REVISED FINAL

REMEDIAL SITE INVESTIGATION/REMEDIAL ALTERNATIVES REPORT

FORMER HALSTEAD QUINN MAJOR OIL STORAGE TERMINAL FACILITY

79-91 ALEXANDER STREET

YONKERS, NEW YORK

NYSDEC Site #B00193-3

January 25, 2006

Prepared for:

Yonkers Alexander Street Redevelopment, Inc.
470 Nepperhan Avenue, Suite 304
Yonkers, New York 10701

Prepared by:

Henningson, Durham & Richardson
Architecture and Engineering, P.C.
711 Westchester Avenue
White Plains, New York 10604

EXECUTIVE SUMMARY

Background

Henningson, Durham & Richardson Architecture and Engineering, P.C. (HDR) was contracted by Yonkers Alexander Street Redevelopment, Inc. (YASR) to undertake a Remedial Investigation of the surface and subsurface conditions of the property at the former Halstead-Quinn Major Oil Storage Facility (MOSF #3-2440) located at 79-91 Alexander Street in Yonkers, New York (site). The site is located on the east bank of the Hudson River in the City of Yonkers, Westchester County, New York and includes Tax Section 2, Block 2610, Lots 18, 22, 30 and 35. The site is approximately 2.8 acres and is currently being used for bus parking by Supertrans, a private company.

The Remedial Investigation of the site was performed as part of the New York State Department of Environmental Conservation (NYSDEC) Environmental Remediation Program under the 1996 Clean Water/Clean Air Bond Act, Brownfields Program and is listed as NYSDEC Site #B00193-3. This Final Remedial Site Investigation/Remedial Alternatives Report (Final SI/RAR): (1) summarizes the activities conducted during the Remedial Investigation, performed in October 2004, and a supplemental investigation, performed in August 2005 to supplement the Remedial Investigation (Supplemental Investigation), and the results of these investigations; and (2) provides YASR with an evaluation of applicable remedial alternatives and their associated costs.

Field Investigation

HDR performed a surface and subsurface remedial investigation in October 2004, in accordance with the October 2003 NYSDEC-approved Work Plan (Remedial Investigation). Field sampling activities were conducted over five days from October 18 through 22, 2004. A total of 15 surface soil samples, 22 subsurface soil samples (one per boring location) and 10 groundwater samples (one per installed well) were obtained to characterize the site conditions. An asbestos survey was performed on October 4, 2004 and a lead-based paint survey was performed on October 6, 2004 to determine if the on-site buildings contained either asbestos and/or lead-based paint. Based on June 23, 2005 comments received from NYSDEC on the Draft SI/RAR, HDR also performed a supplemental site investigation in August 2005 to supplement the results of the remedial investigation. Field sampling activities were conducted over three days from August 9 through 11, 2005. A total of six (6) subsurface soil samples (one per boring location) and 18 groundwater samples from nine (9) locations (one (1) unfiltered and one (1) filtered from each of the nine (9) sampling locations) were collected to supplement data obtained during the October 2004 site investigation. A concrete pad investigation was performed on August 16, 2005 to delineate the approximate depth and extent of a subsurface concrete pad encountered during the Remedial Investigation.

In accordance with the October 2003 NYSDEC-approved Work Plan, interim remedial activities were conducted on the site from April 2005 to July 2005 and included the asbestos abatement and lead-based paint removal in all three remaining on site buildings, and the removal of one aboveground storage tank (AST) and associated piping and one underground storage tank (UST), associated piping and petroleum contaminated soil.

Summary and Recommendations

Based on the soil and groundwater results of the Remedial and Supplemental Investigations, soil and groundwater results in exceedance of the current applicable standards/criteria exist on the site. Investigations at the site have demonstrated that vadose zone site soils are impacted with low concentrations of a variety of volatile organic compounds (VOCs) that are primarily benzene, toluene, ethylbenzene and xylenes (BTEX) compounds, metals, and semi-volatile organic compounds (SVOCs) that are primarily polycyclic aromatic hydrocarbons (PAHs). The concentrations of Resource Conservation and Recovery Act (RCRA) metals found in the soils on the site may be representative of historical uses of the site and/or historic fill placed on the site. The concentrations of SVOCs detected in the on-site subsurface soils are most likely the result of historical petroleum and coal uses on the site. The elevated metals concentrations detected in unfiltered on-site groundwater during the Remedial Investigation was due primarily to the high turbidity in the groundwater samples, as demonstrated from the additional filtered and unfiltered groundwater samples obtained during the Supplemental Investigation. The concentrations of VOCs and SVOCs detected in the on-site groundwater are most likely a result of the historical petroleum and coal uses on the site.

The following four remedial alternatives were evaluated: No Action, Removal of All On-Site Vadose Zone Soils Above the NYSDEC Technical Administrative Guidance Memorandum (TAGM) #4046 Recommended Soil Cleanup Objectives (RSCOs) Screening Criteria, Removal of All On-Site Vadose Zone Soils in the "Hot Spot" Area based on the 50 times NYSDEC TAGM #4046 RSCOs Screening Criteria, and Removal of All On-Site Vadose Zone Soils in the "Hot Spot" Area based on the 100 times NYSDEC TAGM #4046 RSCO Screening Criteria. The Recommended Remedial Alternative for the site is the Removal of All On-Site Soils in the "Hot Spot" Area based on the 50 times NYSDEC TAGM #4046 RSCO Screening Criteria. Since the site will be listed as restricted residential, the NYSDEC will require: (1) submission of a Soil Management Plan for the site prior to any site excavation; (2) placement of two (2) feet of clean fill in future unpaved areas post-remediation; and (3) an environmental easement that restricts excavation below the two (2) feet of clean fill layer in future unpaved areas and prohibits groundwater use.

Section 1.0 of this Final SI/RAR provides the Introduction, including the purpose of the report, site background and report organization. Section 2.0 provides the details of the Remedial Site Investigation and Supplemental Investigation. Section 3.0 provides the physical characteristics of the study area. Section 4.0 provides the nature and extent of contamination on site. Section 5.0 provides an evaluation of investigative data. Section 6.0 provides an evaluation of the on-site contaminant fate and transport and human exposure potential. Section 7.0 provides the details of the Interim Remedial Measures (IRM) conducted on the site. Section 8.0 provides a description of the Data Usability Summary Report (DUSR). Section 9.0 provides an evaluation of the remedial alternatives and estimated costs and Section 10.0 provides the summary and conclusions of the SI/RAR.

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1.0 INTRODUCTION

Henningson, Durham & Richardson Architecture and Engineering, P.C. (HDR) was contracted by Yonkers Alexander Street Redevelopment, Inc. (YASR) to undertake a Remedial Investigation of the surface and subsurface conditions of the property at the former Halstead-Quinn Major Oil Storage Facility (MOSF #3-2440) located at 79-91 Alexander Street in Yonkers, New York (site).

In August and September 2003, abatement and demolition activities were undertaken related to the former fuel tanks and associated aboveground piping and equipment (see section 1.2). After receipt of comments on the Draft Demolition Report, HDR submitted a Final Tank Farm Demolition Report to the New York State Department of Environmental Conservation (NYSDEC) in January 2004. Subsequent site investigation activities were temporarily suspended by YASR while project funding was obtained. After notification by YASR, the Remedial Investigation recommenced in October 2004, and was performed in accordance with the October 2003 NYSDEC-approved Remedial Investigation Work Plan for the site as amended by the Response to NYSDEC Comments Letter dated October 16, 2003 (Work Plan). The Remedial Investigation of the site was performed as part of the NYSDEC Environmental Remediation Program under the 1996 Clean Water/Clean Air Bond Act, Brownfields Program and is listed as NYSDEC Site #B00193-3.

The purpose of the Remedial Investigation was to: (1) conduct a site investigation to identify the existence and potential sources of soil and groundwater contamination on the site; (2) vertically and horizontally define the extent of contamination in on-site soils and horizontally define the extent of contamination in on-site groundwater; (3) conduct an asbestos survey and lead-based paint survey of the structures on the site; (4) prepare alternatives for remedial activities for the end use of the site, if required; (5) identify potential routes of exposure and potential receptors; and (6) evaluate fate and transport of contaminants. As part of the scope of work, HDR evaluated several remedial action alternatives based on the Remedial Investigation results and NYSDEC guidelines (discussed in later sections).

1.1 Purpose of Report

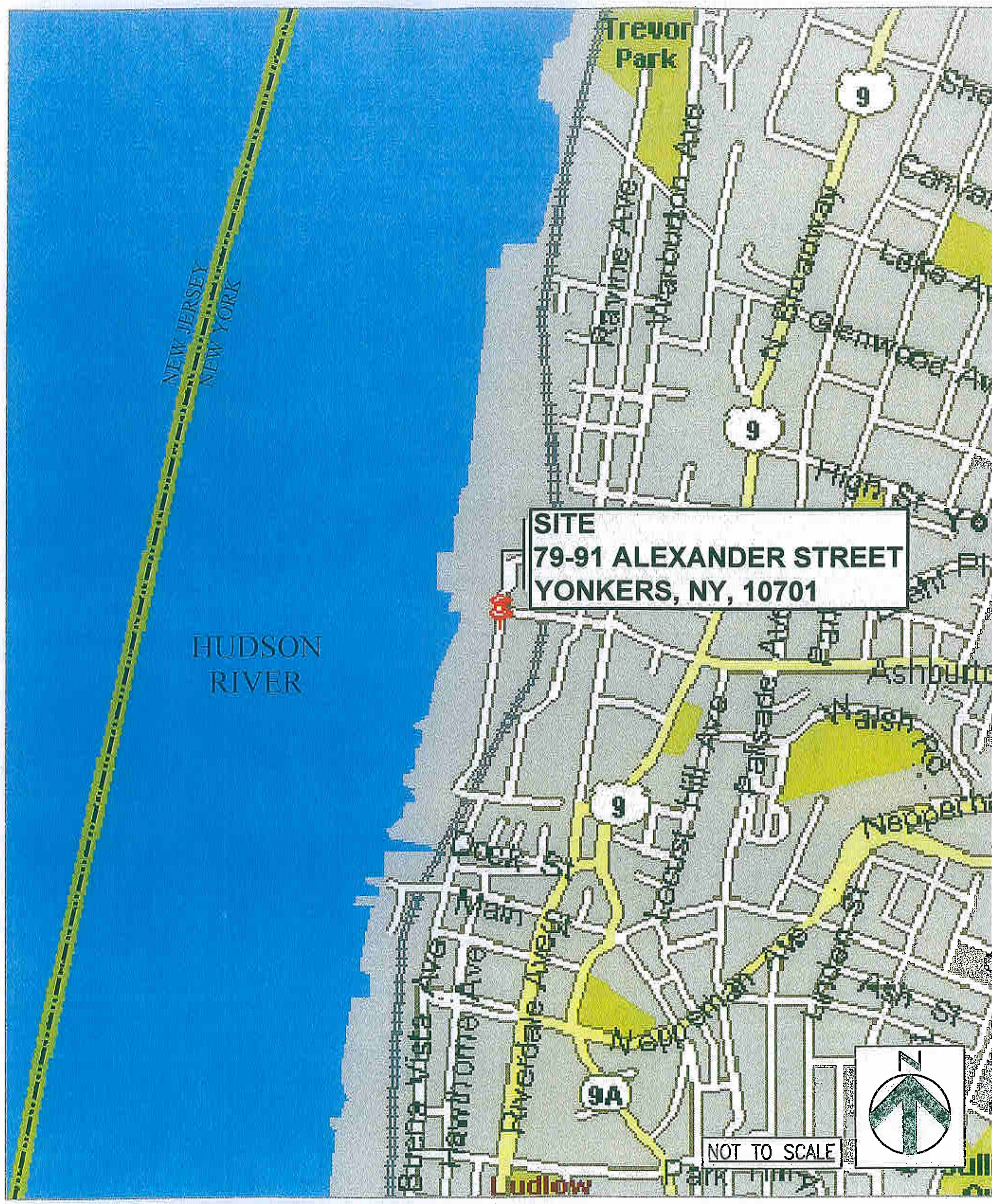
This Final Remedial Site Investigation/Remedial Alternatives Report (Final SI/RAR): (1) summarizes the activities conducted during the Remedial Investigation, performed in October 2004, and a supplemental investigation, performed in August 2005 to supplement the Remedial Investigation (Supplemental Investigation), and the results of surface and subsurface sampling analyses from these investigations; and (2) provides YASR with an evaluation of the no-action alternative and applicable remedial action alternatives and their associated costs.

1.2 Site Background

1.2.1 Site Description

The site is located on the east bank of the Hudson River in the City of Yonkers, Westchester County, New York (see Figure 1) and includes Tax Section 2, Block 2610, Lots 18, 22, 30 and 35. Figure 2 shows a plan view of the property. The site is approximately 2.8 acres and is bordered by the Hudson River on the west, Ashburton Avenue on the north, Alexander Street on the east and an industrial property on the south. Currently, the Department of Social Services is located to the north; Pennysaver, Atlantic Express and Lisa Choice Fundraising are located to the east in former industrial buildings; and a number of industrial buildings are located to the south.

The site was formally used as a MOSF containing 16 registered aboveground storage tanks (ASTs) that were used to store a total capacity of 5,093,000 gallons of unleaded gasoline, diesel and fuel oil. Fifteen (15) of the ASTs, AST Tanks #1 through #16 (AST Tank #3 does not exist), were located in a secondary containment area consisting of a concrete wall and Claymax-lined bottom under at least six (6) of the ASTs. Table 1-1 lists these 15 ASTs, and the product previously stored in each. The 15 ASTs, along with piping within the containment area, were surveyed for lead-based paint. Five (5) of the ASTs tested positive for lead-based paint. In addition, all green piping located within the AST containment area and attached to the fuel fill racks also tested positive for lead. These 15 ASTs were drained and cleaned in August 2003 and demolished in September 2003 for the purpose of this investigation. A Final Tank Farm Demolition Report (Demolition Report) for the site was prepared by HDR for YASR in January 2004, and is provided in Appendix A of this Final SI/RAR Report.



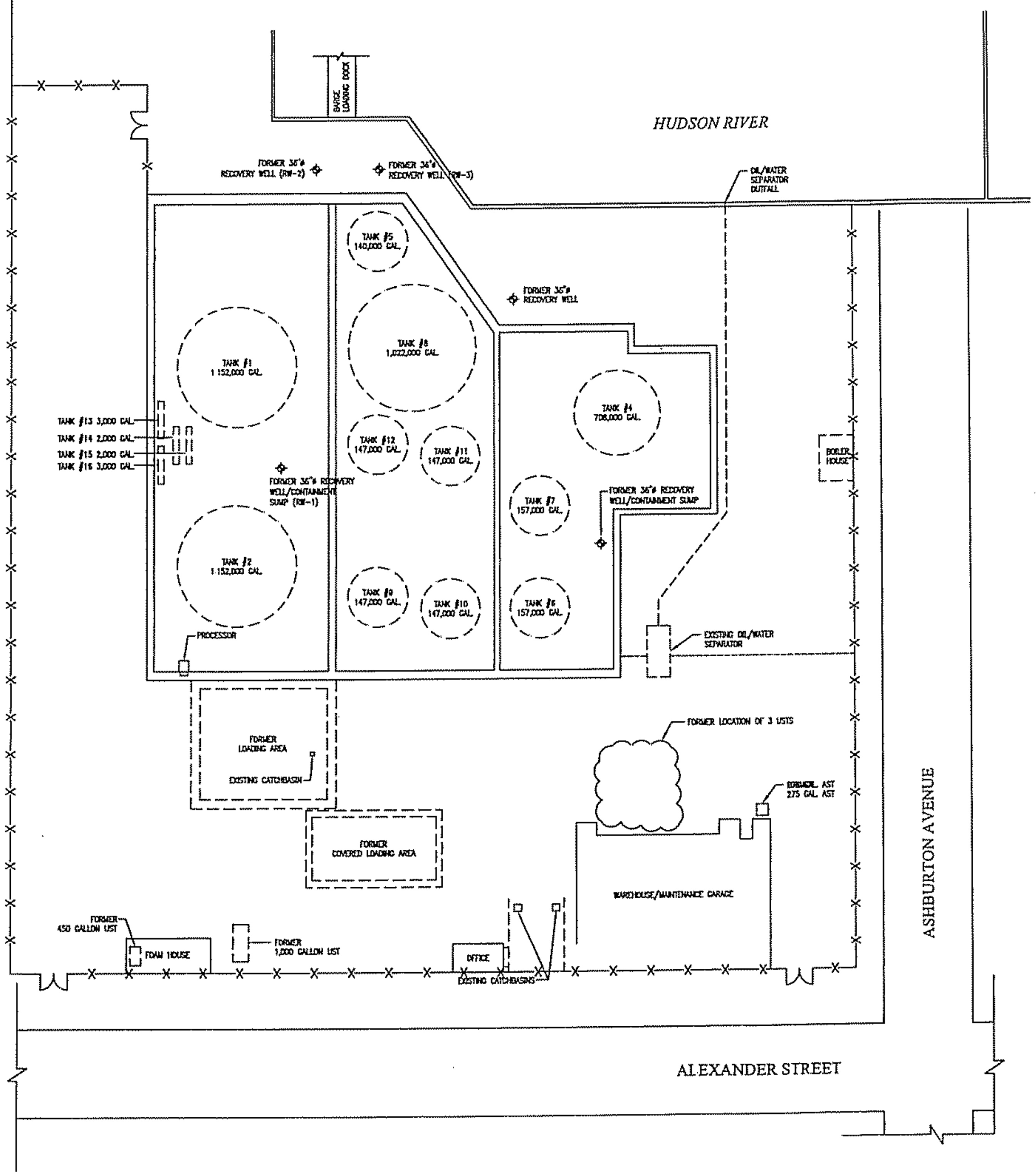
HDR

YONKERS ATI SITE INVESTIGATION/ REMEDIAL ALTERNATIVES REPORT YONKERS, NEW YORK

SITE LOCATION

DATE 10/20/05

FIGURE 1



LEGEND:

- FORMER RECOVERY WELL LOCATION
- DEMOLISHED/REMOVED
- FENCE
- ABOVE GROUND STORAGE TANK
- BENEATH SURFACE

NOTES:

1. TANK LOCATIONS ARE APPROXIMATE.
2. TANKS LOCATED WITHIN THE SECONDARY CONTAINMENT AREA AND THE BOILER HOUSE WERE DEMOLISHED IN 2004.

NOT TO SCALE

N

HDR

YONKERS ATI SITE INVESTIGATION/ REMEDIAL ALTERNATIVES REPORT YONKERS, NEW YORK

SITE PLAN

DATE 10/20/05

FIGURE 2

Table 1-1
Former Aboveground Storage Tanks within Secondary Containment Area[1]

AST Tank #[2]	Tank Size (gallons)	Product Previously Stored
1	1,152,000	Unleaded Gasoline
2	1,152,000	Unleaded Gasoline
4	708,000	#1, #2, or #4 Fuel Oil
5	147,000	Diesel
6	157,000	#1, #2, or #4 Fuel Oil
7	157,000	#1, #2, or #4 Fuel Oil
8	1,022,000	#1, #2, or #4 Fuel Oil
9	147,000	Diesel
10	147,000	#1, #2, or #4 Fuel Oil
11	147,000	#1, #2, or #4 Fuel Oil
12	147,000	#1, #2, or #4 Fuel Oil
13	3,000	Unleaded Gasoline
14	3,000	Diesel
15	2,000	#1, #2, or #4 Fuel Oil
16	2,000	#1, #2, or #4 Fuel Oil

Notes:
(1)These ASTs were demolished and removed from the site in September 2003.
(2)AST Tank #3 does not exist.

The site is still occupied by three small buildings. The buildings include a warehouse/maintenance garage, a dispatch office, and an inactive fire suppression foam pump house. An inactive boiler building was previously located on-site, but was demolished by Supertrans, a private company currently leasing the site for bus parking, between September 2003 and October 2004. In addition, the one-story portion of the warehouse/maintenance garage building was demolished during the abatement of asbestos containing material (ACM) on the roof during the Interim Remedial Measures (IRM) activities conducted as part of the Remedial Investigation (see Section 7.1). The buildings remaining on-site are single story, except for a section of the warehouse/maintenance garage that has a second floor office space (not in use). The buildings are brick and concrete block structures with no basements.

The site previously contained four truck drive-through fuel-fill racks and vehicle fuel dispensers. The rack areas were covered with corrugated metal roofs and surrounded by an asphalt berm. The fuel-fill racks and vehicle fuel dispensers were demolished in September 2003 (see January 2004

Final Demolition Report provided in Appendix A). Catch basins located inside the bermed areas discharge to an oil-water separator that was permitted for discharge to the Hudson River. Since the closing of the site as a MOSF, the valves to discharge to the Hudson River were closed at the request of the NYSDEC.

In addition to the 15 ASTs located in the secondary containment area discussed above, the following ASTs were still located on the site after the September 2003 demolition of the 15 ASTs:

- One 275-gallon AST, registered and believed to be containing waste oil, was located next to the warehouse/maintenance garage building.
- One AST assumed to be 1,000 gallons and one AST assumed to be 550 gallons were located in the boiler house along the northern perimeter of the property. Neither of these tanks was registered and the contents of each tank were unknown.

Supertrans assumed the responsibility of having these 275-gallon, 550-gallon and 1,000-gallon ASTs cleaned and removed from the site. Following the tank removal, Supertrans demolished the boiler house for additional parking spaces. In addition, Supertrans disposed of the contents within the warehouse/maintenance garage building for the purpose of demolishing the building. However, they were informed by the City of Yonkers Building Department that an asbestos survey and lead-based paint survey needed to be conducted before demolition. The asbestos and lead-based paint surveys, performed by HDR on behalf of YASR as part of this Remedial Investigation, identified asbestos and lead-based paint in all three on-site buildings (see Section 4.3.4). Asbestos abatement and lead removal was performed in all three on-site buildings as part of the IRM activities (see Section 7.1) Documentation provided by Supertrans related to the cleaning and removal of the tanks, clearing of the warehouse/maintenance garage building contents, and demolition of the boiler house building is provided in Appendix B of this Final SI/RAR Report.

An additional unregistered AST, having a capacity of 450 gallons, was located in the foam house along the eastern border of the property. The 450-gallon AST, based on the observations made by the Remedial Contractor during IRM activities, contained concentrated fire suppression foam identified to be Aer-O-Foam Cold Foam 3%. Refer to Appendix C for the associated foam material safety data sheet (MSDS) and general data sheet.

Evidence of one remaining Underground Storage Tank (UST), with a capacity of 1,000 gallons, was located outdoors on the north side of the foam house along the eastern border of the property, and, based on the observations made by the Remedial Contractor during IRM activities, contained #2 fuel oil. Both the 450 gallon foam house AST and the 1,000 gallon UST were removed from the site as part of the IRM activities (see Section 7.2) leaving no ASTs and no known USTs on site.

Four 8-inch diameter pipelines previously extended approximately 100 feet out into the Hudson River on the on-site barge loading dock. The four 8-inch diameter pipelines were drained in August 2003 and were removed from the site in September 2003 (see January 2004 Demolition Report provided in Appendix A). An approximate 50-gallon capacity catch basin is located under the pipe header to contain minor spills. A guard/monitoring house is located at the end of the dock from where vessel to tank farm fueling operations were formerly monitored.

Prior to demolition of the ASTs, there were six groundwater monitoring wells, three 3-foot diameter recovery wells, and two storm water sumps/containment sumps on site (see Figure 2). One of the monitoring wells was located upgradient of the tank farm. Several of the monitoring wells and one of the recovery wells were installed as a result of a 1989 #6 fuel oil spill (spill #8912251 – see below for more information). Two of the recovery wells and four of the monitoring wells were installed in 1998 as a result of a pipe leak in which approximately 10,375 gallons of #2 fuel oil was released (spill #9801901 – see below for more information). A Scavenger Recovery System was previously used by the former site owner, Halstead-Quinn Propane, Inc. (Halstead Quinn), to recover product from the groundwater table at these recovery wells. Recovered product was pumped into a tank truck. The two storm water sumps/containment sumps were located inside the containment area. These recovery wells were no longer in use during the time of the Remedial Investigation. Based on a November 19, 2004 conference call between YASR, NYSDEC and HDR, the three recovery wells and two sumps were approved to be discontinued, and were, therefore filled in by Supertrans. During the September 2003 AST demolition, four of the six existing groundwater monitoring wells were either destroyed by heavy machinery or paved over with a temporary layer of asphalt.

The following two spill reports reported by Halstead Quinn are believed to still be active for the site:

Spill #8912251, as reported in the SCS Engineers, P.C (SCS) Phase I Environmental Site Assessment, was listed with a 1989 #6 fuel oil Leaking Underground Storage Tank (LUST). The spill report provided by Halstead-Quinn states that 4,000 gallons of #6 fuel oil was recovered and pumped back into tanks and 1,000 gallons of contaminated product was placed into drums for disposal. Halstead-Quinn personnel stated that because of the consistency of #6 fuel oil in the cold of February, almost all product was scraped up and recovered for reuse or disposed of off-site. Any sheen in the recovery wells was removed by submerging a spill pad in each well.

Spill #9801901, as reported in the SCS Phase I Environmental Site Assessment, was a result of the #2 fuel oil pipe leak discovered on May 13, 1998. Data provided by the owner showed that approximately 10,372 gallons of #2 fuel oil was spilled in June 1998 and 8,575 gallons was recovered through December 31, 1998. The Scavenger Oil Recovery System recovery rate started at approximately 200 gallons per day when first installed on July 1, 1998, and was down to approximately seven (7) gallons per day in January 1999. Halstead-Quinn personnel monitored the system.

In addition, the spill report #0502798, reported by Royal Environmental Services (Royal), was registered for the site due to the presence of petroleum-contaminated soil observed on site on June 8, 2005 during the removal of one (1) 1,000 gallon UST containing #2 fuel oil, previously located near the inactive fire suppression foam pump house.

1.2.2 Site History

A section of the Hudson River was filled between 1886 and 1898 to create the site. See Section 3.2 for more detail on the fill material. The site was occupied by two companies, Archibald Lumber Company and P.A. Deyo and Son Elevator, in 1898 shortly after the site was created. The Hudson Fuel Company and Harrigan Coal and Wood occupied the site by 1917. In 1919, two brick buildings erected on the site, including a garage and stable. Hudson Fuel Company is listed as the site owner in 1919, 1923, and 1933. Hudson Fuel Company is believed to have owned the site through 1951. From 1951 through approximately 1977 or 1978, the site was owned by Standard Oil (currently ExxonMobil Corporation). From 1917 through 1951, Standard Oil owned the site to the east. Standard Oil sold that site to Polychrome, Inc. in 1951, and then acquired the subject site for the purpose of installing a tank farm. Nine ASTs were installed on the northern portion of the site under Standard Oil's ownership (Tanks. #4, #5, #6, #7, #8, #9, #10, #11, and #12) shortly after Standard Oil acquired the site. Therefore, the site first became an operating oil terminal in the 1950s. In 1978, Standard Oil sold the site to A. Tarricone, Inc. (ATI). On or about December 1983, ATI installed two additional large ASTs (Tanks #1 and #2, which are 1,152,000 gallons each, for unleaded gasoline) south of the previous nine ASTs. A total of 11 large ASTs appear to have been present between 1978 and 1989. Eventually, 15 ASTs were registered, including the 11 large ASTs. Sometime between 1995 and 2001, ATI sold or changed its name to Halstead-Quinn Propane, Inc. In spring 2001, Halstead-Quinn Propane, Inc. declared bankruptcy. In July 2002, YASR took control of the property and remains the current owner. Product was removed from the ASTs and the ASTs were cleaned prior to YASR obtaining ownership of the site. The site is no longer in operation as an oil storage facility and all of the ASTs and associated piping within the containment area were removed from the site during the demolition work in September 2003.

As noted above, former adjacent property owners included Standard Oil, who operated the site to the east from 1917 through 1951; and Polychrome, Inc., who operated the site to the east from 1951 through 1995. Other industries that have bordered the site over the past 105 years have included oil, asphalt, feed and produce, lumber, coal, an alcohol brewery, a local post office and a county ferry office.

1.2.3 Previous Investigations

The following Environmental Reports were provided to HDR:

1. September 2001 Phase I Environmental Site Assessment Report, prepared by SCS. The Phase I Report noted the following recommendations for the site:

    - Submit necessary documents to the NYSDEC to close all open spill numbers for the site.

- Register the 275-gallon ASTs containing waste oil and the three USTs that were removed. (This action was performed by SCS for Bernard Costitch, Esq. in August 2001.)
- Submit tank closure reports for the three removed USTs.
- Remove and/or register the one UST still on-site.
- Conduct a future investigation to determine if more USTs exist on site.
- Submit the Investigation Work Plan required under the Consent Order.

2. September 2001 Site Screening Investigation Report, prepared by SCS. The Site Investigation Report identified the following issues and actions for the site:

    - Conduct an additional site characterization sampling event for analyses of Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs) and metals in the groundwater and soil.
    - Remove remaining USTs.
    - Remove known soil hot spots in the immediate area where the three USTs were removed. (This action was performed by Bernard Costitch, Esq. in 2002).
    - Characterize groundwater flow conditions.

1.2.4 Work Plan

HDR submitted a Draft Work Plan (Work Plan), including a Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP), Site-specific Health and Safety Plan (HASP), Citizen Participation Plan (CPP), and Community Air Monitoring Plan (CAMP) for the Remedial Investigation to the NYSDEC for review in November 2002. The Work Plan, FSP/QAPP, HASP, CPP and CAMP outlined the proposed sampling plan (including soil boring and groundwater monitoring well locations and field sampling procedures) to be followed during the field sampling activities. The NYSDEC provided HDR with comments on the Work Plan, FSP/QAPP, HASP, CPP and CAMP on July 25, 2003. HDR provided the NYSDEC with a final Work Plan, FSP/QAPP, HASP CPP and CAMP on October 16, 2003, revised to address NYSDEC comments. A copy of the final Work Plan, FSP/QAPP, HASP, CPP and CAMP and the Response to NYSDEC Comments Letter dated October 16, 2003 is included in Appendix D to this Final SI/RAR Report.

Per the request of the NYSDEC, the NYSDEC-approved final Work Plan was amended as described in the August 1, 2005 letter proposals (Amendment letter #1 and Amendment letter #2) from HDR to YASR that included: (1) collection and analysis of filtered and unfiltered groundwater samples; (2) supplemental soil samples; and (3) use of a geoprobe to determine the approximate depth and extent of a subsurface concrete pad. A copy of both August 1, 2004 Amendment letters are provided in Appendix D to this Final SI/RAR Report.

The reason for these revisions was to perform a Supplemental Investigation. The Supplemental Investigation would confirm the conclusion provided in the Draft SI/RAR dated May 25, 2005, submitted by HDR to NYSDEC for the site (Draft SI/RAR). In the Draft SI/RAR, the elevated metals contamination found in groundwater on site was concluded to be due to the high turbidity (soil particles) in the groundwater samples, which could be confirmed during the Supplemental Investigation where filtered and unfiltered groundwater samples would be collected and analyzed for Resource Conservation Recovery Act (RCRA) Metals. Additional soil sampling was to be performed as part of the Supplemental Investigation to: (1) supplement the results of the Remedial Site Investigation conducted in October 2004; and (2) refine the remedial alternatives evaluated for the site presented in the Draft SI/RAR. In addition, the Supplemental Investigation included an on-site investigation to delineate, to the extent practical, the approximate areal extent and depth of the subsurface concrete pads within the former AST secondary containment area that were identified during the October 2004 Site Investigation to refine the remedial alternatives presented in the Draft SI/RAR.

1.3 Report Organization

This Final SI/RAR Report is organized with the following sections and Appendices:

Section 1.0 – Introduction
Section 2.0 – Remedial and Supplemental Site Investigations
Section 3.0 – Physical Characteristics of the Study Area
Section 4.0 – Nature and Extent of Contamination
Section 5.0 – Evaluation of Investigative Data
Section 6.0 – Contaminant Fate and Transport and Human Exposure Potential

Section 7.0 – Interim Remedial Measures

Section 8.0 – Data Usability Summary Report

Section 9.0 – Remedial Alternatives and Estimated Costs

Section 10.0 – Summary and Conclusions

Appendices

Appendix A - January 2004 Final Tank Farm Demolition Report

Appendix B - Documentation from Supertrans

Appendix C - MSDS and Data Sheet for Aer-O-Foam Cold Foam 3%

Appendix D - October 2003 NYSDEC Approved Final Work Plan, Field Sampling Plan/Quality Assurance Project Plan, Health and Safety Plan, Citizen Participation Plan, Community Air Monitoring Plan; the Response to NYSDEC comments letter dated October 16, 2003; August 1, 2005 Amendment Letter #1 and Amendment Letter #2

Appendix E - Soil Boring Logs and Groundwater Monitoring Logs (Site Investigation, October 2004 and Supplemental Site Investigation, August 2005)

Appendix F - Field Log Book (Site Investigation, October 2004 and Supplemental Site Investigation, August 2005)

Appendix G - Data Usability Summary Reports including Laboratory Analytical Results (Site Investigation, October 2004)

Appendix H - Asbestos and Lead-Based Paint Survey Reports

Appendix I - Data Usability Summary Reports including Laboratory Analytical Results (Supplementary Site Investigation, August 2005)

Appendix J - Asbestos Abatement/Lead-Based Paint Removal and Demolition Documentation

Appendix K - AST/UST Closure Report

2.0 REMEDIAL AND SUPPLEMENTAL SITE INVESTIGATIONS

HDR and its subconsultant, Aquifer Drilling and Testing, Inc. (ADT), performed a surface and subsurface investigation in October 2004. Field sampling activities were conducted over five days from October 18 through 22, 2004. Based on site conditions and review of previous investigations, a total of 15 surface soil samples, 22 subsurface samples (one per boring location) and 10 groundwater samples (one per installed well) were obtained to characterize the site conditions. Due to the unexpected interference of a concrete pad of unknown thickness approximately 5 feet below the surface in the area of the former AST footprints within the secondary containment area, the final locations of borings and monitoring wells were identified in the field, in consultation with the NYSDEC, and varied from the original locations. Figure 3 depicts the final sampling locations. Prior to sampling, YASR informed HDR that all electrical and water lines to the site were turned off. In accordance with the final Work Plan, the soil and groundwater samples were analyzed for the following parameters:

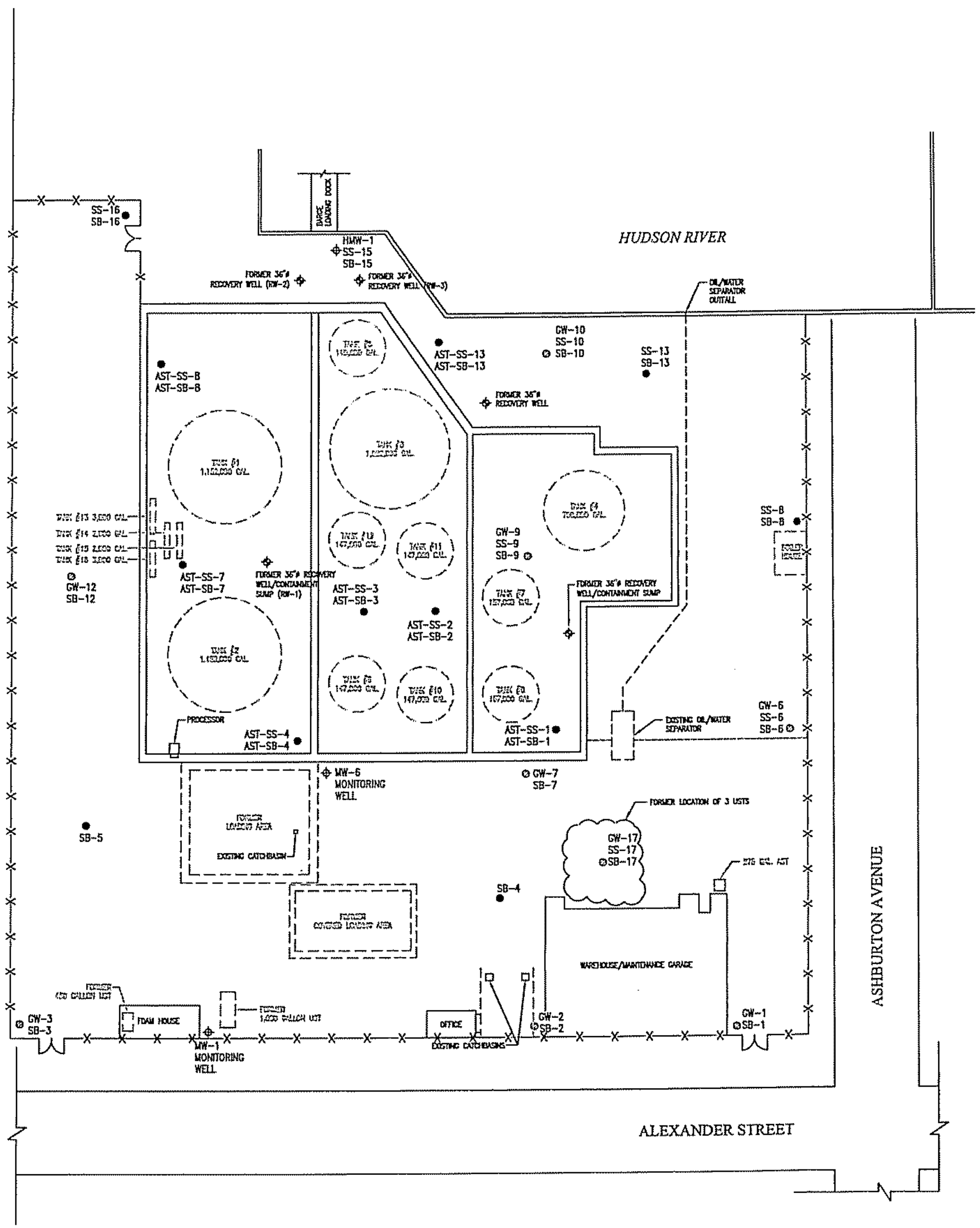
- VOCs;
- SVOCs; and
- RCRA Metals.

HDR's subconsultant, Environmental Management Solutions of New York (EMS) conducted an asbestos survey and a lead-based paint survey on the three buildings remaining on the site. The asbestos survey was conducted on October 4, 2004 and the lead-based paint survey was conducted on October 6, 2004.

In accordance with the revised Final Work Plan, HDR conducted the following activities for the Supplemental Investigation at the site from August 8 through 16, 2005:

- Additional groundwater sampling to: (1) supplement the results of the Remedial Site Investigation performed in October 2004; and (2) confirm the conclusion provided in the Draft SI/RAR, which stated that the elevated metals contamination found in on-site groundwater was due to the high turbidity (soil particles) in the groundwater samples;

- Additional soil sampling to: (1) supplement the results of the Remedial Site Investigation conducted in October 2004; and (2) refine the remedial alternatives evaluated for the site presented in the Draft SI/RAR; and



LEGEND:

- FORMER MONITORING WELL LOCATION
- FORMER RECOVERY WELL LOCATION
- SOIL SAMPLE LOCATION
- SOIL SAMPLE AND TEMPORARY MONITORING WELL LOCATION
- SOIL SAMPLE AND PERMANENT MONITORING WELL LOCATION
- DEMOLISHED/REMOVED
- FENCE
- ABOVE GROUND STORAGE TANK
- BENEATH SURFACE

NOTES:

1. SAMPLING LOCATIONS AND TANK LOCATIONS ARE APPROXIMATE.
2. TANKS LOCATED WITHIN THE SECONDARY CONTAINMENT AREA AND THE BOILER HOUSE WERE DEMOLISHED IN 2004.

MW = MONITORING WELL
HMW = HDR MONITORING WELL
GW = GROUNDWATER SAMPLE
AST-SB = ABOVE GROUND STORAGE TANK SOIL BORING LOCATION
SB = SOIL BORING LOCATION
RW = RECOVERY WELL
SS = SURFACE SOIL SAMPLE LOCATION

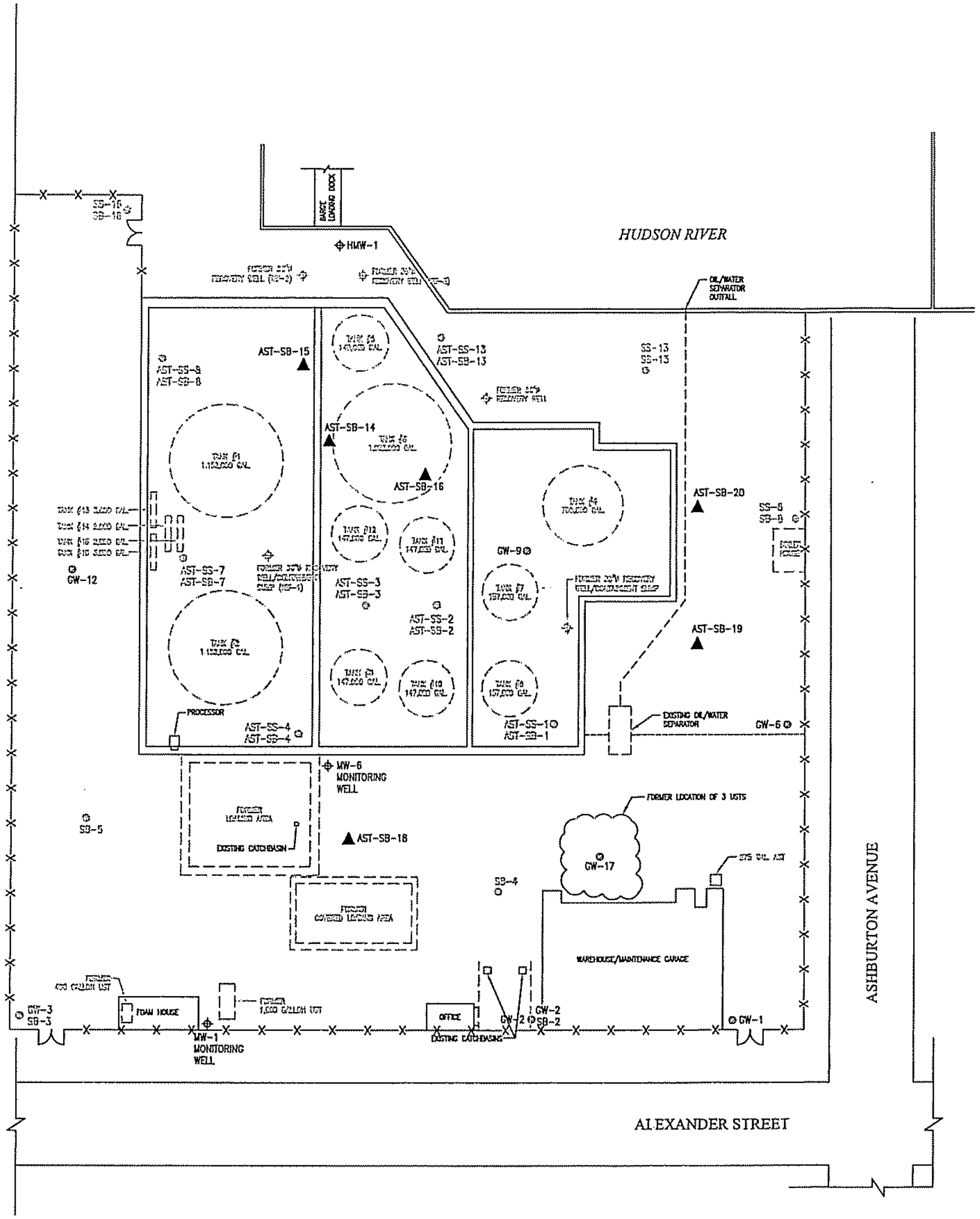
HDR

YONKERS ATI SITE INVESTIGATION/ REMEDIAL ALTERNATIVES REPORT YONKERS, NEW YORK

REMEDIAL INVESTIGATION SAMPLING LOCATIONS (OCTOBER 2004)

DATE 10/20/05

FIGURE 3



LEGEND:

- FORMER MONITORING WELL LOCATION
- FORMER RECOVERY WELL LOCATION
- SOIL SAMPLE LOCATION
- SOIL SAMPLE AND TEMPORARY MONITORING WELL LOCATION
- SOIL SAMPLE AND PERMANENT MONITORING WELL LOCATION
- SUPPLEMENTAL SOIL SAMPLE LOCATION
- DEMOLISHED/REMOVED
- FENCE
- ABOVE GROUND STORAGE TANK
- BENEATH SURFACE

NOTES:

1. SAMPLING LOCATIONS AND TANK LOCATIONS ARE APPROXIMATE.
2. TANKS LOCATED WITHIN THE SECONDARY CONTAINMENT AREA AND THE BOILER HOUSE WERE DEMOLISHED IN 2004.

MW = MONITORING WELL
HMW = HDR MONITORING WELL
GW = GROUNDWATER SAMPLE
AST-SB = ABOVE GROUND STORAGE TANK SOIL BORING LOCATION
SB = SOIL BORING LOCATION
RW = RECOVERY WELL
SS = SURFACE SOIL SAMPLE LOCATION

NOT TO SCALE

HDR

YONKERS ATI SITE INVESTIGATION/ REMEDIAL ALTERNATIVES REPORT YONKERS, NEW YORK

SUPPLEMENTAL INVESTIGATION SAMPLING LOCATIONS (AUGUST 2005)

DATE 10/20/05

FIGURE 3A

- An on-site investigation to delineate, to the extent practical, the approximate areal extent and depth of the subsurface concrete pads within the former AST secondary containment area that were identified during the October 2004 Site Investigation to refine the remedial alternatives presented in the Draft SI/RAR.

