLED	11/8/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
METALS	
IRON (unfiltered)	1,400***
IRON (filtered)	950***
SODIUM (unfiltered)	32,000
SODIUM (filtered)	33,000

DATE SAMPLED	12/2/2002
MATRIX	GROUNDWATER
ANALYTE	RESULTS (ug/L)
ACID EXTRACTABLES	
PHENOL	3
TOTAL PHENOL	6.8

NYSDEC GROUNDWATER CLEANUP STANDARDS AND CLEANUP GUIDANCE VALUES

ANALYTE	RCS (ug/l)	RCG (ug/l)
VOCs		
M&P Xylenes:	5&5	NG
ACID EXTRACTABLES		
Phenol	1	NG
Total Phenol	1	NG

NG - NO GUIDANCE VALUE

Notes:
1. Site 1, 2A/2B, and 3 descriptions as per July 2004 VCP Agreements.
2. This map presents concentrations of BTEX, Acid Extractables, and Metals at levels above NYSDEC Groundwater Cleanup Standards and Groundwater Cleanup Guidance Values.

100 0 100 200
SCALE IN FEET

LEGEND

- UTILITY EASEMENT
- SITE BOUNDARY
- PG-RS-1 — PRE-EXISTING P&G MONITORING WELL LOCATION
- PG-SB-2 — PRE-EXISTING P&G SOIL BORING LOCATION
- PG-PA-MW-6 — YEAR 2000 SITE INVESTIGATION MONITORING WELL LOCATION
- PG-WOOD-03/3 — YEAR 2000 SITE INVESTIGATION SOIL BORING LOCATION
- PG-ST-MW-1D — SURCHARGE MONITORING WELL LOCATIONS
- PG-ST-SW-4 — SURCHARGE SURFACE WATER SAMPLE LOCATIONS

Sheet of

THE PORT AUTHORITY OF NY & NJ

ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

Title:

(BLOCK 1400, LOT 1 AND BLOCK 1338, LOT 1) HHMT-PORT IVORY FACILITY

SURCHARGE MONITORING WELL LOCATIONS MAP AND ANALYTICAL DATA

Designed by Drawn by Checked by

Date

Contract Number

Drawing Number FIGURE 22

Ta[redacted] A

Surcharge Pilot Study -Groundwater Results

BTEX

Site 1: HHMT - Port Ivory Facility

Location Date LAB ID# Concentration	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	CS-7 10/15/2002 AB70453 UG/L	RS-1 10/15/2002 AB70455 UG/L	FB-1 10/15/2002 AB70457 UG/L	TB-1 10/15/2002 AB70459 UG/L	CS-7 11/6/2002 AB72292 UG/L	RS-1 11/6/2002 AB72294 UG/L	TB-1 11/6/2002 AB72304 UG/L	FB-1 11/6/2002 AB72305 UG/L	TB-1 11/7/2002 AB72397 UG/L	CS-7 12/2/2002 AB74079 UG/L	RS-1 12/2/2002 AB74081 UG/L
Benzene	1	NG	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U	0.49U
Ethylbenzene	5	NG	0.63U	0.63U	0.63U	0.63U	0.63U	0.63U	0.63U	0.63U	0.63U	2.4	0.63U
m&p-xylenes	5&5	NG	1.1U	1.1U	1.1U	1.1U	1.1U	1.1U	1.1U	1.1U	1.1U	7	1.1U
O-xylenes	5	NG	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U	0.59U
Toluene	5	NG	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U	0.79U

U Undetectable Levels

NG No Guidance

Table 16B
Surcharge Pilot Study - Groundwater Results
Acid Extractables
Site 1: HHMT Port Ivory Facility

Location Date Lab ID Concentration	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	**CS-7** 10/15/2002 AB70453 UG/L	**RS-1** 10/15/2002 AB70455 UG/L	**FB-1** 10/15/2002 AB70457 UG/L	**CS-7** 11/6/2002 AB72292 UG/L
2,4,5-trichlorophenol	NS	NG	0.6U	0.6U	0.6U	0.6U
2,4,6-trichlorophenol	NS	NG	0.65U	0.65U	0.65U	0.65U
2,4-dichlorophenol	5	NG	0.57U	0.57U	0.57U	0.57U
2,4-dimethylphenol	NS	50	0.49U	0.49U	0.49U	0.49U
2,4-dinitrophenol	NS	10	3.1U	3.1U	3.1U	3.1U
2-chlorophenol	NS	NG	0.49U	0.49U	0.49U	0.49U
2-methylphenol	NS	NG	0.61U	0.61U	0.61U	0.61U
2-nitrophenol	NS	NG	0.64U	0.64U	0.64U	0.64U
3&4-methylphenol	NS	NG	5.4U	1.1J	5.4U	5.4U
4,6-dinitro-2-methylphenol	NS	NG	0.36U	0.36U	0.36U	0.36U
4-chloro-3-methylphenol	NS	NG	0.38U	0.38U	0.38U	0.38U
4-nitrophenol	NS	NG	0.27U	0.27U	0.27U	0.27U
pentachlorophenol	1 (total phenols)	NG	0.57U	0.57U	0.57U	0.57U
phenol	1 (total phenols)	NG	0.14U	0.14U	0.14U	0.14U
Total phenols	1	NG	ND	1.1	ND	ND