Based on a review of the results of the Remedial Site Investigation conducted in October 2004, a total of six (6) subsurface samples (one per boring location) and 18 groundwater samples from nine (9) locations (one (1) unfiltered and one (1) filtered from each of the nine (9) sampling locations) were obtained to supplement the data used to characterize the Site conditions. Figure 3a depicts the final sampling locations. In accordance with Amendment #1 to the final Work Plan, the groundwater samples were analyzed for RCRA Metals. In addition, in accordance with Amendment #2 to the final Work Plan, the soil samples were analyzed for the following parameters:

- VOCs;
- SVOCs; and
- RCRA Metals.

Results of the investigation are included in Section 4.0.

2.1 Field Sampling

Sampling at the site during the October 2004 Remedial Investigation included the following:

- Collection of surface soil samples (0 to 2 inches) at eight (8) of the 15 soil boring locations located outside of the AST containment area. Surface soil samples were collected only in the non-paved areas;
- Collection of surface soil samples (0 to 2 inches) at seven (7) soil boring locations located within the AST containment area;
- Continuous sampling of subsurface soils at 15 soil boring locations outside of the AST containment area;
- Continuous sampling of subsurface soils at seven (7) soil boring locations within the AST containment area;
- Installation of one permanent groundwater monitoring well, near former recovery wells RW-2 and RW-3;

- Continuous sampling of subsurface soils at one (1) groundwater monitoring well location;
- Installation of nine (9) temporary groundwater monitoring wells in nine (9) of the 22 soil boring locations;
- Groundwater sampling from nine (9) temporary groundwater monitoring wells and one (1) permanent groundwater monitoring well installed;
- Measuring groundwater levels and free product thickness (none was observed), from the above-mentioned monitoring wells;
- Surface water sampling from the water located in the oil/water separator;
- The removal of one (1) AST located outside of the containment area;
- Removal of one (1) UST and associated petroleum contaminated soil, if any; and
- An asbestos survey and lead-based paint survey of the building structures on site.

Although the sampling of on-site drums was scoped for this investigation, it was not performed by HDR because the drums were removed from the site by the tenant, Supertrans. Supertrans provided copies of available disposal documentation and, as noted earlier in this Final SI/RAR, this information is provided in Appendix B. In addition, the sampling of six (6) existing on-site groundwater monitoring wells was scoped for this investigation; however, it was not performed since the six (6) existing wells could not be located during the October 2004 Remedial Investigation. Two of these groundwater monitoring wells were discovered and sampled during the August 2005 Supplemental Investigation. The remaining four (4) monitoring wells are assumed to have been either destroyed by heavy machinery or paved over with a temporary layer of asphalt.

Sampling at the site during the August 2005 Supplemental Site Investigation included the following:

- Continuous sampling of subsurface soils at three (3) supplemental soil boring locations within the AST containment area;
- Continuous sampling of subsurface soils at three (3) supplemental soil boring locations outside of the AST containment area;
- Measuring groundwater levels and free product thickness (none was observed), and groundwater sampling from nine (9) temporary groundwater monitoring wells in locations previously sampled during the October 2004 Site Investigation; and
- Use of a geoprobe to determine the approximate location and depth of the concrete pad located within the AST containment area.

2.2 Surface and Subsurface Soil Remedial Investigation (October 2004)

Soil sampling activities were conducted over four days on October 18, 19, 20, and 21, 2004. A summary of the soil samples obtained and analyzed is provided in Tables 2-1 and 2-2.

On-site surface soil samples (0 to 2 inches) were collected at eight (8) soil boring locations that were not paved or covered by buildings (SS-6, SS-8, SS-9, SS-10, SS-13, SS-15, SS-16 and SS-17). Subsurface soil samples were collected at 2-foot sample intervals from 15 soil boring locations (SB-1 through SB-10, SB-12, SB-13, SB-15, SB-16 and SB-17). Surface sample SS-15 and subsurface sample SB-15 were obtained from the one (1) soil boring location at the site that was converted to a groundwater monitoring well location (HMW-1). Surface sample SS-15 and subsurface sample SB-15 were also identified as HMW-SS-15 and HMW-SB-15, respectively.

Surface and subsurface soil samples SS-17 and SB-17, respectively, were located in the former location of the three (3) USTs previously removed by Bernard Costitch, Esq. (while the property was owned by Halstead Quinn), because previous data from the UST removal process were not provided to YASR at the time of transfer of ownership. At the request of Robert Filkins, NYSDEC Project Manager for the site, SS-11 and SB-11 were not required, and therefore were not obtained due to the concrete pad of unknown thickness within the AST containment area. A concrete pad of unknown thickness was encountered at soil boring location SB-14 at a depth of approximately 2 feet below ground surface (bgs). The boring was relocated approximately 6 feet way from the original boring location, where concrete was also encountered at a depth of approximately 5 feet. Therefore, SB-14 was abandoned and a soil sample was not obtained from this location.

All ASTs located within the secondary containment area were drained and cleaned during 2002. The initial cleaning, allegedly performed by the previous owner, removed most of the residue but apparently not all of the residue material in the tanks. Therefore, these ASTs were redrained and recleaned in August 2003, and demolished in September 2003 to allow for continuous soil sampling beneath the tanks. Soil in the immediate area of the former AST locations, within the containment wall were sampled and analyzed. Surface samples within the secondary containment area were not included in the Final Work Plan for the site because the secondary containment area consisted of gravel on a Claymax liner. However, after the tank demolition, but prior to the Remedial Investigation, YASR's tenant, Supertrans, filled the secondary containment area with soil and paved the area with a temporary layer of asphalt to allow for the staging of the buses in this area. As a result, seven (7) surface soil samples (AST-SS-1 through AST-SS-4, AST-SS-7, AST-SS-8, and AST-SS-13) in the secondary containment area from the top 0 to 2 inches of soil below the asphalt pavement were obtained from all soil boring locations sampled within the secondary containment area. Subsurface soil samples were collected at 2-foot sample intervals from seven (7) soil boring locations (AST-SB-1 through AST-SB-4, AST-SB-7, AST-SB-8, and AST-SB-13) at the site. Continuous soil samples were collected using split spoons and a hollow stem auger at 2-foot intervals, from the ground surface (below approximately 1 foot of gravel and a ¼" Claymax liner gravel and Claymax liner) to the depth of groundwater, or to a depth of equipment refusal, whichever was encountered first. During the auger drilling, refusal within the secondary containment area at a depth of approximately 5 feet was constantly encountered. After consultation with the NYSDEC, the number of soil boring locations within the secondary containment area was reduced, and surface/subsurface soil samples were not obtained from the following locations: AST-5, AST-6, and AST-9 through AST-12.

A photoionization detector (PID), Minirae 2000, was used to screen each split spoon sample for the presence of VOC vapors. However, since the ambient air quality was influenced by the idling and moving school buses operating on the site during sampling, the vapor readings did not appear to be representative of the sample itself. On October 19, 2004, high concentrations of exhaust fumes from a large amount of school bus activity on the site caused the PID to inaccurately read organic vapors coming from the surface soil and subsurface soil samples. Robert Filkins of the NYSDEC was notified and agreed that the vapor readings did not need to be obtained after the second day of site work due to the extenuating circumstances.

Table 2-1
Remedial Investigation Soil Sampling Summary (October 2004)

Sample Identification	EPA Method 8260B (VOCs)	EPA Method 8270 (SVOCs)	EPA Method 6010/7000 (RCRA Metals)	Comments
Subsurface Soil Samples				
SB-1	✓	✓	✓	Location 1; temporary monitoring well GW-1 installed in this location
SB-2	✓	✓	✓	Location 2; temporary monitoring well GW-2 installed in this location
SB-3	✓	✓	✓	Location 3; temporary monitoring well GW-3 installed in this location
SB-4	✓	✓	✓	Location 4
SB-5	✓	✓	✓	Location 5
SB-6	✓	✓	✓	Location 6; temporary monitoring well GW-6 installed in this location
SB-7	✓	✓	✓	Location 7; temporary monitoring well GW-7 installed in this location
SB-8	✓	✓	✓	Location 8
SB-9	✓	✓	✓	Location 9; temporary monitoring well GW-9 installed in this location
SB-10	✓	✓	✓	Location 10; temporary monitoring well GW-10 installed in this location
SB-11	No longer required per NYSDEC field instructions			
SB-12	✓	✓	✓	Location 12; temporary monitoring well GW-12 installed in this location
SB-13	✓	✓	✓	Location 13
SB-14	Not obtained due to obstruction encountered			
SB-15	✓	✓	✓	Location 15; permanent monitoring well HMW-1 installed in this location
SB-16	✓	✓	✓	Location 16
SB-17	✓	✓	✓	Location 17; temporary monitoring well GW-17 installed in this location
Surface Soil Samples				
SS-6	✓	✓	✓	Location 6
SS-8	✓	✓	✓	Location 8
SS-9	✓	✓	✓	Location 9
SS-10	✓	✓	✓	Location 10
SS-13	✓	✓	✓	Location 13
SS-15	✓	✓	✓	Location 15
SS-16	✓	✓	✓	Location 16
SS-17	✓	✓	✓	Location 17

Notes:
SB: Soil Boring (Subsurface) -Soil Sample
SS: Surface Soil Sample
VOCs: Volatile Organic Compounds
SVOCs: Semivolatile Organic Compounds
RCRA: Resource Conservation Recovery Act
EPA: Environmental Protection Agency
NYSDEC: New York State Department of Environmental Conservation

Table 2-2
Remedial Investigation AST Soil Sampling Summary (October 2004)

Sample Identification	EPA Method 8260B (VOCs)	EPA Method 8270 (SVOCs)	EPA Method 6010/7000 (RCRA Metals)	Comments
Subsurface Soil Samples				
AST-SB-1	✓	✓	✓	AST Location 1
AST-SB-2	✓	✓	✓	AST Location 2
AST-SB-3	✓	✓	✓	AST Location 3
AST-SB-4	✓	✓	✓	AST Location 4
AST-SB-5	No longer required per NYSDEC due to concrete pad			
AST-SB-6	No longer required per NYSDEC due to concrete pad			
AST-SB-7	✓	✓	✓	AST Location 7
AST-SB-8	✓	✓	✓	AST Location 8
AST-SB-9	No longer required per NYSDEC due to concrete pad			
AST-SB-10	No longer required per NYSDEC due to concrete pad			
AST-SB-11	No longer required per NYSDEC due to concrete pad			
AST-SB-12	Not obtained due to obstruction encountered due to concrete pad			
AST-SB-13	✓	✓	✓	AST Location 13
Surface Soil Samples				
AST-SS-1	✓	✓	✓	AST Location 1
AST-SS-2	✓	✓	✓	AST Location 2
AST-SS-3	✓	✓	✓	AST Location 3
AST-SS-4	✓	✓	✓	AST Location 4
AST-SS-7	✓	✓	✓	AST Location 7
AST-SS-8	✓	✓	✓	AST Location 8
AST-SS-13	✓	✓	✓	AST Location 13

Notes:
SB: Soil Boring (Subsurface) -Soil Sample
SS: Surface Soil Sample
AST: Aboveground Storage Tank
VOCs: Volatile Organic Compounds
SVOCs: Semivolatile Organic Compounds
RCRA: Resource Conservation Recovery Act
EPA: Environmental Protection Agency
NYSDEC: New York State Department of Environmental Conservation

At each of the 22 boring locations, discreet subsurface soil samples were collected at 2-foot intervals using split spoon sampling to groundwater depth (approximately 4.5 to 7.5 feet below grade), or refusal. Each of the soil samples was visually inspected for staining and/or the presence of an oily film or detectable odor, and simultaneously scanned with the PID for VOC vapors during the first two days of sample collection. The sampling equipment was decontaminated between sampling locations by first washing with a potable water and Alconox detergent mixture, then by rinsing with clean potable water and applying a final rinse of deionized water. (A detailed description of the decontamination procedures used during sampling is described in the Work Plan and FSP/QAPP included in Appendix D.) A sample from the depth of soil with the highest PID reading or heaviest visible staining was submitted to the laboratory for analysis. At boring locations (SB-16 and AST-SB-1) where no volatile organic vapors were detected or petroleum stains observed in any of the samples collected, the sample collected at the vadose zone groundwater surface interface was selected for laboratory analysis. Table 2-3 contains the soil boring summary detailing the soil description, the PID readings (as applicable), and comments on the amount of recovery, the depth where groundwater was encountered, the interval selected for laboratory screening, and any odors or staining. All soil samples were sent to HDR's laboratory subconsultant, Chemtech, for analysis of VOCs, SVOCs and RCRA Metals. Soil boring logs are included in Appendix E of this Final SI/RAR Report. In addition, a copy of the field log book is included in Appendix F of this Final SI/RAR Report. Boring holes not selected for development into monitoring wells were refilled with soil following completion of soil sample collection.

2.3 Groundwater Remedial Investigation (October 2004)

A total of nine (9) temporary groundwater monitoring wells (GW-1 through GW-3, GW-6, GW-7, GW-9, GW-10, GW-12 and GW-17) were installed in nine (9) (SB-1 through SB-3, SB-6, SB-7, SB-9, SB-10, SB-12 and SB-17) of the 22 borings at the site. One (1) permanent, flush-mounted, shallow groundwater monitoring well (HMW-1) was installed in one (1) (SB-15) of the 22 borings at the site, after soil sampling was completed at this boring location. The wells were installed from October 18 through 21, 2004 to a depth of 12 to 15 feet below the ground surface with the lower 10 feet screened. The screens were placed such that the vertical midpoint of the screen was near the suspected top of the groundwater table. A copy of the groundwater monitoring well construction logs is included in Appendix E. The groundwater monitoring wells were developed on October 21, 2004.

On October 22, 2004, the groundwater monitoring wells were purged and a single sample was obtained from each well. Prior to purging the monitoring wells, the depth to groundwater was measured using an oil/water interface probe. During purging, but before the collection of groundwater samples, salinity, pH, conductivity, turbidity, and temperature measurements were collected using a Horiba Water Quality Checker U10 meter. Free product was not encountered in the groundwater monitoring wells. Procedures used to collect groundwater samples follow those outlined in the FSP/QAPP, a copy of which is included in Appendix D. Each of the groundwater samples were analyzed using United States Environmental Protection Agency (EPA) SW 846 Methods for RCRA Metals, VOCs, and SVOCs.

2.4 Surface Water Investigation

On October 22, 2004, one surface water sample was obtained from the on-site oil/water separator. At the request of the NYSDEC, the on-site oil/water separator is currently not operating, because the State Pollutant Discharge Elimination System (SPDES) permit for the site has lapsed since the site is no longer operated as a MOSF. Free product was not encountered in the oil/water separator. The surface water sample was analyzed using EPA SW 846 Methods for RCRA Metals, VOCs, and SVOCs. A summary of the groundwater and surface waster samples obtained and analyzed is provided in Table 2-4.

2.5 Asbestos Survey

On October 4, 2004, an asbestos survey was conducted by HDR's subcontractor, EMS, for each of the buildings located within the study area. The survey consisted of an inspection, sampling, and sample analysis. The survey was conducted by a State of New York-certified inspector in accordance with EPA and New York State requirements. The inspection was conducted to identify the presence and location(s) of suspected ACMs within the interior and exterior surfaces of the building. Bulk samples were collected from each of the three (3) on-site buildings. The

TABLE 2-3

Summary of Soil Boring Logs

Drilling Location Number	Drill Date	Depth Below Surface (feet)	Soil Description	PID (ppm)	Soil Samples Obtained	Comment / Soil Recovery
SB-01	10/20/2004	0 - 2'	soil & grv. (with fill & asphalt)	N A per NYSDEC		
		2' - 4'	brn soil & grv.			
		4' - 6'	brn-blk soil & grv.			slight petrol. odor
		6' - 8'	blk sandy soil & silty clay		SB-1 (6-8')	strong odor. GW at 7' Screen at 2' - 12'
SB-02	10/20/2004	0 - 2'	blk soil & grv. (with fill & asphalt)	N A per NYSDEC		
		2' - 4'	blk soil & grv. (with fill & asphalt)			
		4' - 6'	clay & soil		SB-2 (4-6')	petroleum odor
		6' - 8'	clay & coal			GW at 7' Screen at 2' - 12'
SB-03	10/18/2004	0 - 2'	dk brn soil	0		
		2' - 4'	mostly empty split spoon w/some gvl	0	SB-3 (2-4')	
		4' - 6'	empty split spoon	0		GW at 5' Screen at 2' - 12'
SB-04	10/20/2004	0 - 2'	fill & brn sandy soil	N.A. per NYSDEC		
		2' - 4'	brn-blk clay & sandy soil		SB-4 (2-4')	petroleum odor
		4' - 6'	brn-blk clay & sandy soil			
		6' - 8'	brn-gy clay			GW at 6.5'
SB-05	10/18/2004	0 - 2'	blk soil & grv. (with fill & asphalt)	0		
		2' - 4'	dk brn - blk soil	0		
		4' - 6'	dk brn - blk soil and clay	0	SB-5 (4-6')	slight petrol. odor
		6' - 8'	empty spoon	0		GW at 6.5'
SS-06 SB-06	10/19/2004	0 - 2'	dk brn soil & grv. (with fill & asphalt)	4.3	SS-6 (0-2')	
		2' - 4'	blk soil & grv mix	26.5	SB-6 (2-4')	strong p.odor
		4' - 6'	brn - blk soil & grv mix	23.4		petroleum odor
		6' - 8'	brn - blk soil & grv mix	19		GW at 7' Screen at 2' - 12'
SB-07	10/19/2004	0 - 2'	gvl, fill & soil mix	5		
		2' - 4'	brn-gy soil	23		
		4' - 6'	blk silty soil & clay	64	SB-7 (4-6')	
		6' - 8'	brn-blk fill & soil	42		GW at 7' Screen at 2' - 12'
SS-08 SB-08	10/19/2004	0 - 2'	partially empty blk grv. & soil mix	0	SS-8 (0-2')	
		2' - 4'	gy-blk soil & fill mix	9.2		
		4' - 6'	gy-blk soil	42.3		
		6' - 8'	gy-blk soil & clay mix	119	SB-8 (6-8')	GW at 7'
SS-09 SB-09	10/20/2004	0 - 2'	gvl, fill & soil mix	N A. per NYSDEC	SS-9 (0-2')	
		2' - 4'	brn soil & grv. mix			
		4' - 6'	brn-blk soil & grv. mix			slight petrol. odor
		6' - 8'	blk sandy soil		SB-9 (6-8')	strong odor. GW at 6' Screen at 2' - 12'
SS-10 SB-10	10/20/2004	0 - 2'	gvl, fill & soil mix	N A. per NYSDEC	SS-10 (0-2')	
		2' - 4'	brn sandy to silty soil		SB-10 (2-4')	
		4' - 6'	brn sandy to silty soil			petroleum odor GW at 5' (high tide)
		6' - 8'	mst & mostly empty sandy-silty soil			Screen at 2' - 12'
SS-11 SB-11	No longer required per NYSDEC site visit 10.21 04 with Robert Filkins due to concrete pad					
SB-12	10/18/2004	0 - 2'	gy-blk soil & grv. (with fill & asphalt)	0		
		2' - 4'	gy-blk soil & grv., dk brn. sandy soil	0		
		4' - 6'	gy-blk soil	0		
		6' - 8'	gy-blk mst soil	5.4	SB-12 (6-8')	petrol. odor. GW at 7' Screen set at 2'-12'
SS-13 SB-13	10/19/2004	0 - 2'	gy soil & grv (with fill & asphalt)	0	SS-13 (0-2')	
		2' - 4'	gy-blk soil & fill mix	3 5		
		4' - 6'	blk silty soil	12.5		
		6' - 8'	blk silty soil	26.8	SB-13 (6-8')	GW at 7'
SS-14 SB-14	10/18/2004	Encountered concrete pad of unknown thickness 4'-5' below surface. Relocated boring approx. 7' east for second drilling attempt. Encountered concrete pad again. Abandoned boring location.				
SS-15 (HMW-1-SS) SB-15 (HMW-1-SB)	10/18/2004	0 - 2'	mostly empty split spoon	0	SS-15 (0-2')	
		2' - 4'	blk f. soil & clay	6.5		
		4' - 6'	blk grv. & soil mix	63	SB-15 (4-6')	petroleum odor
		6' - 8'	partially empty blk grv & soil mix	54 2		GW at 7.5' Screen set at 5'-15'
SS-16 SB-16	10/18/2004	0 - 2'	mostly empty split spoon	0	SS-16 (0-2')	
		2' - 4'	mst gy soil & clay mix	0	SB-16 (2-4')	GW at 4.5'
SS-17 SB-17	10/20/2004	0 - 2'	soil & grv. (with fill & asphalt)	5	SS-17 (0-2')	
		2' - 4'	mostly empty split spoon	17		
		4' - 6'	brn-blk gvl & soil mix	25		
		6' - 8'	gy-blk mst clay & soil	40	SB-17 (6-8')	petrol. odor. GW at 7' Screen set at 2'-12'

Notes: blk = black. brn = brown. c-f = coarse to fine, dk = dark, f = fine. grv = gravel, gy = grey, m-f = medium to fine, mst = moist. rd = red, SM = silty sand, trc= trace, SS=surface soil, SB=Subsurface soil. AST=Aboveground storage tank

TABLE 2-3 (continued)

Summary of Soil Boring Logs

Drilling Location Number	Drill Date	Depth Below Surface (feet)	Soil Description	PID (ppm)	Soil Samples Obtained	Comment / Soil Recovery
AST-SS-01 AST-SB-01	10/21/2004	0 - 2'	dk brn soil & grv. (with fill & asphalt)	N A per NYSDEC	AST-SS-1 (0-2')	
		2' - 4'	mostly empty split spoon, some sand			
		4' - 6'	brn sandy soil & gravel		AST-SB-1 (4-6')	
		6' - 8'	mst gravel			GW at 6'
AST-SS-02 AST-SB-02	10/21/2004	0 - 2'	dk brn soil & grv. (with fill & asphalt)	N A per NYSDEC	AST-SS-2 (0-2')	
		2' - 4'	blk sandy soil			petroleum odor
		4' - 6'	blk sandy soil		AST-SB-2 (4-6')	strong p.odor
		6' - 8'	mst sandy soil			GW at 6.5'
AST-SS-03 AST-SB-03	10/21/2004	0 - 2'	dk brn soil & grv. (with fill & asphalt)	N A per NYSDEC	AST-SS-3 (0-2')	
		2' - 4'	mostly empty spoon with blk soil			slight petrol. odor
		4' - 6'	blk soil		AST-SB-3 (4-6')	petroleum odor
		6' - 8'	mst blk sandy clay			petroleum odor
AST-SS-04 AST-SB-04	10/21/2004	0 - 2'	dk brn soil & grv. (with fill & asphalt)	N A per NYSDEC	AST-SS-4 (0-2')	
		2' - 4'	dk brn soil & grv.			
		4' - 6'	blk soil & grv.		AST-SB-4 (4-6')	petroleum odor
AST-SS-05 AST-SB-05	No longer required per NYSDEC site visit 10 21 04 with Robert Filkins due to concrete pad					
AST-SS-06 AST-SB-06	No longer required per NYSDEC site visit 10 21 04 with Robert Filkins due to concrete pad					
AST-SS-07 AST-SB-07	10/19/2004	0 - 2'	dk brn soil & grv. (with fill & asphalt)	0	AST-SS-7 (0-2')	
		2' - 4'	brn soil & grv mix (slight staining)	19.2		petroleum odor
		4' - 6'	brn soil & grv mix (slight staining)	45		petroleum odor
		6' - 8'	blk soil	93 7	AST-SB-7 (6-8')	strong p.odor GW at 7'
AST-SS-08 AST-SB-08	10/21/2004	0 - 2'	dk brn soil & grv. (with fill)	N A. per NYSDEC	AST-SS-8 (0-2')	
		2' - 4'	dk brn soil & grv.			
		4' - 6'	empty split spoon		AST-SB-8 (6-8')	
		6' - 8'	gy-blk sandy soil & clay			strong odor, GW at 7'
AST-SS-09 AST-SB-09	No longer required per NYSDEC site visit 10 21 04 with Robert Filkins due to concrete pad					
AST-SS-10 AST-SB-10	No longer required per NYSDEC site visit 10 21 04 with Robert Filkins due to concrete pad					
AST-SS-11 AST-SB-11	No longer required per NYSDEC site visit 10 21 04 with Robert Filkins due to concrete pad					
AST-SS-12 AST-SB-12	10/18/2004	Encountered concrete pad of unknown thickness 4'-5' below surface Relocated boring approx 7' east for second drilling attempt. Encountered concrete pad again. Abandoned boring location.				
AST-SS-13 AST-SB-13	10/21/2004	0 - 2'	dk brn soil & grv. (with fill)	N A per NYSDEC	AST-SS-13 (0-2')	
		2' - 4'	brn grv. & soil			
		4' - 6'	brn-blk sandy soil		AST-SB-13 (4-6')	petroleum odor
		6' - 8'	mst grv & soil			GW at 6'

Notes: blk = black, brn = brown, c-f = coarse to fine, dk = dark, f = fine, grv = gravel, gy = grey, m-f = medium to fine, mst = moist, rd = red, SM = silty sand, trc= trace, SS=surface soil, SB=Subsurface soil, AST=Aboveground storage tank samples were submitted to a New York State Department of Health (NYSDOH)- Environmental Laboratory Approval Program (ELAP) accredited laboratory, Laboratory Testing Services, Inc. (LTS), for analysis. The bulk samples were analyzed for asbestos using Polarized Light Microscopy (PLM) techniques.

Table 2-4
Groundwater/Surface Water Sampling Summary (October 2004)

Sample Identification	EPA Method 8260B (VOCs)	EPA Method 8270 (SVOCs)	EPA Method 6010/7000 (RCRA Metals)	Comments
Temporary Monitoring Well Groundwater Samples				
GW-1	✓	✓	✓	Location 1
GW-2	✓	✓	✓	Location 2
GW-3	✓	✓	✓	Location 3
GW-6	✓	✓	✓	Location 6
GW-7	✓	✓	✓	Location 7
GW-9	✓	✓	✓	Location 9
GW-10	✓	✓	✓	Location 10
GW-12	✓	✓	✓	Location 12
GW-17	✓	✓	✓	Location 17
New Permanent Monitoring Well Groundwater Sample				
HMW-1	✓	✓	✓	Location 15
Surface Water Samples				
Oil/Water Separator	✓	✓	✓	Oil Water Separator

Notes:
GW: Temporary monitoring well
HMW: HDR Monitoring Well
VOCs: Volatile Organic Compounds
SVOCs: Semivolatile Organic Compounds
RCRA: Resource Conservation Recovery Act
EPA: Environmental Protection Agency

Friable and non-friable-organically bound (NOB) materials were analyzed via PLM. If a NOB sample did not result positive for asbestos with PLM techniques, subsequent analysis via Transmission Electron Microscopy (TEM) was performed. However, NOB samples that were intrinsically associated with materials that resulted positive for ACM (i.e., mastic adhered to a floor tile that was negative) were not further analyzed via TEM and were treated as ACM.

If analytical results indicated that the asbestos content was above one percent (1%), the materials were considered to contain asbestos.

2.6 Lead-Based Paint Survey

A lead-based paint survey was conducted by HDR's subcontractor, EMS, on October 6, 2004 for each of the buildings located within the study area. EMS used a portable X-ray Fluorescence (XRF) Niton XL Model 309 Spectrum Analyzer, to determine the lead content of selected paint surfaces. Surfaces are selected based on the site inspection performed and U.S. Department of Housing and Urban Development (HUD) Guidelines. In accordance with NYSDOH limits, paint containing 1.0 milligrams per square centimeter (mg/cm^2) lead or greater was considered lead-based paint.

2.7 Supplemental Investigation

2.7.1 Surface and Subsurface Soil Supplemental Investigation (August 2005)

Soil sampling activities were conducted on August 8, 2005. A summary of the soil samples obtained and analyzed is provided in Tables 2-5. Six (6) supplemental soil boring locations were identified to obtain data between areas previously sampled that showed a significant change in contaminant concentrations to better delineate hot spot areas.

Subsurface soil samples were collected at 4-foot sample intervals from six (6) soil boring locations (AST-SB-14 through AST-SB-16 and AST-SB-18 through AST-SB-20). Subsurface soil samples AST-SB-18 through AST-SB-20 are also referred to as SB-16 through SB-18. Five (5) of the six (6) supplemental soil boring locations were proposed in Amendment #2 to the final Work Plan and approved by the NYSDEC. Although the location of AST-SB-16 was not originally proposed as a sampling location, a soil sample was obtained when petroleum stained soil was observed during the concrete pad investigation. Subsurface soil samples AST-SB-14 through AST-SB-16, respectively, were located inside of the former AST containment, area and subsurface soil samples AST-SB-18 (SB-18) through AST-SB-20 (SB-20) were located outside of the former AST containment area. At each of the six (6) boring locations, soil from the boring was collected continuously using a Geoprobe lined with an acetate sleeve at four (4) foot intervals, from the ground surface to the depth of groundwater (approximately 4.5 to 7.5 feet below grade), or to a depth of equipment refusal, whichever was encountered first.

Table 2-5
Supplemental Soil Sampling Summary (August 2005)

Sample Identification	EPA Method 8260B (VOCs)	EPA Method 8270 (SVOCs)	EPA Method 6010/7000 (RCRA Metals)	Comments
Subsurface Soil Samples				
AST-SB-14	✓	✓	✓	Location 14 within former AST Containment Area
AST-SB-15	✓	✓	✓	Location 15 within former AST Containment Area
AST-SB-16	✓	✓	✓	Location 16 within former AST Containment Area
AST-SB-18 (SB-18)	✓	✓	✓	Location 18 outside of former AST Containment Area
AST-SB-19 (SB-19)	✓	✓	✓	Location 19 outside of former AST Containment Area
AST-SB-20 (SB-20)	✓	✓	✓	Location 20 outside of former AST Containment Area

Notes:
AST: Aboveground Storage Tank
SB: Soil Boring (Subsurface) -Soil Sample
VOCs: Volatile Organic Compounds
SVOCs: Semivolatile Organic Compounds
RCRA: Resource Conservation Recovery Act
EPA: Environmental Protection Agency

Each of the soil tubes was visually inspected for staining and/or the presence of an oily film or detectable odor, and simultaneously scanned with the PID for VOC vapors. The sampling equipment was decontaminated between sampling locations by first washing with a potable water and Alconox detergent mixture, then by rinsing with clean potable water and applying a final rinse of deionized water. (A detailed description of the decontamination procedures used during sampling is described in the Work Plan and FSP/QAPP included in Appendix D.) A sample from the depth of soil with the highest PID reading or heaviest visible staining was submitted to the laboratory for analysis. Table 2-6 contains the soil boring summary detailing the soil description, the PID readings (as applicable), and comments on the amount of recovery, the depth where groundwater was encountered, the interval selected for laboratory screening, and any odors or staining. All soil samples were sent to HDR's laboratory subconsultant, Chemtech, for analysis of VOCs, SVOCs and RCRA Metals. Soil boring logs are included in Appendix E of this Final SI/RAR Report. In addition, a copy of the field log book is included in Appendix F of this Final SI/RAR Report. Boring holes were refilled with soil following completion of soil sample collection.

TABLE 2-6

Summary of Supplemental Soil Boring Logs

Drilling Location Number	Drill Date	Depth Below Surface (feet)	Soil Description	PID (ppm)	Soil Samples Obtained	Comment / Soil Recovery
AST-SB-14	8/8/2005	0 - 4'	Dk brn sand & silt, some fill. Dry-moist.	0	AST-SB-14 (6-8') & AST-SB-14 (7-8')	
		4 - 8'	Blk silts, fine sands & sandy clay, cohesive, moist.	0 (4-6')		GW at 6'. Petrol. odor
				40 -100 (6-8')		
AST-SB-15	8/8/2005	0 - 4'	Gry-blk fine sand & silt, little fill. Dry-damp.	0	AST-SB-15 (4-6') & AST-SB-15 (5-6')	
		4 - 8'	Gry-blk fine sand.	80 - 400 (4-6')		GW at 6' Petrol. odor.
				40 (6-8')		
AST-SB-16	8/8/2005	0 - 4'	Brn-blk sand, some silt & fill.	9999+	AST-SB-16 (3-4') &	2.7' recovery.
		4 - 8'	Gry-blk fine sand, some silt, little fill.	700	AST-SB-16 (3-7')	1.5' recovery. GW at 7'.
AST-SB-18 (SB-18)	8/8/2005	0 - 4'	Gry-blk fine sand, some silt, little fill	1,700 (0-1')	AST-SB-18 (1-3'), AST-SB-18 (1-3') MS, AST-SB-18 (1-3') MSD, AST-SB-18 (1-4'), AST-SB-18 (1-4') MS, & AST-SB-18 (1-4') MSD	
				1,500 (1-2')		
				600 (2-3')		
				1,400 (3-4')		
		4 - 8'	Gry-blk fine sand, some silt, little clay & fill	0 (4-6')		GW at 8'. No recovery from 4-6'
				150 (6-8')		
AST-SB-19 (SB-19)	8/8/2005	0 - 4'	Gry-blk fine sand, some fill	0	SB-9 (4-6'), SB-9 (4-6') DUP, SB-9 (4-8') & SB-9 (4-8') DUP	
		4 - 8'	Blk fine sand, some silt, little clay.	42 - 115 (4-6')		GW at 6'.
				20 (6-8')		
AST-SB-20 (SB-20)	8/8/2005	0 - 4'	Gry-blk fine sand, some fill	0	AST-SB-20 (6-8') & AST-SB-20 (7-8')	
		4 - 8'	Gry-blk fine sand, some silt & fill.	0 (4-6')		GW at 8'. Recovery < 2'
				70 - 700 (6-8')		

<u>Notes:</u> blk = black, brn = brown, gry = gray, dk = dark. SB=Subsurface soil, AST=Aboveground storage tank. Petrol = Petroleum, GW = Groundwater

2.7.2 Groundwater Supplemental Investigation (August 2005)

A total of six (6) temporary groundwater monitoring wells (GW-1, GW-2, GW-6, GW-9, GW-12, and GW-17) were installed within a 5-foot radius of the original temporary well locations installed during the October 2004 Site Investigation. The wells were installed on August 9 and 10, 2005 to a depth of 8 feet to 10 feet below the ground surface with the lower 10 feet screened, and then developed. The screens were placed such that the vertical midpoint of the screen was near the suspected top of the groundwater table.

Groundwater samples were also obtained from the one (1) permanent monitoring well (HMW-1) previously installed during the October 2004 Site Investigation, and from each of the two (2) existing permanent groundwater monitoring wells (MW-1 and MW-6) that were recently located on-site. MW-1 was previously paved over with asphalt and could therefore not be located during the October 2004 Remedial Investigation. MW-6 could also not be located during the October 2004 Remedial Investigation.

Between August 9 and 11, 2005, the groundwater monitoring wells were purged and a single sample was obtained from each well. Prior to purging the monitoring wells, the depth to groundwater was measured using an oil/water interface probe. During purging, but before the collection of groundwater samples, salinity, pH, conductivity, turbidity, and temperature measurements were collected. Free product was not encountered in the groundwater monitoring wells. Procedures used to collect groundwater samples follow those outlined in the FSP/QAPP, a copy of which is included in Appendix D.

As requested by the NYSDEC, one (1) filtered and one (1) unfiltered groundwater sample was obtained from each of the six (6) temporary monitoring well locations. One (1) filtered and one (1) unfiltered groundwater sample was also obtained from each of the three (3) permanent monitoring wells. Filtering of the groundwater was performed on site using a 0.45 micron filter. All filtered and unfiltered samples were analyzed for RCRA Metals using EPA SW846 Methods. In addition, unfiltered groundwater samples from MW-1 and MW-6 were analyzed for VOCs and SVOCs (using EPA SW846 Methods) because they were not previously located, and therefore not sampled and analyzed for these parameters in the October 2004 Site Investigation. A summary of the groundwater samples obtained and analyzed is provided in Table 2-7.

Table 2-7
Supplemental Groundwater Sampling Summary (August 2005)

Sample Identification	EPA Method 8260B (VOCs)	EPA Method 8270 (SVOCs)	EPA Method 6010/7000 (RCRA Metals Filtered)	EPA Method 6010/7000 (RCRA Metals Unfiltered)	Comments
Temporary Monitoring Well Groundwater Samples					
GW-1			✓	✓	Within 5 ft. of original GW-1 location
GW-2			✓	✓	Within 5 ft. of original GW-2 location
GW-6			✓	✓	Within 5 ft. of original GW-6 location
GW-9			✓	✓	Within 5 ft. of original GW-9 location
GW-12			✓	✓	Within 5 ft. of original GW-12 location
GW-17			✓	✓	Within 5 ft. of original GW-17 location
Existing Monitoring Well Groundwater Samples					
MW-1	✓	✓	✓	✓	Existing permanent monitoring well
MW-6	✓	✓	✓	✓	Existing permanent monitoring well
HMW-1			✓	✓	Permanent monitoring well installed by HDR during the October 2004 Site Investigation

<u>Notes:</u>
GW: Temporary monitoring well
MW: Monitoring Well
HMW: HDR Monitoring Well
VOCs: Volatile Organic Compounds
SVOCs: Semivolatile Organic Compounds
RCRA: Resource Conservation Recovery Act
EPA: Environmental Protection Agency

2.7.3 Concrete Pad Investigation

During the October 2004 on-site investigation, subsurface concrete pads were encountered within the former AST secondary containment area below the footprint of several of the former ASTs at a depth ranging from approximately 4 feet to 5 feet below ground surface. To refine the remedial alternatives evaluated for the site in the Draft SI/RAR, the NYSDEC approved HDR's suggested investigation of the approximate areal extent and depth of the subsurface concrete pad(s) within the former AST secondary containment area.

Using a geoprobe, blind probing was performed in at least three (3) locations around the perimeter of each of the locations where the former 11 large ASTs were located within the former AST containment area. A total of 38 locations were probed. Blind probing consisted of advancing the geoprobe to a depth of approximately 12 feet or refusal. If refusal was encountered, the depth to refusal was recorded. Refusal was encountered in 21 of the 38 locations probed at approximately 2 feet to 8 feet below ground surface.

3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

3.1 Surface Features

The study area is approximately 2.8 acres in size and bounded by the Hudson River to the west, the Westchester County Social Services Center to the north, Alexander Street to the east and private industrial warehouses to the south. A sidewalk exists along the eastern perimeter of the site. The majority of the surface of the site is paved. Additional information on the site description can be found in Section 1.2.1.

3.2 Soils

Site soils consisted of fill materials, sand, gravel and clay. The fill materials were encountered generally in the upper horizons of borings and consisted of black cinders with varying degrees of concrete, brick, and gravel interspersed. The sand encountered was classified as SM using the Unified Soil Classification system – silty sand. Sand colors included brown, dark brown, gray and black, with varying degrees of silt and gravel in the matrix. Generally, the sand was well graded. The majority of the secondary containment area consists of asphalt paving, fill, 1 foot of gravel and a ¼" Claymax liner gravel and Claymax liner. Concrete pads were encountered in the majority of this area approximately 6 feet bgs.

3.3 Hydrogeology

Site lithology consists of historic fill underlain by flood plain sediments. The site is located within the 100-year flood zone. The groundwater under the site is tidally influenced and flows toward the Hudson River, which is a Tidal Estuary. Depth to groundwater varies from approximately 4.5 feet bgs to 7.5 feet bgs across the site.

3.4 Site Drainage Features

The site is characterized by relatively flat topography. The land gradient is sloping gently to the west. The elevation of the site is approximately 20 feet above mean sea level. The majority of the area is paved with asphalt. A storm water collection system, consisting of asphaltic berms, storm drains and an oil/water separator, is located on-site to collect the storm water, which was discharged into the Hudson River via an outfall (NYSDEC SPDES Permit number NY-0099538) to the Hudson River located in the northwest border of the site. As previously discussed, the oil/water separator is currently inoperable but remains on-site.

3.5 Demographics and Land Use

The site is currently zoned as "I", which allows for industrial uses and excludes residential use. However, the City of Yonkers is currently engaged in major planning efforts, in the form of a Master Plan, Urban Renewal Plan, and the Brownfield Opportunity Area (BOA) Nomination Study, which will likely result in new zoning for the Alexander Street corridor that will allow for future commercial and residential use.

Based on historic information gathered in the SCS Phase I Environmental Assessment, the property has been used for industrial purposes for over 100 years. The site is currently leased to Supertrans, a bus company that uses the site for parking buses. Groundwater use in the area is for non-potable purposes.

4.0 NATURE AND EXTENT OF CONTAMINATION

4.1 Previously Identified Sources

As discussed in Section 3.0, the site is located in an industrial brownfield area with a long history of industrial uses. Information contained in this section was obtained primarily from the September 2001 SCS Phase I Environmental Site Assessment. Potential on-site and off-site sources identified in this document are described below.

4.1.1 On-Site Sources

The following sources have been identified as potential sources of contamination on the property:

- The site has a long history as a MOSF.
- Spill #8912251, as reported in the SCS Phase I Environmental Site Assessment, was listed with a 1989 #6 fuel oil LUST. The spill report provided by Halstead-Quinn indicates 4,000 gallons of #6 fuel oil were recovered and pumped back into tanks and 1,000 gallons of contaminated product were placed into drums for disposal. Halstead-Quinn personnel stated that, because of the consistency of #6 fuel oil in February, almost all product was scraped up and recovered for reuse or disposed of off-site. Any sheen in the recovery wells was removed by submerging a spill pad in each well.
- Spill #9801901, as reported in the SCS Phase I Environmental Site Assessment, was a result of the #2 fuel oil pipe leak discovered on May 13, 1998. Data provided by the owner showed that approximately 10,372-gallons of #2 fuel oil were spilled in June 1998 and 8,575 gallons were recovered through December 31, 1998. The Scavenger Oil Recovery System recovery rate started at approximately 200 gallons per day when first installed on July 1, 1998, and was down to approximately 7 gallons per day in January 1999. Halstead-Quinn personnel monitored the system.
- Spill #0306169 occurred during the demolition of the ASTs in September 2003 and was reported on September 10, 2003 at 3:50 p.m. by Linda Shaw, Esq., environmental counsel to YASR, less than two hours after receiving notice. The spill was not from one of the tanks, but was from a cut off drum serving as a containment unit for a draining pipe that was inadvertently damaged by equipment during demolition activities. Neither the contractor nor HDR knew the exact quantity or concentration of the spilled matter, and whether it exceeded the five gallon threshold, but the spill was reported. The source material was removed shortly after the incident, and additional material was removed down to the existing Claymax liner. A closure report was submitted to the NYSDEC by Royal, a subcontractor to the demolition contractor. The NYSDEC has closed the spill number.

- Typical historical vehicular maintenance operations occurred in the warehouse/maintenance garage at the site, which may have contributed to site contamination.
- A 1,000-gallon UST containing #2 fuel oil, which existed just outside of the northern doorway of the foam suppression pump house.

4.1.2 Off-Site Sources

The following sources have been identified as potential sources of contamination from surrounding areas:

- Several underground petroleum bulk storage tanks are listed in the Petroleum Bulk Storage Database and have been registered to a chemical manufacturer, Polychrome Chemical Corporation, less than 0.2 mile northeast of the site. Additionally, spill #8807603 was registered to the manufacturer in 1988 due to the spill of an unknown quantity of #2 fuel oil. The chemical manufacturer was also listed in the Resource Conservation and Recovery Information System (RCRIS) as being a large quantity generator of hazardous waste with a history of violations. The manufacturer is listed in the RCRIS as being a high priority violator. Several aboveground chemical bulk storage tanks also were found to be registered to the property on the Chemical Bulk Storage Database.
- Additional underground petroleum bulk storage tanks are listed in the Petroleum Bulk Storage Database to exist less than 0.2 mile north of the site.

4.2 Regulatory Standards and Guidelines

Analytical methods used by the laboratory were those detailed in EPA and NYSDEC Analytical Services Protocol (ASP) 2000 documents. Site-specific data from media were initially compared with applicable regulatory criteria. All samples were submitted to Chemtech, a NYSDOH ELAP-certified laboratory experienced in the analysis of environmental samples using the methods specified. The following regulatory standards and criteria (with a discussion of their applicability to an industrial site) were used:

- NYSDEC Recommended Soil Cleanup Objectives (RSCO) identified in NYSDEC's Technical and Administrative Guidance Memorandum (TAGM) HWR-94-4046, and/or other applicable soil cleanup objectives that will be developed and will be applicable to projects being conducted under the Bond Act Brownfields Restoration Program Title 56 of the Environmental Conservation Law.
- NYSDEC 6NYCRR Part 703, Surface and Groundwater Quality Standards (NYSDEC Standards).
- NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 guidance values (NYSDEC Guidelines) used for groundwater analytes for which NYSDEC Standards are not published.

4.3 Remedial Site Investigation Results

4.3.1 Surface and Subsurface Soil Remedial Investigation (October 2004)

Table 4-1 summarizes the surface soil analytes and Tables 4-2 and 4-3 summarize the subsurface soil analytes that exceeded NYSDEC TAGM #4046 RSCOs. A complete listing of soil analytes that exceeded the NYSDEC's TAGM #4046 RSCOs is provided in Tables 4-4 through 4-6. Soil analytes exceeded the NYSDEC TAGM #4046 RSCOs for RCRA Metals and/or SVOCs for each of the eight (8) surface soil samples obtained from the area outside of the AST containment area. Similarly, soil analytes exceeded the NYSDEC TAGM #4046 RSCOs for RCRA Metals and/or SVOCs for each of the 15 subsurface soil samples obtained from the area outside of the AST containment area. Soil analytes exceeded the NYSDEC TAGM #4046 RSCOs for each of the seven (7) surface soil samples obtained from the area within the AST containment area. Similarly, soil analytes exceeded the NYSDEC TAGM #4046 RSCOs for each of the seven (7) subsurface soil samples obtained from the area within the AST containment area. Soil analytes were not exceeded for the NYSDEC TAGM #4046 RSCOs for VOCs. Figure 4 (for surface soils) and Figures 5 and 6 (for subsurface soils) depict the sampling locations and concentrations that exceeded the NYSDEC's TAGM #4046 RSCOs. Soil sample analytical results not shown in Tables 4-1 through 4-6 and Figures 4 through 6 were below NYSDEC TAGM #4046 RSCOs or were qualified with one of the following qualifiers:

Table 4-1
Summary of October 2004 Surface Soil Sample Results: RCRA Metals and SVOCs Above the NYSDEC TAGM #4046 RSCOs

Analyte	Surface Soil Samples Above the NYSDEC TAGM #4046 RSCOs	Highest Result (& Location)	NYSDEC TAGM #4046 RSCO [1]
RCRA Metals			
Cadmium	SS-17	1.76 ppm (SS-17)	1 ppm (SB)
Chromium	SS-10	53.3 ppm (SS-10)	40 ppm
Mercury	SS-6, SS-8, SS-9, SS-13, SS-15, SS-16, AST-SS-1, AST-SS-2, AST-SS-3, AST-SS-4, AST-SS-7, AST-SS-8	2 ppm (SS-15)	0.1 ppm
SVOCs			
Benzo(a)anthracene	SS-10, SS-13, SS-16, AST-SS-3, AST-SS-7, AST-SS-13	16,000 ppb (SS-10)	224 ppb
Benzo(a)pyrene	SS-9, SS-10, SS-13, SS-16, AST-SS-2, AST-SS-3, AST-SS-7, AST-SS-13	14,000 ppb (SS-9)	61 ppb
Benzo(b)fluoranthene	SS-9, SS-10, AST-SS-3	17,000 ppb (SS-9)	1,100 ppb
Benzo(k)fluoranthene	SS-9, SS-10	12,000 ppb (SS-9)	1,100 ppb
Chrysene	SS-9, SS-10, SS-13, SS-16, AST-SS-3, AST-SS-7, AST-SS-13	18,000 ppb (SS-9)	400 ppb
Pyrene	SS-9	50,000 ppb (SS-9)	50,000 ppb

Notes:
(1) RSCO from NYSDEC's TAGM HWR-94-4046, revised January 24, 1994.
ppm: parts per million
ppb: parts per billion
SS: Surface Soil Sample
AST-SS: Soil sample obtained within AST containment area
RCRA: Resource Conservation Recovery Act
SVOC: Semi-Volatile Organic Compound

Table 4-2
Summary of October 2004 Subsurface Soil Sample Results: RCRA Metals Above the NYSDEC TAGM #4046 RSCOs

Analyte	Subsurface Soil Sample Above the NYSDEC TAGM #4046 RSCOs	Highest Result (& Location)	NYSDEC TAGM #4046 RSCO (1)
RCRA Metals			
Arsenic	SB-4, SB-13, SB-16, AST-SB-1, AST-SB-3	23.2 ppm (SB-4)	12 ppm (SB)
Cadmium	SB-1, SB-3, AST-SB-1	2.75 ppm (SB-1)	1 ppm
Chromium	SB-15	54.5 ppm (SB-15)	40 ppm (SB)
Lead	SB-3, AST-SB-3	858 ppm (SB-3)	500 ppm
Mercury	SB-1, SB-2, SB-3, SB-4, SB-5, SB-6, SB-7, SB-8, SB-9, SB-10, SB-12, SB-13, SB-15, SB-16, SB-17, AST-SB-1, AST-SB-2, AST-SB-3, AST-SB-4, AST-SB-7, AST-SB-8	37.8 ppm (AST-SB-1)	0.1 ppm
Selenium	SB-2, SB-3, SB-4, SB-7, SB-8, SB-13, SB-15, AST-SB-1, AST-SB-3	5.46 ppm (SB-4)	2 ppm
Silver	SB-3, SB-13, SB-15	6.41 ppm (SB-15)	3.9 ppm

Notes:

(1) RSCO from NYSDEC's TAGM HWR-94-4046, revised January 24, 1994.
ppm: parts per million
SB: Soil Boring Sample
AST-SB: Soil sample obtained within AST containment area
RCRA: Resource Conservation Recovery Act

Table 4-3
Summary of October 2004 Subsurface Soil Sample Results: SVOCs Above the NYSDEC TAGM #4046 RSCOs

Analyte	Subsurface Soil Sample Above the NYSDEC TAGM #4046 RSCOs	Highest Result (& Location)	NYSDEC TAGM #4046 RSCO (1)
SVOCs			
2-Methylnaphthalene	AST-SB-7	66,000 ppb (AST-SB-7)	36,400 ppb
4-Nitrophenol	SB-1	110 ppb (SB-1)	100 ppb
Benzo(a)anthracene	SB-1, SB-4, SB-6, SB-7, SB-8, SB-10, AST-SB-1, AST-SB-2, AST-SB-3, AST-SB-4, AST-SB-7, AST-SB-13	20,000 ppb (AST-SB-3)	224 ppb
Benzo(a)pyrene	SB-1, SB-2, SB-4, SB-6, SB-7, SB-8, SB-9, SB-10, SB-13, SB-17, AST-SB-1, AST-SB-2, AST-SB-3, AST-SB-4, AST-SB-8, AST-SB-13	18,000 ppb (AST-SB-3)	61 ppb
Benzo(b)fluoranthene	SB-3, SB-6, SB-7, SB-10, AST-SB-1, AST-SB-3	19,000 ppb (AST-SB-3)	1,100 ppb
Benzo(k)fluoranthene	SB-3, SB-6, SB-7, SB-10, AST-SB-1, AST-SB-3	4,800 ppb (AST-SB-3)	1,100 ppb
Chrysene	SB-3, SB-4, SB-6, SB-7, SB-10, AST-SB-1, AST-SB-2, AST-SB-3, AST-SB-7, AST-SB-13	20,000 ppb (AST-SB-3)	400 ppb
Dibenz(a,h)anthracene	AST-SB-1, AST-SB-3	3,400 ppb (AST-SB-3)	14 ppb
Dimethylphthalate	AST-SB-3	15,000 ppb (AST-SB-3)	2,000 ppb
Indeno(1,2,3-cd)pyrene	AST-SB-3	14,000 ppb (AST-SB-3)	3,200 ppb
Phenanthrene	AST-SB-3	74,000 ppb (AST-SB-3)	50,000 ppb
Pyrene	AST-SB-3	67,000 ppb (AST-SB-3)	50,000 ppb

Notes:

(1) RSCO from NYSDEC's TAGM HWR-94-4046, revised January 24, 1994.
ppb: parts per billion
SB: Soil Boring Sample
AST-SB: Soil sample obtained within AST containment area
SVOC: Semi-Volatile Organic Compound

TABLE 4-4a

Surface Soil Sample Results (October 2004): RCRA Metals Above the NYSDEC TAGM #4046 RSCOs

Metals (ppm) [1]

Sample ID	NYSDEC TAGM #4046 RSCOs (ppm)		SS-6 (0'-2')	SS-8 (0'-2')	SS-9 (0'-2')	SS-10 (0'-2')	SS-13 (0'-2')	SS-15 (0-6")	SS-16 (0-6")	SS-17 (0'-2')	AST-SS-1 (0'-2')	AST-SS-2 (0'-2')	AST-SS-3 (0'-2')	AST-SS-4 (0'-2')	AST-SS-7 (0'-2')	AST-SS-8 (0'-2')
Lab Sample Number			S5280-01	S5280-05	S5379-11	S5379-12	S5280-07	S5280-11	S5280-14	S5379-01	S5376-12	S5376-07	S5376-03	S5376-01	S5280-03	S5376-17
Sampling Date			10/19/04	10/19/04	10/20/04	10/20/04	10/19/04	10/18/04	10/18/04	10/20/04	10/21/2004	10/21/2004	10/21/2004	10/21/2004	10/19/04	10/21/2004
Matrix			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Parameter	RSCO	Site Background														
Cadmium	1	1	0.052 U	0.052 U	0.049 U	0.123 J	0.085 J	0.224 J	0.052 U	1.76	0.064 J	0.157 J	0.148 J	0.056 U	0.052 U	0.048 U
Chromium	10	40	7.66	7.11	11.3	53.3	15.9	25	15.5	1.43	11.8	7.5	10.7	7.43	26	9.25
Mercury	0.1	.	0.532	0.445	0.273 J	0.007 UJ	0.72 D	2 D	0.328	0.006 UJ	0.508 J	0.147 J	0.646 JD	0.226 J	0.218	0.138 J

Data Qualifiers & Notes

U - The compound was not detected at the indicated concentration.
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.
D - Dilution performed due to analyte's concentration exceeded the calibrated range of the instrument for specific analysis
UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit appropriate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
SS - Surface soil sample taken outside of original above-ground storage tank containment area
AST-SS - Surface soil sample taken within original above-ground storage tank containment area
Bold - Exceedence of NYSDEC TAGM #4046 RSCO and/or Site Background
ppm - parts per million
RCRA - Resource Conservation Recovery Act
[1] - NYSDEC TAGM #4046 offers an option between the cleanup objective and/or soil background thresholds. In this case, exceedence is highlighted when the higher of the two is surpassed.

TABLE 4-4b

Surface Soil Sample Results (October 2004): SVOCs Above the NYSDEC TAGM #4046 RSCOs

SVOCs (ppb)

Sample ID	NYSDEC TAGM #4046 RSCOs (ppb)	SS-9 (0'-2')	SS-9 (0'-2') RE	SS-10 (0'-2')	SS-13 (0'-2')	SS-16 (0-6")	AST-SS-2 (0'-2')	AST-SS-3 (0'-2')	AST-SS-7 (0'-2')	AST-SS-13 (0'-2')
Lab Sample Number		S5379-11	S5379-11 RE	S5379-12	S5280-07	S5280-14	S5376-07	S5376-03	S5280-03	S5376-14
Sampling Date		10/20/04	10/20/04	10/20/04	10/19/04	10/18/04	10/21/2004	10/21/2004	10/19/04	10/21/2004
Matrix		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Parameter										
Benzo(a)anthracene	224	16000 UJ	2000 J	3500 J	350 J	610 J	160 J	1700 J	340 J	920 J
Benzo(a)pyrene	61	14000 J	2100 J	3400 J	340 J	460 J	150 J	1400 J	290 J	920 J
Benzo(b)fluoranthene	1,100	17000 J	2400 J	4000 J	450 J	560 J	170 J	1600 J	480 J	860 J
Benzo(k)fluoranthene	1,100	12000 J	2100 J	2700 J	190 J	130 U	78 J	500 J	140 J	150 U
Chrysene	400	18000	2100 J	3900 J	420 J	580 J	160 J	1900 J	410 J	1400 J
Pyrene	50,000	50000 J	4500 J	12000 J	910 J	1600 J	310 J	3800	790	3800 J

Data Qualifiers & Notes

U - The compound was not detected at the indicated concentration.
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

UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit appropriate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
SS - Surface soil sample taken outside of original above-ground storage tank containment area
AST-SS - Surface soil sample taken within original above-ground storage tank containment area
Bold - Exceedence of NYSDEC TAGM #4046 RSCOs
ppb - parts per billion
SVOC - Semi-Volatile Organic Compound

TABLE 4-5

Subsurface Soil Sample Results (October 2004): RCRA Metals Above the NYSDEC TAGM #4046 RSCOs

Metals (ppm) [1]

Sample ID	NYSDEC TAGM #4046 RSCOs (ppm)		SB-1 (6'-8')	SB-2 (4'-6')	SB-2 (4'-6') DUP	SB-3 (2'-4')	SB-4 (2'-4')	SB-5 (4'-6')	SB-6 (2'-4')	SB-7 (4'-6')	SB-8 (6'-8')	SB-9 (6'-8')	SB-10 (2'-4')	SB-12 (6'-8')	SB-13 (6'-8')
Lab Sample Number			S5379-07	S5379-08	S5379-09	S5280-10	S5379-03	S5280-09	S5280-02	S5379-10	S5379-14	S5379-13	S5379-06	S5280-08	S5280-06
Sampling Date			10/20/04	10/20/04	10/20/04	10/18/04	10/20/04	10/18/04	10/19/04	10/20/04	10/19/04	10/20/04	10/20/04	10/18/04	10/19/04
Matrix			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Parameter	RSCO	Site Background													
Arsenic	7.5	12	1.98	1.96	4.3	8.62 J	23.2	5.77 J	4.66 J	4.28	7.24	2.37	3.01	7.55 J	12.7 J
Cadmium	1	1	2.75	0.052 U	0.052 U	2.69	0.059 U	0.048 U	0.052 U	0.197 J	0.054 U	0.057 U	0.049 U	0.05 U	0.055 U
Chromium	10	40	22.1	17.9	18.2	15.1	35.9	9.35	11.8	27.9	13.5	13.8	17.7	14.9	18.5
Lead	.	500	97.5 J	32.6 J	64 J	858 JN	409 JN	153 JN	100 JN	72.9 J	36.3 J	15.2 J	65.3 J	217 JN	56 JN
Selenium	2	0.2	1.35 J	1.46 J	3.6 J	2.53 J	5.46 J	1.08	0.912 J	2.09 J	3.91 J	0.385 U	1.1 J	1.02 J	2.97 J
Silver [1]	.	3.9	0.123 U	0.119 U	0.483 J	4.06	1.83	0.111 U	0.118 U	0.125 U	0.122 U	0.129 U	0.112 U	0.115 U	6.37
Mercury	0.1	.	0.265 J	4.2 JD	2.8 JD	1.5 D	10.5 JD	0.24	1.6 D	2.9 JD	0.211 J	0.243 J	1.7 JD	0.307	0.319

Sample ID	NYSDEC TAGM #4046 RSCOs (ppm)		SB-15 (4'-6')	SB-16 (2'-4')	SB-17 (6'-8')	AST-SB-1 (4'-6')	AST-SB-1 (4'-6') DUP	AST-SB-2 (4'-6')	AST-SB-2 (4'-6') DUP	AST-SB-3 (4'-6')	AST-SB-4 (4'-6')	AST-SB-7 (6'-8')	AST-SB-8 (6'-8')	AST-SB-8 (6'-8') DUP	
Lab Sample Number			S5280-12	S5280-13	S5379-02	S5376-11	S5376-10	S5376-08	S5376-09	S5376-04	S5376-02	S5280-04	S5376-16	S5376-15	
Sampling Date			10/18/04	10/18/04	10/20/04	10/21/2004	10/21/2004	10/21/2004	10/21/2004	10/21/2004	10/21/2004	10/19/04	10/21/2004	10/21/2004	
Matrix			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
Parameter	RSCO	Site Background													
Arsenic	7.5	12	11.7 J	13.4 J	2.44	20.1 J	15.7 J	6.65 J	7.35 J	12 J	2.69 J	4.21 J	7.35 J	5.37 J	
Cadmium	1	1	0.049 U	0.054 U	0.056 U	1.01	0.056 U	0.342 J	0.541 J	0.053 U	0.055 U	0.058 U	0.082 U	0.419 J	
Chromium	10	40	54.5	35.3	6.54	12.4	8.14	9.37	10.1	7.88	7.47	8.22	10.6	8.03	
Lead	.	500	144 JN	119 JN	33.9 JN	254 J	96.3 J	172 J	93.8 J	721 J	69.9 J	352 JN	229 J	211 J	
Selenium	2	0.2	3.41 J	1.47 J	0.996 J	2.34	1.39	1.23	1.18	5.1	0.797 J	1.38 J	1.87	1.92	
Silver [1]	.	3.9	6.41	0.124 U	0.127 U	0.125 U	0.127 U	0.121 U	0.119 U	0.295 J	0.125 U	0.133 U	0.188 U	0.313 J	
Mercury	0.1	.	0.485	0.285	3.8 JD	32 JD	37.8 JD	0.618 J	0.355 J	0.177 J	0.26 J	0.281	0.729 J	0.496 J	

Data Qualifiers & Notes

U - The compound was not detected at the indicated concentration
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
D - Dilution performed due to analyte's concentration exceeded the calibrated range of the instrument for specific analysis
NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration
SB - Soil boring sample taken outside of original above-ground storage tank containment area
AST-SB - Soil boring sample taken within original above-ground storage tank containment area
DUP - Duplicate sample
Bold - Exceedence of NYSDEC TAGM #4046 RSCOs
ppm - parts per million
RCRA - Resource Conservation Recovery Act
[1] - NYSDEC TAGM #4046 offers an option between the cleanup objective and/or soil background thresholds. In this case, exceedence is highlighted when the higher of the two is surpassed

TABLE 4-6

Subsurface Soil Sample Results (October 2004): SVOCs Above the NYSDEC TAGM #4046 RSCOs

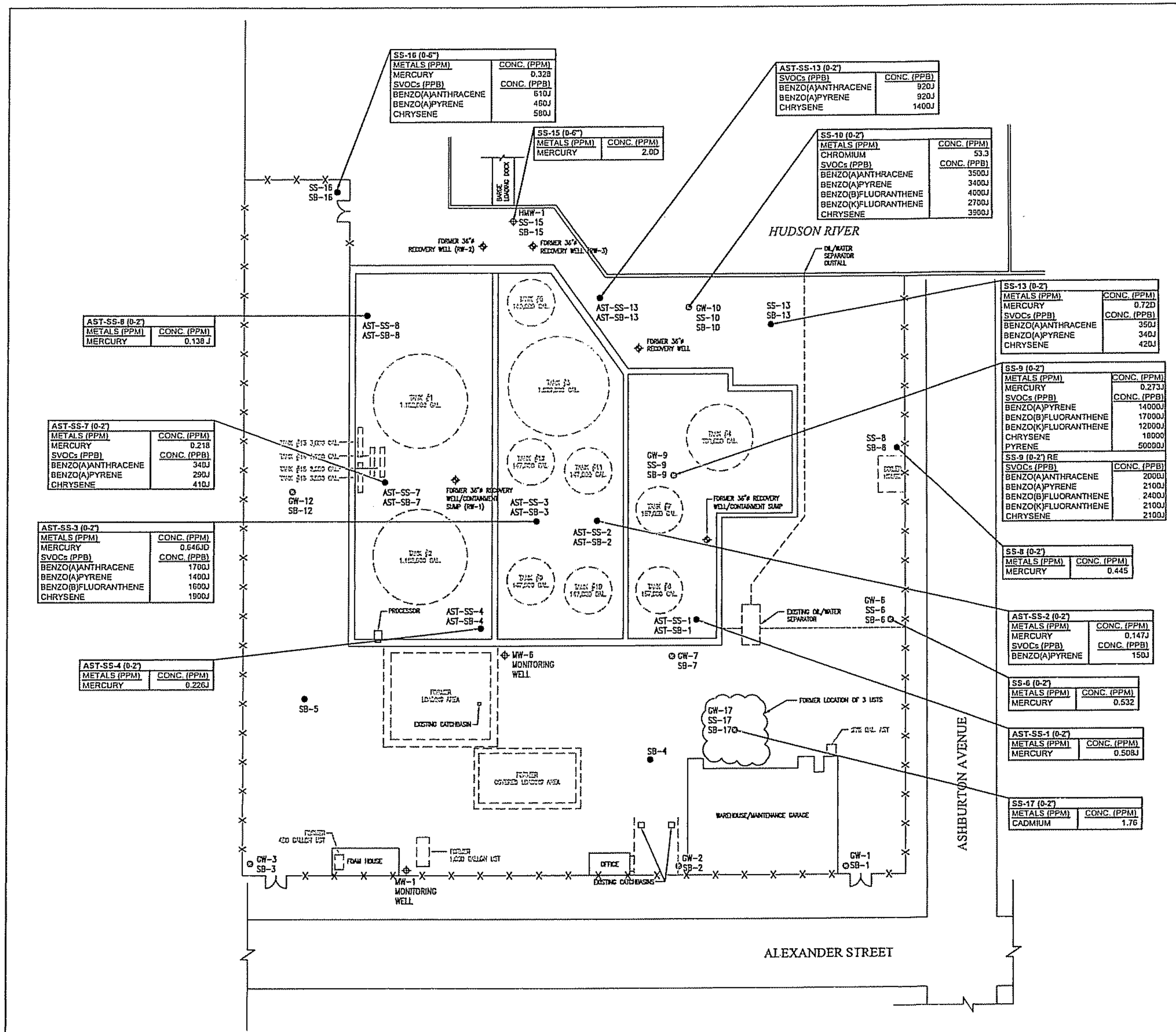
SVOCs (ppb)

Sample ID	NYSDEC TAGM #4046 RSCOs (ppb)	SB-1 (6'-8')	SB-1 (6'-8') RE	SB-2 (4'-6')	SB-3 (2'-4')	SB-4 (2'-4')	SB-6 (2'-4')	SB-7 (4'-6')	SB-7 (4'-6') DL	SB-8 (6'-8')	SB-9 (6'-8')	SB-10 (2'-4')	SB-10 (2'-4') RE
Lab Sample Number		S5379-07	S5379-07 RE	S5379-08	S5280-10	S5379-03	S5280-02	S5379-10	S5379-10DL	S5379-14	S5379-13	S5379-06	S5379-06 RE
Sampling Date		10/20/04	10/20/04	10/20/04	10/18/04	10/20/04	10/19/04	10/20/04	10/20/04	10/19/04	10/20/04	10/20/04	10/20/04
Matrix		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Parameter													
Benzo(a)anthracene	224	300 J	340 J	66 J	260 R	730 J	6600 J	6800 E	7000 JD	260 J	180 J	2000 J	2000 J
Benzo(a)pyrene	61	290 J	350 J	65 J	300 R	820 J	4800 J	2000 J	2100 JD	270 J	120 J	2300 J	1900 J
Benzo(b)fluoranthene	1,100	550 J	400 J	64 J	1900 J	520 J	3200 J	3200 J	3000 JD	280 J	330 J	2500 J	2600 J
Benzo(k)fluoranthene	1,100	750 J	300 J	55 J	2000 J	150 J	3000 J	2100 J	3200 JD	340 J	430 J	2600 J	2200 J
Chrysene	400	360 J	420 J	74 J	1800 J	890 J	6600 J	5800	5800 JD	380 J	220 J	2300 J	2200 J
Dibenz(a,h)anthracene	14	23 UJ	23 U	11 U	500 R	120 UJ	220 U	23 UJ	230 UD	23 UJ	24 UJ	520 UJ	520 U
Dimethylphthalate	2,000	19 UJ	19 U	8.9 U	410 R	1300 UJ	180 U	19 U	190 UD	19 U	19 U	420 U	420 U
Indeno(1,2,3-cd)pyrene	3,200	19 UJ	19 U	9 U	420 R	100 UJ	180 U	130 J	190 UD	19 UJ	19 U	420 U	420 U
2-Methylnaphthalene	36,400	13 UJ	13 U	6.4 U	300 R	73 UJ	2100 J	600 J	130 UD	9000 E	14 U	300 U	300 U
Phenanthrene	50,000	760 J	380 J	86 J	380 R	450 J	32000	12000 E	12000 D	2400	97 J	2600 J	2600 J
Pyrene	50,000	1200 J	32 U	150 J	2000 J	680 J	29000	26000 E	34000 D	1100 J	320 J	5700 J	3700 J

Sample ID	NYSDEC TAGM #4046 RSCOs (ppb)	SB-13 (6'-8')	SB-17 (6'-8')	AST-SB-1 (4'-6')	AST-SB-1 (4'-6') DUP	AST-SB-2 (4'-6') DUP	AST-SB-3 (4'-6')	AST-SB-3 (4'-6') DL	AST-SB-4 (4'-6')	AST-SB-7 (6'-8')	AST-SB-7 (6'-8') DL	AST-SB-8 (6'-8')	AST-SB-13 (4'-6')
Lab Sample Number		S5280-06	S5379-02	S5376-11	S5376-10	S5376-09	S5376-04	S5376-04DL	S5376-02	S5280-04	S5280-04DL	S5376-16	S5376-13
Sampling Date		10/19/04	10/20/04	10/21/2004	10/21/2004	10/21/2004	10/21/2004	10/21/2004	10/21/2004	10/19/04	10/19/04	10/21/2004	10/21/2004
Matrix		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Parameter								DL 25.0			DL 50.0		
Benzo(a)anthracene	224	150 J	72 J	580 J	4100	790	20000	20000 D	330 J	440 J	320 UD	170 J	230 J
Benzo(a)pyrene	61	140 J	66 J	460 J	3600	640 J	18000	19000 D	290 J	74 U	370 UD	130 J	180 J
Benzo(b)fluoranthene	1,100	120 J	71 J	490 J	4000	760	19000	21000 D	300 J	230 U	1100 UD	130 J	43 U
Benzo(k)fluoranthene	1,100	65 J	13 U	130 U	1400	310 J	4800	5100 JD	110 J	150 U	730 UD	20 U	28 U
Chrysene	400	170 J	86 J	550 J	3900	1000	20000	19000 D	370 J	520 J	680 UD	170 J	500 J
Dibenz(a,h)anthracene	14	11 U	11 U	110 U	560 J	22 UJ	3400 J	3000 JD	11 UJ	130 U	630 UD	17 UJ	24 UJ
Dimethylphthalate	2,000	9.3 U	9.4 U	93 U	19 U	18 U	15000	16000 JD	9.3 U	100 U	510 UD	14 U	19 U
Indeno(1,2,3-cd)pyrene	3,200	9.4 U	9.5 U	94 U	3000 J	500 J	14000 J	9800 JD	240 R	100 U	520 UD	100 J	20 UJ
2-Methylnaphthalene	36,400	210 J	6.8 U	520 J	1000	32000 E	26000	28000 D	5400 E	82000 E	66000 D	6000 E	14 U
Phenanthrene	50,000	370 J	180 J	660 J	5700	8300 E	77000 E	74000 D	1900	16000	11000 JD	1500	18 U
Pyrene	50,000	560	200 J	1200 J	9600 E	4400	69000 E	67000 D	1100	4400	4100 JD	720	2300

Data Qualifiers & Notes

U - The compound was not detected at the indicated concentration.
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.
D - Dilution performed due to analyte's concentration exceeded the calibrated range of the instrument for specific analysis
E - Exceeds calibration
R - The sample results are unreliable/unusable. The presence or absence of the analyte cannot be varified.
UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit appropriate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
DL - Dilution performed due to analyte's concentration exceeded the calibrated range of the instrument for specific analysis
SB - Soil boring sample taken outside of original above-ground storage tank containment area
AST-SB - Soil boring sample taken within original above-ground storage tank containment area
DUP - Duplicate sample
Bold - Exceedence of NYSDEC TAGM #4046 RSCOs
ppb - parts per billion
SVOC - Semi-Volatile Organic Compound



LEGEND:

- FORMER MONITORING WELL LOCATION
- FORMER RECOVERY WELL LOCATION
- SOIL SAMPLE LOCATION
- SOIL SAMPLE AND TEMPORARY MONITORING WELL LOCATION
- SOIL SAMPLE AND PERMANENT MONITORING WELL LOCATION
- DEMOLISHED/REMOVED
- FENCE
- ABOVE GROUND STORAGE TANK
- BENEATH SURFACE

NOTES:

1. SAMPLING LOCATIONS AND TANK LOCATIONS ARE APPROXIMATE.
2. TANKS LOCATED WITHIN THE SECONDARY CONTAINMENT AREA AND THE BOILER HOUSE WERE DEMOLISHED IN 2004.
3. RESULTS SHOWN ON THIS FIGURE ARE ONLY THOSE THAT EXCEEDED THE NYSDEC TAGM #4046 RSCOs OR THOSE SAMPLING RESULTS QUALIFIED WITH A "U" OR "B".

MW = MONITORING WELL
HMW = HDR MONITORING WELL
GW = GROUNDWATER SAMPLE
AST-SB = ABOVE GROUND STORAGE TANK SOIL BORING LOCATION
SB = SOIL BORING LOCATION
RW = RECOVERY WELL
SS = SURFACE SOIL SAMPLE LOCATION

SEE TABLES 4-4 THROUGH 4-7 IN THE FINAL SI/RAR FOR DEFINITION OF THE DATA QUALIFIERS.

NOT TO SCALE

HDR

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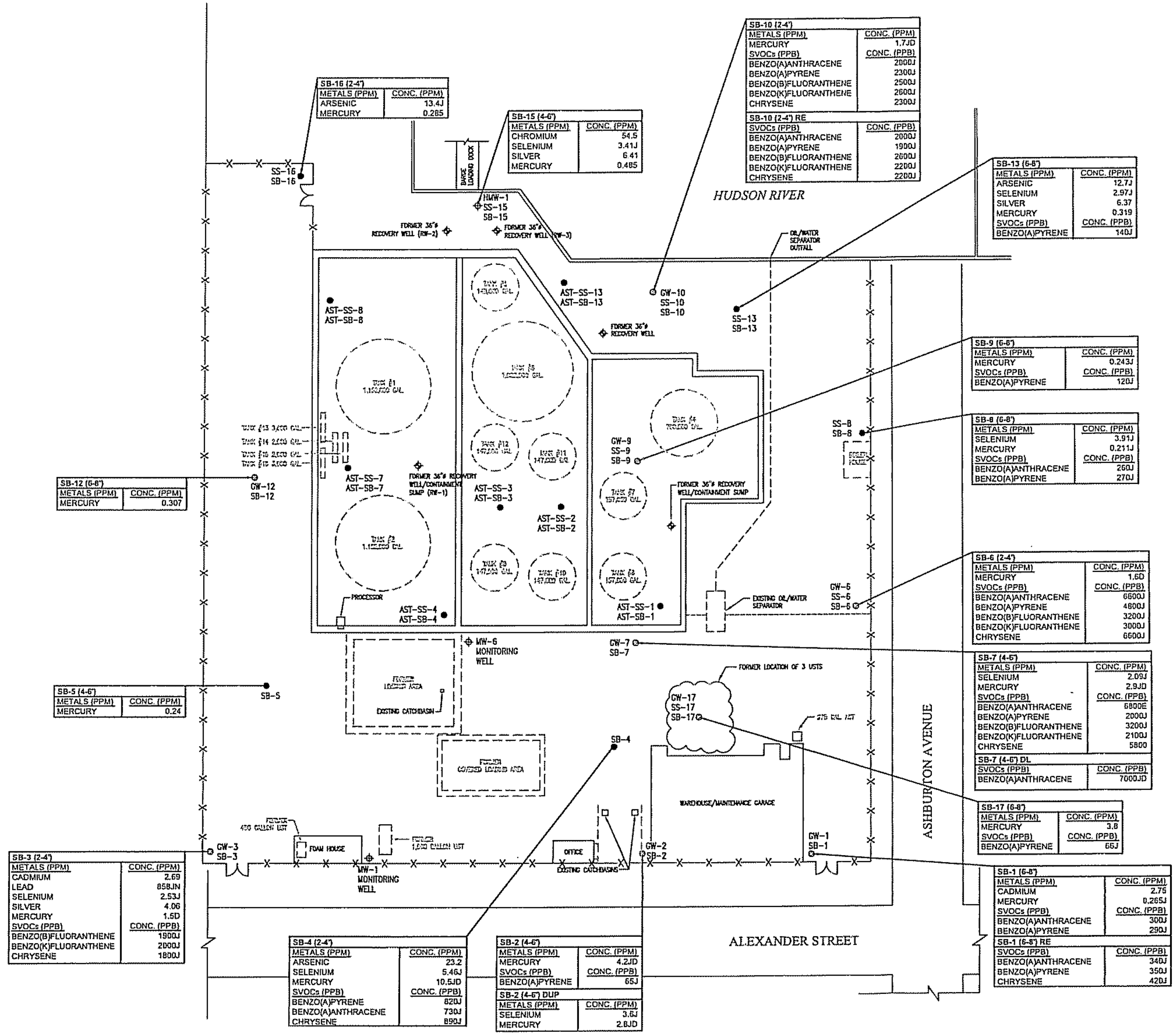
SURFACE SOIL SAMPLES ABOVE NYSDEC TAGM #4046 RSCOs (OCTOBER 2004)

DATE 10/20/05

FIGURE 4



SB-16 (2-4')	
METALS (PPM)	CONC. (PPM)
ARSENIC	13.4J
MERCURY	0.285

SB-15 (4-6')	
METALS (PPM)	CONC. (PPM)
CHROMIUM	54.5
SELENIUM	3.41J
SILVER	6.41
MERCURY	0.485

SB-10 (2-4')	
METALS (PPM)	CONC. (PPM)
MERCURY	1.7JD
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	2000J
BENZO(A)PYRENE	2300J
BENZO(B)FLUORANTHENE	2500J
BENZO(K)FLUORANTHENE	2600J
CHRYSENE	2300J
SB-10 (2-4') RE	
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	2000J
BENZO(A)PYRENE	1900J
BENZO(B)FLUORANTHENE	2600J
BENZO(K)FLUORANTHENE	2200J
CHRYSENE	2200J

SB-13 (6-8')	
METALS (PPM)	CONC. (PPM)
ARSENIC	12.7J
SELENIUM	2.97J
SILVER	6.37
MERCURY	0.319
SVOCs (PPB)	CONC. (PPB)
BENZO(A)PYRENE	140J

SB-12 (6-8')	
METALS (PPM)	CONC. (PPM)
MERCURY	0.307

SB-9 (6-8')	
METALS (PPM)	CONC. (PPM)
MERCURY	0.243J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)PYRENE	120J

SB-8 (6-8')	
METALS (PPM)	CONC. (PPM)
SELENIUM	3.91J
MERCURY	0.211J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	260J
BENZO(A)PYRENE	270J

SB-6 (2-4')	
METALS (PPM)	CONC. (PPM)
MERCURY	1.6D
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	6600J
BENZO(A)PYRENE	4800J
BENZO(B)FLUORANTHENE	3200J
BENZO(K)FLUORANTHENE	3000J
CHRYSENE	6600J

SB-7 (4-6')	
METALS (PPM)	CONC. (PPM)
SELENIUM	2.09J
MERCURY	2.9JD
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	6800E
BENZO(A)PYRENE	2000J
BENZO(B)FLUORANTHENE	3200J
BENZO(K)FLUORANTHENE	2100J
CHRYSENE	5800
SB-7 (4-6') DL	
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	7000JD

SB-5 (4-6')	
METALS (PPM)	CONC. (PPM)
MERCURY	0.24

SB-17 (6-8')	
METALS (PPM)	CONC. (PPM)
MERCURY	3.8
SVOCs (PPB)	CONC. (PPB)
BENZO(A)PYRENE	66J

SB-3 (2-4')	
METALS (PPM)	CONC. (PPM)
CADMIUM	2.69
LEAD	858JN
SELENIUM	2.53J
SILVER	4.06
MERCURY	1.5D
SVOCs (PPB)	CONC. (PPB)
BENZO(B)FLUORANTHENE	1900J
BENZO(K)FLUORANTHENE	2000J
CHRYSENE	1800J

SB-4 (2-4')	
METALS (PPM)	CONC. (PPM)
ARSENIC	23.2
SELENIUM	5.46J
MERCURY	10.5JD
SVOCs (PPB)	CONC. (PPB)
BENZO(A)PYRENE	820J
BENZO(A)ANTHRACENE	730J
CHRYSENE	890J

SB-2 (4-6')	
METALS (PPM)	CONC. (PPM)
MERCURY	4.2JD
SVOCs (PPB)	CONC. (PPB)
BENZO(A)PYRENE	65J
SB-2 (4-6') DUP	
METALS (PPM)	CONC. (PPM)
SELENIUM	3.6J
MERCURY	2.8JD

SB-1 (6-8')	
METALS (PPM)	CONC. (PPM)
CADMIUM	2.75
MERCURY	0.265J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	300J
BENZO(A)PYRENE	290J
SB-1 (6-8') RE	
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	340J
BENZO(A)PYRENE	350J
CHRYSENE	420J

LEGEND:

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- FORMER RECOVERY WELL LOCATION
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- SOIL SAMPLE AND TEMPORARY MONITORING WELL LOCATION
- SOIL SAMPLE AND PERMANENT MONITORING WELL LOCATION
- DEMOLISHED/REMOVED
- FENCE
- ABOVE GROUND STORAGE TANK
- BENEATH SURFACE

NOTES:

1. SAMPLING LOCATIONS AND TANK LOCATIONS ARE APPROXIMATE.
2. TANKS LOCATED WITHIN THE SECONDARY CONTAINMENT AREA AND THE BOILER HOUSE WERE DEMOLISHED IN 2004.
3. RESULTS SHOWN ON THIS FIGURE ARE ONLY THOSE THAT EXCEEDED THE NYSDEC TAGM #4046 RSCOs OR THOSE SAMPLING RESULTS QUALIFIED WITH A "U" OR "B".

MW = MONITORING WELL
HMW = HDR MONITORING WELL
GW = GROUNDWATER SAMPLE
AST-SB = ABOVE GROUND STORAGE TANK SOIL BORING LOCATION
SB = SOIL BORING LOCATION
RW = RECOVERY WELL
SS = SURFACE SOIL SAMPLE LOCATION

SEE TABLES 4-4 THROUGH 4-7 IN THE FINAL SI/RAR FOR DEFINITION OF THE DATA QUALIFIERS

NOT TO SCALE

HDR

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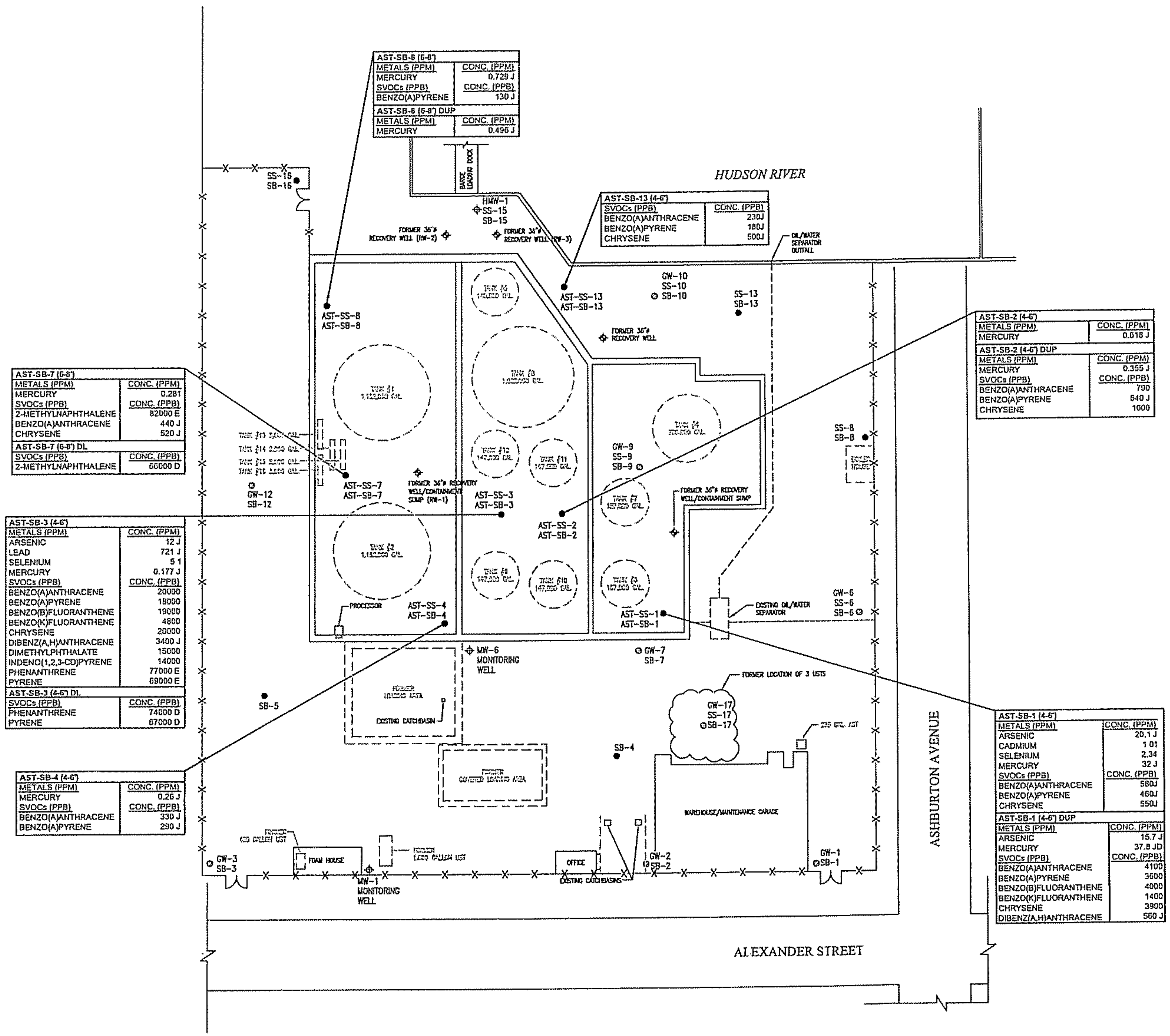
SUBSURFACE SOIL SAMPLES ABOVE NYSDEC TAGM #4046 RSCOs (OCTOBER 2004)

DATE 10/20/05

FIGURE 5



AST-SB-8 (6-8')	
METALS (PPM)	CONC. (PPM)
MERCURY	0.729 J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)PYRENE	130 J
AST-SB-8 (6-8') DUP	
METALS (PPM)	CONC. (PPM)
MERCURY	0.496 J

AST-SB-13 (4-6')	
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	230J
BENZO(A)PYRENE	180J
CHRYSENE	500J

AST-SB-7 (6-8')	
METALS (PPM)	CONC. (PPM)
MERCURY	0.281
SVOCs (PPB)	CONC. (PPB)
2-METHYLNAPHTHALENE	82000 E
BENZO(A)ANTHRACENE	440 J
CHRYSENE	520 J
AST-SB-7 (6-8') DL	
SVOCs (PPB)	CONC. (PPB)
2-METHYLNAPHTHALENE	66000 D

AST-SB-3 (4-6')	
METALS (PPM)	CONC. (PPM)
ARSENIC	12 J
LEAD	721 J
SELENIUM	5 1
MERCURY	0.177 J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	20000
BENZO(A)PYRENE	18000
BENZO(B)FLUORANTHENE	19000
BENZO(K)FLUORANTHENE	4800
CHRYSENE	20000
DIBENZ(A,H)ANTHRACENE	3400 J
DIMETHYLPHTHALATE	15000
INDENO(1,2,3-CD)PYRENE	14000
PHENANTHRENE	77000 E
PYRENE	69000 E
AST-SB-3 (4-6') DL	
SVOCs (PPB)	CONC. (PPB)
PHENANTHRENE	74000 D
PYRENE	67000 D

AST-SB-4 (4-6')	
METALS (PPM)	CONC. (PPM)
MERCURY	0.26 J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	330 J
BENZO(A)PYRENE	290 J

AST-SB-2 (4-6')	
METALS (PPM)	CONC. (PPM)
MERCURY	0.018 J
AST-SB-2 (4-6') DUP	
METALS (PPM)	CONC. (PPM)
MERCURY	0.355 J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	790
BENZO(A)PYRENE	640 J
CHRYSENE	1000

AST-SB-1 (4-6')	
METALS (PPM)	CONC. (PPM)
ARSENIC	20.1 J
CADMIUM	1 01
SELENIUM	2.34
MERCURY	32 J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	580J
BENZO(A)PYRENE	460J
CHRYSENE	550J
AST-SB-1 (4-6') DUP	
METALS (PPM)	CONC. (PPM)
ARSENIC	15.7 J
MERCURY	37.8 JD
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	4100
BENZO(A)PYRENE	3600
BENZO(B)FLUORANTHENE	4000
BENZO(K)FLUORANTHENE	1400
CHRYSENE	3900
DIBENZ(A,H)ANTHRACENE	560 J

LEGEND:

- FORMER MONITORING WELL LOCATION
- FORMER RECOVERY WELL LOCATION
- SOIL SAMPLE LOCATION
- SOIL SAMPLE AND TEMPORARY MONITORING WELL LOCATION
- SOIL SAMPLE AND PERMANENT MONITORING WELL LOCATION
- DEMOLISHED/REMOVED
- FENCE
- ABOVE GROUND STORAGE TANK
- BENEATH SURFACE

NOTES:

1. SAMPLING LOCATIONS AND TANK LOCATIONS ARE APPROXIMATE.
2. TANKS LOCATED WITHIN THE SECONDARY CONTAINMENT AREA AND THE BOILER HOUSE WERE DEMOLISHED IN 2004.
3. RESULTS SHOWN ON THIS FIGURE ARE ONLY THOSE THAT EXCEEDED THE NYSDEC TAGM #4046 RSCOs OR THOSE SAMPLING RESULTS QUALIFIED WITH A "U" OR "B".

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HMW = HDR MONITORING WELL
GW = GROUNDWATER SAMPLE
AST-SB = ABOVE GROUND STORAGE TANK SOIL BORING LOCATION
SB = SOIL BORING LOCATION
RW = RECOVERY WELL
SS = SURFACE SOIL SAMPLE LOCATION

SEE TABLES 4-4 THROUGH 4-7 IN THE FINAL SI/RAR FOR DEFINITION OF THE DATA QUALIFIERS.