U Undetectable Levels
NS No Standard
NG No Guidance
ND Not Detected

Table 16B
Surcharge Pilot Study - Groundwater Results
Acid Extractables
Site 1: HHMT Port Ivory Facility

Location Date Lab ID Concentration	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	RS-1 11/6/2002 AB72294 UG/L	FB-1 11/6/2002 AB72305 UG/L	CS-7 12/2/2002 AB74079 UG/L	RS-1 12/2/2002 AB74081 UG/L
2,4,5-trichlorophenol	NS	NG	0.6U	0.6U	0.6U	0.6U
2,4,6-trichlorophenol	NS	NG	0.65U	0.65U	0.65U	0.65U
2,4-dichlorophenol	5	NG	0.57U	0.57U	0.57U	0.57U
2,4-dimethylphenol	NS	50	0.49U	0.49U	0.49U	0.49U
2,4-dinitrophenol	NS	10	3.1U	3.1U	3.1U	3.1U
2-chlorophenol	NS	NG	0.49U	0.49U	0.49U	0.49U
2-methylphenol	NS	NG	0.61U	0.61U	0.61U	0.61U
2-nitrophenol	NS	NG	0.64U	0.64U	0.64U	0.64U
3&4-methylphenol	NS	NG	5.4U	5.4U	5.4U	3.8J
4,6-dinitro-2-methylphenol	NS	NG	0.36U	0.36U	0.36U	0.36U
4-chloro-3-methylphenol	NS	NG	0.38U	0.38U	0.38U	0.38U
4-nitrophenol	NS	NG	0.27U	0.27U	0.27U	0.27U
pentachlorophenol	1 (total phenols)	NG	0.57U	0.57U	0.57U	0.57U
phenol	1 (total phenols)	NG	0.14U	0.14U	0.14U	3
Total phenols	1	NG	ND	ND	ND	6.8

U Undetectable Levels
NS No Standard
NG No Guidance
ND Not Detected

Tab C

Surcharge Pilot Study - Groundwater and Surface Water Results
Metals and pH
Site 1: HHMT - Port Ivory Facility

Location Date Lab ID Concentration Filtered or Unfiltered	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	ST-SW1 10/21/2002 AB70895 UG/L	ST-SW2 10/21/2002 AB70896 UG/L	ST-SW3 10/21/2002 AB70460 UG/L	ST-SW4 10/21/2002 AB70897 UG/L	ST-SW5 10/21/2002 AB70898 UG/L	CS-7 10/15/2002 AB70453 UG/L unfiltered	CS-7 10/15/2002 AB70454 UG/L filtered	RS-1 10/15/2002 AB70455 UG/L unfiltered
Aluminum	NS	NG	570	400	140	190	330	100U	100U	170
Antimony	3	NG	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U
Arsenic	25	NG	4.0U	5.4	4.0U	10	4.0U	4.0U	4.0U	4.1
Barium	1000	NG	27	25U	45	25U	25U	25U	25U	59
Beryllium	NS	3	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U
Cadmium	5	NG	2.5	2.5	2.0U	2.5	2.5	2.0U	2.0U	2.0U
Calcium	NS	NG	150000	160000	93000	170000	160000	110000	120000	130000
Chromium	50	NG	25U	25U	25U	25U	25U	25U	25U	36
Cobalt	NS	NG	10U	10U	10U	10U	10U	10U	10U	10U
Copper	200	NG	25U	25U	25U	25U	25U	25U	25U	25U
Iron	300***	NG	**610*** **	**280*** **	**790*** **	150U	150U	210	150U	**20000*** **
Lead	25	NG	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
Magnesium	NS	35000	**600000**	**630000**	**130000**	**610000**	**630000**	**47000**	**52000**	27000
Manganese	300***	NG	**82*** **	**69*** **	**260*** **	67	61	25U	25U	**180*** **
Nickel	100	NG	25U	25U	25U	25U	25U	25U	25U	46
Potassium	NS	NG	250000	260000	58000	250000	260000	13000	15000	5800
Selenium	10	NG	25U	25U	25U	25U	25U	25U	25U	25U
Silver	50	NG	**4800000**	10U	10U	10U	10U	10U	10U	10U
Sodium	20000	NG	50000U	**5100000**	**1300000**	**4900000**	**5000000**	**79000**	**89000**	**29000**
Thallium	NS	0.5	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
Vanadium	NS	NG	25U	25U	25U	25U	25U	25U	25U	25U
Zinc	NS	2000	47	34	25U	32	31	64	67	440
Mercury	0.7	NG	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
pH	NS	NG	7.5	7.6	7.7	7.6	7.6	7	7	7.2