HDR

YONKERS ATI SITE INVESTIGATION/ REMEDIAL ALTERNATIVES REPORT YONKERS, NEW YORK

AST SUBSURFACE SOIL SAMPLES ABOVE NYSDEC TAGM #4046 RSCOs (OCTOBER 2004)

DATE 10/20/05

FIGURE 6

- "U" meaning that the compound was not detected at the indicated concentration.
- "B" meaning, for VOCs and SVOCs, that the analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

Refer to Appendix G for all laboratory surface and subsurface soil analytical results.

4.3.2 Groundwater Remedial Investigation (October 2004)

Table 4-7 summarizes the groundwater analytes that exceeded the NYSDEC Standards/Guidelines. A complete listing of groundwater analytes that exceeded the NYSDEC Standards/Guidelines is provided in Tables 4-8a through 4-8c. Groundwater analytes exceeded the NYSDEC Standards/Guidelines for each of the nine (9) groundwater samples obtained from temporary monitoring wells and the one (1) of the three (3) groundwater samples obtained from the permanent monitoring wells. Figure 7 depicts the sampling locations and concentrations that exceeded the NYSDEC Standard/Guidelines. Groundwater analytical results not shown in Tables 4-7 and 4-8a through 4-8c and Figure 7 were below NYSDEC Standards/Guidelines or were qualified with one of the following qualifiers:

- "U" meaning that the compound was not detected at the indicated concentration.
- "B" meaning, for VOCs and SVOCs, that the analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

Refer to Appendix G for all laboratory groundwater analytical results. Note that the NYSDEC Standards/Guidelines are based on the aquifer being a source of drinking water. The groundwater from the Site is not used as a source of potable water. Residential/commercial buildings may be constructed on the Site in the future, at which time, the buildings would be connected to the City's water supply.

Table 4-7
Summary of Groundwater Sample Results (October 2004): RCRA Metals, VOCs and SVOCs Above NYSDEC Groundwater Standards/Guidelines

Analyte	Groundwater Samples Above NYSDEC Standards/Guidelines	Highest Result (& Location)	NYSDEC Standard/Guidelines
RCRA Metals			
Arsenic	GW-1, GW-2, GW-6, GW-9, GW-12, HMW-1	84.1 ppb (GW-1)	25 ppb(1)
Barium	GW-1	1,540 ppb (GW-1)	1000 ppb(1)
Cadmium	GW-1, GW-6	9.12 ppb (GW-6)	5 ppb(1)
Chromium	GW-1, GW-2, GW-6, GW-10, HMW-1	202 ppb (GW-1)	50 ppb(1)
Lead	GW-1, GW-2, GW-3, GW-6, GW-7, GW-9, GW-10, GW-12, GW-17, HMW-1	1,710 ppb (GW-1)	25 ppb(1)
Mercury	GW-1, GW-2, GW-6, GW-7, GW-9, GW-10, GW-12, GW-17, HMW-1	710 ppb (GW-2)	0.7 ppb(1)
VOCs			
Ethyl Benzene	GW-6	20 ppb (GW-6)	5 ppb(1)
Isopropylbenzene	GW-6	7.7 ppb (GW-6)	5 ppb(1)
SVOCs			
Acenaphthene	GW-6	75 ppb (GW-6)	20 ppb (2)
Benzo(a)anthracene	GW-6	1.3 ppb (GW-6)	0.002 ppb (2)
Chrysene	GW-6	1.5 ppb (GW-6)	0.002 ppb (2)

Notes:
(1) Based on Title 6 of the New York Code of Rules and Regulations, Part 703, Surface and Groundwater Quality Standards for class GA waters (fresh groundwater with a best end usage as drinking water).
(2) Based on NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 guidance values.
ppb: micrograms per kilogram
GW: Temporary Monitoring Well
HMW: HDR Monitoring Well
RCRA: Resource Conservation Recovery Act
VOC: Volatile Organic Compound
SVOC: Semi-Volatile Organic Compound

TABLE 4-8a

Groundwater and Surface Water Sample Results (October 2004): RCRA Metals Above the NYSDEC Standards/Guidelines

Metals (ppb)	NYSDEC Standards/ Guidelines												
Sample ID		GW-1	GW-2	GW-3	GW-6	GW-7	GW-9	GW-10	GW-12	GW-17	HMW-1	HMW-1DUP	OIL/WATER SEP.
Lab Sample Number		S5383-01	S5383-02	S5383-03	S5383-06	S5383-07	S5383-08	S5383-09	S5383-10	S5386-08	S5385-04	S5385-05	S5385-03
Sampling Date		10/22/2004	10/22/2004	10/22/2004	10/22/2004	10/22/2004	10/22/2004	10/22/2004	10/22/2004	10/22/2004	10/22/2004	10/22/2004	10/22/2004
Matrix		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Parameter		(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Arsenic	25	84.1	78.6	6.62 J	56.2	19.5	28.3	21	37.7	16.4	35.7	51.9	100
Barium	1000	1540	478	427	693	360	369	357	771	311	757	938	17.6 J
Cadmium	5	7.38	1.43 J	0.994 U	9.12	0.994 U	1.5 J	1.46 J	1.94 J	0.994 U	2.89 J	3.42 J	2.34 J
Chromium	50	202	80.6	2.84 JB	123	13.4	24.2	57	33.7	7.62 JB	81.3	104	303
Lead	25	1710 J	1010 J	65.4 J	1380 J	231 J	451 J	174 J	1250 J	218 J	199 J	282 J	35.2 J
Mercury	0.7	15.5 J	710 J	0.58 J	33.9 J	9.27 JN	3.38 JN	1.59 JN	4.78 JN	63.6 JN	0.84 JN	1.01 JN	0.8 JN

Data Qualifiers & Notes

U - The compound was not detected at the indicated concentration.
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
NJ - The analysis indicates presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration
GW - Groundwater sample taken from temporary well
HMW - Groundwater sample taken from permanent well installed by HDR
DUP - Duplicate sample
Bold - Exceedence of NYSDEC Standards / Guidelines
RCRA - Resource Conservation Recovery Act
ppb - parts per billion

TABLE 4-8b

Groundwater and Surface Water Sample Results (October 2004): VOCs Above the NYSDEC Standards/Guidelines

VOCs (ppb)	NYSDEC Standards/ Guidelines	
Sample ID		GW-6
Lab Sample Number		S5383-06
Sampling Date		10/22/2004
Matrix		WATER
Parameter		(ppb)
Ethyl Benzene	5	20
Isopropylbenzene	5	7.7

Data Qualifiers & Notes

GW - Groundwater sample taken from temporary well
Bold - Exceedence of NYSDEC Standards / Guidelines
ppb - parts per billion
VOC - Volatile Organic Compound

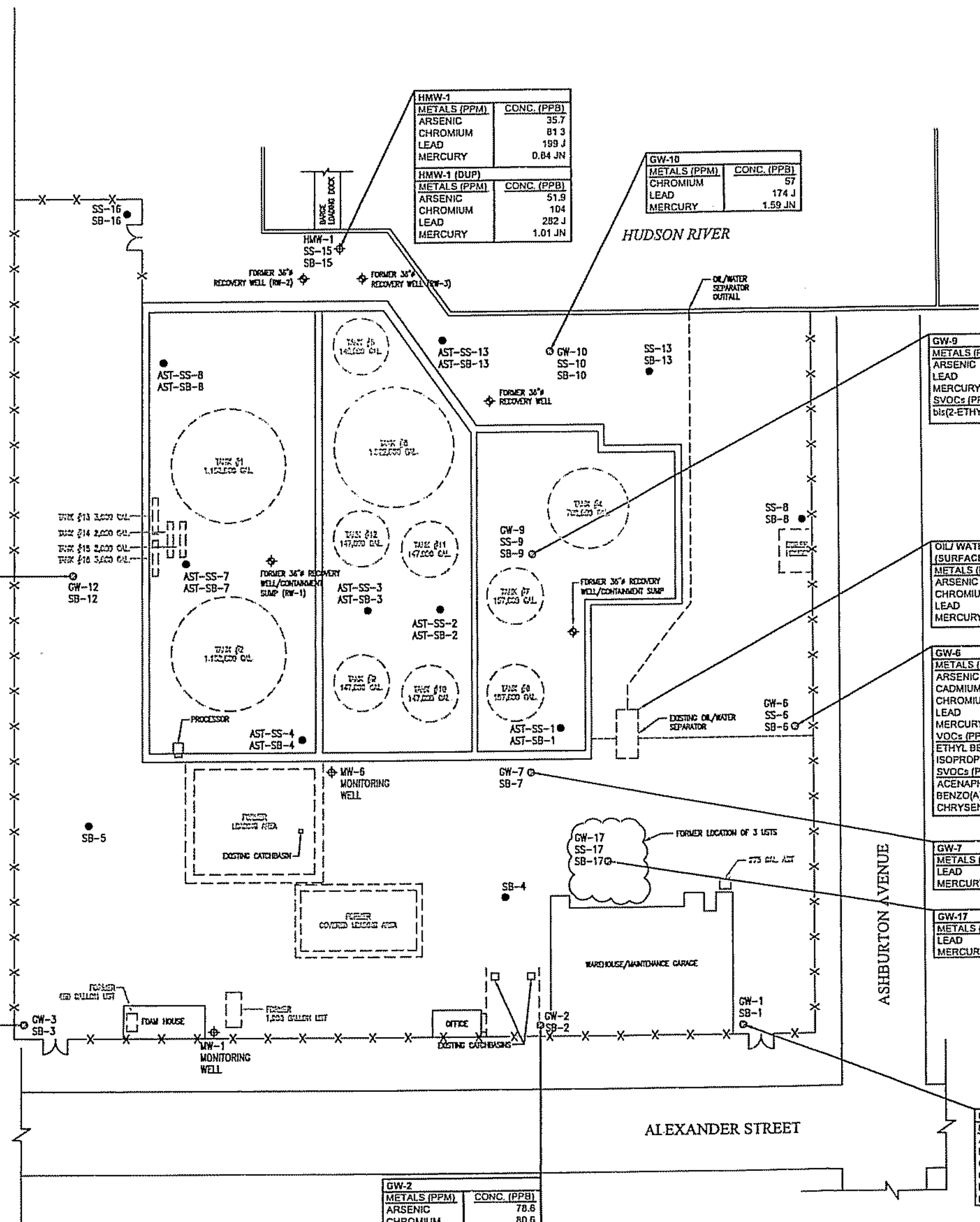
TABLE 4-8c

Groundwater and Surface Water Sample Results (October 2004): SVOCs Above the NYSDEC Standards/Guidelines

SVOCs (ppb)	NYSDEC Standards/ Guidelines	
Sample ID		GW-6
Lab Sample Number		S5383-06
Sampling Date		10/22/04
Matrix		WATER
Parameter		(ppb)
Acenaphthene	20	75
Benzo(a)anthracene	0.002	1.3 J
Chrysene	0.002	1.5 J

Data Qualifiers & Notes

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit
GW - Groundwater sample taken from temporary well
Bold - Exceedence of NYSDEC Standards / Guidelines
ppb - parts per billion
SVOC - Semi-Volatile Organic Compound



GW-12	
METALS (PPM)	CONC. (PPB)
ARSENIC	37.7
LEAD	1250 J
MERCURY	4.78 J

HMW-1	
METALS (PPM)	CONC. (PPB)
ARSENIC	35.7
CHROMIUM	81 3
LEAD	199 J
MERCURY	0.84 JN
HMW-1 (DUP)	
METALS (PPM)	CONC. (PPB)
ARSENIC	51.9
CHROMIUM	104
LEAD	282 J
MERCURY	1.01 JN

GW-10	
METALS (PPM)	CONC. (PPB)
CHROMIUM	57
LEAD	174 J
MERCURY	1.59 JN

GW-9	
METALS (PPM)	CONC. (PPB)
ARSENIC	28.3
LEAD	451J
MERCURY	3.38 JN
SVOCs (PPB)	CONC. (PPB)
bis(2-ETHYLHEXYL)PHTHALATE	6.2 J

OIL/ WATER SEPERATOR (SURFACE WATER)	
METALS (PPM)	CONC. (PPB)
ARSENIC	100
CHROMIUM	303
LEAD	35.2 J
MERCURY	0.8 JN

GW-6	
METALS (PPM)	CONC. (PPB)
ARSENIC	56.2
CADMIUM	9.12
CHROMIUM	123
LEAD	1380 J
MERCURY	33.9 J
VOCs (PPB)	CONC. (PPB)
ETHYL BENZENE	20
ISOPROPYLBENZENE	7.7
SVOCs (PPB)	CONC. (PPB)
ACENAPHTHENE	75
BENZO(A)ANTHRACENE	1 3 J
CHRYSENE	1.5 J

GW-7	
METALS (PPM)	CONC. (PPB)
LEAD	231
MERCURY	9.27

GW-17	
METALS (PPM)	CONC. (PPB)
LEAD	218 J
MERCURY	63.6 JN

GW-3	
METALS (PPM)	CONC. (PPB)
LEAD	65.4 J

GW-2	
METALS (PPM)	CONC. (PPB)
ARSENIC	78.6
CHROMIUM	80.6
LEAD	1010 J
MERCURY	710 J

GW-1	
METALS (PPM)	CONC. (PPB)
ARSENIC	84.1
BARIUM	1540
CADMIUM	7.38
CHROMIUM	202
LEAD	1710 J
MERCURY	15.5

LEGEND:

- FORMER MONITORING WELL LOCATION
- FORMER RECOVERY WELL LOCATION
- SOIL SAMPLE LOCATION
- SOIL SAMPLE AND TEMPORARY MONITORING WELL LOCATION
- SOIL SAMPLE AND PERMANENT MONITORING WELL LOCATION
- DEMOLISHED/REMOVED
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- BENEATH SURFACE

NOTES:

1. SAMPLING LOCATIONS AND TANK LOCATIONS ARE APPROXIMATE.
2. TANKS LOCATED WITHIN THE SECONDARY CONTAINMENT AREA AND THE BOILER HOUSE WERE DEMOLISHED IN 2004.
3. RESULTS SHOWN ON THIS FIGURE ARE ONLY THOSE THAT EXCEEDED THE NYSDEC STANDARDS/GUIDELINES OR THOSE SAMPLING RESULTS QUALIFIED WITH A "U" OR "B"

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SB = SOIL BORING LOCATION
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SEE TABLES 4-4 THROUGH 4-7 IN THE FINAL SI/RAR FOR DEFINITION OF THE DATA QUALIFIERS.

NOT TO SCALE

N

HDR

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GROUNDWATER AND SURFACE WATER SAMPLES ABOVE NYSDEC STANDARDS/GUIDELINES (OCTOBER 2004)

DATE 10/20/05

FIGURE 7

4.3.3 Surface Water Investigation (October 2004)

Tables 4-8a through 4-8c also provide a complete listing of the surface water analytes that exceeded the NYSDEC Standards/Guidelines for surface water. Surface water analytes exceeded the NYSDEC Standards/Guidelines for RCRA Metals in the surface water sample obtained from the on-site oil/water separator. The surface water sample did not result in exceedances of the NYSDEC Standards/Guidelines for surface water for VOCs and SVOCs. Surface water analytical results not shown in Tables 4-8a through 4-8c were below NYSDEC Standards/Guidelines or were qualified with one of the following qualifiers:

- "U" meaning that the compound was not detected at the indicated concentration.
- "B" meaning, for VOCs and SVOCs, that the analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

Refer to Appendix G for all laboratory surface water analytical results.

4.3.4 Building Materials

Asbestos and lead-based paint surveys were conducted in the warehouse/maintenance garage, the dispatch office, and the inactive fire suppression foam pump house.

4.3.4.1 Asbestos Survey

On October 4, 2004, an asbestos survey was performed. Sampled materials were analyzed using PLM and, if necessary, TEM. The materials that contained greater than total 1% asbestos are listed in Table 4-9. Refer to Appendix H for the asbestos survey report, which includes the sample analytical results.

Table 4-9
Asbestos Containing Building Materials
Containing Greater than 1% Asbestos

Material	Location	Approx. Quantity
Pipe fitting/ insulation	Warehouse/Maintenance Garage Building Boiler Room	330 linear feet
Boiler Gun Gaskets	Warehouse/Maintenance Garage Building Boiler Room and Foam Pump House	4 square feet
Roofing Materials	Warehouse/Maintenance Garage Building	2,500 square feet
Window Caulking	Warehouse/Maintenance Garage Building	60 linear feet
Roofing Materials	Dispatch Office	650 square feet
Roofing Materials	Foam Pump House	400 square feet

4.3.4.2 Lead-Based Paint Survey

Lead-based paint surveys were conducted in the warehouse/maintenance garage, the dispatch office, and the inactive fire suppression foam pump house. The white-gray paint covering the southern interior brick wall of the garage tested positive for lead. In the dispatch office, the lobby door, door casing and window sash (both interior and exterior) tested positive for lead. Additionally, the door casing and piping inside and outside of the foam pump house tested positive for lead. Refer to Appendix H for the lead-based paint survey report, which includes the sample analytical results and an inventory of the surfaces found to contain lead-based paint.

4.4 Supplemental Investigation Results (August 2005)

4.4.1 Subsurface Soil Supplemental Investigation (August 2005)

Tables 4-10 and 4-11 summarize the subsurface soil analytes that exceeded NYSDEC TAGM #4046 RSCOs. A complete listing of soil analytes that exceeded the NYSDEC's TAGM #4046 RSCOs is provided in Tables 4-12a through 4-12c. Soil analytes exceeded the NYSDEC TAGM #4046 RSCOs for each of the three (3) subsurface soil samples obtained from the area inside of the former AST containment area. Soil analytes exceeded the NYSDEC TAGM #4046 RSCOs for each of the three (3) subsurface soil samples obtained from the area outside of the former AST containment area.

Table 4-10
Summary of Supplemental Subsurface Soil Sample Results (August 2005): RCRA Metals and VOCs Above the NYSDEC TAGM #4046 RSCOs

Analyte	Subsurface Soil Samples Above the NYSDEC TAGM #4046 RSCOs	Highest Result (& Location)	NYSDEC TAGM #4046 RSCO [1]
RCRA Metals			
Arsenic	AST-SB-16	44.2 ppm (AST-SB-16)	12 ppm
Cadmium	AST-SB-14, AST-SB-16, AST-SB-18 (SB-18), AST-SB-19 (SB-19), AST-SB-20 (SB-20)	3.58 ppm (AST-SB-16)	1 ppm
Mercury	AST-SB-14, AST-SB-15, AST-SB-16, AST-SB-18 (SB-18), AST-SB-19 (SB-19), AST-SB-20 (SB-20)	0.971 ppm (AST-SB-20 (SB-20))	0.1 ppm
VOCs			
Acetone	AST-SB-16, AST-SB-19 (SB-19), AST-SB-20 (SB-20)	1,800 ppb (AST-SB-16)	200 ppb
Benzene	AST-SB-18 (SB-18) & AST-SB-20 (SB-20)	32,000 ppb (AST-SB-18 (SB-18))	60 ppb
Ethylbenzene	AST-SB-18 (SB-18)	17,000 ppb (AST-SB-18 (SB-18))	5,500 ppb
Methylene chloride	AST-SB-14	150 ppb (ASTSB--14)	100
Toluene	AST-SB-18 (SB-18)	6,500 ppb (AST-SB-18 (SB-18))	1,500 ppb
Total Xylenes	AST-SB-18 (SB-18) & AST-SB-20 (SB-20)	66,000 ppb (AST-SB-18 (SB-18))	1,200 ppb
Total VOCs	AST-SB-18 (SB-18)	140,700 ppb (AST-SB-18 (SB-18))	10,000 ppb

Notes:
[1] RSCO from NYSDEC's TAGM HWR-94-4046, revised January 24, 1994.
ppm: parts per million
ppb: parts per billion
SB: Soil Boring
AST: Aboveground Storage Tank
AST-SB: Soil sample obtained within AST containment area
RCRA: Resource Conservation Recovery Act
VOC: Volatile Organic Compounds

Table 4-11
Summary of Supplemental Subsurface Soil Sample Results (August 2005): SVOCs Above the NYSDEC TAGM #4046 RSCOs

Analyte	Subsurface Soil Sample Above the NYSDEC TAGM #4046 RSCOs	Highest Result (& Location)	NYSDEC TAGM #4046 RSCO [(1)]
SVOCs			
Benzo(a)anthracene	AST-SB-14, AST- SB-15, AST-SB-16, AST-SB-18 (SB-18), AST-SB-19 (SB-19), AST-SB-20 (SB-20)	5,800 ppb (AST-SB-20 (SB-20))	224 ppb
Benzo(a)pyrene	AST-SB-14, AST- SB-15, AST-SB-16, AST-SB-18 (SB-18), AST-SB-19 (SB-19), AST-SB-20 (SB-20)	5,300 ppb (AST-SB-20 (SB-20))	61 ppb
Benzo(b)flouranthene	AST-SB-20 (SB-20)	5,200 ppb (AST-SB-20 (SB-20))	1,100 ppb
Benzo(k)flouranthene	AST-SB-20 (SB-20)	2,500 ppb (AST-SB-20 (SB-20))	1,100 ppb
Chrysene	AST-SB-14, AST-SB-16, AST-SB-18 (SB-18), AST-SB-20 (SB-20)	5,500 ppb (AST-SB-20 (SB-20))	400 ppb
2-Methylnaphthalene	AST-SB-18 (SB-18)	53,000 ppb (AST-SB-18 (SB-18))	36,400 ppb
Naphthalene	AST-SB-18 (SB-18)	23,000 ppb (AST-SB-18 (SB-18))	13,000 ppb

Notes:

(1) RSCO from NYSDEC's TAGM HWR-94-4046, revised January 24, 1994.
ppm: milligrams per kilogram
ppb: micrograms per kilogram
SB: Soil Boring
AST: Aboveground Storage Tank
AST-SB: Soil sample obtained within AST containment area
SVOC: Semivolatile Organic Compounds

TABLE 4-12a

Supplemental Subsurface Soil Sample Results (August 2005): RCRA Metals Above the NYSDEC TAGM #4046 RSCOs

Metals (ppm) [1]	NYSDEC TAGM #4046 RSCOs (ppm)								
Sample ID[2]			AST-SB-14 (6'-8')	AST-SB-15 (4'-6')	AST-SB-16 (3'-7')	AST-SB-18 (1'-4') (SB-18 (1'-4'))	AST-SB-19 (4'-8') (SB-19 (4'-8'))	AST-SB-19 (4'-8') DUP (SB-19 (4'-8') DUP)	AST-SB-20 (6'-8') (SB-20 (6'-8'))
Lab Sample Number			T4140-02	T4140-04	T4140-06	T4140-10	T4140-15	T4140-16	T4140-18
Sampling Date			8/8/2005	8/8/2005	8/9/2005	08/08/05	8/8/2005	8/8/2005	8/8/2005
Matrix			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Parameter	RSCO	Site Background							
Arsenic	7.5	12	3.07	6.07	44.2	4.23	1.41	2.21	3.89
Cadmium	1	1	1.94 J	0.967 J	3.58 J	2.01 J	1.98 J	2.34 J	1.39 J
Mercury	0.1		0.282 J	0.154 J	0.355 J	0.155 J	0.135 J	0.151 J	0.971 JD

Data Qualifiers & Notes

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
D -	Dilution performed due to analyte's concentration exceeded the calibrated range of the instrument for specific analysis
AST-SB -	Soil boring sample taken within original above-ground storage tank containment area
SB -	Soil boring sample taken outside of original above-ground storage tank containment area
DUP -	Duplicate sample
Bold -	Exceedence of NYSDEC TAGM #4046 RSCOs
ppm -	parts per million
RCRA -	Resource Conservation Recovery Act
(1) -	NYSDEC TAGM #4046 offers an option between the cleanup objective and/or soil background thresholds. In this case, exceedence is highlighted when the higher of the two is surpassed.
(2) -	Although samples AST-SB-18 through AST-SB-20 are identified as AST-SB samples, they were not obtained from within the above-ground storage tank containment area.

TABLE 4-12b

Supplemental Subsurface Soil Sample Results (August 2005): VOCs Above the NYSDEC TAGM #4046 RSCOs

VOCs (ppb)	NYSDEC TAGM #4046 RSCOs (ppb)						
Sample ID[2]		AST-SB-14 (7'-8')	AST-SB-16 (3'-4')	AST-SB-18 (1'-4') (SB-18 (1'-4'))	AST-SB-19 (4'-8') (SB-19 (4'-8'))	AST-SB-19 (4'-8') DUP (SB-19 (4'-8') DUP)	AST-SB-20 (6'-8') (SB-20 (6'-8'))
Lab Sample Number		T4140-01	T4140-05	T4140-07	T4140-13	T4140-14	T4140-17
Sampling Date		08/08/05	8/9/2005	08/08/05	8/8/2005	8/8/2005	8/8/2005
Matrix		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Parameter							
Acetone	200	490 U	1800 J	7100 UJ	1200 J	390 U	800 J
Benzene	60	35 U	36 U	32000 J	35 U	28 U	120 J
Ethyl Benzene	5,500	150 J	190 J	17000 J	390 J	330 J	330 J
Methylene Chloride	100	150 J	93 UJ	70 UJ	90 UJ	73 UJ	86 UJ
Toluene	1,500	57 U	350 J	6500 J	130 J	110 J	690 J
Total Xylenes	1,200	210 J	1030 J	66000 J	1660 J	1420 J	1180 J
TOTAL VOCs [1]	10,000	1,590	3,610	140,700	3,820	2,210	3,360

Data Qualifiers & Notes

U -	The compound was not detected at the indicated concentration.
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
UJ -	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit appropriate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
AST-SB -	Soil boring sample taken within original above-ground storage tank containment area
SB -	Soil boring sample taken outside of original above-ground storage tank containment area
DUP -	Duplicate sample
Bold -	Exceedence of NYSDEC TAGM #4046 RSCOs
ppb -	parts per billion
VOC -	Volatile Organic Compound
(1) -	Sum of all VOCs not qualified with "U" or "B" qualifiers, as reported by analyzing lab.
(2) -	Although samples AST-SB-18 through AST-SB-20 are identified as AST-SB samples, they were not obtained from within the above-ground storage tank containment area.

TABLE 4-12c

Supplemental Subsurface Soil Sample Results (August 2005): SVOCs Above the NYSDEC TAGM #4046 RSCOs

SVOCs (ppb) Sample ID[1]	NYSDEC TAGM #4046 RSCOs (ppb)	AST-SB-14 (6'-8')	AST-SB-15 (4'-6')	AST-SB-16 (3'-7')	AST-SB-18 (1'-4') (SB-18 (1'-4'))	AST-SB-18 (1'-4') DL (SB-18 (1'-4') DL)	AST-SB-19 (4'-8') (SB-19 (4'-8'))	AST-SB-19 (4'-8') DUP (SB-19 (4'-8') DUP)	AST-SB-20 (6'-8') (SB-20 (6'-8'))
Lab Sample Number		T4140-02	T4140-04	T4140-06	T4140-10	T4140-10 DL	T4140-15	T4140-16	T4140-18
Sampling Date		8/8/2005	8/8/2005	8/9/2005	08/08/05	08/08/05	8/8/2005	8/8/2005	8/8/2005
Matrix		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Parameter									
Benzo(a)anthracene	224	350 J	190 J	1100 J	750 J	1500 UD	160 J	350 J	5800
Benzo(a)pyrene	61	160 J	87 J	820 J	460 J	1700 UD	140 J	270 J	5300
Benzo(b)fluoranthene	1,100	210 J	120 J	950 J	680 J	1200 UD	150 J	270 J	5200
Benzo(k)fluoranthene	1,100	110 J	84 U	580 J	470 U	2400 UD	83 U	150 J	2500
Chrysene	400	470 J	310 J	1900	1000 J	1900 UD	140 J	290 J	5500
2-Methylnaphthalene	36,400	28000 J	17000 J	8700	43000 E	53000 D	430	250 J	8200
Naphthalene	13,000	69 UJ	65 UJ	1100 J	21000 E	23000 D	65 U	65 U	2500

Data Qualifiers & Notes

U - The compound was not detected at the indicated concentration.
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.
D - Dilution performed due to analyte's concentration exceeded the calibrated range of the instrument for specific analysis
E - Exceeds calibration
UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit appropriate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
DL - Dilution performed due to analyte's concentration exceeded the calibrated range of the instrument for specific analysis
AST-SB - Soil boring sample taken within original above-ground storage tank containment area
SB - Soil boring sample taken outside of original above-ground storage tank containment area
Bold - Exceedence of NYSDEC TAGM #4046 RSCOs
ppb - parts per billion
SVOC - Semi-Volatile Organic Compound
[1] - Although samples AST-SB-18 through AST-SB-20 are identified as AST-SB samples, they were not obtained from within the above-ground storage tank containment area.

Figure 8 (for supplemental subsurface soils) depicts the sampling locations and concentrations that exceeded the NYSDEC's TAGM #4046 RSCOs. Soil sample analytical results not shown in Tables 4-10 through 4-12c and Figure 8 were below NYSDEC TAGM #4046 RSCOs or were qualified with one of the following qualifiers:

- "U" meaning that the compound was not detected at the indicated concentration.
- "B" meaning, for VOCs and SVOCs, that the analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

Refer to Appendix I for all laboratory subsurface soil analytical results.

4.4.2 Groundwater Supplemental Investigation (August 2005)

Table 4-13 summarizes the groundwater analytes that exceeded the NYSDEC Standards/Guidelines. A complete listing of groundwater analytes that exceeded the NYSDEC Standards/Guidelines is provided in Tables 4-14a through 4-14c. Groundwater analytes exceeded the NYSDEC Standards/Guidelines for RCRA Metals for:

- Five (5) of the six (6) unfiltered groundwater samples obtained from the six (6) temporary monitoring wells.
- Two (2) of the six (6) filtered groundwater samples obtained from the six (6) temporary monitoring wells.
- Each of the three (3) unfiltered groundwater samples obtained from the permanent monitoring wells.
- One (1) of the three (3) filtered groundwater samples obtained from the permanent monitoring wells.

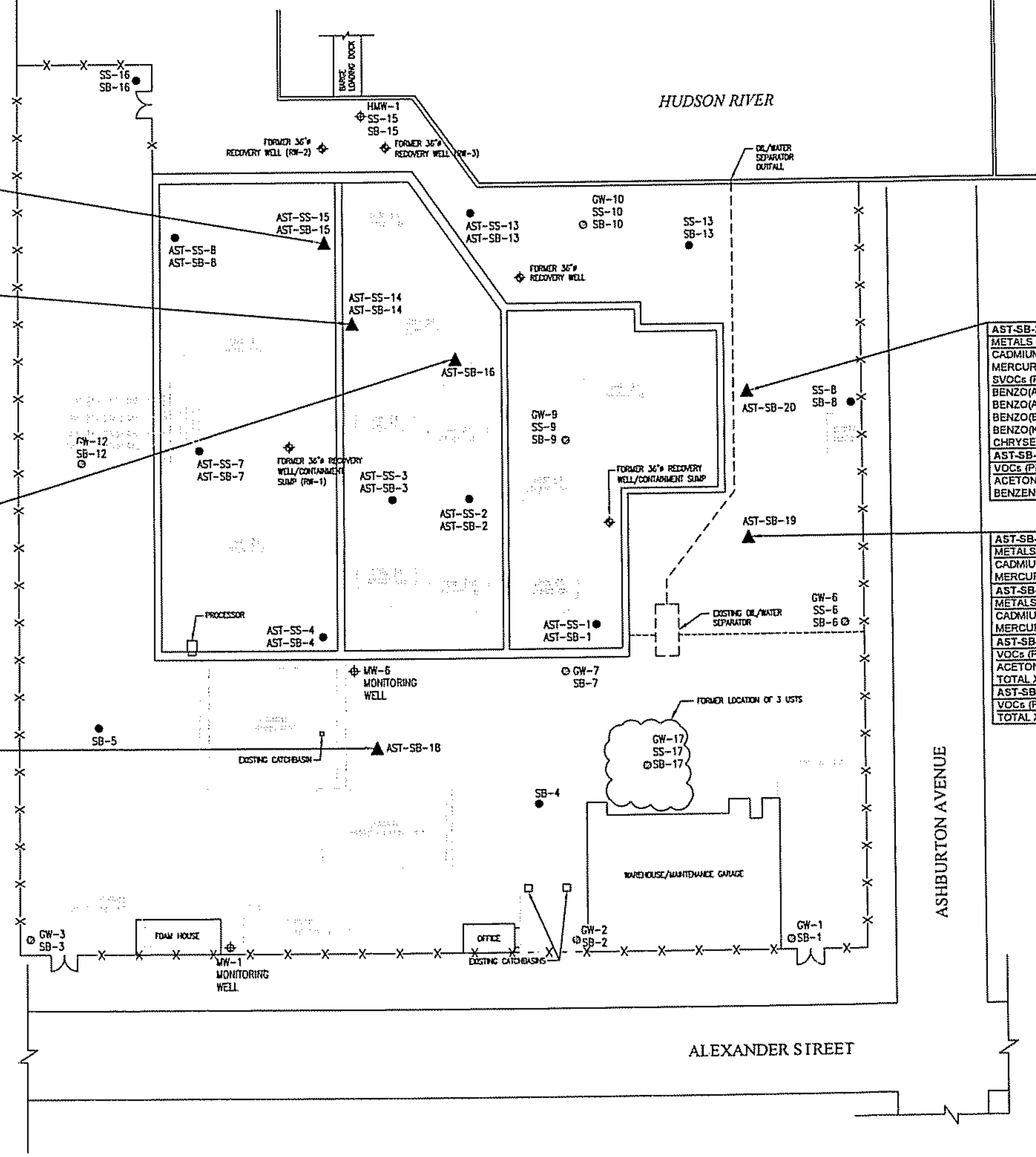
Groundwater analytes exceeded the NYSDEC Standards/Guidelines for VOCs and SVOCs for one unfiltered sample of three (3) unfiltered groundwater samples obtained from the three (3) permanent monitoring wells. Figure 9 depicts the sampling locations and concentrations that exceeded the NYSDEC Standard/Guidelines. Groundwater analytical results not shown in Tables 4-13 through 4-14c and Figure 9 were below NYSDEC Standards/Guidelines or were qualified with one of the following qualifiers:

AST-SB-15 (4'-6')	
METALS (PPM)	CONC. (PPM)
MERCURY	0.154 J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	190 J
BENZO(A)PYRENE	87 J

AST-SB-14 (6'-8')	
METALS (PPM)	CONC. (PPM)
CADMIUM	194 J
MERCURY	0.282 J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	350 J
BENZO(A)PYRENE	160 J
CHRYSENE	470 J
AST-SB-14 (7'-8')	
VOCs (PPB)	CONC. (PPB)
METHYLENE CHLORIDE	150 J

AST-SB-16 (3'-7')	
METALS (PPM)	CONC. (PPM)
ARSENIC	44.2
CADMIUM	3.58 J
MERCURY	0.355 J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	1100 J
BENZO(A)PYRENE	820 J
CHRYSENE	1900
AST-SB-16 (3'-4')	
VOCs (PPB)	CONC. (PPB)
ACETONE	1800 J

AST-SB-18 (1'-4')	
METALS (PPM)	CONC. (PPM)
CADMIUM	2.01 J
MERCURY	0.155 J
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	750 J
BENZO(A)PYRENE	460 J
CHRYSENE	1000 J
2-METHYLNAPHTHALENE	43000 E
NAPHTHALENE	21000 E
AST-SB-18 (1'-4') DL	
SVOCs (PPB)	CONC. (PPM)
2-METHYLNAPHTHALENE	53000 D
NAPHTHALENE	23000 D
AST-SB-18 (1'-3')	
VOCs (PPB)	CONC. (PPB)
BENZENE	32000 J
ETHYL BENZENE	17000 J
TOLUENE	6500 J
TOTAL XYLENES	66000 J



AST-SB-20 (6'-8')	
METALS (PPM)	CONC. (PPM)
CADMIUM	1.39 J
MERCURY	0.971 JD
SVOCs (PPB)	CONC. (PPB)
BENZO(A)ANTHRACENE	5800
BENZO(A)PYRENE	5300
BENZO(B)FLUORANTHENE	5200
BENZO(K)FLUORANTHENE	2500
CHRYSENE	5500
AST-SB-20 (7'-8')	
VOCs (PPB)	CONC. (PPB)
ACETONE	800 J
BENZENE	120 J

AST-SB-19 (4'-8')	
METALS (PPM)	CONC. (PPM)
CADMIUM	1.08 J
MERCURY	0.135 J
AST-SB-19 (4'-8') DUP	
METALS (PPM)	CONC. (PPM)
CADMIUM	2.34 J
MERCURY	0.151 J
AST-SB-16 (3'-4')	
VOCs (PPB)	CONC. (PPB)
ACETONE	1200 J
TOTAL XYLENES	1660 J
AST-SB-19 (4'-6') DUP	
VOCs (PPB)	CONC. (PPB)
TOTAL XYLENES	1420 J

LEGEND:

- FORMER MONITORING WELL LOCATION
- FORMER RECOVERY WELL LOCATION
- SOIL SAMPLE LOCATION
- SOIL SAMPLE AND TEMPORARY MONITORING WELL LOCATION
- SOIL SAMPLE AND PERMANENT MONITORING WELL LOCATION
- ADDITIONAL SOIL SAMPLE LOCATION
- DEMOLISHED/REMOVED
- FENCE
- ABOVE GROUND STORAGE TANK
- BENEATH SURFACE

NOTES:

1. SAMPLING LOCATIONS AND TANK LOCATIONS ARE APPROXIMATE.
2. TANKS LOCATED WITHIN THE SECONDARY CONTAINMENT AREA AND THE BOILER HOUSE WERE DEMOLISHED IN 2004.
3. RESULTS SHOWN ON THIS FIGURE ARE ONLY THOSE THAT EXCEEDED THE NYSDEC TAGM #4046 RSCOs OR THOSE SAMPLING RESULTS QUALIFIED WITH A "U" OR "B".

MW = MONITORING WELL
HMW = HDR MONITORING WELL
GW = GROUNDWATER SAMPLE
AST-SB = ABOVE GROUND STORAGE TANK SOIL BORING LOCATION
SB = SOIL BORING LOCATION
RW = RECOVERY WELL
SS = SURFACE SOIL SAMPLE LOCATION

SEE TABLES 4-4 THROUGH 4-7 IN THE FINAL SI/RAR FOR DEFINITION OF THE DATA QUALIFIERS.

NOT TO SCALE

N

HDR

YONKERS ATI SITE INVESTIGATION/ REMEDIAL ALTERNATIVES REPORT YONKERS, NEW YORK

SUPPLEMENTAL SUBSURFACE SOIL SAMPLE ABOVE NYSDEC TAGM #4046 RSCOs (AUGUST 2005)

DATE 01/26/06

FIGURE 8

Table 4-13
Summary of Supplemental Groundwater Sample Results (August 2005): RCRA Metals, VOCs and SVOCs Above NYSDEC Groundwater Standards/Guidelines

Analyte	Groundwater Sample Above NYSDEC Groundwater Standards/Guidelines	Highest Result (& Location)	NYSDEC Standard[1] /Guidelines[2]
RCRA Metals			
Arsenic	HMW-1	27.6 ppm (HMW-1)	25 ppb
Cadmium	HMW-1	12.6 ppm (HMW-1)	5 ppb
Chromium	HMW-1	79.3 ppm (HMW-1)	50 ppb
Lead	GW-6, GW-12, MW-1, MW-6, HMW-1	172 ppm (GW-12)	25 ppb
Selenium	GW-9F, MW-1, MW-1F	11.2 ppb (MW-1F)	10 ppb
Mercury	GW-6, GW-12, GW-12F, GW-17, MW-1, MW-6	1.43 ppb (MW-1)	0.7 ppb
VOCs			
Methyl tert-butyl ether	MW-6	18 ppb (MW-6)	10 ppb
SVOCs			
Benzo(a)anthracene	MW-6	2.1 ppb (MW-6)	0.002 ppb
Benzo(b)flouranthene	MW-6	1.7 ppb (MW-6)	0.002 ppb
Chrysene	MW-6	2.1 ppb (MW-6)	0.002 ppb

Notes:
(1) Based on Title 6 of the New York Code of Rules and Regulations, Part 703, Surface and Groundwater Quality Standards for class GA waters (fresh groundwater with a best end usage as drinking water).
(2) Based on NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 guidance values.
ppb: micrograms per kilogram
GW: Temporary Monitoring Well
HMW: HDR Monitoring Well
RCRA: Resource Conservation Recovery Act
VOC: Volatile Organic Compound
SVOC: Semi-Volatile Organic Compound
F: Filtered sample

TABLE 4-14a

Supplemental Groundwater Sample Results (August 2005): RCRA Metals (Unfiltered and Filtered) Above the NYSDEC Standards/Guidelines

Metals (ppb)

Sample ID	**NYSDEC Standards/Guidelines**	**GW-6**		**GW-12**		**GW-17**		**MW-1**		**MW-1 DUP**		**MW-6**		**HMW-1**	
Lab Sample Number		T4140-24		T4181-02		T4181-03		T4181-05		T4181-06		T4181-04		T4181-07	
Sampling Date		8/9/2005		8/10/2005		8/10/2005		8/11/2005		8/11/2005		8/11/2005		8/11/2005	
Matrix		WATER		WATER		WATER		WATER		WATER		WATER		WATER	
Parameter		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)	
Arsenic	25	3.32	U	3.32	UN	10.5	N	3.32	UN	3.32	UN	3.32	UN	**27.6**	N
Cadmium	5	0.327	UJN	3.8	JN	0.87	JN	2.23	JN	3.03	J	1.95	JN	**12.6**	JN
Chromium	50	4.83	JN	0.343	UN	1.79	JN	0.343	UN	0.343	UN	2.52	JN	**79.3**	N
Lead	25	**134**	JN	**172**	JN	14.5	JN	**58.5**	JN	**66.3**	JN	**43.6**	JN	**108**	JN
Selenium	10	3.04	UJ	8.9	J	3.04	UJ	6.71	J	**10.7**	J	3.04	UJ	9.02	J
Mercury	0.7	**1.05**		**0.79**	J	**1.24**	J	**1.429**	J	**1.07**	J	**1.039**	J	0.62	J

Dissolved Metals (ppb) (1)

Sample ID	**NYSDEC Standards/Guidelines**	**GW-9 Filtered**		**GW-12 Filtered**		**MW-1 Filtered**	
Lab Sample Number		T4181-01		T4181-02		T4181-05	
Sampling Date		8/10/2005		8/10/2005		8/11/2005	
Matrix		WATER		WATER		WATER	
Parameter		(ppb)		(ppb)		(ppb)	
Selenium	10	**10.8**	JN	7.32	JN	**11.2**	JN
Mercury	0.7	0.03	U	**0.83**		0.03	U

Data Qualifiers & Notes

U - The compound was not detected at the indicated concentration.
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.
NJ - The analysis indicates presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
GW - Groundwater sample taken from temporary well
MW - Groundwater sample taken from permanent well
HMW - Groundwater sample taken from permanent well installed by HDR
DUP - Duplicate sample
Bold - Exceedence of NYSDEC Standards / Guidelines
ppb - parts per billion
RCRA - Resource Conservation Recovery Act
(1) - Supplementary groundwater samples collected in Aug. 2005 and tested for Dissolved Metal concentrations were passed through a 0.45 micron filter in the field.