ND No Data
U Undetectable Levels
NS No Standard
NG No Guidance
ST-SW1 through ST-SW5 represents samples collected from surface water
*** Total for Iron and Manganese is > 500
Note-1: pH listed is the pH recorded in the field
Note-2: ST-SW1 through ST-SW5 represents samples collected from surface water

Table C

Surcharge Pilot Study - Groundwater and Surface Water Results
Metals and pH
Site 1: HHMT - Port Ivory Facility

Location Date Lab ID Concentration Filtered or Unfiltered	Recommended Groundwater Cleanup Standard UG/L	Recommended Groundwater Cleanup Guidance UG/L	RS-1 10/15/2002 AB70456 UG/L filtered	FB-1 10/15/2002 AB70457 UG/L unfiltered	FB-1 10/15/2002 AB70458 UG/L filtered	ST-SW1 11/7/2002 AB72569 ug/l	ST-SW2 11/7/2002 AB72570 ug/l	ST-SW3 11/7/2002 AB72571 ug/l	ST-SW4 11/7/2002 AB72572 ug/l	ST-SW5 11/7/2002 AB72573 ug/l
Aluminum	NS	NG	100U	100U	100U	430	420	340	550	290
Antimony	3	NG	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U
Arsenic	25	NG	4.0U	4.0U	4.0U	4.0U	4.0U	4.1	5.4	4.0U
Barium	1000	NG	52	25U	25U	28	25U	37	25U	25U
Beryllium	NS	3	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U
Cadmium	5	NG	2.0U	2.0U	2.0U	2.6	2.8	2.6	2.8	2.8
Calcium	NS	NG	130000	1000U	1000U	160000	170000	170000	180000	180000
Chromium	50	NG	25U	25U	25U	25U	25U	25U	25U	25U
Cobalt	NS	NG	10U	10U	10U	10U	10U	10U	10U	10U
Copper	200	NG	25U	25U	25U	25U	25U	25U	25U	25U
Iron	300***	NG	**380*** **	150U	150U	**400*** **	290	**360*** **	**460*** **	150U
Lead	25	NG	5.0U	5.0U	5.0U	5U	5U	5U	5U	5U
Magnesium	NS	35000	26000	1000U	1000U	**620000**	**680000**	**610000**	**710000**	**730000**
Manganese	300***	NG	**170*** **	25U	25U	**72*** **	53	**100*** **	**48*** **	36
Nickel	100	NG	25U	25U	25U	25U	25U	25U	25U	25U
Potassium	NS	NG	5500	2500U	2500U	300000	340000	300000	360000	380000
Selenium	10	NG	25U	25U	25U	25U	25U	25U	25U	25U
Silver	50	NG	10U	10U	10U	10U	10U	10U	10U	10U
Sodium	20000	NG	**28000**	25000U	25000U	**5100000**	**5500000**	**5000000**	**5500000**	**5900000**
Thallium	NS	0.5	5.0U	5.0U	5.0U	5U	5U	5U	5U	5U
Vanadium	NS	NG	25U	25U	25U	25U	25U	25U	25U	25U
Zinc	NS	2000	25U	25U	25U	26	25U	28	25U	25U
Mercury	0.7	NG	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
pH	NS	NG	7.2	4.2	4.2	7.7	7.6	7.7	7.8	7.8

ND No Data
U Undetectable Levels
NS No Standard
NG No Guidance
ST-SW1 through ST-SW5 represents samples collected from
*** Total for Iron and Manganese is > 500
Note-1: pH listed is the pH recorded in the field
Note-2: ST-SW1 through ST-SW5 represents samples collected from surface water

Table 3C

Surcharge Pilot Study - Groundwater and Surface Water Results
Metals and pH
Site 1: HHMT - Port Ivory Facility

Location	Recommended	Recommended	CS-7	CS-7	RS-1	RS-1	ST-4S	ST-4S	ST-4D	ST-4D
Date	Groundwater	Groundwater	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002
Lab ID	Cleanup	Cleanup	AB72292	AB72293	AB72294	AB722945	AB72296	AB72297	AB72298	AB72299
Concentration	Standard	Guidance	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Filtered or Unfiltered	UG/L	UG/L	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered
Aluminum	NS	NG	100U	100U	100U	100U	970	2300	140	100U
Antimony	3	NG	7.5U	7.5U	7.5U	7.5U	7.5U	**75**	7.5U	7.5U
Arsenic	25	NG	7.5	5.9	4.1	4.6	15	**69**	8.1	8.3
Barium	1000	NG	25U	25U	78	76	80	130	780	710
Beryllium	NS	3	4U	4U	4U	4U	4U	**40**	4U	4U
Cadmium	5	NG	2U	2U	2U	2U	2U	3.2	2U	2U
Calcium	NS	NG	83000	81000	130000	120000	200000	90000	290000	230000
Chromium	50	NG	25U	25U	25U	25U	25U	46	25U	25U
Cobalt	NS	NG	10U	10U	10U	10U	10U	220	10U	10U
Copper	200	NG	25U	25U	25U	25U	25U	160	25U	25U
Iron	300***	NG	150U	150U	**1400*** **	**950*** **	**3300*** **	**550*** **	**22000*** **	**19000*** **
Lead	25	NG	5U	5U	5U	5U	5U	5U	5U	5U
Magnesium	NS	35000	34000	34000	18000	19000	2000	**52000**	**97000**	**89000**
Manganese	300***	NG	25U	25U	**170****	**170*** **	**28*** **	**150*** **	**5200*** **	**4800*** **
Nickel	100	NG	25U	25U	25U	25U	25U	49	25U	25U
Potassium	NS	NG	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	10	NG	25U	25U	25U	25U	25U	25U	25U	25U
Silver	50	NG	10U	10U	10U	10U	10U	10U	10U	10U
Sodium	20000	NG	**130000**	**130000**	**32000**	**33000**	**400000**	**470000**	**2100000**	**2000000**
Thallium	NS	0.5	5U	5U	5U	5U	5U	**42**	5U	5U
Vanadium	NS	NG	25U	25U	25U	25U	25U	25U	28	26
Zinc	NS	2000	49	25U	130	34	26	920	25U	25U
Mercury	0.7	NG	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
pH	NS	NG	8	8	8	8	11	11	7	7

ND No Data
U Undetectable Levels
NS No Standard
NG No Guidance
ST-SW1 through ST-SW5 represents samples collected from
*** Total for Iron and Manganese is > 500
Note-1: pH listed is the pH recorded in the field
Note-2: ST-SW1 through ST-SW5 represents samples collected from surface water

Table C

Surcharge Pilot Study - Groundwater and Surface Water Results
Metals and pH
Site 1: HHMT - Port Ivory Facility

Location	Recommended	Recommended	ST-1S	ST-1S	ST-1D	ST-1D	FB-1	FB-1	FB-1	FB-1
Date	Groundwater	Groundwater	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/6/2002	11/7/2002	11/7/2002
Lab ID	Cleanup	Cleanup	AB72300	AB72301	AB72302	AB72303	AB72305	AB72306	AB72395	AB72396
Concentration	Standard	Guidance	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Filtered or Unfiltered	UG/L	UG/L	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered
Aluminum	NS	NG	3200	350	910	140	100U	100U	100U	100U
Antimony	3	NG	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U
Arsenic	25	NG	**90**	**53**	8	6.2	4U	4U	4U	4U
Barium	1000	NG	190	150	84	74	25U	25U	25U	25U
Beryllium	NS	3	4U	4U	4U	4U	4U	4U	4U	4U
Cadmium	5	NG	3.2	2.5	2U	2U	2U	2U	2U	2U
Calcium	NS	NG	690000	350000	74000	74000	1000U	1000U	1000U	1000U
Chromium	50	NG	25U	25U	25U	25U	25U	25U	25U	25U
Cobalt	NS	NG	10U	10U	10U	10U	10U	10U	10U	10U
Copper	200	NG	25U	25U	25U	25U	25U	25U	25U	25U
Iron	300***	NG	**2200*** **	150U	**5200*** **	**3500*** **	150U	150U	150U	150U
Lead	25	NG	5U	5U	5U	5U	5U	5U	5U	5U
Magnesium	NS	35000	12000	1000U	**58000**	**59000**	1000U	1000U	1000U	1000U
Manganese	300***	NG	**54*** **	25U	**120*** **	**110*** **	25U	25U	25U	25U
Nickel	100	NG	92	**110**	25U	25U	25U	25U	25U	25U
Potassium	NS	NG	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	10	NG	25U	25U	25U	25U	25U	25U	25U	25U
Silver	50	NG	10U	10U	10U	10U	10U	10U	10U	10U
Sodium	20000	NG	**1500000**	**1600000**	**660000**	**720000**	2500U	2500U	2500U	2500U
Thallium	NS	0.5	5U	5U	5U	5U	5U	5U	5U	5U
Vanadium	NS	NG	32	25U	25U	26	25U	25U	25U	25U
Zinc	NS	2000	44	25U	25U	25U	25U	25U	25U	25U
Mercury	0.7	NG	0.2U	0.21	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
pH	NS	NG	13	13	7.3	7.3	6.5	6.5	6.8	6.8