TABLE 4-14b

Supplemental Groundwater Sample Results (August 2005): VOCs Above the NYSDEC Standards/Guidelines

VOCs (ppb)	Sample ID	NYSDEC Standards/ Guidelines	MW-6	
	Lab Sample Number		T4181-04	
	Sampling Date		8/11/2005	
	Matrix		WATER	
	Parameter		(ppb)	
	Methyl tert-butyl Ether	10	**18**	

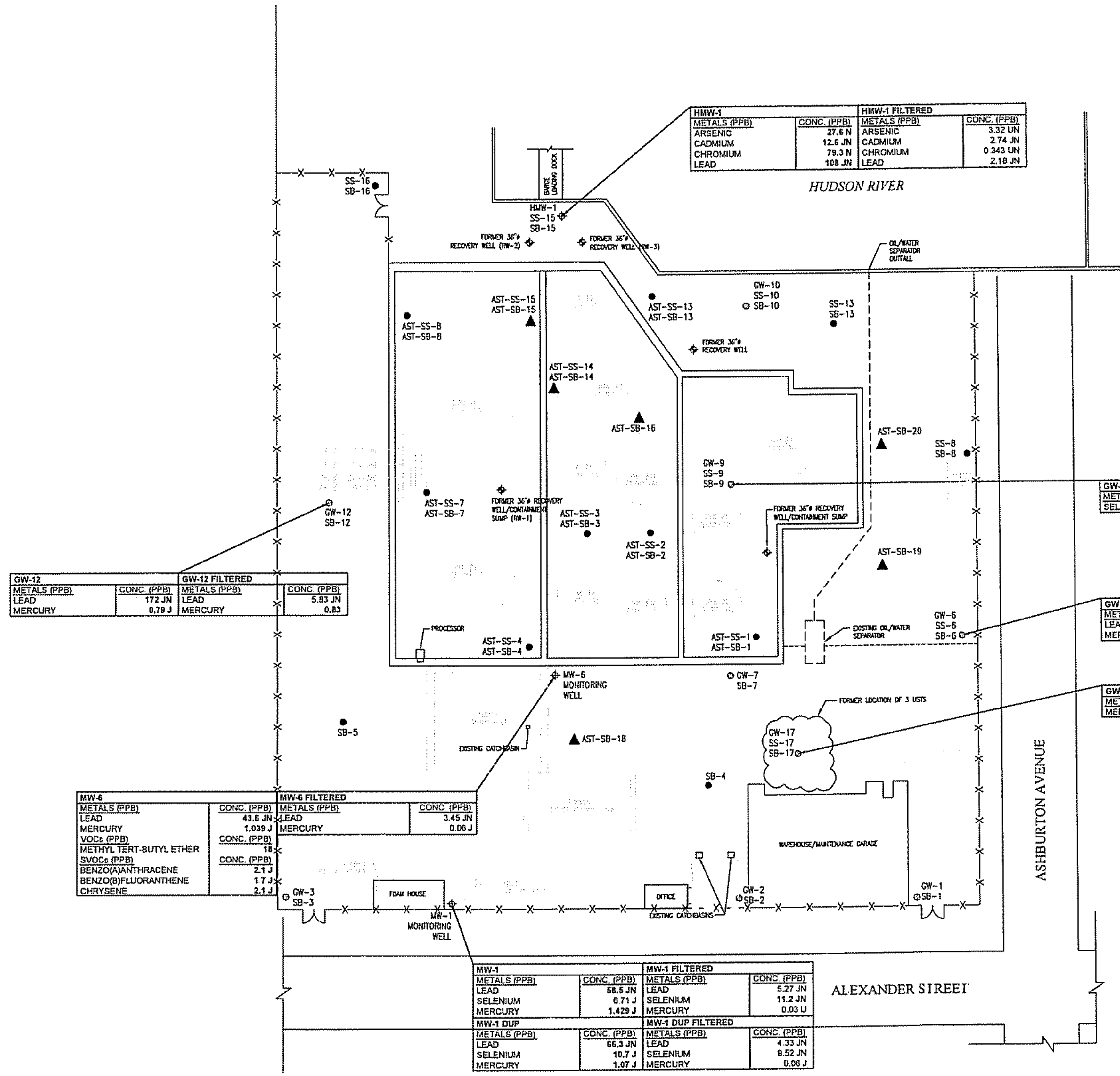
Data Qualifiers & Notes
- MW - Groundwater sample taken from permanent monitoring well
- **Bold** - Exceedence of NYSDEC Standards / Guidelines
- VOC - Volatile Organic Compound
- ppb - parts per billion

TABLE 4-14c

Supplemental Groundwater Sample Results (August 2005): SVOCs Above the NYSDEC Standards/Guidelines

SVOCs (ppb)	Sample ID	NYSDEC Standards/ Guidelines	MW-6	
	Lab Sample Number		T4181-04	
	Sampling Date		8/11/2005	
	Matrix		WATER	
	Parameter		(ppb)	
	Benzo(a)anthracene	0.002	**2.1**	J
	Benzo(b)fluoranthene	0.002	**1.7**	J
	Chrysene	0.002	**2.1**	J

Data Qualifiers & Notes
- 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.
- MW - Groundwater sample taken from monitoring well
- **Bold** - Exceedence of NYSDEC Standards / Guidelines
- SVOC - Semi-Volatile Organic Compound
- ppb - parts per billion



HMW-1		HMW-1 FILTERED	
METALS (PPB)	CONC. (PPB)	METALS (PPB)	CONC. (PPB)
ARSENIC	27.6 N	ARSENIC	3.32 UN
CADMIUM	12.6 JN	CADMIUM	2.74 JN
CHROMIUM	79.3 N	CHROMIUM	0.343 UN
LEAD	108 JN	LEAD	2.18 JN

GW-12		GW-12 FILTERED	
METALS (PPB)	CONC. (PPB)	METALS (PPB)	CONC. (PPB)
LEAD	172 JN	LEAD	5.83 JN
MERCURY	0.79 J	MERCURY	0.83

GW-9		GW-9 FILTERED	
METALS (PPB)	CONC. (PPB)	METALS (PPB)	CONC. (PPB)
SELENIUM	9.4 J	SELENIUM	10.8 JN

GW-6		GW-6 FILTERED	
METALS (PPB)	CONC. (PPB)	METALS (PPB)	CONC. (PPB)
LEAD	134 JN	LEAD	2.18 UJN
MERCURY	1.05	MERCURY	0.03 U

GW-17		GW-17 FILTERED	
METALS (PPB)	CONC. (PPB)	METALS (PPB)	CONC. (PPB)
MERCURY	1.24 J	MERCURY	0.03 U

MW-6		MW-6 FILTERED	
METALS (PPB)	CONC. (PPB)	METALS (PPB)	CONC. (PPB)
LEAD	43.6 JN	LEAD	3.45 JN
MERCURY	1.039 J	MERCURY	0.06 J
VOCs (PPB)	CONC. (PPB)		
METHYL TERT-BUTYL ETHER	18		
SVOCs (PPB)	CONC. (PPB)		
BENZO(A)ANTHRACENE	2.1 J		
BENZO(B)FLUORANTHENE	1.7 J		
CHRYSENE	2.1 J		

MW-1		MW-1 FILTERED	
METALS (PPB)	CONC. (PPB)	METALS (PPB)	CONC. (PPB)
LEAD	58.5 JN	LEAD	5.27 JN
SELENIUM	6.71 J	SELENIUM	11.2 JN
MERCURY	1.429 J	MERCURY	0.03 U
MW-1 DUP		MW-1 DUP FILTERED	
METALS (PPB)	CONC. (PPB)	METALS (PPB)	CONC. (PPB)
LEAD	66.3 JN	LEAD	4.33 JN
SELENIUM	10.7 J	SELENIUM	9.52 JN
MERCURY	1.07 J	MERCURY	0.06 J

LEGEND:

- FORMER MONITORING WELL LOCATION
- FORMER RECOVERY WELL LOCATION
- SOIL SAMPLE LOCATION
- SOIL SAMPLE AND TEMPORARY MONITORING WELL LOCATION
- SOIL SAMPLE AND PERMANENT MONITORING WELL LOCATION
- ADDITIONAL SOIL SAMPLE LOCATION
- DEMOLISHED/REMOVED
- FENCE
- ABOVE GROUND STORAGE TANK
- BENEATH SURFACE

NOTES:

1. SAMPLING LOCATIONS AND TANK LOCATIONS ARE APPROXIMATE.
2. TANKS LOCATED WITHIN THE SECONDARY CONTAINMENT AREA AND THE BOILER HOUSE WERE DEMOLISHED IN 2004.
3. RESULTS SHOWN ON THIS FIGURE IN BOLD ARE THOSE THAT EXCEEDED THE NYSDEC STANDARDS/GUIDELINES OR THOSE SAMPLING RESULTS QUALIFIED WITH A "U" OR "B"

MW = MONITORING WELL
HMW = HDR MONITORING WELL
GW = GROUNDWATER SAMPLE
AST–SB = ABOVE GROUND STORAGE TANK SOIL BORING LOCATION
SB = SOIL BORING LOCATION
RW = RECOVERY WELL
SS = SURFACE SOIL SAMPLE LOCATION

SEE TABLES 4-4 THROUGH 4-7 IN THE FINAL SI/RAR FOR DEFINITION OF THE DATA QUALIFIERS.

HDR

YONKERS ATI SITE INVESTIGATION/ REMEDIAL ALTERNATIVES REPORT YONKERS, NEW YORK

SUPPLEMENTAI GROUNDWATER SAMPLES ABOVE NYSDEC STANDARD/GUIDELINES (AUGUST 2005)

DATE 01/26/06

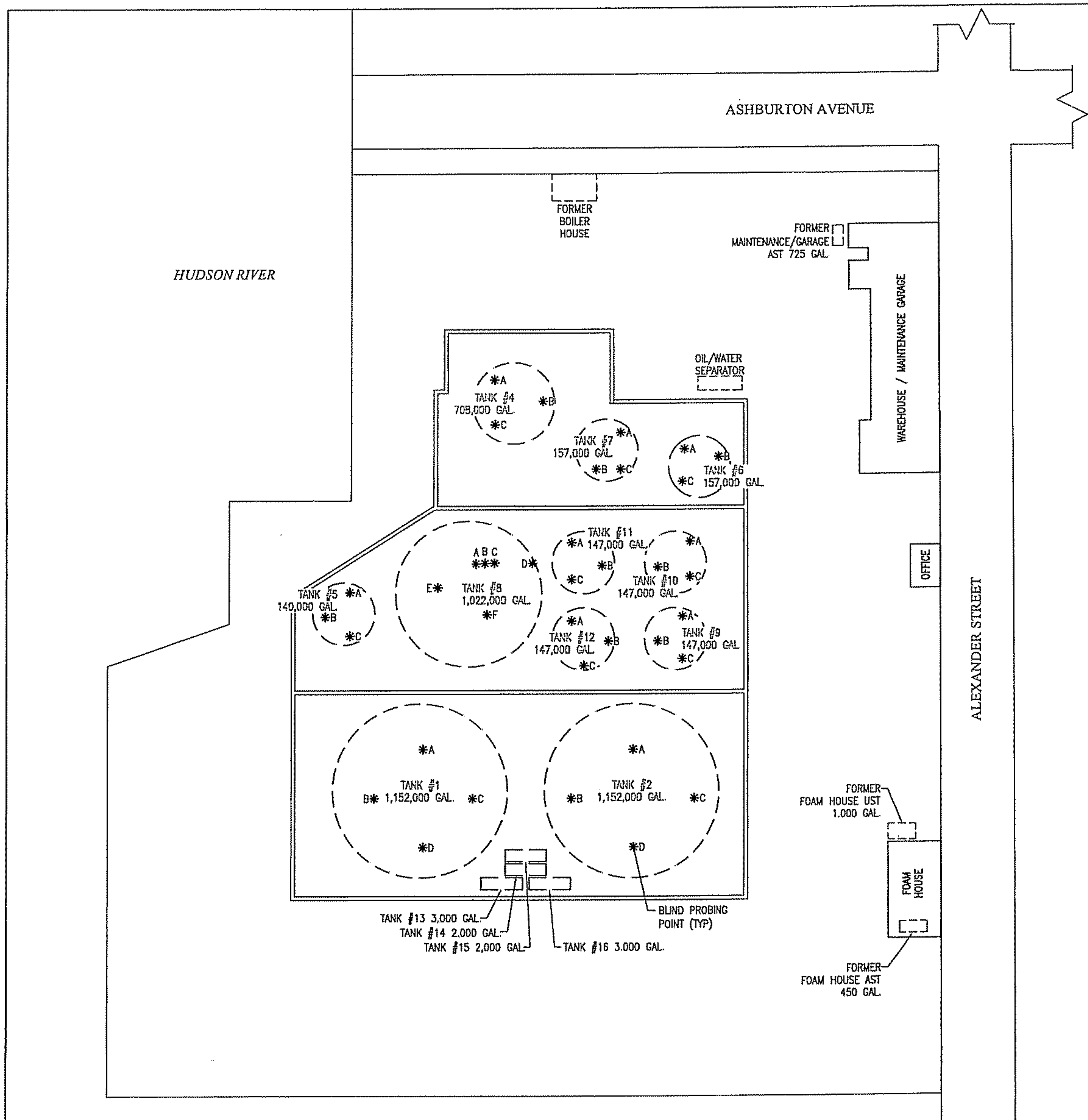
FIGURE 9

- "U" meaning that the compound was not detected at the indicated concentration.
- "B" meaning, for VOCs and SVOCs, that the analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

Refer to Appendix I for all laboratory groundwater analytical results. Note that the NYSDEC Standards/Guidelines are based on the aquifer being a source of drinking water. The groundwater from the site is not used as a source of potable water. Residential/commercial buildings may be constructed on the site in the future, at which time, the buildings would be connected to the City's water supply.

4.4.3 Concrete Pad Investigation (August 2005)

The blind probing was performed at three (3) or more locations below the approximate former footprint of each of the 11 large ASTs formerly stored on site. Refusal was not encountered under three (3) of the former AST footprints (Tanks #6, #10 and #11, each consisting of a volume of 147,000 gallons). Therefore, it is assumed that a concrete pad does not exist under the footprint of these former tanks. Refusal was encountered during all the blind probes performed under two (2) of the former AST footprints (Tans #4 and #9, consisting of a volume of 708,00 gallons and 147,000 gallons, respectively). Therefore, a concrete pad is assumed to exist under the entire footprint of each of these two (2) tanks. The concrete pad is assumed to be at a depth of approximately 3 feet bgs to 4 feet bgs for Tank #4 and approximately 6.5 feet bgs for Tank #9. Refusal was encountered for some, but not all, of the blind probes advanced under each of the remaining six (6) former AST footprints [Tanks #1, #2, #5, #7, #8, #12 (note: Tank #3 did not exist)]. Therefore, it is assumed that a concrete pad exists under a portion of the former AST footprints. The depth to refusal ranged from approximately 2 feet bgs to 8 feet bgs for these tanks. The depth to refusal encountered during blind probing performed under the footprint of former Tanks #2, #8 and #12 varied within the footprint area. For example, for the blind probing performed under the footprint of former Tank #2, refusal was encountered at one (1) blind probe location at approximately 3 feet bgs, at another blind probe location at approximately 8 feet bgs, and was not encountered at the other two blind probing locations. It is unknown if, at the blind probe locations where refusal was encountered but the depth to refusal varied, the concrete pad collapsed during the probing to a deeper depth than originally installed. A map depicting the locations where refusal was encountered and the depth of refusal is provided in Figure 10.



BLIND PROBING POINT	DEPTH TO REFUSAL (FT.)
TANK #1	
A	NO REFUSAL
B	2
C	2
D	3
TANK #2	
A	NO REFUSAL
B	3
C	8
D	NO REFUSAL
TANK #4	
A	3
B	4
C	4
TANK #5	
A	5
B	6
C	NO REFUSAL
TANK #6	
A	NO REFUSAL
B	NO REFUSAL
C	NO REFUSAL
TANK #7	
A	6
B	NO REFUSAL
C	NO REFUSAL

BLIND PROBING POINT	DEPTH TO REFUSAL (FT.)
TANK #8	
A	8
B	8
C	3.5
D	3
E	8
F	NO REFUSAL
TANK #9	
A	6.5
B	6.5
C	6.5
TANK #10	
A	NO REFUSAL
B	NO REFUSAL
C	NO REFUSAL
TANK #11	
A	NO REFUSAL
B	NO REFUSAL
C	NO REFUSAL
TANK #12	
A	2
B	5.5
C	NO REFUSAL

0 50 100
APPROXIMATE SCALE OF FEET

N

HDR

YONKERS ATI SITE INVESTIGATION/ REMEDIAL ALTERNATIVES REPORT YONKERS, NEW YORK

CONCRETE PAD INVESTIGATION RESULTS

DATE 10/20/05

FIGURE 10

5.0 EVALUATION OF INVESTIGATIVE DATA

5.1 Soils

5.1.1 Surface Soils

RCRA Metals were detected at concentrations exceeding the NYSDEC TAGM #4046 RSCOs in the surface soils at the site. Metals detected above NYSDEC TAGM #4046 RSCO consisted of cadmium, chromium and mercury. Mercury was the most prevalent metal detected in concentrations above the NYSDEC TAGM #4046 RSCO. The mercury concentrations in exceedance of the NYSDEC TAGM #4046 RSCO of 0.1 parts per million (ppm) were detected in 12 of the 15 surface soil samples, including surface soil samples SS-6 and SS-8, located in the northern perimeter of the site. Mercury was detected below NYSDEC TAGM #4046 RSCO in surface soil samples AST-SS-13, SS-10 and SS-17. VOCs were not detected above the NYSDEC TAGM #4046 RSCOs.

SVOCs were also detected in concentrations exceeding the NYSDEC TAGM #4046 RSCOs in the surface soils on the site. Half of the samples reporting exceedances were located outside of the AST containment area in the western area of the Site, with the second half of the samples located within of the AST containment area. Concentrations in exceedance of the NYSDEC TAGM #4046 RSCO for SVOCs that are primarily polycyclic aromatic hydrocarbons (PAHs) were detected in the surface soils at the following eight (8) of the 15 surface soil samples obtained: SS-9, SS-10, SS-13, SS-16. AST-SS-2, AST-SS-3, AST-SS-7, AST-SS-13. Additionally, seven (7) of these surface soil samples also exceeded the NYSDEC TAGM #4046 RSCO of 400 parts per billion (ppb) for chrysene. Surface soil sample SS-9 reported the highest concentration of PAHs and chrysene, than all of the surface soil samples. Surface soil sample SS-9 also exceeded the NYSDEC TAGM #4046 RSCO of 50,000 ppb for pyrene.

The concentrations of RCRA Metals found in the surface soils on the site, specifically mercury, may be representative of historical uses of the site. The concentration of SVOCs detected in the on-site surface soils are most likely a result of the historical petroleum and coal uses on the site.

Exceedances to the NYSDEC TAGM #4046 RSCOs for VOCs and SVOCs were mainly detected in the AST containment area and the area west of the AST containment area and are typical PAHs.

5.1.2 Subsurface Soils

Two subsurface soil sampling events occurred on-site in October 2004 and August 2005. Results from the October 2004 sampling event showed RCRA Metals detected at concentrations exceeding the NYSDEC TAGM #4046 RSCOs in the subsurface soils at the site. Metals detected above NYSDEC TAGM #4046 RSCOs consisted of arsenic, cadmium, chromium, lead, selenium, silver and mercury. Similar to the surface soil samples results, mercury was the most prevalent metal detected in concentrations above the NYSDEC TAGM #4046 RSCO. The mercury concentrations exceeding the NYSDEC TAGM #4046 RSCO of 0.1 ppm were detected in 21 of the 22 subsurface soil samples, including samples obtained from the perimeter of the site. Mercury was detected below NYSDEC TAGM #4046 RSCO in subsurface soil sample AST-SB-13.

In addition, SVOCs levels were detected in concentrations exceeding the NYSDEC TAGM #4046 RSCOs in the subsurface soils on the site. The highest SVOC concentrations were within the former AST containment area. Concentrations of SVOCs in exceedance of the NYSDEC TAGM #4046 RSCOs were also detected in subsurface samples obtained from the perimeter of the site.

Concentrations in exceedance of the NYSDEC TAGM #4046 RSCOs for PAHs were detected in the subsurface soils at 18 of the 22 subsurface soil samples obtained. Other SVOCs detected above NYSDEC TAGM #4046 RSCOs in one or more subsurface samples include 2-methylnaphthalene, chrysene and dibenz(a,h)anthracene. Subsurface soil sample AST-SB-3 contained the highest concentrations for the majority of the SVOC parameters detected above the NYSDEC TAGM #4046 RSCOs. In addition, the following parameters were detected above the NYSDEC TAGM #4046 RSCO in subsurface soil sample AST-SB-3: dimethylphthalate, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene.

Results from the August 2005 supplemental sampling event showed RCRA Metals and VOCs detected at concentrations exceeding the NYSDEC TAGM #4046 RSCOs in the subsurface soils at the site. Metals detected above NYSDEC TAGM #4046 RSCOs consisted of arsenic, cadmium, and mercury. Similar to the surface and subsurface samples obtained during the October 2004 Site Investigation, mercury was the most prevalent metal detected. Mercury concentrations exceeding the NYSDEC TAGM #4046 RSCO of 0.1 ppm were detected in all six (6) of the subsurface soil samples. Cadmium concentrations exceeding the NYSDEC TAGM #4046 RSCO of 1 ppm were detected in five (5) of the six (6) subsurface soil samples. Unlike the October 2004 Site Investigation, VOCs were detected at concentrations exceeding the NYSDEC TAGM #4046 RSCOs in the subsurface soils at the site. VOCs detected above NYSDEC TAGM #4046 RSCOs consisted of acetone, benzene, ethylbenzene, methylene chloride, toluene, total xylenes and total VOCs. Acetone was the most prevalent VOC detected in concentrations above the NYSDEC TAGM #4046 RSCOs. The acetone concentrations exceeding the NYSDEC TAGM #4046 RSCO of 200 ppb were detected in three (3) of the six (6) of the subsurface soil samples.

In addition, SVOCs levels were detected in concentrations exceeding the NYSDEC TAGM #4046 RSCOs in the subsurface soils on the site. Similar to the October 2004 Site Investigation, the highest SVOC concentrations were within the former AST containment area. Concentrations of SVOCs in exceedance of the NYSDEC TAGM #4046 RSCOs were also detected in subsurface samples obtained outside of the former AST containment area. SVOC concentrations in exceedance of the NYSDEC TAGM #4046 RSCOs for PAHs were detected in the subsurface soils at all six (6) subsurface soil samples obtained. Other SVOCs detected above the NYSDEC TAGM #4046 RSCOs in one or more soil sample include chrysene, 2-methylnaphthalene and naphthalene. Benzo(a)anthracene and benzo(a)pyrene were the most prevalent SVOCs detected in concentrations above the NYSDEC TAGM #4046 RSCOs. The benzo(a)anthracene and benzo(a)pyrene concentrations exceeding the NYSDEC TAGM #4046 RSCO of 224 ppb for benzo(a)anthracene and 61 ppb for benzo(a)pyrene were detected in each of the six (6) subsurface soil samples. Subsurface soil sample AST-SB-20 (SB-20) contained the highest concentrations for the majority of the SVOC parameters detected above the NYSDEC TAGM #4046 RSCOs.

Also similar to the surface soils, the concentration of SVOCs detected in the on-site subsurface soils are most likely a result of the historical petroleum and coal uses on the site. Exceedances to the NYSDEC TAGM #4046 RSCOs for SVOCs were mainly detected in the AST containment area and the area west of the AST containment area and are typical PAHs.

5.2 Groundwater

RCRA Metals, VOCs and SVOCs were present in concentrations exceeding NYSDEC Standards/Guidelines in groundwater samples collected from the nine (9) temporary groundwater monitoring wells and one (1) permanent groundwater monitoring well. Metals detected above NYSDEC Standards/Guidelines include: arsenic, barium, cadmium, chromium, lead and mercury. Lead was detected above NYSDEC Standards/Guidelines in all of the monitoring wells and mercury was detected above NYSDEC Standards/Guidelines in all of the monitoring wells except for GW-3. A review of the field data shows that turbidity measurement reported at all monitoring wells reported turbidity exceeding 800 nephelometric turbidity units (NTU), the maximum reported by the field instrument. The groundwater in the wells was purged at a minimum of five times the volume of the water in the wells prior to sampling. Groundwater samples analyzed for metals, with a turbidity exceeding 20 NTU often report false positives; thus the metals concentrations reported in site groundwater samples may be the result of the elevated sample turbidity and not impacts resulting from historic land use. VOCs detected above NYSDEC Standards/Guidelines include ethyl benzene and isopropylbenzene, which were present in GW-6. This temporary groundwater monitoring well was located along the northeastern perimeter of the site. SVOCs, including acenaphthene, benzo(a)anthracene, and chrysene, were detected above NYSDEC Standards/Guidelines in GW-6.

The August 2005 Supplemental Site Investigation included obtaining groundwater samples from two (2) permanent monitoring wells (MW-1 and MW-6, previously installed by others) that were not found, and therefore not sampled, during the October 2004 Site Investigation. MW-1 was previously paved over with asphalt and could therefore not be located during the October 2004 Remedial Investigation. MW-6 could also not be located during the October 2004 Remedial Investigation. VOCs and SVOCs were present in concentrations exceeding NYSDEC

Standards/Guidelines for one (1) of these monitoring wells (MW-6), located just outside to the east of the former AST containment area and near the former fuel-fill rack. VOCs detected above NYSDEC Standards/Guidelines include methyl tert-butyl ether. SVOCs detected above NYSDEC Standards/Guidelines include PAHs and chrysene.

At the request of the NYSDEC, supplemental groundwater samples, consisting of filtered and unfiltered samples, were obtained in August 2005.

RCRA Metals were present in concentrations exceeding NYSDEC Standards/Guidelines for both filtered and unfiltered samples in groundwater samples collected from the six (6) temporary groundwater monitoring wells and three (3) permanent monitoring wells. Metals detected above NYSDEC Standards/Guidelines in unfiltered samples include: arsenic, cadmium, chromium, lead, selenium and mercury. Lead was detected above NYSDEC Standards/Guidelines in two (2) of the temporary monitoring wells, and all three (3) of the permanent monitoring wells. Mercury was detected above NYSDEC Standards/Guidelines in three (3) of the temporary monitoring wells, and two (2) of the permanent monitoring wells. Metals detected above NYSDEC Standards/Guidelines in filtered samples include: selenium and mercury. Selenium was detected above NYSDEC Standards/Guidelines in one (1) of the temporary monitoring wells and one (1) of the permanent monitoring wells, and mercury was detected above NYSDEC Standards/Guidelines in one (1) of the temporary monitoring wells. As shown in Table 5-1, the results of the supplemental groundwater sampling, consisting of filtered and unfiltered samples for RCRA Metals analysis, show significantly less concentrations of metals in the filtered samples. The unfiltered samples exceed the NYSDEC Standards/Guidelines for six (6) of the nine (9) groundwater samples obtained. Three (3) of the nine (9) filtered groundwater samples resulted in concentrations of metals slightly above the NYSDEC Standards/Guidelines. Based on the significant reduction of metals concentration in the filtered groundwater samples, it can be concluded that the additional groundwater sampling supports the conclusion that the elevated metals concentrations found in the on-site groundwater was due primarily to the high turbidity in the groundwater samples.

TABLE 5-1

Groundwater Sample Result Comparison (August 2005):
RCRA Metals (Unfiltered and Filtered) Above the NYSDEC Standards / Guidelines

Metals & Dissolved Metals (ppb) [1]

Sample ID	NYSDEC Standards/ Guidelines	GW-1		GW-1 Filtered		GW-2		GW-2 Filtered		GW-6		GW-6 Filtered		GW-9		GW-9 Filtered		GW-12		GW-12 Filtered	
Lab Sample Number		T4140-22		T4140-22		T4140-23		T4140-23		T4140-24		T4140-24		T4181-01		T4181-01		T4181-02		T4181-02	
Sampling Date		8/9/2005		8/9/2005		8/9/2005		8/9/2005		8/9/2005		8/9/2005		8/10/2005		8/10/2005		8/10/2005		8/10/2005	
Matrix		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER	
Parameter		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)	
Arsenic	25	3.32	U	3.32	U	3.32	U	3.32	U	3.32	U	3.32	U	3.32	UN	3.32	UN	3.32	UN	3.32	UN
Barium	1000	413		375		390		390		79.8	J	58.4	J	379		403		423		412	
Cadmium	5	0.327	UJN	0.327	UJN	0.92	JN	0.327	UJN	0.327	UJN	0.327	UJN	0.48	JN	0.327	UJN	3.8	JN	1.99	JN
Chromium	50	1.63	JN	2.82	JN	2.63	JN	0.343	U	4.83	JN	0.5	JN	0.343	UN	0.343	UJ	0.343	UN	0.343	UN
Lead	25	2.18	UJN	3.98	JN	7.09	JN	2.18	UJN	**134**	JN	2.18	UJN	14.5	JN	5.16	JN	**172**	JN	5.83	JN
Selenium	10	3.04	UJ	3.04	UJ	3.04	UJ	3.04	UJ	3.04	UJ	3.04	UJ	9.4	J	**10.8**	JN	8.9	J	7.32	JN
Silver	50	1.64	U	1.64	U	1.64	U	1.64	U	1.64	U	1.64	U	2.23	JN	1.72	JN	3.78	JN	4.37	JN
Mercury	0.7	0.54		0.06	J	0.17	J	0.05	J	**1.05**		0.03	U	0.03	UJ	0.03	U	**0.79**	J	**0.83**	

Sample ID	NYSDEC Standards/ Guidelines	GW-17		GW-17 Filtered		MW-1		MW-1 Filtered		MW-1 DUP		MW-1 DUP Filtered		MW-6		MW-6 Filtered		HMW-1		HMW-1 Filtered	
Lab Sample Number		T4181-03		T4181-03		T4181-05		T4181-05		T4181-06		T4181-06		T4181-04		T4181-04		T4181-07		T4181-07	
Sampling Date		8/10/2005		8/10/2005		8/11/2005		8/11/2005		8/11/2005		8/11/2005		8/11/2005		8/11/2005		8/11/2005		8/11/2005	
Matrix		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER		WATER	
Parameter		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)		(ppb)	
Arsenic	25	10.5	N	13.3	JN	3.32	UN	3.32	UN	3.32	UN	3.32	UN	3.32	UN	3.32	UN	**27.6**	N	3.32	UN
Barium	1000	214		225		357		325		415		322		389		361		999		544	
Cadmium	5	0.87	JN	0.327	UJN	2.23	JN	2.11	JN	3.03	J	1.75	JN	1.95	JN	1.28	JN	**12.6**	JN	2.74	JN
Chromium	50	1.79	JN	0.343	UN	0.343	UN	0.343	UN	0.343	UN	0.343	UN	2.52	JN	0.343	UN	**79.3**	N	0.343	UN
Lead	25	14.5	JN	4.24	JN	**58.5**	JN	5.27	JN	**66.3**	JN	4.33	JN	**43.6**	JN	3.45	JN	**108**	JN	2.18	JN
Selenium	10	3.04	UJ	6.49	JN	6.71	J	**11.2**	JN	**10.7**	J	9.52	JN	3.04	UJ	7.14	JN	9.02	J	5.7	JN
Silver	50	3.37	JN	2.79	JN	3.67	JN	3.08	JN	4	JN	3.2	JN	2.54	JN	4.08	JN	6.52	JN	3.66	JN
Mercury	0.7	**1.24**	J	0.03	U	**1.429**	J	0.03	U	**1.07**	J	0.06	J	**1.039**	J	0.06	J	0.62	J	0.04	J

Data Qualifiers & Notes

U - The compound was not detected at the indicated concentration
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.
NJ - The analysis indicates presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration
GW - Groundwater sample taken from temporary well
MW - Groundwater sample taken from permanent well
HMW - Groundwater sample taken from permanent well installed by HDR
DUP - Duplicate sample
Bold - Exceedence of NYSDEC Standards / Guidelines
ppb - parts per billion
RCRA - Resource Conservation Recovery Act
[1] - Supplementary groundwater samples collected in Aug. 2005 and tested for Dissolved Metal concentrations were passed through a 0.45 micron filter in the field.

The concentration of VOCs and SVOCs detected in the on-site groundwater are most likely a result of the historical petroleum and coal uses on the site.

5.3 Surface Water

RCRA Metals were detected above NYSDEC Standards/Guidelines in the one surface water sample that was collected from the on-site oil/water separator. RCRA Metals detected above NYSDEC Standards/Guidelines consisted of arsenic, chromium, lead and mercury. VOCs and SVOCs were not detected above the NYSDEC Standards/Guidelines.

5.4 Building Materials

Lead-based paint and ACM were found in the warehouse/maintenance garage, the dispatch office, and the inactive fire suppression foam pump house. Refer to Appendix H for detailed information on the building materials, which were identified as containing lead-based paint or ACM.

5.5 Concrete Pad Investigation

Refusal was encountered under the footprint of eight (8) of the large ASTs formerly on site. Therefore, it is assumed that a concrete pad exists under a portion of the former AST footprints. The depth to refusal ranged from approximately 2 feet bgs to 8 feet bgs for these tanks. Based on the number of borings where a concrete pad was encountered, a percent of the tank footprint area was estimated to contain a concrete pad and used to calculate an estimated area of concrete pad within the tank footprint (see Table 5-2).

Table 5-2 Estimated Area of Concrete Pad within AST Footprints

	General AST Information			Concrete Pad within Tank Footprint		
AST #	AST Volume (gal)	AST Diameter (ft)	AST Area (ft^2)	Estimated % of Area with Concrete Pad	Average Depth to Concrete Pad (ft)	Estimated Area of Concrete Pad (ft^2)
1	1,152,000	70	2,886	75%	2.3	2,165
2	1,152,000	70	3,848	50%	5.5	1,924
4	708,000	33	855	100%	3.7	855
5	140,000	25	491	50%	5.5	245
6	157,000	25	491	0%	0.0	0
7	157,000	25	491	25%	6.0	123
8	1,022,000	60	2,827	50%	5.6	1,414
9	147,000	25	491	100%	6.5	491
10	147,000	25	491	0%	0.0	0
11	147,000	25	491	0%	0.0	0
12	147,000	25	491	50%	3.8	245
		TOTAL	**13,854**		**TOTAL**	**7,462**

6.0 CONTAMINANT FATE AND TRANSPORT AND HUMAN EXPOSURE POTENTIAL

A qualitative human health exposure assessment was conducted to evaluate the potential human health exposures from contamination at the site under two project scenarios: (1) remediation and current use for school bus parking; and (2) remediation and potential future use for residential housing. The Human Health Exposure Assessment focuses on:

- Identifying potential contaminants of concern (COCs) for each environmental media;
- Identifying potential pathways of exposure to those contaminants identified for various human health receptors, and
- Concluding whether significant exposures to human health currently exist or will exist under a future residential site use.

Identification of potential COCs was conducted by analyzing environmental data collected during the Remedial and Supplemental Investigations and summarized in tables presented in Chapter 4. For each media, potential exposure pathways and an evaluation of potential human exposure is discussed.

6.1 Site Description

Based upon the investigations conducted at the site, site geological and hydrogeological information has been evaluated. The site is characterized by relatively flat topography. The land gradient is sloping gently to the west. The elevation of the site is approximately 20 feet above mean sea level. Currently the majority of the site is paved and used for temporary parking for school buses. The site is bordered to the west by the Hudson River and to the north, east, and south by developed commercial and industrial properties.

Site lithology is characterized by fill material underlain by flood plain sediments; consisting of silty sand. Typically fill at the site is comprised of silty sand with occasional debris, including bricks, cement fragments, organic material. Depth to groundwater varies from approximately 4.5 feet bgs to 7.5 feet bgs across the site. Shallow surficial (0 - 12 feet bgs) site groundwater is tidally influenced and flows west towards the Hudson River. Deeper flow regimes were not evaluated as part of this investigation.

6.2 Soil

Investigations at the site have demonstrated that vadose zone site soils are impacted with low concentrations of a variety of VOCs (primarily BTEX), metals, and SVOCs (primarily PAHs). Soil samples were collected primarily from the filled interval above the water table, at depths ranging from 0 feet bgs to 8 feet bgs.

The highest VOC and SVOC concentrations occur within the central portion of the site, beneath the former AST containment area. This area also demonstrated the most frequent occurrences of VOC and SVOC impacts. The majority of SVOC concentrations exceeding NYSDEC TAGM #4046 RSCOs are present within the former AST containment area at soil boring location AST-SB-3. SVOC concentrations exceeding NYSDEC TAGM #4046 RSCOs were also present at soil boring locations SB-6 and SB-7, located in the northern and eastern portions of the site respectively; outside of the former containment area. Metals concentrations in site soils exceeding NYSDEC TAGM #4046 RSCOs occur consistently through out the site.

SVOCs and metals are typically relatively immobile in soils as these contaminants tend to sorb to soil particles in the vadose zone. Due to the physical characteristics of the contaminants and current site conditions (i.e., pavement) the likelihood of additional SVOC and metal migration through the vadose zone is low. VOCs are typically more mobile through the vadose zone than SVOCs and metals. The low occurrence and relatively low concentrations of VOCs in site soil at the present time do not promote migration through the vadose zone. In the past, when significantly more VOCs were present from historic spills and releases at the site, migration through the vadose zone may have occurred. However, the results of this investigation reveal that: (1) no source areas of VOC petroleum contamination appear to still be present at the site; and (2) the mass of VOCs in the on-site soils is relatively low and immobile.

The receptors identified under the remediation and current site use scenario include:

- On-site workers: adult (bus operators, remediation and construction workers).
- Temporary worker – adult (utility worker/inspector, subcontractors, sampler/remediation inspector).

The receptors identified under the remediation and potential future site use as residential/commercial development include:

- Adult and children residents;
- Adult and children patrons;
- On-site workers: adult maintenance; and
- Temporary worker – adult (utility worker/inspector, landscape worker, construction worker).

The receptors identified above are believed to be the primary receptors of interest.

A completed exposure pathway is comprised of five elements which include: a contaminant source, contaminant release and transport mechanisms, a point of exposure, a route of exposure, and a receptor population. When one or more of the stated elements are missing, a potential or exposure does not exist.

The majority of the site is currently paved with asphalt, and is being temporarily used for school bus parking. Thus, the paved areas of the site do not provide an exposure pathway for human receptors as a result of inhalation, dermal or ingestion exposure pathways. While there may currently be no health risks associated with exposure to site contaminants due to the lack of any completed exposure pathways, this could change in the future if site conditions change.

Currently, unpaved areas of the site present potential inhalation, ingestion, and dermal exposure pathways for human receptors.

As stated above, the concentrations of VOCs in the on-site soils do not indicate that a soil vapor intrusion issue exists in the on-site buildings. In addition, since the three on-site buildings are located in the upgradient portion of the site, soil vapor intrusion is not expected to exist in the on-site buildings. However, direct soil vapor measurements have not been obtained. Future site development plans will include mitigation measures to assess if a soil vapor intrusion issue is determined to exist on -site.

Construction activities at the site during remediation and development phases that disturb in place soils should incorporate appropriate engineering controls.

Workers on site during remedial activities or future development and post-development utility, landscape, and other intrusive work on the site will potentially be exposed to hazardous substances from subsurface media, as well as dust. Excavation for site construction and utility work may result in short-term exposure to subsurface soils, soil gas, and groundwater by individuals involved in excavation activities. Although it is possible for contaminated soil to become airborne in the form of fugitive dust during remedial excavation work, engineering controls (such as dust suppression) will be implemented to mitigate such an exposure. An institutional control will protect site workers in that 40 CFR 1910.120 specifies that site contractors are responsible to apprise and protect those workers with potential to contact contaminated media through training, use of monitoring equipment, engineering controls and personal protective equipment (PPE). Site workers thus will have no completed exposure pathway to contaminated soil. Visitors to the site during remediation will be guided to avoid contaminated soils.

Since soil remediation will have occurred, levels of contamination will decrease in the future and exposure potential to subsurface contamination will be eliminated or substantially lessened. For both scenarios, approximately 2 feet of fill meeting the NYSDEC TAGM #4046 RSCOs is assumed to have been placed over exposed soils on the site.

6.3 Groundwater

Site groundwater impacts consist of low concentrations of VOCs, SVOCs, and RCRA metals. The metals impacts will not be addressed, since these impacts are likely not representative of metal concentrations in site groundwater as elevated sample turbidity has likely biased the results high. Groundwater samples were collected from the shallow surficial aquifer, occurring between approximately 4.5 feet bgs and 12 feet bgs.

VOC and SVOC impacts exceeding NYSDEC Standards/Guidelines occurred at monitoring well GW-6, located along the northern property boundary, and MW-6, located to the east of the former AST containment area.

The concentrations present in samples collected from GW-6 and MW-6 do not suggest the presence of free product/dense non-aqueous phase liquid (DNAPL) or a large source area. Additionally, the VOCs and SVOCs present at GW-6 and MW-6 were not detected in samples collected from down-gradient wells GW-10 and HMW-1 (for GW-6), which are located along the western property boundary and the Hudson River. As a result, the likelihood of significant contaminant migration off site or toward the Hudson River is low.

Ingestion of potable water is not a current exposure pathway for groundwater because all on-site water use is currently provided by the municipal system which derives its water from regulated upstate sources. In addition, there are no potable drinking water wells screened within the surficial aquifer within a ½ mile of the site (based on public water supply system information). Downgradient monitoring wells near the Hudson River have not indicated VOC or SVOC impacts. Therefore, the likelihood of contaminant migration into the Hudson River is low, thus there is no current pathway for human exposure to site groundwater impacts. Future site development will rely on municipal water. An environmental easement is expected to be placed on the site allowing for use of the site as a Restricted Residential site and will require a prohibition against the use of groundwater.

The results of the soil sampling performed during the Remedial Investigation and Supplemental Investigation indicate that the mass of VOCs in the on-site soils is relatively low and is expected to result in no significant leaching to groundwater. Therefore, groundwater does not pose a vapor intrusion risk for the current use of the site or for the future site scenario.

However, since on-site groundwater may have a short-term exposure pathway for workers near excavations to the groundwater, a short-term exposure pathway is possible. The controls provided to protect workers from exposure (described above for soils) afford protection against completion of the groundwater exposure pathway for workers and visitors during the site remediation and potential future site development.

7.0 INTERIM REMEDIAL MEASURES

7.1 Building Materials

Lead-based paint and ACM were found in the warehouse/maintenance garage, the dispatch office, and the inactive fire suppression foam pump house. In November 2004, HDR conducted a procurement for the abatement of asbestos and lead-based paint removal in these three buildings. A Request for Quotes (RFQ) was provided to eight remedial contractors, including minority-owned business enterprises and women-owned business enterprises (MBE/WBE) interested in performing the asbestos abatement and lead removal on the site. A site visit was conducted by HDR and YASR for these remedial contractors on November 8, 2004. A total of six quotes were received. NSC Abatement (NSC) provided the lowest quote. Although a contract was executed between YASR and NSC, NSC did not respond to phone calls and requests for information in a timely fashion, did not submit the required documentation identified in the contract documents in acceptable forms, and was unable to provide the bonds required to perform the work. The contractor with the second lowest quote was not available to perform the work. Therefore, the contractor with the third lowest quote, Asbestos Corporation of America, Inc. (ACA) was considered the apparent lowest responsive quoter and selected to perform the asbestos abatement and lead-based paint removal on the site. A contract was executed between YASR and ACA for this work.

ACA conducted asbestos abatement and lead-based paint removal/demolition from April 25, 2005 to May 23, 2005. Third party Project Monitoring and air sampling was performed by EMS of NY during asbestos abatement activities.

In April 2005, ACA determined that the New York State Department of Labor (NYSDOL) Variance AV-119, "Asbestos Containing Roofing/Flashing" could not be used for abatement of the roof on the one-story portion of the warehouse/maintenance garage building. The use of AV-119 was infeasible due to the unsafe conditions caused by the roof deteriorating and partially collapsing into the building, and the potential for collapse of the side walls if the roof was removed. Therefore, in May 2005, based on the condition of the building, ACA determined that using the variance AV-106 "Asbestos Demolition of Condemned Building or Structures" was more appropriate, since the demolition of the entire one-story portion of the warehouse/maintenance garage building should be performed due to the condition of the building. On-site asbestos abatement activities concluded on May 23, 2005.

The "Asbestos/Lead-Paint Abatement Report", prepared by EMS of NY for HDR and dated May 10, 2005, as well as other related documentation, is provided in Appendix J of this Final SI/RAR.

7.2 AST/UST Removal

In November 2004, HDR also conducted a procurement for the removal of the one remaining on-site AST, located in the inactive fire suppression foam pump house, and the one remaining on-site UST, located outdoors on the north side of the foam house along the eastern border of the property. The unregistered AST was assumed to have a capacity of 550 gallons based on inspection of the AST and was suspected to contain solidified concentrated fire suppression foam identified to be Aer-O-Foam Cold Foam 3%. Refer to Appendix C for the associated foam MSDS and general data sheet. The unregistered UST was assumed to have a capacity of 1,000 gallons and to have unknown contents. The RFQ was provided to nine remedial contractors, including MBEs and WBEs interested in performing the AST/UST removal work on the site. A site visit was conducted by HDR and YASR for these remedial contractors on November 16, 2004. A total of three quotes were received. The apparent lowest responsive quote was provided by Royal Environmental Services Corporration (Royal). A contract was executed between YASR and Royal for this work.

Since the pipes leading to the AST were determined by EMS during the lead-based paint survey to contain lead, the removal of the AST was postponed awaiting the completion of the asbestos abatement and lead removal work. Prior to commencing with the AST/UST removal process, Royal determined that the UST did not have to be registered, and therefore a work permit was not required per the Westchester County Department of Health (WCDOH), since at the time of the UST removal, less 1,100 gallons of petroleum were stored on site. In addition, Royal was informed by the NYSDEC that since the AST was being removed from the site, registration of the AST as a chemical bulk storage tank with the NYSDEC prior to the commencement of work was not required.

Tank removal site activities commenced on June 8, 2005 and concluded on June 13, 2005. Prior to on-site excavation, Supertrans informed Royal that power to the site was off and no below ground water line existed on that portion of the site. Excavation for the UST began in the northwest corner of the inactive fire suppression foam pump house, in the area of the fill port believed to be connected to the UST. Prior to excavating, Royal determined through the fill port that the UST contained approximately 15 inches of oil (no water). The contents of the UST, determined by Royal to be #2 fuel oil, was pumped out into 55-gallon drums. Excavation commenced and the UST was uncovered at approximately 5 feet bgs to 6 feet bgs. During the UST excavation, petroleum-contaminated soil was observed within the tank trench. Royal contacted the NYSDEC and Spill #0502798 was registered for the site due to the presence of petroleum-contaminated soil. Royal also contacted the City of Yonkers Fire Department. Royal removed the UST from the trench and placed it on a polyethylene liner for cleaning. Upon removing the UST from the ground, several holes were found on the underlying portion of the tank, possibly caused by corrosion of the tank. The capacity of the UST was confirmed by Royal based on observation of the UST to be 1,000 gallons.

The AST within the inactive fire suppression foam pump house had been drained by Royal the previous week. The AST was determined by Royal to have a capacity of 450 gallons (not 550 gallons as was previously assumed) based on observations of the AST. To remove the AST from the foam building, the doorway of the foam building, facing Alexander Street, was enlarged by Royal. The AST was removed from the building, placed on a polyethylene liner and cleaned by Royal.