ND No Data
U Undetectable Levels
NS No Standard
NG No Guidance
ST-SW1 through ST-SW5 represents samples collected from
*** Total for Iron and Manganese is > 500
Note-1: pH listed is the pH recorded in the field
Note-2: ST-SW1 through ST-SW5 represents samples collected from surface water

Table C

Surcharge Pilot Study - Groundwater and Surface Water Results
Metals and pH
Site 1: HHMT - Port Ivory Facility

Location	Recommended	Recommended	ST-2S	ST-2S	ST-2D	ST-2D	ST-3D	ST-3D	ST-3S	ST-3S
Date	Groundwater	Groundwater	11/7/2002	11/7/2002	11/7/2002	11/7/2002	11/7/2002	11/7/2002	11/7/2002	11/7/2002
Lab ID	Cleanup	Cleanup	AB72398	AB72398	AB72400	AB72401	AB72402	AB72403	AB72404	AB72405
Concentration	Standard	Guidance	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Filtered or Unfiltered	UG/L	UG/L	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered
Aluminum	NS	NG	2400	800	1400	670	680	100U	4400	420
Antimony	3	NG	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U	7.5U
Arsenic	25	NG	28	23	8.2	6.2	8.2	4U	61	9.7
Barium	1000	NG	160	180	120	110	91	83	510	430
Beryllium	NS	3	4U	4U	4U	4U	4U	4U	4U	4U
Cadmium	5	NG	2U	2U	2U	2U	2U	2U	2.7	2U
Calcium	NS	NG	420000	420000	120000	110000	220000	220000	880000	430000
Chromium	50	NG	25U	25U	25U	25U	25U	25U	25U	25U
Cobalt	NS	NG	10U	10U	10U	10U	10U	10U	10U	10U
Copper	200	NG	25U	25U	25U	25U	25U	25U	25U	25U
Iron	300***	NG	1100***	150U	6600***	4900***	8500***	8200***	2100***	150U
Lead	25	NG	6.7	5U	5U	5U	5U	5U	5U	5U
Magnesium	NS	35000	2400	1000U	83000	82000	130000	140000	13000	1000U
Manganese	300***	NG	25U	25U	430***	400***	2300***	2500***	58***	25U
Nickel	100	NG	39U	37	25U	25U	25U	25U	39	25U
Potassium	NS	NG	52000	57000	23000	32000	72000	74000	250000	2500
Selenium	10	NG	25U	25U	25U	25U	25U	25U	25U	25U
Silver	50	NG	10U	10U	10U	10U	10U	10U	10U	10U
Sodium	20000	NG	780000	850000	740000	540000	2200000	2300000	2100000	25000
Thallium	NS	0.5	5U	5U	5U	5U	5U	5U	7.1	5U
Vanadium	NS	NG	27	25U	25U	25U	55	52	27	25U
Zinc	NS	2000	56	25U	25U	25U	25U	25U	130	25U
Mercury	0.7	NG	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	1.7	0.2U
pH	NS	NG	13	13	7.8	7.8	7.2	7.2	13	13

ND No Data
U Undetectable Levels
NS No Standard
NG No Guidance
ST-SW1 through ST-SW5 represents samples collected from
*** Total for Iron and Manganese is > 500
Note-1: pH listed is the pH recorded in the field
Note-2: ST-SW1 through ST-SW5 represents samples collected from surface water