Firefighter Russell, City of Yonkers Fire Department, arrived on site and inspected both tanks. Firefighter Russell informed Royal that they could proceed and remove the tanks from the site. Royal then removed the tanks from the site on June 8, 2005.

Approximately 100 cubic yards of soil were removed from the UST trench on June 8, 2005 and June 13, 2005. Limiting factors to the excavation area included the foam building, as well as a concrete pad west of the foam building. HDR contacted the NYSDEC Project Manager for the site, Robert Filkins, who agreed that, to the extent feasible, the visible petroleum-contaminated soil above the groundwater table should be removed. All petroleum-contaminated soil removed from the UST trench was placed on and covered by a polyethylene liner. Royal obtained composite samples of the UST trench walls and trench bottom, as required by the NYSDEC Spills Technology and Remediation Series Memo #1 (STARS Memo #1). The UST trench was backfilled with clean fill.

On June 13, 2005, Royal collected a waste characterization grab sample from the southwest portion of the stockpiled excavated petroleum contaminated soil. The sample had reported concentrations in exceedance of the STARS Memo #1 standard of 5 ppm for Toxicity Characteristic Leachate Procedure (TCLP) lead. As a result, on July 18, 2005, HDR collected two (2) additional grab soil samples and one (1) composite sample from the stockpiled excavated soil. The analytical results did not exceed thresholds the STARS Memo #1 for TCLP lead.

On July 20, 2005, Royal and its subcontractor, Bilt Rite Driveways, arrived on site to pave the area of the UST trench with asphalt. Item #4 aggregate was placed on top of the backfill in the trench. The trench area was then compacted and paved with asphalt.

The pick-up and removal from the site of the stockpiled soil occurred on November 1, 2005. Based on the one (1) waste characterization sample that resulted in a concentration exceeding the STARS Memo #1 TCLP standard, the stockpiled petroleum-contaminated soil was disposed of as hazardous waste. Royal will submit a UST Closure Report to HDR after the removal of the stockpiled soil from the site. The UST Closure Report will be submitted to the NYSDEC once it becomes available.

8.0 DATA USABILITY SUMMARY REPORT

A Data Usability Summary Report (DUSR) for the soil, groundwater and surface water sample obtained from the site during the Remedial Investigation and Supplemental Investigation was performed by HDR's subcontractor, Premier Environmental Services (Premier). The DUSR was prepared based on the data validation that was performed in accordance to the guidelines described in the NYSDEC, Division of Environmental Remediation, Guidance for the Development of a DUSR and the NYS ASP. All changes to qualifiers recommended by the DUSR have been performed and are reflected in the tables provided in Section 4.0 of this Final SI/RAR Report. Refer to Appendix G and Appendix I for all DUSRs prepared as part of the Remedial Investigation for the site.

9.0 REMEDIAL ALTERNATIVES AND ESTIMATED COSTS

Of the four (4) identified potential Remedial Alternatives described below, one (1) recommended Remedial Alternative has been identified for the soil and groundwater on the site. These alternatives were based on: (1) information gathered for the Remedial Investigation and Supplemental Investigation being representative of conditions across the site; (2) the assumption that no drinking water receptors exist downgradient of the study area; (3) future use of the site as a residential/commercial area; and (4) exceedances of the NYSDEC TAGM #4046 RSCOs and NYSDEC Standards/Guidelines.

The four (4) potential Remedial Alternatives include:

- No-Action Alternative.
- Removal of All On-Site Vadose Zone Soils Above the NYSDEC TAGM #4046 RSCOs Screening Criteria.
- Removal of All On-Site Vadose Zone Soils in the "Hot Spot" Area based on the 50 times NYSDEC TAGM #4046 RSCOs Screening Criteria.
- Removal of All On-Site Vadose Zone Soils in the "Hot Spot" Area based on the 100 times NYSDEC TAGM #4046 RSCOs Screening Criteria.

It is the responsibility of Supertrans to remove two (2) feet of soil in temporarily paved areas at their cost. Therefore, it is assumed that, for Remedial Alternatives No. 2 through No. 4 listed below, the top (2) feet of areas temporarily paved (approximately 35 percent of the site, primarily within the AST containment area) will be removed by Supertrans and are therefore not included in the estimated Alternative costs.

"Hot Spot" Area Removal

Certain areas are "hot spot" areas for VOCs, SVOCs and RCRA metals since soil samples exceeded the NYSDEC TAGM #4046 RSCOs for these parameters with high concentrations.

The "hot spot" area was estimated by performing a linear extrapolation between each sample that exceeded the (1) NYSDEC TAGM #4046 RSCOs Screening Criteria; (2) 50 times NYSDEC TAGM #4046 RSCOs "hot spot" Screening Criteria or (3) 100 times NYSDEC TAGM #4046

RSCOs "hot spot" Screening Criteria and the surrounding soil samples to determine the linear concentration reduction gradient for that parameter. The linear concentration reduction gradient was used to calculate the distance from the sample that exceeded the NYSDEC TAGM #4046 RSCOs Screening Criteria, 50 times NYSDEC TAGM #4046 RSCOs "hot spot" Screening Criteria or 100 times NYSDEC TAGM #4046 RSCOs "hot spot" Screening Criteria to the location where the concentration in the soil of that parameter would be equivalent to the Screening Criteria. This method was used to determine the surface area of the NYSDEC TAGM #4046 RSCOs Screening Criteria area, 50 times NYSDEC TAGM #4046 RSCOs "hot spot" Screening Criteria area, and, 100 times NYSDEC TAGM #4046 RSCOs "hot spot" Screening Criteria area.

Post-Remediation Soil Gas Survey

Review of the analytical data indicate that only trace level concentrations of the VOCs ethylbenzene, isopropylbenzene and methyl tert-butyl ether at 20 ppb, 7.7 ppb and 18 ppb, respectively, were detected in two monitoring wells on-site. In addition, BTEX compounds were detected in site soils, however the preponderance of the data was reported as non-detect. The highest BTEX concentrations were detected in soil boring sample ATS-SB-18 (SB-18) SVOC contaminants detected in soils and groundwater on-site were primarily PAHs, which have a very low Henry's Law constant indicating vapor phase migration is not a pathway of concern. Based on indications from NYSDEC that the NYSDOH will require the components of a sub-slab depressurization system in all future buildings on sites with elevated benzene, toluene, ethylbenzene, and xylene (BTEX) or other VOCs, either YASR if it proceeds through the Bond Act remedial program, or a future buyer, shall install a depressurization system as required by an institutional control in lieu of conducting a post-remedial soil vapor investigation or shall perform such investigation to determine if such a system is necessary. If this investigation determines the system is necessary, it will be installed subject to the institutional control.

Table 9-1 provides a summary of the estimated costs, including O&M, for the sub-slab depressurization system.

Table 9-1
Sub-slab Depressurization System
Estimated Costs

Item	Option 1 - Assuming 40% of Site is Covered by Future Buildings	Option 2 - Assuming 60% of Site is Covered by Future Buildings
Total Project Duration (Years)	30	30
Cost Year 0	$230,000	$320,000
O&M (Yr 0-1)	$5,710	$8,050
Periodic Cost (Yr 0-1)	$15,000	$20,000
O&M + Periodic Cost (Yr 1-30)	$621,290	$841,500
Total Cost	$872,000	$1,189,550
Total Present Value	$568,710	$779,050

Notes/Assumptions:

(1) 5% Was Used for Present Value Calculations

(2) All labor costs are for union labor

(3) Costs do not include potential DEC review fees.

(4) This cost estimate is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative.

(5) On-Site buildings were assumed to have a height of 15 stories and no basement.

The following sections provide an evaluation of each of the four (4) identified potential Remedial Alternatives. A comparison of the mass of contaminants removed from the site for each Alternative is provided in Section 9.5. Estimated costs for each Alternative are provided in Section 9.6. In addition, the recommended Remedial Alternative is provided in Section 9.7.

9.1 Alternative No. 1 – No Action

The No Action alternative does not conform to applicable or relevant and appropriate requirements of federal, state and local government. Although the on-site petroleum sources have been removed from the site, high variations of petroleum compounds in the on-site soils and groundwater results were observed.

The No Action alternative does not take into consideration the overall protectiveness of public health and the environment. The majority of the site is capped with asphalt. However, exposed soils (unpaved) do exists on the site, and may be a potential exposure pathway.

Short-term effectiveness has been assessed for the No Action alternative. Short-term risks to the community, potential impacts on workers during remedial action or potential environmental impacts of the remedial action are not projected during the implementation of the No Action alternative. The effectiveness and reliability of the mitigation measure is based upon the following assumptions and conclusions:

- The majority of the site is paved or covered with buildings and is likely to be covered with buildings or pavement in the future. However, exposed soils do currently exist on the site and, in the future, some areas of soil may be left exposed for landscaping, after construction. Therefore, a pathway may exist for human contact with soil contamination possibly presenting a threat to human health.
- There are no known human receptors for the groundwater (the water is non-potable).

Long-term effectiveness has been assessed for the No Action alternative. The majority of the soils that exist on the site are non-hazardous. However, a relatively high volume of contaminants remain in the on-site soils.

No containment systems are believed to be necessary to manage the treatment of any residual contaminants. Potential exposure pathways of humans with residual contaminants has been decreased on the site as there are no human receptors for the groundwater (the water is non-potable) and the majority of the site is paved. However, a pathway does exist for human contact with soil contamination in existing or future unpaved areas.

There is no time frame for implementation for this alternative, since no action will be performed as part of this alternative. Operation & Maintenance (O&M) for this alternative is not required.

Of the four proposed Remedial Alternatives, the No Action alternative has a high degree of implementability. The No Action alternative has no costs. However, based on the evaluation of this alternative, presented above, community acceptance of this alternative is assumed to be very low.

9.2 Alternative No. 2 - Removal of All On-Site Vadose Zone Soils Above the NYSDEC TAGM #4046 RSCOs Screening Criteria

This alternative is based on the assumption that the on-site soils are all generally contaminated, and the soil contamination is posing a threat to human health, and therefore, the removal of all and protection. Although the on-site petroleum sources have been removed from the site, high on-site vadose zone soils above the NYSDEC TAGM #4046 should be performed and replaced with clean fill. This alternative consists of the removal of soil from an area of approximately 101,118 square feet and is based on the removal of soil throughout the site within the contaminated area to the depth of groundwater (assumed to be an average of 7.5 feet bgs). Remedial activity would result in removal of approximately 742,016 cubic feet (CF) of soil. Soils removed from the site will be transported off-site for disposal or beneficial use. The removal of the subsurface concrete pads below some of the former AST footprints within the contaminated area is included in this alternative.

The Removal of All On-Site Vadose Zone Soils above the NYSDEC TAGM #4046 RSCOs Screening Criteria alternative shall conform to applicable or relevant and appropriate requirements of federal, state and local government. Federal, Westchester County and City of Yonkers regulations pertaining to site health and safety and heavy machinery operation and activity shall be met. All active work zones shall be clearly marked for the public's awareness variations of petroleum compounds in the on-site soil were observed. The removal of all on-site vadose zone soils above the NYSDEC TAGM #4046 RSCOs Screening Criteria would remove any potential source of contamination to groundwater.

This alternative takes into consideration the overall protectiveness of public health and the environment. Remedial Contractors will be exposed to contaminated soil during the implementation of this alternative, therefore a Health & Safety Plan, Community Air Monitoring Plan, engineering controls (i.e., dust suppression), and applicable training of workers should be implemented and applicable PPE should be donned. These safety precautions will eliminate any short-terms risks of the alternative to the community and remedial action personnel.

Short-term effectiveness has been assessed for this alternative. The majority of the site is paved or covered with buildings and is likely to be covered with buildings or pavement in the future. With the removal of all vadose zone soils above the NYSDEC TAGM #4046 RSCOs Screening Criteria, a pathway would no longer exist for human contact with soil contamination. In addition, there are no known human receptors for the groundwater (the water is non-potable).

Long-term effectiveness has been assessed for the Removal of All On-Site Vadose Zone Soils Above the NYSDEC TAGM #4046 RSCOs Screening Criteria alternative. The removal of vadose zone soils above the NYSDEC TAGM #4046 RSCOs Screening Criteria would greatly decrease the overall magnitude of residual risk from on-site contaminants. This remedial action would also greatly reduce the toxicity of the soils and groundwater, as well as the mobility of the remaining contaminants.

No institutional controls are believed to be necessary on the site following the implementation of this Remedial Alternative. However, containment systems will be necessary to manage the contaminants being removed from the site. Water management will also be difficult during such extensive site excavation activities. Potential exposure pathways of humans with residual contaminants will be removed from the site since all vadose zone soils will be removed.

The time frame for implementation for this alternative, is approximately nine (9) months, which includes three (3) months for preparation and procurement, five (5) months for excavation and one (1) month for project close-out (assuming 5-day weeks). O&M for this alternative is not required.

Of the four proposed Remedial Alternatives, the Removal of All On-Site Vadose Zone Soils Above the NYSDEC TAGM #4046 RSCOs Screening Criteria alternative has a low degree of implementability. The cost of this alternative is high and may be considered economically infeasible. However, based on the evaluation of this alternative presented above, community acceptance of this alternative is assumed to be high.

9.3 Alternative No. 3 – Removal of All On-Site Soils in the "Hot Spot" Area based on the 50 times NYSDEC TAGM #4046 RSCO Screening Criteria

This alternative is based on the assumption that the removal of the soils on the site 50 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria will remove the majority of the soils exceeding the NYSDEC TAGM #4046 RSCOs Screening Criteria, and therefore, the removal of the soil should be performed and replaced with clean fill. This alternative consists of the removal of soil from an area of approximately 47,468 square feet and is based on the removal of soil throughout the site within the "hot spot" area to the depth of groundwater (assumed to be an average of 7.5 feet bgs). Remedial activity would result in removal of approximately 340,135 cubic feet (CF) of soil. Soils removed from the site will be transported off-site for disposal or beneficial use. The removal of the subsurface concrete pads below some of the former AST footprints within the "hot spot" area is included in this alternative.

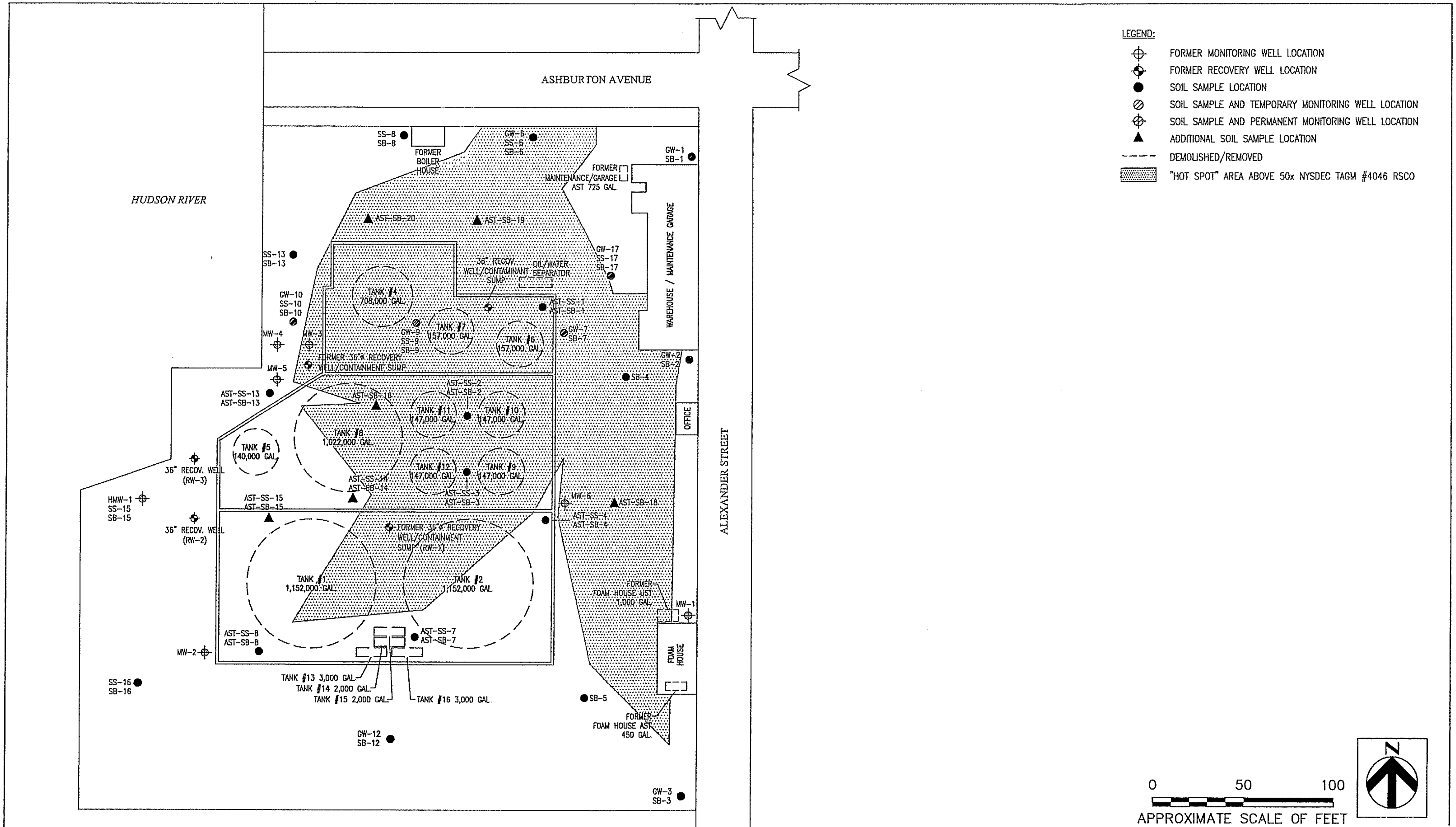
The 50 Times Hot Spot Soil Removal Alternative shall conform to applicable or relevant and appropriate requirements of federal, state and local government. Federal, Westchester County and City of Yonkers regulations pertaining to site health and safety and heavy machinery operation and activity shall be met. All active work zones shall be clearly marked for the public's awareness and protection. Although the on-site petroleum sources have been removed from the site, high variations of petroleum compounds in the on-site soil were observed. The removal of soils on the site 50 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria would remove the majority of the potential sources of contamination to groundwater.

Table 9-2 summarizes the subsurface soil analytes that exceeded 50 times the NYSDEC TAGM #4046 RSCOs Screening Criteria. Figure 11 depicts the area of soils 50 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria.

Table 9-2
Summary of Soil Sample Results 50 times Above the NYSDEC TAGM #4046 RSCOs

Analyte	Soil Samples Above 50 times the NYSDEC TAGM #4046 RSCO	Highest Result (& Location)	50-times NYSDEC TAGM 4046 RSCO [(1)]
RCRA Metals			
Mercury	SB-4, AST-SB-1	37.8 ppm (AST-SB-1)	5 ppm
VOCs			
Benzene	AST-SB-18	32,000 ppb (AST-SB-18)	3,000 ppb
Total Xylenes	AST-SB-18	66,000 ppb (AST-SB-18)	60,000 ppb
SVOCs			
Benzo(a)anthracene	AST-SB-3	20,000 ppb (AST-SB-3)	11,200 ppb
Benzo(a)pyrene	SS-9, SS-10, SB-6, AST-SB-1, AST-SB-3, AST-SB-20	18,000 ppb (AST-SB-3)	3,050 ppb
Chrysene	AST-SB-3	20,000 ppb (AST-SB-3)	20,000 ppb
Dibenz(a,h)anthracene	AST-SB-3	3,400 ppb (AST-SB-3)	700 ppb

Notes:
(1) RSCO from NYSDEC's TAGM HWR-94-4046, revised January 24, 1994.
ppm: parts per million
ppb: parts per billion
AST: Aboveground Storage Tank
SS: Surface Soil
SB: Soil Boring
RCRA: Resource Conservation Recovery Act
VOC: Volatile Organic Compounds
SVOC: Semivolatile Organic Compounds



HDR

YONKERS ATI SITE INVESTIGATION/ REMEDIAL ALTERNATIVES REPORT YONKERS, NEW YORK

50x NYSDEC TAGM #4046 RSCO "HOT SPOT" AREA

DATE 10/20/05

FIGURE 11

This alternative takes into consideration the overall protectiveness of public health and the environment. Remedial contractors will be exposed to contaminated soil during the implementation of this alternative, therefore a Health & Safety Plan, Community Air Monitoring Plan, engineering controls (i.e., dust suppression), and applicable training of workers should be implemented and applicable PPE should be worn. These safety precautions will eliminate any short-terms risks of the alternative to the community and remedial action personnel.

Short-term effectiveness has been assessed for this alternative. The majority of the site is paved or covered with buildings and is likely to be covered with buildings or pavement in the future. With the removal of soils on the site 50 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria, a pathway for human contact with soil contamination would be significantly reduced. In addition, there are no known human receptors for the groundwater (the water is non-potable).

Long-term effectiveness has been assessed for the Removal of All Soils on the Site 50 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria alternative. The removal of soils on the site 50 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria would greatly decrease the overall magnitude of residual risk from on-site contaminants. This remedial action would also greatly reduce the toxicity of the soils and groundwater, as well as the mobility of the remaining contaminants.

Since this Alternative will not remove all vadose zone soils, institutional controls are believed to be necessary on the site following the implementation of this Remedial Alternative. An environmental easement is expected to be placed on the site allowing for use of the site as a Restricted Residential site and will require: (1) a Soil Management Plan for the site; (2) the capping of all areas to remain unpaved with 2 feet of clean fill; and (3) a prohibition against the use of groundwater. Containment systems will be necessary to manage the contaminants being removed from the site. The majority of the potential exposure pathways of humans with residual contaminants will be removed from the site since soils on the site 50 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria will be removed.

The time frame for implementation for this alternative, is approximately six (6) months, which includes three (3) months for preparation and procurement, two (2) months for excavation and one (1) month for project close-out (assuming 5-day weeks). There will be O&M costs for this alternative for an annual cap recertification by a Professional Engineer and annual review of the Soil Management Plan for the site, which will be updated, if necessary.

Of the four proposed Remedial Alternatives, the Removal of Soils on the Site 50 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria alternative has a medium degree of implementability. The cost of this alternative is considered economically feasible. Based on the evaluation of this alternative presented above, community acceptance of this alternative is assumed to be high.

9.4 Alternative No. 4 – Removal of All On-Site Soils in the "Hot Spot" Area based on the 100 times NYSDEC TAGM #4046 RSCO Screening Criteria

This alternative is based on the assumption that the removal of soils on the site 100 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria will remove a sizeable amount of the soils above the NYSDEC TAGM #4046 RSCOs Screening Criteria from the site but not the majority of the contaminated soils, and should therefore be removed and replaced with clean fill. This alternative consists of the removal of soil from an area of approximately 35,414 square feet and is based on the removal of soil throughout the site within the "hot spot" area to the depth of groundwater (assumed to be an average of 7.5 feet bgs). Remedial activity would result in removal of approximately 256,869 CF of soil. Soils removed from the site will be transported off-site for disposal or beneficial use. The removal of the subsurface concrete pads below some of the former AST footprints within the "hot spot" area is included in this alternative.

The 100 times Hot Spot Soil Removal alternative shall conform to applicable or relevant and appropriate requirements of federal, state and local government. Federal, Westchester County and City of Yonkers regulations pertaining to site health and safety and heavy machinery operation and activity shall be met. All active work zones shall be clearly marked for the public's awareness and protection. Although the on-site petroleum sources have been removed from the site, high variations of petroleum compounds in the on-site soil were observed. The removal of soils on the site 100 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria would remove a significant amount of the potential sources of contamination to groundwater.

Table 9-3 summarizes the subsurface soil analytes that exceeded 100 times the NYSDEC TAGM #4046 RSCOs Screening Criteria. Figure 12 depicts the area of soils 100 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria.

This alternative takes into consideration the overall protectiveness of public health and the environment. Remedial Contractors will be exposed to contaminated soil during the implementation of this Alternative, therefore a Health & Safety Plan, Community Air Monitoring Plan, engineering controls (i.e., dust suppression), and applicable training of workers should be implemented and applicable PPE should be worn. These safety precautions will eliminate any short-terms risks of the alternative to the community and remedial action personnel.

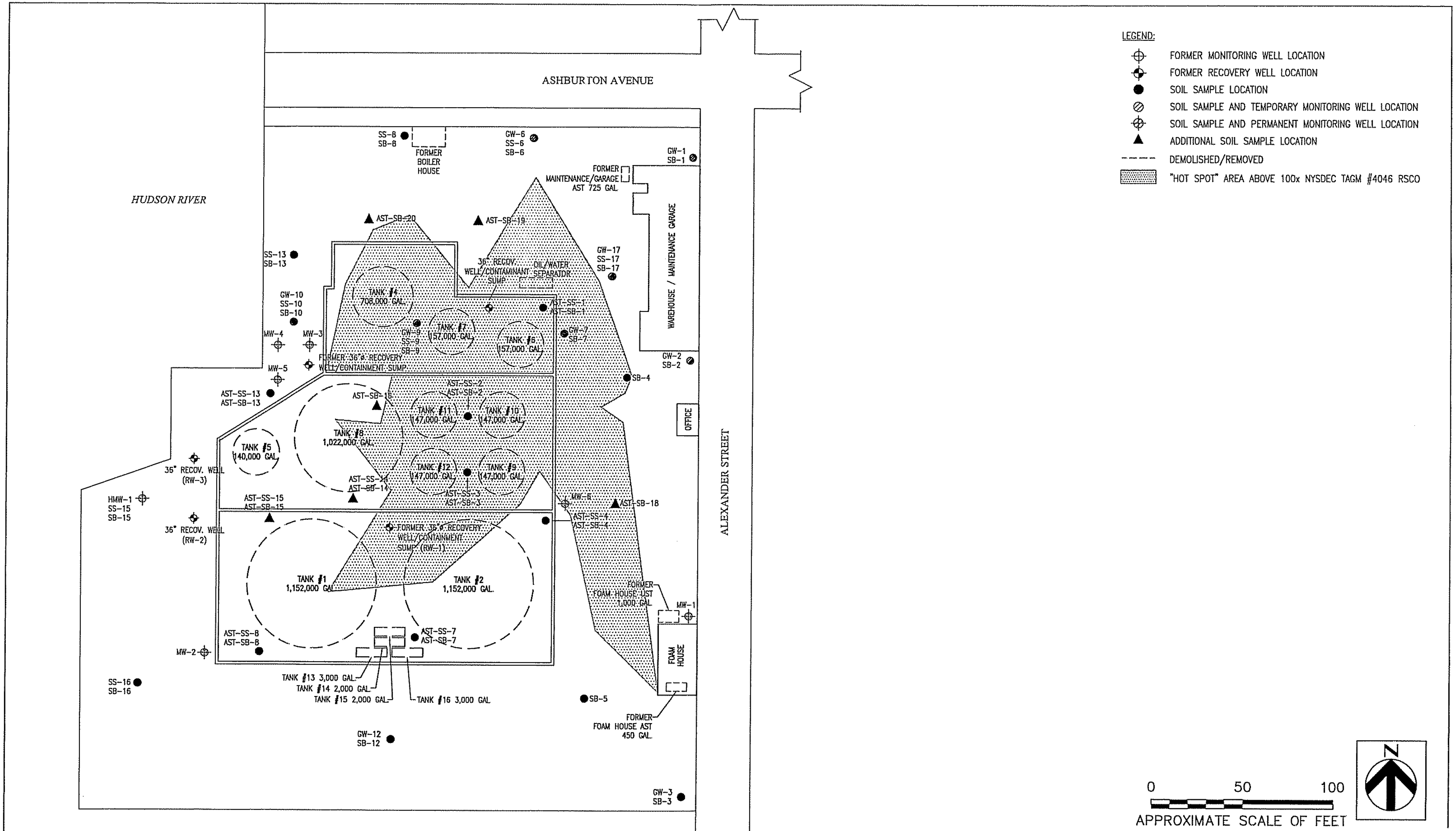
Short-term effectiveness has been assessed for this alternative. The majority of the site is paved or covered with buildings and is likely to be covered with buildings or pavement in the future. With the removal of soils on the site 100 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria, a pathway for human contact with soil contamination would be significantly reduced. In addition, there are no known human receptors for the groundwater (the water is non-potable).

Long-term effectiveness has been assessed for the Removal of all Soils on the Site 100 Times above the NYSDEC TAGM #4046 RSCOs Screening Criteria alternative. The removal of soils on the site 100 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria would decrease the overall magnitude of residual risk from on-site contaminants. This remedial action would also reduce the toxicity of the soils and groundwater, as well as the mobility of the remaining contaminants.

Table 9-3
Summary of Soil Sample Results 100 times Above the NYSDEC TAGM #4046 RSCO

Analyte	Soil Samples Above the 100 times NYSDEC TAGM #4046 RSCO	Highest Result (& Location)	100-times NYSDEC TAGM 4046 RSCO [1]
RCRA Metals			
Mercury	SB-4, AST-SB-1	37.8 ppm (AST-SB-1)	10 ppm
VOCs			
Benzene	AST-SB-18	32,000 ppb (AST-SB-18)	6,000 ppb
SVOCs			
Benzo(a)pyrene	SS-9, AST-SB-3	18,000 ppb (AST-SB-3)	6,100 ppb
Dibenz(a,h)anthracene	AST-SB-3	3,400 ppb (AST-SB-3)	1,400 ppb

Notes:
(1) RSCO from NYSDEC's TAGM HWR-94-4046, revised January 24, 1994.
ppm: parts per million
ppb: parts per billion
AST: Aboveground Storage Tank
SS: Surface Soil
SB: Soil Boring
RCRA: Resource Conservation Recovery Act
VOC: Volatile Organic Compounds
SVOC: Semivolatile Organic Compounds



HDR

YONKERS ATI SITE INVESTIGATION/ REMEDIAL ALTERNATIVES REPORT YONKERS, NEW YORK

100x NYSDEC TAGM #4046 RSCO "HOT SPOT" AREA

DATE	FIGURE
10/20/05	12

Since this alternative will not remove all vadose zone soils, institutional controls are believed to be necessary on the site following the implementation of this Remedial Alternative. An environmental easement is expected to be placed on the site allowing for use of the site as a Restricted Residential site and will require: (1) a Soil Management Plan for the site; (2) the capping of all areas to remain unpaved with 2 feet of clean fill; and (3) a prohibition against the use of groundwater. Containment systems will be necessary to manage the contaminants being removed from the site. A significant amount of the potential exposure pathways of humans with residual contaminants will be removed from the site since soils on the site 100 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria will be removed.

The time frame for implementation for this alternative, is approximately five (5) months, which includes three (3) months for preparation and procurement, one (1) month for excavation and one (1) month for project close-out (assuming 5-day weeks). There will be O&M costs for this alternative for an annual cap recertification by a Professional Engineer and annual review of the Soil Management Plan for the site, which will be updated, if necessary.

Of the four proposed Remedial Alternatives, the Removal of Soils on the Site 100 Times above the NYSDEC TAGM #4046 RSCOs Screening Criteria alternative has a medium degree of implementability. The cost of this Alternative is considered economically feasible. Based on the evaluation of this alternative presented above, community acceptance of this alternative is suspected to be less than that of alternative No. 3, which is high.

9.5 Comparison of Contaminant Mass Removal

Table 9-4, below, provides the mass of each contaminant of concern in the "hot spot" area that is removed based on the four (4) Remedial Alternatives evaluated above. As shown, in Table 9-3, Remedial Alternative No. 3 would remove approximately 63% of the mass of mercury, 74% of the mass of benzo(a)pyrene, 60% of the mass of benzo(a)anthracene, 96% of the mass of dibenz(a,h)anthracene and 99 % of the mass of benzene that would be removed from the entire site under Remedial Alternative No. 2. However, Alternative 4 would only remove approximately 49% of the mass of mercury, 55% of the mass of benzo(a)pyrene, 50% of the mass of benzo(a)anthracene, 82% of the mass of dibenz(a,h)anthracene and 93 % of the mass of benzene that would be removed from the entire site under Remedial Alternative No. 2.

9.6 Cost Estimate

Table 9-5 provides a summary of the estimated costs, including O&M, for the Remedial Alternatives discussed in this section.

9.7 Recommended Remedial Alternative

Based upon the stated assessment of Remedial Alternative criteria, Remedial Alternative No. 3, Removal of All On-Site Soils in the "Hot Spot" Area based on the 50 times NYSDEC TAGM #4046 RSCO Screening Criteria, is recommended at the site. Remedial Alternative No. 3 will require the placement of an environmental easement is expected to be placed on the site allowing for use of the site as a Restricted Residential site and will require: (1) a Soil Management Plan for the site; (2) the capping of all areas to remain unpaved with 2 feet of clean fill; and (3) a prohibition against the use of groundwater. Excavation of all vadose zone soils above the NYSDEC TAGM #4046 RSCOs is cost prohibitive and impractical because of the proposed future use of the site, which would consist of the majority of the site being capped by buildings and/or pavement.

Table 9-4
Comparison of Contaminant Mass Removal

Contaminant	Remedial Alternative No. 1 "No Action"		Remedial Alternative No. 2 Removal of All Vadose Zone Soils Above NYSDEC TAGM #4046	Remedial Alternative No. 3 Removal of All Vadose Zone Soils in Hot Spot Areas Above 50X NYSDEC TAGM #4046		Remedial Alternative No. 4 Removal of All Vadose Zone Soils in Hot Spot Areas Above 100X NYSDEC TAGM #4046	
	Total Excavation Area = 0 sf		Total Excavation Area = 101,118 sf	Total Excavation Area = 47,468 sf		Total Excavation Area = 35,414 sf	
	Mass (lbs.)	Percentage (1)	Mass (lbs.)	Mass (lbs.)	Percentage (1)	Mass (lbs.)	Percentage (1)
Mercury	0	0%	345.53	217.44	62.9%	170.59	49.4%
Benzo(a)pyrene	0	0%	230.9	171.7	74.4%	127.7	55.3%
Benzo(a)anthracene	0	0%	411.5	247.1	60.0%	206.8	50.3%
Dibenz(a,h)anthracene	0	0%	27.4	26.2	95.7%	22.5	82.3%
Benzene	0	0%	205.3	203.5	99.1%	191.2	93.1%

Notes:
(1) Percentage of contaminant volume removed for Remedial Alternatives No. 1, 3 and 4 is based calculated in relation to the contaminant volume removed for Remedial Alternative No. 2.

Table 9-5
Remedial Alternatives
Estimated Costs [1]

Remedial Alternatives	Estimated Cost Range Year 0		O&M [2] Cost (Year 0-1)	O&M [2] Cost (Year 1-30)	Total Cost		Total Present Value[3]	
	Low	High			Low	High	Low	High
Remedial Alternative No. 1 No Action	$0	$0	$0	$0	$0	$0	$0	$0
Remedial Alternative No. 2 Removal of All Vadose Zone Soils Above NYSDEC TAGM #4046	$4,569,000	$4,840,000	$0	$0	$4,569,000	$4,840,000	$4,569,000	$4,840,000
Remedial Alternative No. 3 Removal of All Vadose Zone Soils in Hot Spot Areas Above 50X NYSDEC TAGM #4046	$2,175,000	$2,305,000	$16,000	$480,000	$2,671,000	$2,801,000	$2,437,000	$2,567,000
Remedial Alternative No. 4 Removal of All Vadose Zone Soils in Hot Spot Areas Above 100X NYSDEC TAGM #4046	$1,484,000	$1,573,000	$16,000	$480,000	$1,980,000	$2,069,000	$1,746,000	$1,835,000

Notes:
(1) Remedial costs are presented in 2005 dollars and include the transportation and disposal of contaminated soil based on $45/ton of contaminated soil assuming the soil is non-hazardous. The unit cost of $45/ton is assuming that the soil is transported to a facility in Elizabeth, New Jersey for beneficial reuse.
(2) O&M costs include an annual cap recertification by a Professional Engineer and an annual review and update, if necessary, of the site Soil Management Plan. O&M Cost's duration assumed to be for 30 years.
(3) 5% was used for Present Value calculations.

10.0 SUMMARY AND CONCLUSIONS

10.1 Summary

After the demolition of the former ASTs and associated aboveground piping and equipment, 22 soil boring locations were advanced at the site, of which 15 surface soil samples and 22 subsurface soil samples were collected. Temporary monitoring wells were installed in nine (9) of the soil sampling locations, and one (1) groundwater sample was collected from each of the wells. One (1) permanent groundwater monitoring well was installed in one of the soil boring locations and one (1) groundwater sample was collected from the well. In addition, one (1) surface water sample was collected from the on-site oil/water separator. A supplemental soil investigation was performed, including the advancement of six (6) additional soil boring locations, of which six (6) subsurface soil samples were collected. Six (6) temporary monitoring wells were installed within five (5) feet of the original temporary monitoring well locations, from the October 2004 Site Investigation, of which six (6) filtered and six (6) unfiltered samples were collected for RCRA metals analysis. In addition, two (2) existing permanent monitoring wells, previously installed on the site by others, were sampled. RCRA Metals VOCs and SVOCs were reported in concentrations exceeding the NYSDEC TAGM #4046 RSCOs and NYSDEC Standards/Guidelines.

Since the Recommended Remedial Alternative will not remove all vadose zone soils above the NYSDEC TAGM #4046 RSCOs, institutional controls are believed to be necessary on the site following the implementation of this Remedial Alternative. An environmental easement is expected to be placed on the site allowing for use of the site as a Restricted Residential site and will require: (1) a Soil Management Plan for the site; (2) the capping of all areas to remain unpaved with 2 feet of clean fill; and (3) a prohibition against the use of groundwater.

Although exceedances of the NYSDEC Standards/Guidelines were detected, groundwater contaminant levels detected at the site did not indicate that a plume of contamination is present on the site. A review of the field data shows that turbidity measurement reported at all monitoring wells reported turbidity exceeded 800 NTU, the maximum reported by the field instrument. Groundwater sample concentrations for metals are typically biased high when collected with a turbidity exceeding 20 NTU and may result in false positives; thus the elevated metals concentrations reported in site groundwater samples collected during the Remedial

Investigation (October 2004) may be the result of the elevated sample turbidity and not impacts resulting from historic land use. This conclusion is supported by the supplemental site investigation performed, in which metal concentrations were significantly reduced by filtering the samples prior to laboratory analyses.

A summary of asbestos and lead-based paint surveys and abatement/removal and AST/UST removal is included in this Report.

10.2 Conclusions

Data Limitations and Recommendations for Future Investigation

The environmental information available at the site is based on the NYSDEC-approved Final Remedial Investigation Work Plan and prior investigations. Due to the presence of concrete pads, the investigation was frequently limited. Future site excavations activities may reveal additional areas of concern. Four potential remedial alternatives have been identified. Assuming that the NYSDEC and the NYSDOH approve the evaluated remedial alternatives and do not request additional information or alternatives, no additional investigation is recommended.

Recommended Remedial Action Alternative

The Recommended Remedial Alternative for the site is based on the removal of the majority of the contaminants that exists on the site in high levels and the consideration of the applicable rules and regulations, the overall protectiveness of public health and the environment, implementability, short-term effectiveness, long-term effectiveness, mass of contaminants removed and costs. Remedial Alternative No. 3, consisting of the removal of all on-site soils 50 times above the NYSDEC TAGM #4046 RSCOs Screening Criteria, is the Recommended Alternative for the site. Remedial Alternative No. 3 will allow for the removal of the majority of the contaminants on-site at high concentrations in an economically feasible manner. Remedial Alternative No. 3 will require the placement of a an environmental easement for the site, requiring the following: require: (1) a Soil Management Plan for the site; (2) the capping of all areas to remain unpaved with 2 feet of clean fill; and (3) a prohibition against the use of groundwater.

APPENDIX A

JANUARY 2004 FINAL TANK FARM DEMOLITION REPORT

January 26, 2004

Robert H. Filkins, Project Manager
New York State Department of Environmental Conservation
Bureau of Eastern Remedial Action
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7016

Re: Halstead-Quinn, 79-91 Alexander Street, Project #B00193-3

Dear Mr. Filkins:

In accordance with the New York State Department of Environmental Conservation (NYSDEC) letter dated December 29, 2003, Henningson, Durham & Richardson Architecture and Engineering, P.C. (HDR) has enclosed for your approval four (4) signed and sealed originals of the Final Tank Farm Demolition Report for the property located at 79-91 Alexander Street, Yonkers, New York (Site). In addition, please find a Response to Comments, provided as Attachment A to this letter, addressing the comments issued by the NYSDEC in the aforementioned letter. The Response to Comments also serves as a guide as to where the NYSDEC's comments are addressed in the report.

If you have any questions, please do not hesitate to contact me at (914) 993-2034.

Sincerely,

G. Noemi Castillo
Assistant Project Manager

Enclosures

cc: Edward Sheeran (YIDA)
Dennis Lynch (Dorfman, Lynch & Knoebel)
Linda Shaw (Knauf Shaw)
Joyce Mariani (HDR)
Stephanie Nakai (HDR)
File/Chron

ATTACHMENT A

Response to Comments

Final Tank Farm Demolition Report
State Brownfield Site #B00193-3
79-91 Alexander Street, Yonkers, New York

In response to the New York State Department of Environmental Conservation (NYSDEC) letter dated December 29, 2003, please find below a response to comments for the Tank Farm Demolition Report (report) for 79-91 Alexander Street, Yonkers, New York (site). These responses have been incorporated into the Final Tank Farm Demolition Report (Final Report).

Comment 1: Section 1.1

Add that another purpose is to certify that the demolition activities complied with the approved plans and specifications.

Response 1: Section 1.1

Section 1.1 has been revised to include the following: "....(2) certify that the demolition activities complied with the approved plans and specifications;...."

Comment 2: Section 1.2.1, page 5, last paragraph

It should be stated why the recovery wells are no longer in use (presumably due to there no longer being recoverable quantities of petroleum products present). If there are recoverable quantities remaining in the wells, that product should be captured and removed.

Response 2: Section 1.2.1, page 5, last paragraph

Section 1.2.1, page 5 has been revised to include the following: "These recovery wells are not currently in use. As stated by SGS Engineers, PC in the Phase I Environmental Site Assessment, a Scavenger Oil Recovery System was installed and implemented on July 1, 1998. At the beginning of the operation, up to 200 gallons per day of #2 fuel oil was recovered. As of April 2001, the recovered amount had decreased to less than 5 gallons per day. In the October 2001 Remedial Action Work Plan prepared by SGS Engineers, PC, it was concluded by the investigational findings that it appeared that the historic spills, UST leaks and other soil contamination were not significantly affecting the groundwater or the river. A Scavenger Oil Recovery System was formerly used to recover product from the groundwater table at these recovery wells. Recovered product was reportedly pumped into a tank truck. During the Tank Farm Demolition activities, HDR observed free product in one of the recovery wells. During the site investigation, an estimate of the amount of free product (based on thickness) will be obtained to determine if the free product is recoverable. If the free product is recoverable, HDR will make arrangements, on behalf of the YASR, to pump out the free product during the investigation."

Comment 3: Section 2.2.4, page 13, bottom paragraph

If the spills resulted from the activities of Yonkers Contracting, did Yonkers Contracting pay for the disposal of the contaminated gravel? If so, state that they did. If not, they should since the spill was due to their error, and that cost should not have been included in the payment request sent to the NYSDEC.

Response 3: Section 2.2.4, page 13, bottom paragraph

Section 2.2.4, page 14 has been revised to include the following: "As agreed upon during the September 11, 2003 on-site meeting, Yonkers Contracting excavated, removed and disposed of the fuel oil in the aboveground piping and oil-contaminated gravel at their own expense." In addition, other sections of the Final Report have been revised to reflect this.

Comment 4: Section 2.2.4, page 14, bottom paragraph

Similarly, if gravel was contaminated by lead chips due to the practices of Yonkers Contracting, they should bear the cost to dispose of that gravel, not NYSDEC and the City of Yonkers.

Response 4: Section 2.2.4, page 14, bottom paragraph

Section 2.2.4, page 15 has been revised to include the following: "As agreed upon during the September 11, 2003 on-site meeting, the additional costs incurred due to the removal of the contaminated gravel potentially containing lead-based paint were paid in full by Yonkers Contracting." In addition, other sections of the Final Report have been revised to reflect this.

Comment 5: Section 2.2.6

A summary of the air monitoring results should be included here and all data should be included in the report as an appendix or on a CD included in a pocket.

Response 5: Section 2.2.6

Although continuous community air monitoring was performed on site during the demolition activities by equipment that recorded the air monitoring data, Yonkers Contracting's subconsultant, Karen Smyth Consultants, did not download the data and therefore it is not available to include with the Final Report. However, it was reported in Karen Smyth Consultants' logbook that all readings were satisfactory.

Comment 6: Photograph 14, page B9

Caption should say "Temporary Placement of Contaminated Sand..."

Response 6: Photograph 14, page B9

The Photograph 14 caption has been revised to include the following: "Temporary Placement of Contaminated Sand in Northeast Property Corner from AST #1 False Bottom."

Comment 7: Note

Please note that the Final Demolition Report must be stamped and signed by a professional engineer licensed to practice engineering in New York State.

Response 7: Note

The Final Demolition Report has been stamped and signed by Joyce Mariani, a professional engineer licensed to practice engineering in New York State.

FINAL
TANK FARM DEMOLITION REPORT
HALSTEAD QUINN OIL STORAGE TERMINAL FACILITY
79-91 ALEXANDER STREET
YONKERS, NEW YORK

Site # B00193-3

January 2004

Prepared for:

Yonkers Alexander Street Redevelopment Inc.
Yonkers, New York

Prepared by:

Henningson, Durham & Richardson
Architecture and Engineering, P.C.
711 Westchester Avenue
White Plains, New York 10604

STATE OF NEW YORK
JOYCE MARIANI
01-26-04
No. 073626
LICENSED PROFESSIONAL ENGINEER

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Appendix D - Yonkers Contracting AST Removal Report

1.0 INTRODUCTION

Henningson, Durham & Richardson Architecture and Engineering, P.C. (HDR) was contracted to provide engineering and science services to Yonkers Alexander Street Redevelopment Inc. (YASR) related to the demolition activities for aboveground storage tanks (ASTs) within the containment walls, piping, equipment and the containment walls located at the former Halstead-Quinn Major Oil Storage Facility (MOSF#3-2440) located at 91 Alexander Street in Yonkers, New York. The site is defined as Tax Section 2, Block 2610, Lots 12, 13, 18, 22, 30, 35, 44, and 48 (Fuel Farm site).

HDR's objective was to provide YASR with remedial observation of the following demolition activities for the tanks and associated aboveground piping within the containment walls and the containment walls on the Fuel Farm site:

- Draining and removal of sludge or free product (as applicable) from 15 ASTs and all associated piping within the containment walls, decontamination of the tanks and piping, and verification testing;
- Abatement of lead-based paint from the tanks and aboveground piping;
- Demolition of 15 ASTs, associated aboveground piping, foam fire suppression and vapor recovery systems within containment walls and demolition of the containment walls;
- Demolition of fuel fill racks and associated aboveground piping;
- Removal of approximately 280 feet of fuel fill lines and three electrical conduits from the containment area at the end of the dock which extends over the Hudson River;
- Transportation and off-site disposal of demolished materials;
- Testing, removal and disposal of contaminated materials; and
- Community air monitoring.

An Invitation to Bid (ITB) was advertised and issued to contractors on June 19, 2003. A mandatory pre-bid site visit was held on June 25, 2003 and attended by four contractors and representatives from YASR, HDR, the New York State Department of Environmental Conservation (NYSDEC), and the New York State Department of Health (NYSDOH). Addendum #1 was issued on July 3, 2003 that included a response to questions received and extended the bid submittal deadline from July 7, 2003 to July 10, 2003. Addendum # 2 was issued on July 9, 2003, and modified the location for receipt of bids. Two bids were received in response to the ITB, and on July 17, 2003, the contract was awarded to the lowest responsive bidder, Yonkers Contracting Company (Yonkers Contracting). YASR signed the contract with Yonkers Contracting on August 20, 2003. Included in the contract were supplemental general conditions, technical specifications, demolition drawing and bid prices (Contract Documents). Following satisfactory submission of pre-construction submittals, mobilization commenced on August 25, 2003. Demolition activities commenced on August 26, 2003 and were completed on September 26, 2003.

HDR was contracted by YASR to conduct full time on-site demolition observation and reporting. This Demolition Report summarizes the on-site demolition activities that were observed by HDR on behalf of YASR for compliance with the technical specifications in the Contract Documents. On September 3, 2003 and September 11, 2003, representatives of the NYSDEC were on site to observe the activities. A representative from YASR was present on site approximately every two days to observe progress.

1.1 Purpose of Report

The purpose of this report is to: (1) summarize the abatement and demolition activities that occurred on site; (2) certify that the demolition activities complied with the approved plans and specifications; and (3) report observations by HDR during these activities.

1.2 Site Background

1.2.1 Site Description

The Fuel Farm site is approximately 2.8 acres and is located on the east bank of the Hudson River in Yonkers, New York. The property is listed on Tax Section 2 as Block 2610, Lots 12, 13, 18, 22, 30, 35, 44, and 48. The Fuel Farm site is bordered by the Hudson River on the west, Ashburton Avenue on the north, Alexander Street on the east and an industrial property on the south.

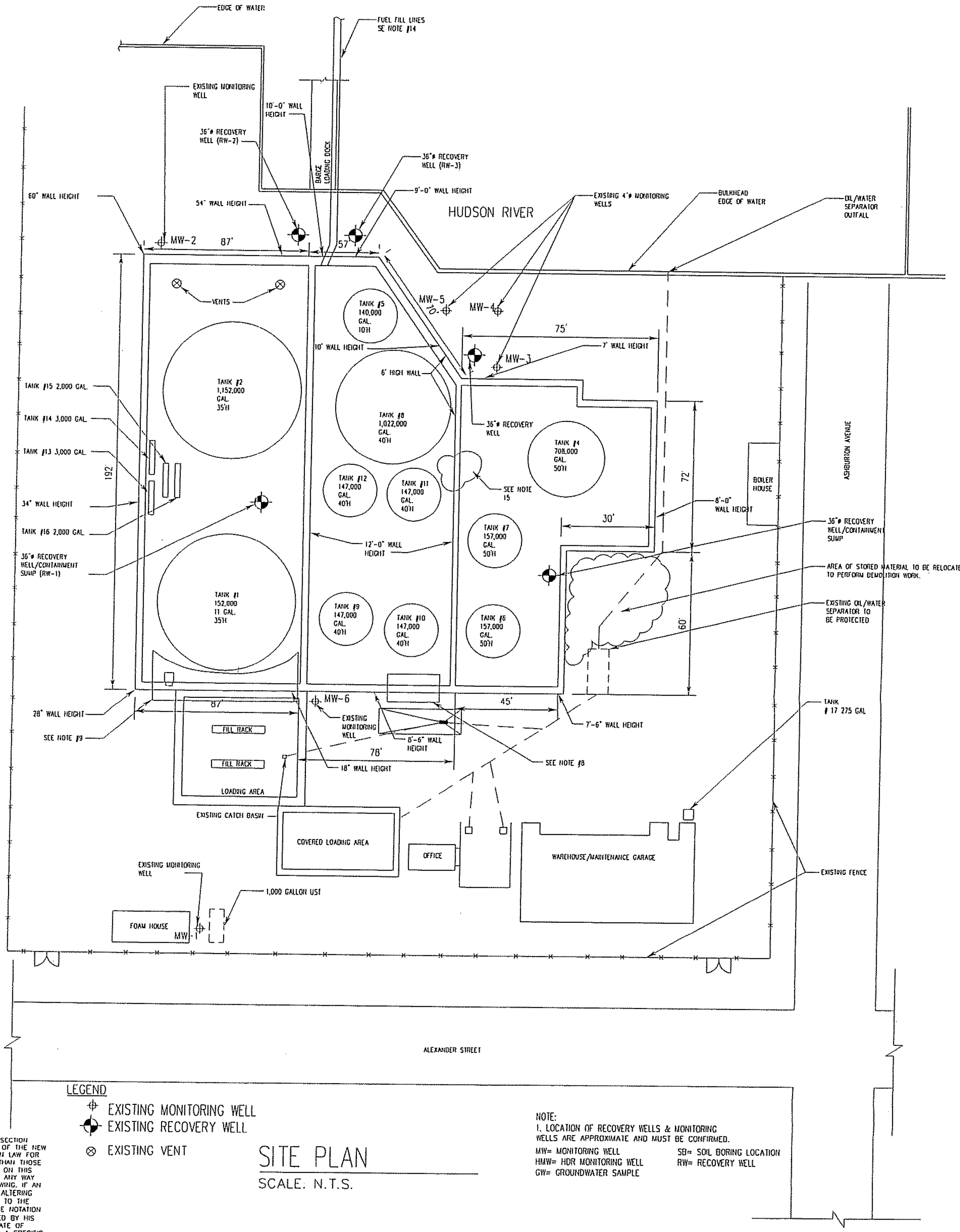
The Fuel Farm site was formally used as a MOSF containing 16 registered ASTs with a total capacity of 5,093,000 gallons of diesel and fuel oil. Table 1 lists the ASTs and the petroleum product that was previously stored in each. Fifteen (15) of the ASTs, #1 through #16 (please note that there is no AST #3), were located in a secondary containment area. At least six of the ASTs had a Claymax lining beneath the tank. One registered 275-gallon AST, believed to be containing waste oil, is located next to the warehouse building/maintenance garage. Two ASTs, assumed to be 1,000 gallons and 550 gallons, respectively, are located in the boiler house along the northern perimeter of the property.

Neither of these tanks is registered, and their contents are unknown. An additional AST assumed to be 550 gallons is located in the foam house along the eastern border of the property, and has unknown contents and is unregistered. These four ASTs will be removed during the Site Investigation to be performed on the site.

Table 1
Aboveground Storage Tanks

AST Number	Tank Size (gallons)	Product Previously Stored
1	1,152,000	Unleaded Gasoline
2	1,152,000	Unleaded Gasoline
4	708,000	#1, #2 or #4 Fuel Oil
5	147,000	Diesel
6	157,000	#1, #2 or #4 Fuel Oil
7	157,000	#1, #2 or #4 Fuel Oil
8	1,022,000	#1, #2 or #4 Fuel Oil
9	147,000	Diesel
10	147,000	#1, #2 or #4 Fuel Oil
11	147,000	#1, #2 or #4 Fuel Oil
12	147,000	#1, #2 or #4 Fuel Oil
13	3,000	Unleaded Gasoline
14	3,000	Diesel
15	2,000	#1, #2 or #4 Fuel Oil
16	2,000	#1, #2 or #4 Fuel Oil
17	275	#1, #2 or #4 Fuel Oil
18	550	#1, #2 or #4 Fuel Oil
19	1,000	#1, #2 or #4 Fuel Oil
20	550	#1, #2 or #4 Fuel Oil

ASTs #1 through #16, and associated aboveground piping within the containment area, were surveyed for lead-based paint on June 9 and 10, 2003. Five of the ASTs, and the green aboveground piping, tested positive for lead-based paint. Figure 1 shows the site and location of the structures (including ASTs) prior to demolition activities.



LEGEND

- EXISTING MONITORING WELL
- EXISTING RECOVERY WELL
- EXISTING VENT

SITE PLAN

SCALE: N.T.S.

NOTE:
1. LOCATION OF RECOVERY WELLS & MONITORING WELLS ARE APPROXIMATE AND MUST BE CONFIRMED.

MW= MONITORING WELL
HMW= HDR MONITORING WELL
GW= GROUNDWATER SAMPLE
SB= SOIL BORING LOCATION
RW= RECOVERY WELL

NOTE:
IT IS A VIOLATION OF SECTION 7209, SUBDIVISION 2, OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON, OTHER THAN THOSE WHOSE SEAL APPEARS ON THIS DRAWING, TO ALTER IN ANY WAY AN ITEM ON THIS DRAWING. IF AN ITEM IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE AND THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

BLOCK DESCRIPTION:	
DEMOLITION PLAN AND NOTES	
BLOCK NAME: PLAN VIEW	PROJECT: CITY OF YONKERS-ATI

HDR
Henningson, Durham & Richardson Architecture & Engineering, P.C.
711 Westchester Avenue
White Plains, NY 10604

The site is occupied by four buildings totaling approximately 5,000 square feet. The buildings include a warehouse/maintenance garage, a dispatch office, a fire suppression foam pumphouse, and an inactive boiler building. The buildings are single story, except for a section of the warehouse/maintenance garage that has a second floor office space (not in use). The buildings are brick and concrete block structures with no basements.

The site contained four drive-through fuel fill racks and vehicle fuel dispensers. The rack areas were covered with corrugated metal roofs and small asphalt berms around the perimeter for stormwater management. Catch basins located inside the bermed areas discharge to an oil-water separator that was permitted to discharge into the Hudson River. Since the closing of the site as a MOSF, YASR closed the valves to the outfall at the request of the NYSDEC.

A barge loading dock, which previously contained the fuel fill lines and electrical conduits, extends approximately 100 feet out into the Hudson River. An approximate 50-gallon capacity catch basin is located under the pipe header to contain minor spills. A guard/monitoring house is at the end of the dock from which fuel farming operations were formerly monitored.

There are six groundwater monitoring wells, three 3-foot diameter recovery wells, and two stormwater sumps/containment sumps on site (see Figure 1). One monitoring well (MW1) is located upgradient of the tank farm. Several monitoring wells and one recovery well were installed as a result of a 1989 Number 6 fuel oil spill (spill #8912251 – see below). Two additional recovery wells and four monitoring wells were installed in 1998 as a result of a pipe leak in which approximately 10,375 gallons of Number 2 fuel oil were released (spill #9801901 – see below).

These recovery wells are not currently in use. As stated by SGS Engineers, PC in the Phase I Environmental Site Assessment, a Scavenger Oil Recovery System was installed and implemented on July 1, 1998. At the beginning of the operation, up to 200 gallons per day of #2 fuel oil was recovered. As of April 2001, the recovered amount had decreased to less than 5 gallons per day. In the October 2001 Remedial Action Work Plan prepared by SGS Engineers, PC, it was concluded by the investigational findings that it appeared that the historic spills, UST leaks and other soil contamination were not significantly affecting the groundwater or the river. A Scavenger Oil Recovery System was formerly used to recover product from the groundwater table at these recovery wells. Recovered product was reportedly pumped into a tank truck. During the Tank Farm Demolition activities, HDR observed free product in one of the recovery wells. During the site investigation, an estimate of the amount of free product (based on thickness) will be obtained to determine if the free product is recoverable. If the free product is recoverable, HDR will make arrangements, on behalf of the YASR, to pump out the free product during the investigation.

The two stormwater sumps/containment sumps are located inside the containment area. A vapor recovery system was also present in the southeastern corner within the containment wall that contains two small tanks estimated to be approximately 1,000 gallons each. The groundwater monitoring wells, recovery wells and sumps were protected during demolition activities and remain in place.

The following two spill reports are believed to still be active for the site:

Spill #8912251

As reported in a Phase I Environmental Site Assessment prepared by SCS Engineers dated September 2001 (SCS Phase I Environmental Site Assessment), the site was listed with a 1989 Number 6 fuel oil Leaking Underground Storage Tank (LUST) spill #8912251. The spill report provided by Halstead-Quinn Propane, Inc., former owners of the Fuel Farm site, indicates 4,000 gallons of Number 6 fuel oil was recovered and pumped back into tanks and 1,000 gallons of contaminated product was placed into drums for disposal. Halstead-Quinn Propane, Inc. personnel stated that because of the consistency of Number 6 fuel oil in the cold of February, almost all product was scraped up and recovered for reuse or disposed of off-site. Sheen in the recovery wells was removed by submerging a spill pad in the well.

Spill #9801901

As reported in the SCS Phase I Environmental Site Assessment, this spill was a result of the Number 2 fuel oil pipe leak discovered on May 13, 1998. Data provided by the owner indicated approximately 10,372 gallons of Number 2 fuel oil were spilled in June 1998 and 8,575 gallons were recovered through December 31, 1998. A Scavenger Oil Recovery System was installed in July 1998. Initial recovery rates were reported to be approximately 200 gallons per day. By January 1999, recovery rates were reported to be approximately seven gallons per day. Halstead-Quinn Propane, Inc. personnel monitored the system.

1.2.2 Site History

A section of the Hudson River was filled between 1886 and 1898 to create the Fuel Farm site. The Fuel Farm site was occupied by two companies, Archibald Lumber Company and P.A. Deyo and Son Elevator, in 1898 shortly after it was created. The Hudson Fuel Company and Harrigan Coal and Wood occupied the Fuel Farm site by 1917. In 1919, two brick buildings were initially erected on the Fuel Farm site, including a garage and stable. Hudson Fuel Company is listed as the Fuel Farm site owner in 1919, 1923, and 1933. Hudson Fuel Company is believed to have owned the Fuel Farm site through 1951. From 1951 through approximately 1977 or 1978, the Fuel Farm site was owned by Standard Oil (currently ExxonMobil Corporation), who also owned the adjacent parcel to the east from 1917 through 1951. Standard Oil sold the adjacent parcel to Polychrome, Inc. in 1951, and then acquired the Fuel Farm site for the purpose of installing a tank farm. Standard Oil installed nine ASTs on the northern portion of the Fuel Farm site (Tank #4, #5, #6, #7, #8, #9, #10, #11, and #12) shortly after it acquired the site. In 1978, Standard Oil sold the Fuel Farm site to A. Tarricone, Inc. (ATI). On or about December 1983, ATI installed two additional large ASTs (Tank #1 and #2) south of the previous nine ASTs. A total of 11 large ASTs appear to have been present on the Fuel Farm site between 1978 and 1989. Eventually, 16 ASTs were registered, including the 11 large ASTs. Sometime between 1995 and 2001, ATI sold or changed its name to Halstead-Quinn Propane, Inc. In spring 2001, Halstead-Quinn Propane, Inc. declared bankruptcy. In July 2002, YASR acquired the Fuel Farm through a bankruptcy court proceeding and is the current owner.

1.2.3 Hydrogeology

A portion of the Fuel Farm site is located within a 100-year flood zone area. The groundwater under the Fuel Farm site is tidally influenced and flows toward the Hudson River. The groundwater table is located approximately six feet below ground surface. The geology of the Fuel Farm site consists mainly of historic fill material. The majority of the area is paved with asphalt. A stormwater collection system, consisting of asphaltic berms, storm drains and an oil/water separator, is located on-site to collect the stormwater, which previously discharged into the Hudson River via an outfall (NYSDEC State Pollutant Discharge Elimination System (SPDES) Permit Number NY-0099538) to the Hudson River located in the northwest border of the Fuel Farm site that is now closed.

2.0 DEMOLITION ACTIVITIES

Yonkers Contracting's scope of work included:

- Demolition of all ASTs, piping, equipment, structures and containment walls around and between the ASTs located at the Fuel Farm site, and confirmation of the presence of free product in the four ASTs (two, 2,000 gallons and two, 3,000 gallons) on the Fuel Farm site;
- Draining and removal of sludge or free product and cleaning of ASTs within the containment walls that contain sludge or free product, as required;
- Removal of all deteriorated lead paint from demolition items and removal of lead paint from areas to be cut; and
- Testing, removal and material disposal in accordance with the specifications.

Minimal disturbance of the Fuel Farm site soils, gravel or the liners beneath the steel bottoms of the tank was required to meet the objectives of the demolition task. The activities were to be performed in such a manner that the project's schedule would be met and the project accomplished in accordance with the Contract Documents.

Prior to the initiation of demolition work occurring on site, HDR and YASR requested the following pre-construction submittals from Yonkers Contracting: (1) Site Specific Demolition Work Plan; (2) Site Specific Health and Safety Plan; (3) Site Specific Dust Control Plan; (4) Site Specific Water Management Plan; (5) Site Specific Lead Abatement Plan; and (6) Site Specific Erosion Control Plan. In addition, during the duration of remedial/demolition activities on site, Yonkers Contracting was to: (1) perform daily health and safety toolbox meetings; (2) provide HDR and YASR with progress reports and projected task schedule reports on a weekly basis; and (3) maintain daily logs on all remedial and non-remedial activities occurring on site. Submittals/Permits provided by Yonkers Contracting are included in Appendix A of this Demolition Report.

2.1 Summary of Scope of Work

The following is a summary of the work that was to be performed by Yonkers Contracting.

2.1.1 Testing, Removal and Cleaning of Free Product in ASTs and Associated Piping

All 15 ASTs within the containment wall were reportedly drained and cleaned before YASR purchased the property. During the pre-proposal site visit, sludge (suspected to have melted down from the interior walls of the tanks in the hot weather) was identified in the bottom of several of the ASTs.

Yonkers Contracting was responsible for the proper draining and removal of any free product from the identified ASTs, associated aboveground piping and fill stations, and cleaning of the 15 ASTs, as applicable. Free product included any liquid or sludge to be found in the ASTs or piping defined in the Scope of Work. Yonkers Contracting subcontracted to Royal Environmental Services (Royal Environmental) to conduct all activities associated with the sampling, testing and removal of free product and cleaning of all ASTs within the containment walls.

2.1.2 Lead-Based Paint Abatement

ASTs #5, #9, #10, #11 and #12 and all associated aboveground piping coated with green paint within the containment walls had tested positive for lead-based paint by Adelaide Associates, LLC before commencement of the project. Yonkers Contracting was responsible for the removal, testing and disposal of delaminated lead-based paint chips from these locations, and removal of lead-based paint from areas where welding or cutting was to take place as part of the demolition activities. Yonkers Contracting was also responsible for preparing a Negative Exposure Assessment Plan (as applicable) for the lead abatement task and minimizing further contamination of the surrounding gravel and soil.

2.1.3 ASTs and Associated Aboveground Piping and Containment Wall Demolition

Yonkers Contracting was responsible for demolition of the 15 ASTs and associated aboveground piping within the containment walls, as well as the four fill stations that existed on the eastern containment wall, in accordance with API Standards, while minimizing disturbance of the surrounding soils. Yonkers Contracting subcontracted Metal Management Northeast, Inc. (Metal Management) to conduct the demolition of the ASTs and associated aboveground piping within the containment walls and the four fill stations that existed along the eastern containment wall.

Approximately 18-inch thick concrete exterior containment walls with steel rebar existed around the perimeter of the 15 ASTs and associated aboveground piping. Two interior concrete containment walls, approximately 18 inches thick, were located between several of the ASTs (see Figure 1). Yonkers Contracting was responsible for the demolition of the concrete exterior and interior containment walls.

2.1.4 Removal and Disposal of Demolished Materials

Once demolition of the ASTs, associated aboveground piping and fill stations, and containment walls was complete, Yonkers Contracting was responsible for the removal and disposal of the demolished materials in accordance with the Contract Documents. Yonkers Contracting subcontracted Metal Management to conduct the removal and disposal of the demolished materials originating from the ASTs and associated aboveground piping within the containment walls in addition to the four fill stations that existed along the eastern containment wall. Yonkers Contracting subcontracted C & K Trucking Company to conduct the removal and disposal of the materials originating from the demolition of the exterior and interior containment walls.

2.1.5 Community Air Monitoring

Yonkers Contracting was responsible for the community air monitoring of particulate matter and volatile organic compounds (VOCs) during demolition activities. Yonkers Contracting subcontracted with a woman-owned business, Karen Smyth Consultants (KS Consultants), to be on site and conduct community air monitoring during periods when dust-generating activities occurred (i.e., when demolition activities occurred).

2.2 Demolition Activities and Observations

The following sections include a summary of the demolition activities and HDR's observations of the activities performed by Yonkers Contracting. Appendix B of this Demolition Report contains a photographic log of activities. Appendix C contains copies of all manifests submitted by Yonkers Contracting related to transportation and off-site disposal of materials from the Fuel Farm site. Appendix D contains a copy of Yonkers Contracting's AST Removal Report.

2.2.1 Testing, Removal and Cleaning of Free Product in ASTs and Associated Piping

Prior to removal of sludge and/or free product from the ASTs, aboveground piping associated with each tank was drained and/or vacuumed, filled with absorbent padding, and either: (1) cut and removed; or (2) capped with a flange, if temporarily remaining in place. When loosening bolts to access the piping, field technicians placed containment units (consisting of 55-gallon barrels cut in half, lengthwise) below the pipes.

Once sludge and/or free product were removed, ASTs were ventilated for a minimum of 30 minutes prior to air monitoring using a multiple gas detector. Prior to tank entry, air monitoring was conducted. If air monitoring results were favorable, two field technicians (with 40-hour Hazardous Waste Operations and HAZWOPER and Confined Space Entry certifications) entered the tank wearing Level C personal protective equipment (which includes: coveralls, chemical-resistant outer gloves, chemical-resistant inner gloves, chemical-resistant steel-toed boots, disposable boot covers, hard hats, two-way radios and half-face air-purifying respirators) and a safety harness. A third field technician remained outside of the tank to monitor activities and assist as required.

Sludge and/or free product were removed from the tank using a vacuum truck. If sludge and/or free product remained that could not be removed with the vacuum truck, absorbent powder was mixed with the remaining sludge/liquid. Once the sludge/liquid was absorbed into the absorbent powder, the mixture from the tank interior was scraped with a rubber tipped scraper and the tank swept clean. All recovered sludge and/or free product was transported and disposed of off-site by Royal Environmental.

For the fuel fill lines along the dock, holes (approximately 6 inches by 8 inches) were cut in the top of each pipe where the pipe was at the lowest elevation. The pipe was vacuumed to remove the free product and absorbent powder was placed into the pipe to absorb any remaining free product. The mixture was then vacuumed out and the hole along the top of each pipe was filled with absorbent padding.

2.2.2 Lead-Based Paint Abatement

Yonkers Contracting was responsible for scraping all deteriorating lead-based paint from ASTs #5, #9, #10, #11, #12 and aboveground piping coated with green lead-based paint. All lead-based paint chips were to be contained, stored and properly manifested, transported and disposed off-site in accordance with applicable regulations. However, Yonkers Contracting was concerned that extensive scraping would cause the lead-based paint chips to become airborne. Yonkers Contracting elected to shear cut the tanks and then stage the cut sections for further size reduction on the bottom of the largest non lead-based painted tanks, AST #2 and AST #8, which were the first tanks removed. The lead-based paint that was contained on the tank bottom was swept once the demolished tank was removed. Yonkers Contracting placed tarps on the gravel surface around the tanks to contain the deteriorated lead-based paint chips that were disturbed during this process and prevent the paint chips from mixing into the gravel and/or underlying soil surface.

On September 9, 2003, Yonkers Contracting was notified by HDR that they were in non-compliance with the Contract Documents when their operating practices did not adequately remove delaminated lead-based paint chips from the portions of the tanks where they would be cut, prior to the shearing of the tanks, or prevent the deteriorated lead-based paint chips from mixing into the gravel and/or underlying soil surface. On September 11, 2003, a meeting was held with YASR, HDR and Yonkers Contracting on site. The group reached agreement that Yonkers Contracting would complete demolition of the remaining tanks without removing the lead-based paint from areas that would be sheared, and Yonkers Contracting would, at their own expense, remove gravel within the containment walls in areas where delaminated lead-based paint could be present due to their operational practices during demolition. This procedure would be followed as a corrective measure to the non-compliance notice (see Section 2.2.4). Those lead-based paint chips that were scraped and collected from some sections of the ASTs prior to and during demolition activities and stored on-site in one 55-gallon labeled drum, manifested as hazardous waste, were transported and removed off-site for disposal by C & K Trucking Company on September 26, 2003.

2.2.3 ASTs, Associated Piping and Containment Wall Demolition

The 15 ASTs within the containment walls, associated aboveground piping (including the four fill stations outside of the containment walls to be found on site), and the concrete interior and exterior containment walls were demolished between September 1 and September 24, 2003. AST removal occurred between September 1 and September 17, 2003. The ASTs were sheared into sections by an excavator, which was used to further reduce/compact the tank sections and stage the scrap metal within the containment walls prior to removal and off-site disposal by Metal Management. All associated aboveground piping was removed by the excavator, placed on the ground within the containment walls and sheared into transportable lengths. Sections of the containment walls were demolished during AST demolition. Once all 15 ASTs and associated aboveground piping had been demolished, transported and removed off-site, the remaining sections of the containment wall were demolished, transported and removed off-site, with the exception of the lowest two feet of the containment wall on the eastern portion of the site. This section was left in place for safety reasons to prevent vehicles traveling or parking on the site from accessing the area within the containment wall that is at an elevation approximately three feet lower than the eastern portion of the site.

2.2.4 Other Demolition/Removal Activities

On August 27, 2003, while preparing to enter AST #1 and AST #8, Royal Environmental identified what appeared to be welded sections on the tanks approximately three inches above the gravel surface that appeared to be false bottoms. False bottoms were used in fuel farm tank construction if a leak or weak spots were present on the bottom of the tanks. The tank would be drained, the existing tank bottom covered with sand, and a second layer of metal welded in place above the sand in the tank as the new tank bottom. On September 12, 2003, AST #4 was discovered to have an apparent false bottom. These three ASTs that were discovered to have false bottoms contained approximately three to five inches of petroleum-contaminated sand between the original and new tank bottoms. In addition, the vapor recovery system in the southeastern corner within the containment wall contained two small tanks, estimated to be approximately 1,000 gallons each, that were partially filled with charcoal pellets contaminated with gasoline (remaining from when the vapor recovery was in operation). The charcoal pellets were removed and disposed of at CycleChem in Elizabeth, New Jersey and the vapor recovery system demolished on September 16, 2003.

The petroleum-contaminated sand from the three tanks with false bottoms and the gasoline contaminated charcoal from the vapor recovery system were vacuumed from their respective locations, stored and tarped in the northeastern property corner, and transported and disposed of off-site by Leticia, Inc., a minority-owned business.

On September 9, 2003, HDR observed a fresh mark of what appeared to be fuel oil Number 4 on the southern side of AST #4. Upon closer inspection, piping associated with AST #4 and AST #6 still contained some free product that was supposed to be removed prior to demolition (access to this piping was restricted, pending demolition of ASTs #8, #11 and #7). HDR also observed staining on the gravel surface along the eastern side of AST #4 and along the western side of AST #6. The two areas of staining near AST #4 and #6 were estimated to have been caused by less than five gallons of spilled material, therefore no spill was registered with the NYSDEC. In addition, half of a 55-gallon plastic drum that was placed below a slow-leaking aboveground pipe by Royal Environmental appeared to have been disturbed during demolition of the nearby aboveground piping/ASTs, releasing approximately five to seven gallons of oil onto the gravel surrounding the containment unit that lay along the eastern side of AST #4. On September 10, 2003, Spill #0306169 was reported to the NYSDEC by Linda Shaw, Esq., environmental counsel to YASR, within two hours of her discovery of the spill. As agreed upon during the September 11, 2003 on-site meeting, Yonkers Contracting excavated, removed and disposed of the fuel oil in the aboveground piping and oil-contaminated gravel at their own expense. Yonkers Contracting did not excavate below the Claymax liner. All excavated material was placed in 55-gallon drums and transported off-site for disposal by Royal Environmental. A closure report, dated September 22, 2003, by Royal Environmental and letter to Mark Tschantre from John K. O'Mara of the NYSDEC, dated September 23, 2003, confirmed that spill has been closed.

On September 12, 2003, as an excavator began demolition of the southwestern fill station (located along the eastern containment wall), one of the pipes to the fill station was cut, and a small cloud of dry foam associated with the fire suppression/extinguishing system for the fill station was released and lightly coated the immediate area. According to Yonkers Contracting, the dry foam was composed of dehydrated animal fat (to smother fire without releasing possible toxic materials). Yonkers Contracting completed demolition of the fill station and the dry foam was swept up.

On September 13, 2003, the four 4-inch diameter pipes along the dock were removed. The excavator was positioned on the land next to the dock. The excavator pinched the pipes into approximate 15-foot sections, removed the 15-foot sections and placed them along the western side of the western containment wall. After each section was removed, the remaining pipe was pulled closer to land and the process repeated.

In response to the September 11, 2003 on-site meeting, on September 22 and 23, 2003, Yonkers Contracting excavated two to three inches of the top gravel layer within the interior containment wall section of the containment walls in areas where delaminated lead-based paint could be present due to their operational practices during demolition. The gravel was removed from the area with an excavator owned and operated by Yonkers Contracting. Upon removing the gravel from the area, it was piled on the pavement along the southwestern property corner. The gravel was taken off-site and disposed of on September 23 and 24, 2003, along with the concrete rubble from the demolition of the interior and exterior containment walls. As agreed upon during the September 11, 2003 on-site meeting, the additional costs incurred due to the removal of contaminated gravel potentially containing delaminated lead-based paint were paid fully by Yonkers Contracting.

2.2.5 Removal and Disposal of Demolished Materials

During demolition of the ASTs and/or associated aboveground piping and piping along the docks, Metal Management provided up to thirty (30) transfer trailers and one dumpster for the transportation, removal and off-site disposal of scrap metal. Yonkers Contracting subcontracted to C & K Trucking Company for the removal and disposal of all concrete rubble created by the demolition of the concrete containment walls.

2.2.6 Community Air Monitoring

Particulate matter (PM) and multiple gas (used for the detection of VOCs) detectors were employed by KS Consultants for community air monitoring in the field when: (1) demolition equipment was operating on site; (2) demolition activities created visible dust; and/or (3) demolition activities had the potential to expose VOCs into the air. The PM and VOC detectors were to be operated continuously downwind of the demolition activities, as well as periodically upwind of demolition activities and along the site perimeter.

The PM and VOC monitors used by KS Consultants collected data as well as provided instantaneous results. When equipment was working, KS Consultants recorded whether the readings were in compliance every 60 minutes. HDR observed that KS Consultants did not conduct continuous monitoring during shifting wind directions, experienced equipment failure (resulting in gaps of up to two hours at times in their data retrieval), and appeared to have faulty readings at times. When observed, HDR requested that KS Consultants move to an appropriate location, fix equipment problems as soon as encountered and calibrate their equipment appropriately. In general, visible dust emissions during demolition and other activities were low with periods of higher levels that lasted less than approximately 30 minutes. The area is surrounded by industrial uses, there were few pedestrians passing by the site, and no complaints of visible dust were received during demolition activities.

3.0 SUMMARY AND CONCLUSIONS

HDR was contracted to provide engineering and science services to YASR related to the demolition activities of the 15 ASTs and all associated aboveground piping within the containment walls, the concrete interior and exterior containment walls, overhead fuel fill racks, and fuel fill lines and electrical conduits extending over the Hudson River on an existing dock. This Demolition Report summarizes the on-site demolition activities that were observed by HDR.

In summary:

1. Sludge and/or free product were removed from the 15 ASTs within the containment walls, fuel fill racks, and the pipes extending over the existing dock. Most of the free product was removed from the associated aboveground piping prior to demolition. Spill #0306169 was reported on September 10, 2003 for approximately five to seven gallons of fuel oil that was spilled on site during demolition activities. The contaminated gravel and soil were excavated, removed and disposed of off-site by Royal Environmental, subcontractor to Yonkers Contracting. NYSDEC issued a spill closure letter on September 23, 2003. The additional costs incurred due to Spill #0306169 were paid in full by Yonkers Contracting.

2. Yonkers Contracting conducted limited removal of lead-based paint from ASTs and aboveground piping prior to demolition. Lead-based paint that was contained on the largest tank bottom during shearing and crushing was swept at the end of the demolition activities. Excavation of potential lead-based paint contaminated gravel was conducted after AST demolition was completed from the area within the interior containment wall section. The additional costs incurred due to the removal of contaminated gravel potentially containing delaminated lead-based paint were paid in full by Yonkers Contracting.

3. Fifteen (15) ASTs, associated aboveground piping, containment walls, fuel fill lines and electrical conduit extending into the Hudson River, the vapor recovery and foam suppression systems and overhead fill racks on the eastern portion of the site were demolished.

4. Demolished materials were removed and disposed of off-site by subcontractors to Yonkers Contracting and taken to the following locations:

   - Thirty-six thousand nine hundred and ninety (36,990) gallons of sludge/free product from ASTs and associated aboveground piping: Clean Water of New York in Staten Island, New York;
   - Approximately 592 tons of scrap metal: Metal Management Northeast in Newark, New Jersey;
   - One 55-gallon drum of lead-based paint chips: CycleChem in Elizabeth, New Jersey;

- Approximately 109 tons of petroleum-contaminated sand from the false tank bottoms, petroleum-contaminated gravel from the spill site and gravel containing lead-based paint chips: Clean Earth of Carteret in Carteret, New Jersey;
- Approximately 962 tons of concrete from the demolition of the interior and exterior containment walls: Edison Avenue Recycling in Mount Vernon, New York.

5. Community air monitoring was conducted during the operation of machinery on site and/or during demolition activities.

The demolition activities observed by HDR were performed in accordance with the intent of the Technical Specifications of the Contract Documents. In instances where non-compliance was observed by HDR, Yonkers Contracting was made aware of the situation and corrective measures were performed.

Appendix A

Yonkers Contracting Submittals/Permits

YONKERS CONTRACTING COMPANY, INC.

969 Midland Avenue, Yonkers, NY 10704
Tel: (914) 965-1500 Fax: (914) 378-8885

September 4, 2003

1/2

Knauf Shaw LLP
975 Crossroads Bldg.
2 State St.
Rochester, NY 14614
Tel: (585) 546-8430
Fax: (585) 546-4324

TO

Attn: Ms.Linda Shaw, Esq.

Re: Karen Smyth Health & Safety
Yonkers Alexander Street Redevelopment, Inc. (YASR)
Tank Demolition: Halstead-Quinn Oil Storage Facility

Dear Ms. Shaw:

Attached for your information, is a letter from Karen Smyth Consultant, Inc. stating that she will adhere to Yonkers Contracting Company's Health & Safety Plan.

Additionally, air monitoring will be conducted whenever demolition operations are being performed.

Please call me should you have any further questions, or concerns. Thank you.

Sincerely,

Rich France
Project Manager

Cc:	P.Hubert	YCC	Fax: 914-378-8885
	T.Larson	YCC	Fax: 914-378-8885
	Ms.Joyce Mariani	HDR	Fax: 914-993-2022
	Mr Robert Cozzy	NYSDEC	Fax: 518-402-9773
	Mr Robert Filkins	NYSDEC	Fax: 518-402-9773
	T.Schaad	MMN	Fax: 973-344-8155
	A Tschantre, & M Tschantre	RES	Fax: 914-428-9763

KSC

Karen Smyth Consultant, Inc.
395 South End Avenue, Suite 7AA
New York, New York 10280

September 3, 2003

Mr. Thomas Larson
Yonkers Contracting Company, Inc.
969 Midland Ave.,
Yonkers, New York 10704

RE: Site Safety Plan
Yonkers, Tank Farm Demolition Project

Dear Mr. Larson:

Please be advised that my firm has reviewed and will adhere to all of the guidelines and requirements of the Yonkers Contracting, Site Safety Plan, for the above referenced project

In addition, and as requested, by Mr. Richard France (Project Manager), my firm will be present at this site - for a two additional hours, each day. If you have any questions, please feel free to contact me at my office or by cellular phone at (917) 592-5421.

Sincerely,

Karen Smyth
Karen Smyth
President

Cc: R. France

(212) 406-8168
email: safetymave@aol.com

Yonkers Contracting Company, Inc.

Building Quality for Over 50 Years

969 Midland Avenue Yonkers, NY 10704 Tel 914 965 1500 Fax 914 378 8880

FACSIMILE COVER SHEET

PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME: Ms. Joyce Mariani, P.E.

FIRM: Henningson, Durham & Richardson

FAX #: (F)914-993-2022/(T)914-993-2000

THIS INFORMATION WAS SENT BY: Thomas R. Larson, P.E.

DATE: 08/29/03

NUMBER OF PAGES SENT: 8

RE: YASR / Halstead-Quinn Oil Storage Facility / Tank Demolition Project, Yonkers, NY

- Please see attached.

Thank you.

Yonkers Contracting Company, Inc.

Building Quality for Over 50 Years

969 Midland Avenue Yonkers, NY 10704 Tel 914 965 1500 Fax 914 378 8880

August 29, 2003 - Facsimile
Ms. Joyce Mariani, P.E.
Henningson, Durham & Richardson
711 Westchester Avenue
White Plains, NY 10604-3504
(T)914-993-2000/(F)914-993-2022

RE: Yonkers Alexander Street Redevelopment, Inc.
Halstead-Quinn ATI Tank Farm; Tank Demolition Project, Yonkers, NY.

Dear Ms. Mariani:

Reference is made to the above project.

Enclosed for your review and approval are the revised Community Air Monitoring Plan and the Dust and Erosion Control Plan.

If you have any questions, please feel free to call me at (914)965-1500, ext. 809.

Thank you.

Sincerely,

YONKERS CONTRACTING COMPANY, INC.

Thomas R. Larson, P.E.
Manager, Estimating Department

w/as03/0829031.doc
Attachments
cc: John Kolaya (YCC)
Paul Hubert (YCC)
John Chrysogelos (YCC)
Tom Smith (YCC)
Robert Cozzy, NYS Dept. of Environmental Conservation; (F)518-402-9773
Robert Filkins, NYS Dept. of Environmental Conservation; (F)518-402-9773
Linda Shaw, Esquire, Knauf Shaw LLC; (F)585-546-4324

ATI
Tank Farm Demolition Project

Community
Air Monitoring Plan
(CAMP)

Yonkers Contracting, Co.

1.0 PURPOSE

The purpose of this program is to establish procedures for a Community Air Monitoring Plan (CAMP) for the ATI, Tank Farm Demolition Project. These air monitoring procedures will be implemented by Yonkers Contracting, Company. These procedures will be followed by the contractor and the subcontractors on this project.

Depending on the nature of the known or potentially known contaminants, monitoring may be conducted for Nuisance Dust, Heavy Metals and Volatile Organic Compounds (VOC's) using state of the art, direct reading, and continual air monitoring equipment.

2.0 AIR SAMPLING PROCEDURES

Air samples will be collected continually, daily, during demolition activities.

Air samples will be collected upwind and downwind in directions to determine background levels of contamination and samples will also be collected on the perimeters of the demolition site.

3.0. NUISANCE DUST AND HEAVY METALS

As applicable, a continual nuisance dust monitoring program will be implemented for air dust content and heavy metals. A monitor comparable to the HAZ-DUST EPAM-5000 Environmental Particulate Air Monitor will be used to collect sample data, on-site for the duration of the project.

This portable microprocessor-based instrument is designed for environmental and indoor air quality investigations. Highly sensitive, this monitor offers immediate real-time determinations and data recordings of airborne particle concentration in milligrams per cubic meter (mg/m^3). Interchangeable size-selective sampling heads allow PM_{10}, $PM_{2.5}$, or $PM_{1.0}$ monitoring. The monitor samples by aerodynamic particle sizing and 47 mm in-line filter cassette allow concurrent gravimetric sampling. Data may also be stored in a PC for further analysis.

EPAM-5000 Applications

- Quantifying off-site particulate migration
- Surveying for $PM_{2.5}$, PM_{10}, and TSP levels
- Monitoring dust generation
- Evaluating dust suppression and engineering controls
- Locating and identifying "hot spots"
- Emergency response and fugitive emissions-compliance
- Determining level of respiratory protection
- Survey of workplace for OSHA/EPA compliance
- Evaluating worker exposure to airborne contaminants
- Dust collector/ventilation system checks
- Monitoring lung-damaging particles in factories and buildings

4. 0 VOLATILE ORGANIC COMPOUNDS (VOC's)

As applicable, air monitoring will be performed for activities that may elevate exposures to volatile organic compounds (VOC's). VOC's will be continually monitored by collecting air samples using equipment comparable to the MultiRAE Plus: A 5-gas Combination: PID with up several sensors. Photo-ionization detectors (PIDs) such as the one that will be used at this site; use an electrode-less ultraviolet lamp to break chemicals with ionization potentials (IP) into ions to detect chemical concentrations in parts-per-million. A PID best detects low levels (0-2000 ppm) of broadband toxics or VOCs.

The instrument used on this site will be a one-to-five-sensor instrument (4 gases plus PID) can be used for confined space, emergency response, industrial hygiene, and many other applications. The equipment has a dual protection using standard gas detection sensors to detect oxygen, combustible gas, and specific toxic gases, as well as an integrated photo-ionization detector (PID) for broad-range toxic gas detection.

This equipment may be used as a personal monitor, a hand-held sniffer, or a continuous area monitor. It has a powerful pump that draws from over 100 feet horizontally or vertically, an automatic liquid trap to protect pump, a programmable alarm with a flashing LED and loud tone alert for the user, it accommodates LEL, 02 and a PID plus any two plug-in smart toxic gas sensors. It has a one-button calibration with auto-zero capability and a large digital display

Examples of Organics Measured by PIDs

- Aromatics
- Ketones & Aldehydes
- Chlorinated hydrocarbons
- Sulfur compounds
- Amines & Amides
- Unsaturated hydrocarbons
- Alcohols
- Saturated hydrocarbons

Inorganics Measured by PIDs

- Ammonia
- Chlorine
- Semi-conductor gases (Arsine)

ATI
Tank Farm Demolition Project

Dust and Erosion Control Plan

Yonkers Contracting, Co.

1.0 PURPOSE

The purpose of this program is to establish procedures for a Dust and Erosion Control Plan for the ATI, Tank Farm Demolition Project. These procedures will be implemented by Yonkers Contracting Company, Inc. These procedures will be followed by the contractor and the subcontractors on this project.

Dust controls reduce the surface and air transport of dust, thereby preventing pollutants from entering water and surrounding ambient environments. Control measures will be implemented at this site where demolition will be ongoing.

2.0 PROCEDURES

If deemed necessary by air monitoring or even visual assessment, the contractor will implement dust control by using wet suppression methods.

The contractor will stop work immediately and implement the appropriate response if any field observation (monitoring data, odors, etc.) indicates contamination.

The contractor will make every effort to ascertain that all work is conducted in a manner that limits the generation of dust.

Erosion control will consist of hay bales installed between the concrete containment wall and the bulkhead at the edge of the water.

There is no scheduled excavation at this project site.

YONKERS CONTRACTING COMPANY, INC.

969 Midland Avenue, Yonkers, NY 10704
Tel: (914) 965-1500 Fax: (914) 378-8885

August 28, 2003 1/5

Knauf Shaw LLP
975 Crossroads Bldg.
2 State St.
Rochester, NY 14614
Tel: (585) 546-8430
Fax: (585) 546-4324

Attn: Ms.Linda Shaw, Esq.

Re: Community Air Monitoring Plan
Yonkers Alexander Street Redevelopment, Inc. (YASR)
Tank Demolition: Halstead-Quinn Oil Storage Facility

Dear Ms. Shaw:

Attached, for your information, is the Community Air Monitoring Plan (CAMP) as prepared by Karen Smyth Inc.

Please call me should you have any further questions, or concerns. Thank you.

Sincerely,

Rich France
Project Manager

Cc:	P.Hubert	YCC	Fax: 914-378-8885
	T Larson	YCC	Fax: 914-378-8885
	Ms.Joyce Mariani	HDR	Fax: 914-993-2022
	Mr.Robert Cozzy	NYSDEC	Fax: 518-402-9773
	Mr. Robert Filkins	NYSDEC	Fax: 518-402-9773
	T.Schaad	MMN	Fax: 973-344-8155
	A.Tschantre, & M.Tschantre	RES	Fax: 914-428-9763

2|5

ATI
Tank Farm Demolition Project

Community
Air Monitoring Plan
(CAMP)

Yonkers Contracting, Co.

1.0 PURPOSE

The purpose of this program is to establish procedures for a Community Air Monitoring Plan (CAMP) for the ATI, Tank Farm Demolition Project. These air monitoring procedures will be implemented by Yonkers Contracting, Company. These procedures will be followed by the contractor and the subcontractors on this project.

Depending on the nature of the known or potentially known contaminants, monitoring may be conducted for Nuisance Dust, Heavy Metals and Volatile Organic Compounds (VOC's).

2.0 AIR SAMPLING PROCEDURES

Air samples will be collected daily, during demolition activities.

Air samples will be placed in a downwind direction and positioned on the perimeters of the above referenced site.

AUG-28-2003 THU 06:40 AM YONKERS CONTRACTING FAX NO. 9143788880 P. 05
4|5

3.0. NUISANCE DUST AND HEAVY METALS (sp. Lead)

As applicable, air samples for dust and heavy metals will be collected using a mixed cellulose-ester filter, with an average pore diameter of 0.8 micrometers, mounted in a 37-millimeter (mm) diameter plastic two piece sampling cassette.

A high flow, electrical powered vacuum pump will be used to draw a calibrated volume of air through the filter cassettes. Volumetric airflow rates will be measured before and after the collection of each sample.

Using a rotometer (pre-calibrated against a primary standard) for field calibration, sampling cassettes will be attached to the pumps using flexible plastic tubing and then calibrated. These sampling cassettes may also be attached to a real time area monitoring device

Volumetric flow rates will be set between 1 and 5 liters per minute. The samples will be allowed to run for a sufficient time to allow a minimum volume of 250 liters of air to pass through the filters. Factors determining the sampling duration and total volume of air drawn are based on a statically valid representation of the airborne contaminants known to be associated, with the site conditions, at the time the samples are collected.

Once collected, all samples will be sent to laboratory for analyses. Each contaminant will be analyzed by an approved standardized methodology. An example of an approved methodology would be the NIOSH 7082, Flame Atomic Absorption – FAA that would be used for lead analyses.

4. 0 VOLATILE ORGANIC COMPOUNDS (VOC's)

As applicable, air monitoring will be performed for activities that may elevate exposures to volatile organic compounds (VOC's). VOC's will be monitored by collecting air samples.

Air samples for VOC's will be collected by using a multi-stage activated charcoal sorbent tube. A high volume, vacuum pump will be used to draw air through the sorbent tube. Volumetric airflow rates are measured before and after the collection of each sample, using a rotometer (which is pre-calibrated through a primary standard) for the field calibration.

Sorbent tubes are attached to the pumps using flexible plastic tubing. Volumetric flow rates are set between 1 and 5 liters per minute. The samples will be allowed to run for a sufficient time to allow a minimum of 250 liters of air to pass through the sorbent tube.

Factors determining the sampling duration and total volume of air drawn will be based on an established statistically valid representation of the airborne VOC concentrations as related with the site conditions, at the time the samples are collected.

Once collected, the samples will be submitted to a laboratory and will be analyzed using carbon disulfide desorption and gas chromatography with a flame ionization detector in accordance with the NIOSH 1022, 1500 AND 1502 Methodologies.

HDR | ONE COMPANY *Many Solutions*℠

Fax

Date:	August 28, 2003	Number of pages (include cover):	5

Message To

Name:	Thomas Larson, P.E.	Fax No:	914-378-8880
Firm:	Yonkers Contracting Company, Inc	Phone No:	914-965-1500
City:	Yonkers	State:	New York
Re:	YASR/Halstead-Quinn Oil Storage Facility	Project:	Demolition Project

Message From:

Name:	Noemi Castillo	Fax No:	914-993-2022
CC:	Linda Shaw, Knauf Shaw Joyce Mariani,HDR	Phone No:	914-993-2034

Document1

Notes:

Please see attached comments.

Thank you.

Comments on Yonkers Contracting and Subcontractors Submittals
Yonkers Alexander Street Redevelopment, Inc.
Tank Demolition – Halstead-Quinn Oil Storage Facility
August 28, 2003

Please note that all information that is required to be included in the Plans is provided in the Technical Specifications. In addition, prior to the commencement of work, all necessary permits must be obtained and notifications must be made.

A. The following comments are in response to comment #'s 4a through 4c of Yonkers Contracting Company, Inc August 25, 2003 letter to Knauf Shaw, Esq.:

Section 02085 Lead-based Paint Abatement of the Contract Documents states :

1. Remove deteriorated lead containing paint from all items
2. Remove all lead containing paint where demolition cuts are to be made.
3. Areas to be torch or grinder cut shall be prepared for surface wipe sampling. If the clearance wipe samples show levels that exceed regulatory guidelines, then the Remedial Contractor will re-clean the work area until satisfactory sampling results are obtained.
4. Work of the Remedial Contractor (or subcontractor) who performs lead abatement work shall be licensed to perform lead hazard control.
5. All abatement work must be completed by a New York State EPA Lead Abatement Contractor.
6. The remedial contractor is responsible for personal air monitoring of it's employees.

In addition, minimal disturbance of the site is mandatory, therefore loose paint chips should not be allowed to have contact with non-paved areas. It is suggested that covering of the work area ground be put in place to accomplish minimal disturbance of the site.

B. Please note that Karen Smyth Inc.'s Health and Safety Plan has not yet been received.

C. Prior to the commencement of demolition of the tanks/piping:

1) Please provide all work permits from the Westchester County Department of Health Petroleum Bulk Storage Division;
2) Confirm that the City of Yonkers Fire Department and Building Department has been notified of the demolition activities;
3) Provide any other necessary permits and notifications.

D The New York State Department of Conservation/Department of Health (NYSDEC/NYSDOH) has stated that the Community Air Monitoring Plan (CAMP) submitted by Yonkers Contracting on August 28, 2003 is insufficient. The Plan should consist of real-time monitoring during all demolition activities for Volatiles and dust, recording 15-minute running averages. Please see the attached NYSDOH CAMP for all requirement and submit a revised CAMP.

APPENDIX 1

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during <u>non-intrusive</u> activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

<u>VOC Monitoring, Response Levels, and Actions</u>

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring partculate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

June 20, 2000

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FAXED 4:15 PM
8.27.03
RJF

YONKERS CONTRACTING COMPANY, INC.

969 Midland Avenue, Yonkers, NY 10704
Tel: (914) 965-1500 Fax: (914) 378-8885

August 27, 2003

1/2

TO

CC: Noemi

Knauf Shaw LLP
975 Crossroads Bldg.
2 State St.
Rochester, NY 14614
Tel: (585) 546-8430
Fax: (585) 546-4324

Attn: Ms.Linda Shaw, Esq.

Re: OSHA 1926.850(a) Engineering Survey Certification In Writing
Yonkers Alexander Street Redevelopment, Inc. (YASR)
Tank Demolition: Halstead-Quinn Oil Storage Facility

Dear Ms. Shaw:

Attached, for your information, is confirmation that an engineering survey has been completed at the Halstead-Quinn Oil Storage Facility.

Please call me should you have any further questions, or concerns. Thank you.

Sincerely,

Rich France
Project Manager

Cc:			
	P.Hubert	YCC	Fax: 914-378-8885
	T.Larson	YCC	Fax: 914-378-8885
	Ms.Joyce Mariani	HDR	Fax: 914-993-2022
	Mr.Robert Cozzy	NYSDEC	Fax: 518-402-9773
	Mr. Robert Filkins	NYSDEC	Fax: 518-402-9773
	T.Schaad	MMN	Fax: 973-344-8155
	A.Tschantre, & M Tschantre	RES	Fax: 914-428-9763

August 27, 2003

(Via facsimile and Regular Mail)
Mr. Rich France, Project Manager
Yonkers Contracting Company, Inc,
969 Midland Avenue
PO Box 39
Yonkers NY 10704

RE: Halstead-Quinn ATI Tank Farm Project

Dear Rich,

Regarding the Halstead-Quinn ATI Tank Farm, this letter shall certify that, in accordance with OSHA Regulation 1926.850(a), the undersigned competent person has inspected the facility. All tanks have been inspected and are in sound condition and are suitable for demolition in a controlled manner. There are no other adjacent structures within the diked area.

The following hazards will be monitored:

a) Heavy equipment
b) Lead awareness
c) Controlled structure fall

Very truly yours,

Tom Schaad

Tom Schaad
Manager, Demolition
Metal Management NE, Inc

Facsimile 914-377-8484

FAXED 8-26.
3 10 pm

YONKERS CONTRACTING COMPANY, INC.

969 Midland Avenue, Yonkers, NY 10704
Tel: (914) 965-1500 Fax: (914) 378-8885

1/1

August 26, 2003

Knauf Shaw LLP
975 Crossroads Bldg.
2 State St.
Rochester, NY 14614
Tel: (585) 546-8430
Fax: (585) 546-4324

TO

Attn: Ms.Linda Shaw, Esq.

Re: Response to "DEC Comments To HDR Dated 8-25-03"
Dated August 25, 2003
Yonkers Alexander Street Redevelopment, Inc. (YASR)
Tank Demolition: Halstead-Quinn Oil Storage Facility

Dear Ms. Shaw:

With regards to the Department of Environmental Conservation's comments to Hennington, Durham & Richardson, Yonkers Contracting is responding as follows:

1) All tanks will be tested for the presence of combustible gas prior to cutting operations per Royal Environmental's Health & Safety Plan, section 13, "Combustible Gas/Oxygen Monitoring". Additionally, no sparks will be created with the use of the LaBounty shear.
2) The LaBounty shear will make initial cuts into the roof through vents. It will then "peel back these locations to allow fresh air into tanks. Ultimately, the roof will be completely peeled back, or folded into the tank to allow for controlled collapse of the tanks.
3) All tanks will be sampled. All oil, or oil-sludge samples will have two analysis performed: specifically test No. 8021, and test No. 8270. For gasoline samples, only test No. 8021 will be performed.
4) A community air monitoring program will be formally submitted tentatively Thursday, 8-28-03 by Karen Smyth Inc. In the meantime, Royal Environmental is taking air samples at 4 corners of jobsite periodically (every 2 to 3 hours), and specifically downwind to ensure clean ambient air.

Should you have any further questions, please contact Rich France at the following numbers:

Cell: (914) 403-2887
Field: (914) 377-4949
Fax: (914) 377-8484

Sincerely,

Rich France
Project Manager

Cc:	P.Hubert	YCC	Ms.Joyce Mariani	Fax: 914-993-2022
	T.Larson	YCC	Mr.Robert Cozzy	Fax: 518-402-9773
	A.Tschantre, & M.Tschantre	RES	Mr. Robert Filkins	Fax: 518-402-9773
	T.Schaad	MMN		

Yonkers Contracting Company, Inc.

Building Quality for Over 50 Years

969 Midland Avenue Yonkers, NY 10704 Tel 914 965 1500 Fax 914 378 8880

FACSIMILE COVER SHEET

PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME: Ms. Joyce Mariani, P.E.

FIRM: Henningson, Durham & Richardson

FAX #: (F)914-993-2022/(T)914-993-2000

THIS INFORMATION WAS SENT BY: Thomas R. Larson, P.E.

DATE: 08/25/03

NUMBER OF PAGES SENT: 4

RE: YASR / Halstead-Quinn Oil Storage Facility / Tank Demolition Project, Yonkers, NY

- Please see attached.

Thank you.

YONKERS CONTRACTING COMPANY, INC.

969 Midland Avenue, Yonkers, NY 10704
Tel: (914) 965-1500 Fax: (914) 378-8885

August 25, 2003

Knauf Shaw LLP
975 Crossroads Bldg.
2 State St.
Rochester, NY 14614
Tel: (585) 546-8430
Fax: (585) 546-4324

Attn: Ms.Linda Shaw, Esq.

Re: Response to "Comments on Yonkers Contracting (YCC) & Subcontractors Submittals"
Dated August 20, 2003
Yonkers Alexander Street Redevelopment, Inc. (YASR)
Tank Demolition: Halstead-Quinn Oil Storage Facility

We are pleased to respond to your original letter faxed August 20, 2003 from Knauf Shaw LLP to Yonkers Contracting Company (YCC) commenting on YCC's, and Subcontractors submittals.

1) General Comments:

a) The schedule, and sequence of events will be as follows:

- Week Ending 8-30-03: Testing, and Cleaning of Tanks
- Week Ending 9-6-03: Mobilization & Start of Tank/Piping & Wall Demolition
- Week Ending 9-13-03: Continue with Demolition
- Week Ending 9-20-03: Complete Demolition, Vacuum Lead, and Demobilize

b) Dust Control, Water Management, and Erosion Control Plan

- These plans will be forthcoming under separate cover.

2) Health & Safety Plan:

a) Toolbox meetings will be held daily.
b) MSDS sheets will be provided for all chemicals utilized on this project; however, we do not anticipate any chemical usage.
c) Karen Smyth Inc.'s Health & Safety Plan is forthcoming under separate cover.

3) Demolition Plan:

a) Method for removal of free product, etc...has been provided by Royal Environmental Corp.
b) Testing & handling of waste material, etc ...has been provided by Royal Environmental Corp.
c) YCC nor any of it's Subcontractors will disturb the existing soil. Track equipment will be utilized in demolition operations, and, will remain on the pavement surfaces, whenever possible, or the gravel surfaces (within the concrete containment walls). It is not our intention to excavate anything below existing grade(s).
d) An engineering survey has been completed by a competent person. Mr Tom Schaad, Manager of Metal Management Northeast, Inc. in accordance with OSHA 1926 850(a). A letter certifying this will be forthcoming.

YONKERS CONTRACTING COMPANY, INC.

969 Midland Avenue, Yonkers, NY 10704
Tel: (914) 965-1500 Fax: (914) 378-8885

Cont'd

e) We will protect existing monitoring wells, and recovery wells by clearly delineating them with high visibility orange barrels, and/or safety fencing to ensure that neither equipment, nor vehicles hit them. Additionally, tops of wells will be covered to ensure that no foreign matter enters wells.

f) The existing oil/water separator will be protected in the same manner as the wells listed above in item "e" to ensure that no vehicles, nor equipment run over top of underground structure potentially crushing it.

g) The method for demolition of piping and all other equipment within the containment area will be accomplished utilizing primarily a Komatsu PC400 track excavator with a LaBounty shear attached That is, most demolition will be accomplished by cutting the tanks, roof racks, or pipe. Minimal torching will be required on some portions of piping, and tanks where the LaBounty shear is too large, or cumbersome for smaller detailed work area's.

h) The method for demolition of piping on the dock will be to cut piping into manageable lengths, and drag onto shore via excavator to be loaded on to trucks, and disposed.

i) The existing adjacent structures not to be demolished will be protected in the same manner as the existing oil/water separator, or monitoring wells listed in items "e", and "f" above.

j) The destination of the demolition material, and waste will be the recycling company, Metal Management Northeast, Inc. located at the Foot of Hawkins St, Newark, NJ 07105.

k) The waste hauler on the project will also be Metal Management Northeast, Inc. located at the Foot of Hawkins St, Newark, NJ 07105.

4) Lead Procedures:

a) No abatement of cutting areas on tanks, nor pipes will be performed, as cutting will be performed, in most instances, with the LaBounty shear. In very limited area's where burning will be required, personnel will be provided with full personal protective equipment including, but not limited to respirators that have been properly fit tested to the individual, as well as lead monitoring equipment attached to the individuals person. Finally, blood level monitoring of the employees will be performed. Upon completion of demolition operations, the site will be vacuumed utilizing HEPA vac's to remove loose paint chips. These chips will be placed in 55 gallon drums, and disposed of off-site by CycleChem in Elizabeth, NJ.

b) No deteriorated paint will be scraped.

c) No wipe samples will be taken.

d) Visual inspections will be performed daily by competent person(s).

e) Testing, and handling of lead chips, if any, will be done by CycleChem in Elizabeth, NJ.

f) Negative exposure assessment plan will not be provided as it is not necessary in an open air environment. No employees will be entering tanks.

g) Medical clearance documents will be on file documenting employee(s) blood lead levels prior to working on site.

h) Naporano Iron & Metal d.b.a. Metal Management Northeast, Inc. are steel recycler's, and as such, are fully qualified, and certified to handle lead painted steel.

i) Methods for obtaining minimal disturbance of soils, etc....see item 3(c).

j) The waste hauler of steel, and demolition debris on the project will be Metal Management Northeast, Inc. located at the Foot of Hawkins St, Newark, NJ 07105. Some lead containing drums may need removal at the end of the project – this will be handled by CycleChem in Elizabeth, NJ.

YONKERS CONTRACTING COMPANY, INC.

969 Midland Avenue, Yonkers, NY 10704
Tel: (914) 965-1500 Fax: (914) 378-8885

Cont'd 3/3

5) Ambient Air Monitoring

- On site ambient air monitoring will be provided by Karen Smyth Inc.'s to ensure proper oxygen levels, CO levels, LEL's, etc...

Yonkers Contracting Company trusts that these responses have answered your questions, however, please do not hesitate to contact me should you have futher concerns, or comments. In the intrest of the local community, we look forward to a safe, successful, and expeditious project. Thank you.

Sincerely,

Thomas Larson for

Richard France
Project Manager

Attachment: Original Comments from Knauf Shaw LLP

Cc: Tom Dugan
Tom Larson
Paul Hubert
Joyce Mariani, HDR ; (F) 914-993-2022
Robert Cozzy, NYSDEC; (F) 518-402-9773
Robert Filkins, NYSDEC; (F) 518-402-9773

lew York State Department of Environmental Conservation
livision of Environmental Remediation
5 Broadway, Albany, New York 12233-7016
hone: (518) 402-9768 • FAX: (518) 402-9020
Vebsite: www.dec.state.ny.us

Erin M. Crotty
Commissioner

August 25, 2003

Joyce Mariani
Noemi Castillo
Hennington, Durham & Richardson
711 Westchester Avenue
White Plains, NY 10604-3504

Re: Halstead Quinn/ATI Tank Farm, site # B00193-3

Dear Joyce/Noemi:

NYSDEC has reviewed the Safety Program (dated 8/14/03) and the additional information provided in subsequent faxes (received 8/21/03 & 8/22/03) for the tank demolition at the Halstead Quinn/ATI tank farm in Yonkers, NY and have the following comments:

1. All tanks must be tested for the presence of combustible gas immediately before cutting operations commence.

2. Step 4 of the demolition procedure states: "Shear will then remove roof of tank which allows for the controlled fall of the tank". How will the shear remove the roof of the tank? Will the operator of the sheer be at risk due to the potential fall of the tank walls upon removal of the roof?

3. The paragraph describing the testing of residual waste material in the tanks does not include information as to what analyses the laboratory will perform on these samples.

4. A community air monitoring program must be submitted. A generic community air monitoring program in electronic format will be attached to the e-mail version of this letter for your reference.

If you have any questions you may contact me at (518) 402-9767.

Sincerely,

Robert H. Filkins

Robert H. Filkins
Project Manger
Remedial Bureau B
Division of Environmental Remediation

ec:	E. Sheeran	City of Yonkers
	L. Shaw	Knauf Shaw LLC
	D. Leibnitz	HDR
	R. Cozzy	NYSDEC

Yonkers Contracting Company, Inc.

Building Quality for Over 50 Years

969 Midland Avenue Yonkers, NY 10704 ***Tel** 914.965.1500* ***Fax** 914.378.8880*

<u>August 22, 2003 - Facsimile</u>
Ms. Joyce Mariani, P.E.
Henningson, Durham & Richardson
711 Westchester Avenue
White Plains, NY 10604-3504
(T)914-993-2000/(F)914-993-2022

RE: **Yonkers Alexander Street Redevelopment, Inc.**
Halstead-Quinn ATI Tank Farm; Tank Demolition Project, Yonkers, NY.

Dear Ms. Mariani:

Reference is made to the above project.

Enclosed for your review and approval is the work plan from Royal Environmental Services Corporation.

If you have any questions, please feel free to call me at (914)965-1500, ext. 809.

Thank you.

Sincerely,

YONKERS CONTRACTING COMPANY, INC.

Thomas R. Larson

Thomas R. Larson, P.E.
Manager, Estimating Department

w/as03/082203.doc
Attachments
cc: John Kolaya (YCC)
Paul Hubert (YCC)
John Chrysogelos (YCC)
Tom Smith (YCC)
Robert Cozzy, NYS Dept. of Environmental Conservation; (F)518-402-9773
Robert Filkins, NYS Dept. of Environmental Conservation; (F)518-402-9773
Linda Shaw, Esquire, Knauf Shaw LLC; (F)585-546-4324

Royal Environmental Services Corporation
P.O. Box 967
Pelham, NY 10803-0967
Tel 914 328 6549
Toll-Free 877-494-9153
Fax 914 428 9703
www.royalenvironmentalservices.com

ROYAL

August 22, 2003
Yonkers Contracting Company
969 Midland Ave.
Yonkers, NY 10704
914-965-1500 phone
914-387-8880 fax
Attn: Tom Larson

RE: ATI Tank Farm Demolition Project

1. Methods for draining of pipe work:
All pipe work to be disconnected will have spill containment placed under the connections. RES will be on site with a vac. truck when Yonkers Contracting removes pipe work.
2. Name of hauler and final destination of waste:
Clean Water of New York Inc. 3249 Richmond Terrace, Staten Island, NY 10303
3. Disposal of waste:
All waste to be disposed of in vac. trucks. Enclosed is a copy of a waste manifest.
4. Vapor monitoring plan:
See enclosed copy, or section 13 of Safety, Health and Emergency Plan for Royal Environmental Services
5. Equipment decontamination plan:
See enclosed copy or section 6 of Safety, Health and Emergency Plan for Royal Environmental Services
6. Spill prevention plan:
See enclosed copy or section 4 of Safety, Health and Emergency Plan for Royal Environmental Services
7. Material safety data sheets: MSDS for all chemical that will be used by RES. No chemicals will be used.
8. Containment of waste water if any:
All liquids to be in vac. trucks only. Absorbent pads will be placed around each hose fitting. Absorbent booms will be placed around each vac. truck

Thank you,

cell
914
804-3296

Marc Tschantre
Royal Environmental Services

CLEANING NSPECTION REPORT

ROYAL ENVIRONMENTAL SERVICES CORP.

Tel: 914-328-6549 • Fax: 914-428-0763
P.O. BOX 967 • PELHAM, NY 10803-0967

LOAD NO.

DATE:

NAME	DRIVER NO.

NK WASH

LAST PRODUCT	GAL'S HEEL

EQUIPMENT CONTROL

DESCRIPTION	OUT	IN	DESCRIPTION	OUT	IN
NUMBER OF 2" HOSES			TANK CLEANLINESS RATING		
NUMBER OF 3" HOSES			3 X 2 PRODUCER		
NUMBER & TYPE SPECIAL HOSES			GASKETS TEFLON OTHER		
FUSIBLE CAPS			CHRISTMAS TREE		

NOTIFY DISPATCH OF ANY DISCREPANCIES

REMARKS:

CLEANING AND INSPECTION

ALL OF THE FOLLOWING ITEMS MUST BE CLEANED

TANK INTERIOR DOME LIDS SPILL DAM	CHRISTMAS TREE CAPS GASKETS	DISCHARGE VALVLE UNLOADING LINES HOSE TUBES

CLEANED BY

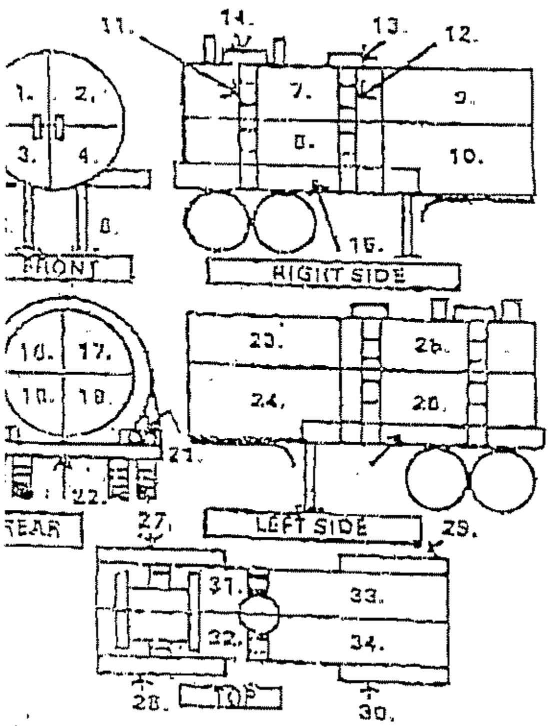
CHECKED BY

TIME

DATE

CODE	TYPE OF CLEANING OR PROCESS	COST PER COMP. 1	COST PER COMP. 2	COST PER COMP. 3	COST PER COMP. 4
40	HOOK/UNHOOK				
49	DRAIN				
51	CAUSTIC				
52	DETERGENT				
53	PRESOLVE				
54	SCRAPE				
55	STEAM				
56	HOT WATER FLUSH				
57	COLD WATER FLUSH				
58	DRY				
59	HEEL DISPOSAL FEE				
64	PUMP CLEANING				
65	HOSE & FITTING				
71	EXTERIOR WASH TRAILER				
80	TOTAL TANK WASH CHARGES				

TRAILER DAMAGE CONTROL



...es using numbers in diagram to identify location. Give brief ...of all damage using the code on the back of this form.

List all damages using numbers in diagram to identify location. Give brief description of all damage using the code on the back of this form.

TANK WASH:

Section 13

EXPOSURE/INJURY/MEDICAL SUPPORT

As a follow-up to an injury or possible exposure above established exposure limits, all employees are entitled to and encouraged to seek medical attention and medical testing. Depending upon the type of exposure, it is critical to perform follow-up testing within 24-48 hour. The RES medical consultant will advise as to the type of test required to accurately monitor for exposure effects.

EXIT MEDICAL EXAMINATION

At termination of employment or at the physician's discretion each employee shall complete an exit medical surveillance examination. The content of the examination is to be determined by the employer's medical consultant.

COMBUSTIBLE GAS/OXYGEN MONITORING

All tanks, excavation, or confined space will be monitored for the presence of combustible vapors prior to commencement and systematically throughout project operations. Such monitoring will be conducted, both in the tanks as well as the area surrounding the tanks, in accordance with standards established by the American Petroleum Institute (API). Areas will be monitored, first for oxygen content and then for lower explosive limit (LEL). Prior to monitoring for combustible gas levels, oxygen levels must be determined. The LEL will not be utilized whenever monitored oxygen levels are below 10% combustible gas meters do no operate properly whenever oxygen levels are below 10%.

All areas (top, middle, bottom) of the tanks will be tested in the event stratification of gases/vapors occurs. Periodic monitoring will be conducted to ensure the tanks' atmospheres remain below 10% LEL content until the tanks have been decontaminated or demolished. Until the tanks have been decontaminated or demolished, any oxygen monitoring of the tanks' interiors indicating reading above 10%LEL will require additional purging with inert gas until readings are below 10%LEL.

Oxygen levels will be monitored in trenches/excavations prior to allowing workers to enter such spaces, and continuously during the time the workers are present in these spaces. All areas (top,middle,bottom) of the trenches/excavations will be tested in the event stratification of gases/vapors occurs. Any reading less than 19.5% oxygen or greater than 23.5% oxygen will prevent the workers from entering until the situation is resolved and retesting indicates the space is safe for entry. Resolution of these hazardous situations may require forced ventilation of the spaces.

Section 4

Standard procedures for loading and unloading vacuum, tanker, trailer and tanks for Royal Environmental Services Corp.

1. Have emergency telephone numbers handy, Such as fire department, hospital number, spill, response and office number (914) 328-6549.
2. Have material safety data sheets (MSDS) before starting job,
3. Make sure someone else is aware of what you are doing.
4. Chuck wheels on truck front and back.
5. Ground truck is material is flammable. No smoking or open flame. Be careful of sparks and static electricity.
6. Load and unload material on spill pad if possible.
7. Check motor oil levels on engine and compressor before starting vacuum unit.
8. Make sure operator has full personal protection on. Glasses, face shield, respirator, gloves, and coveralls, according to material the truck is handling.
9. A visible check should be done at all times.
10. Any truck being loaded or unloaded must be vented and monitored. Do not over fill tank of truck.
11. There must be proper ventilation for vapors and fumes given off by truck.
12. Operator is responsible for the safe handling of loading and unloading of tankers.
13. Operator is to stay with truck at all times when it is being loaded or unloaded.
14. Off loading tanker do not exceed 20 pounds pressure?
15. In the event of leaks or spill -- close values, shut down systems contain spill, notify customer and office (914) 328-6549 -- clean up spill.
16. Trailer must be washed out when emptied.

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N / A

Manifest Doc. No.

2. Page 1 of

3. Generator's Name and Mailing Address

4. Generator's Phone ( )

5. Transporter 1 Company Name: TERRACE TRANSPORTATION

6. US EPA ID Number: N Y R 0 0 0 0 0 0 5 4 9

A. Transporter's Phone: (718) 981-4600

7. Transporter 2 Company Name

8. US EPA ID Number

B. Transporter's Phone

9. Designated Facility Name and Site Address:
CLEAN WATER OF NEW YORK, INC.
3249 RICHMOND TERRACE
STATEN ISLAND, NY 10303

10. US EPA ID Number: N / A

C. Facility's Phone: (718) 981-4600

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. NON D.O.T. NON R.C.R.A. PETROLEUM CONTAMINATED WATER	0 0 1	TT		G
b.				
c.				
d.				

D. Additional Descriptions for Materials Listed Above

E. Handling Codes for Wastes Listed Above
e) T

15. Special Handling Instructions and Additional Information

EMERGENCY RESPONSE # (877) 319-0300

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name | Signature | Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19

Printed/Typed Name | Signature | Month Day Year

GENERATOR'S COPY

12-BLS-C5 Rev. 12/98

Yonkers Contracting Company, Inc.

Building Quality for Over 50 Years

909 Midland Avenue Yonkers, NY 10704 Tel 914 965 1500 Fax 914 378 8880

FACSIMILE COVER SHEET

PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME: Ms. Joyce Mariani, P.E.

FIRM: Henningson, Durham & Richardson

FAX #: (F)914-993-2022/(T)914-993-2000

THIS INFORMATION WAS SENT BY: Thomas R. Larson, P.E.

DATE: 08/21/03

NUMBER OF PAGES SENT: 5

RE: Halstead-Quinn ATI Tank Farm Site, Yonkers, NY

- Please see attached.

Thank you.

Yonkers Contracting Company, Inc.

Building Quality for Over 50 Years 969 Midland Avenue Yonkers, NY 10704 **Tel** 914 965 1500 **Fax** 914 378 8880

<u>August 21, 2003 - Facsimile</u>
Ms. Joyce Mariani, P.E.
Henningson, Durham & Richardson
711 Westchester Avenue
White Plains, NY 10604-3504
(T)914-993-2000/(F)914-993-2022

RE: Yonkers Alexander Street Redevelopment, Inc.
Halstead-Quinn ATI Tank Farm; Tank Demolition Project, Yonkers, NY.

Dear Ms. Mariani:

Reference is made to the above project.

Enclosed for your review and approval is the response from Royal Environmental Services Corporation to HDR's comments on the work plans submitted.

If you have any questions, please feel free to call me at (914)965-1500, ext. 809.

Thank you.

Sincerely,

YONKERS CONTRACTING COMPANY, INC.

Thomas R. Larson

Thomas R. Larson, P.E.
Manager, Estimating Department

w/as03/082103.doc
Attachments
cc: John Kolaya (YCC)
Paul Hubert (YCC)
John Chrysogelos (YCC)
Tom Smith (YCC)
Robert Cozzy, NYS Dept. of Environmental Conservation; (F)518-402-9773
Robert Filkins, NYS Dept of Environmental Conservation; (F)518-402-9773
Linda Shaw, Esquire, Knauf Shaw LLC; (F)585-546-4324

Royal Environmental Services Corporation
P.O Box 967
Pelham, NY 10803-0967
Tel 914 328 6549
Toll Free 877 494-9153
Fax 914 428 9763
www.royalenvironmentalservices.com

ROYAL

August 20, 2003
Yonkers Contracting
969 Midland Ave.
Yonkers, NY 10704
914-965-1500 phone ext. 809
914-378-8880 fax
Attn: Tom Larson

Job Name: Tank demolition Halstead Quinn oil storage facility.

This letter is to answer questions regarding comments on Yonkers Contracting and subcontractor submittal.

3) Demolition plan does not include:

A. Method for removal of free product in tanks and cleaning of tanks. Royal Environmental Services (RES) will remove manhole covers on tanks, pump tanks dry using a vac. truck. RES will then enter tank using OSHA Confined space procedures to squeegee clean tanks. (Enclosed is a copy of RES Confined Space Procedures report)

B. testing and handling of waste material including laboratory. RES will enter tanks using confined space procedures to obtain a sample of the product from each tank. A chain of custody form will be filled out for each sample taken. RES will drop off each sample to JMS Environmental Services Inc. located at 1500 Summer Street, Stamford, CT 06905 (Enclosed is a copy of the chain of custody form)

Thank you,

Marc Tschantre,
Royal Environmental Services

ROYAL ENVIRONMENTAL SERVICES CORP. P.O. BOX 967, PELHAM, NY 10803-0967 • TEL: 914-328-6540 FAX: 914-428-9763

CONFINED SPACE ☐ HAZARDOUS AREA

PERMIT VALID FOR 8 HOURS ONLY. ALL COPIES OF PERMIT WILL REMAIN AT WORK SITE UNTIL JOB IS COMPLETED.

SITE LOCATION AND DESCRIPTION	DATE
PURPOSE OF ENTRY	TIME
PERSON AUTHORIZING ENTRY	DURATION

AUTHORIZED ENTRANT(S) — ATTACH LIST (IF NECESSARY)

ATTENDANTS

REQUIREMENTS COMPLETED	DATE	TIME	REQUIREMENTS COMPLETED	DATE	TIME
Lock Out/De-Energize/Tag-Out			**Lifelines**		
Line(s) Broken — Capped — Blanked			Fire Extinguishers		
Purge — Flush and Vent			Lighting (Explosive Proof)		
Ventilation			Protective Clothing		
Secure Area (Post and Flag)			Respirator(s) (Air Purifying)		
Breathing Apparatus			Burning and Welding Permit		
Resuscitator-Inhaler					
Standby Safety Personnel					
Full Body Harness with "D" Ring					
Emergency Escape Retrieval Equipment					
COMMUNICATION PROCEDURES					

NOTES: BOLD DENOTES MINIMUM REQUIREMENTS TO BE COMPLETED AND REVIEWED PRIOR TO ENTRY.
ENTER N/A OR CROSS OUT ITEMS THAT DO NOT APPLY.

TEST(S) TO BE TAKEN	PERMISSIBLE ENTRY LEVEL	DATE / TIME								
Percent of Oxygen	19.5% to 23.5%									
Lower Explosive Limit	Under 10%									
Carbon Monoxide	135 PPM									
Hydrogen Sulfide	†10PPM *15PPM									

GAS TESTER(S) NAME	CHECK #	INSTRUMENT MODEL/TYPE	SERIAL/UNIT #

REMARKS

*Short-term exposure limit: Employee can work in area up to 15 minutes.
†8 hour Time Weighted Average (TWA): Employee can work in area up to 8 hours (longer with appropriate respiratory protection).
*CONTINUOUS MONITORING REQUIRES RESULTS TO BE MONITORED EVERY 2 HOURS.

SAFETY STANDBY PERSON(S)	CHECK #	SAFETY STANDBY PERSON(S)	CHECK #

ENTRY SUPERVISOR. ALL ABOVE CONDITIONS SATISFIED	FIRE	AMBULANCE
DEPARTMENT / PHONE	Safety	Gas Coordinator

JMS ENVIRONMENTAL SERVICES INC.
1500 Summer Street Stamford, CT 06905
Telephone (203) 961-9911 Fax (203) 961-9919

Chain of Custody

Royal Environmental
518 Fayette Ave
Mamaroneck, NY 10543
Tel: 914-328-6549/ Fax 914-428-9763

Project ID ______________________

Address of Site: ______________________

____

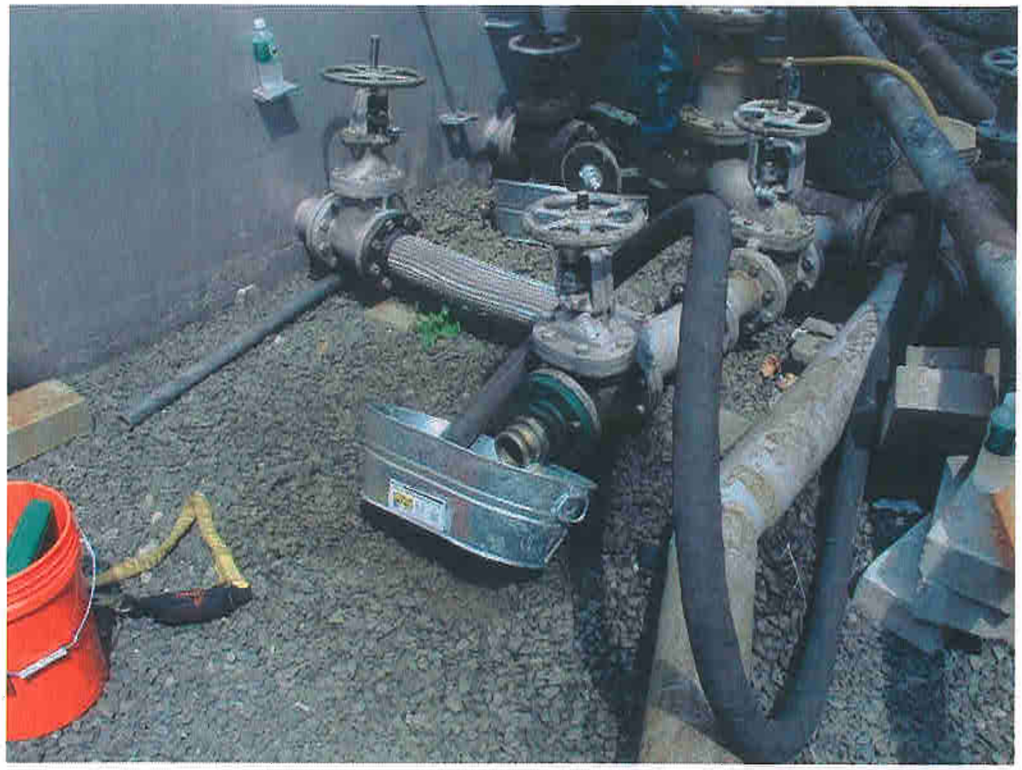
Collected by:	Relinquished by	DATE	TIME	Received by:	DATE	TIME

Sample ID NO.	Date	Time	Sample Location	Water	Soil	Analysis Requested

SPECIAL INSTRUCTIONS	COMMENTS

Appendix B

Photographic Log



Photograph 1. Containment and Vacuuming of Free Product from Associated Piping within Containment Walls

Photograph 2. Ventilation of Aboveground Storage Tank

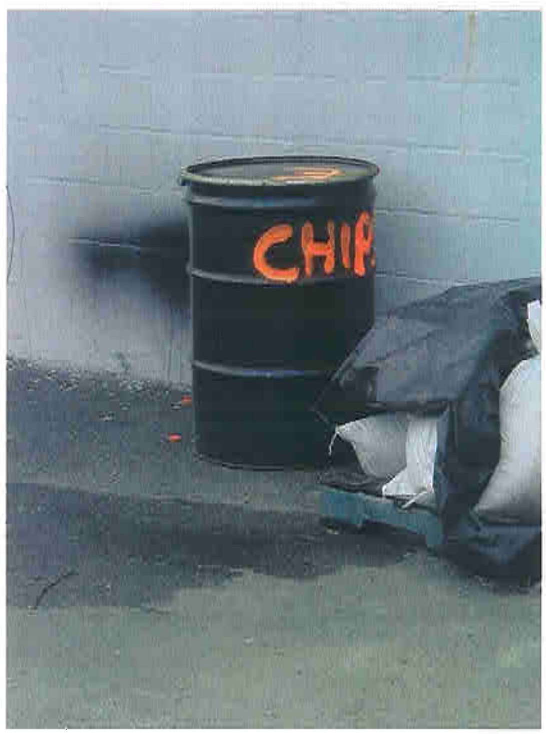
Photograph 3. Rectangular and Horizontal Welding Marks along AST #8

Photograph 4. View from Northeast Corner Prior to Demolition Commencement

Photograph 5a. Partial Demolition of AST #2

Photograph 5b. Folding and Shearing of AST #2 Sections

Photograph 6. Folded AST Sections Prepared for Removal and Disposal



Photograph 7. Containment of Lead-Based Paint Chips in 55-gallon Metal Drum

Photograph 8. Staining on Southern Side of AST #4

Photograph 9. Spill #1: Number 4 Oil Containment Unit on Eastern Side of AST #4

Photograph 10. Spill #2: Number 2 Oil Leak from Broken Piping Along Eastern Side of AST #4

Photograph 11a. Spill #3: Number 2 Oil Leak from Broken Piping Along Western Side of AST #6

Photograph 11b. Spill #3: Number 2 Oil Leak from Broken Piping Along Western Side of AST #6

Photograph 12. Beginning of Excavation of Contaminated Gravel in Spill #1 Area

Photograph 13. Containment of Contaminated Gravel from Spill #1 in 55-gallon Metal Drums

Photograph 14. Temporary Placement of Contaminated Sand in Northeast Property Corner from AST #1 False Bottom

Photograph 15. Placement of Contaminated Charcoal in Northeast Property Corner from Vapor Recovery System

Photograph 16. Piles of All Unconsolidated Contaminated Material from ASTs #1, #4, #8 False Bottoms and from Vapor Recovery System

Photograph 17a. Dock Prior to Associated Piping Demolition

Photograph 17b. Dock After Associated Piping Demolition

Photograph 18a. Western Recovery Wells Prior to Demolition Activities

Photograph 18b. Western Recovery Wells After Demolition Activities

Photograph 19a. Oil-Water Separator Prior to Demolition Activities

Photograph 19b. Oil-Water Separator After Demolition Activities

Photograph 20. Post-Demolition — View from Southeast Property Corner

Photograph 21a. Post-Demolition — View from Northeast Property Corner

Photograph 21b. Post-Demolition – View from Northeast Property Corner

Photograph 22. Post-Demolition – View from Southwest Property Corner

Photograph 23. Post-Demolition – View from Western Property Boundary

Appendix C
Yonkers Contracting Manifests

YONKERS Fax

Job No 01-928
Yonkers Joint Wastewater Treatment Plant
Disinfection System Upgrade

To: Ms. Stephanie Nakai

Fax No: (914) 993-2022 Tel: (914) 993-2000

From: Rich France

Date: 11.11.03

Subject: Tonnage of Concrete Rubble

Pages: 3, including this

- Attached are calculations on tonnage removed from site (concrete rubble).

- Please call me should you have any further questions, or concerns.

cc: P. Hubert fax: (914) 378-8885
File

Yonkers Contracting Company, Inc
Yonkers Joint Wastewater Treatment Plant
1 Fernbrook Street
Yonkers, NY 10705
Phone: 914-377-4949
Fax: 914-377-8484

3|3

Substance	Weight Lb. per Cu. Ft.	Specific Gravity
ASHLAR MASONRY		
Granite, syenite, gneiss	165	2.3-3.0
Limestone, marble	160	2.3-2.8
Sandstone, bluestone	140	2.1-2.4
MORTAR RUBBLE MASONRY		
Granite, syenite, gneiss	155	2.2-2.8
Limestone, marble	150	2.2-2.6
Sandstone, bluestone	130	2.0-2.2
DRY RUBBLE MASONRY		
Granite, syenite, gneiss	130	1.9-2.3
Limestone, marble	125	1.9-2.1
Sandstone, bluestone	110	1.8-1.9
BRICK MASONRY		
Pressed brick	140	2.2-2.3
Common brick	120	1.8-2.0
Soft brick	100	1.5-1.7
CONCRETE MASONRY		
Cement, stone, sand	144	2.2-2.4
Cement, slag, etc.	130	1.9-2.3
Cement, cinder, etc.	100	1.5-1.7
VARIOUS BUILDING MATERIALS		
Ashes, cinders	40-45	——
Cement, portland, loose	90	——
Cement, portland, set	183	2.7-3.2
Lime, gypsum, loose	53-64	——
Mortar, set	103	1.4-1.9
Slags, bank slag	67-72	——
Slags, bank screenings	98-117	——
Slags, machine slag	96	——
Slags, slag sand	49-55	——
EARTH, ETC., EXCAVATED		
Clay, dry	63	——
Clay, damp, plastic	110	——
Clay and gravel, dry	100	——
Earth, dry, loose	76	——
Earth, dry, packed	95	——
Earth, moist, loose	78	——
Earth, moist, packed	96	——
Earth, mud, flowing	108	——
Earth, mud, packed	115	——
Riprap, limestone	80-85	——
Riprap, sandstone	90	——
Riprap, shale	105	——
Sand, gravel, dry, loose	90-105	——
Sand, gravel, dry, packed	100-120	——
Sand, gravel, wet	118-120	——
EXCAVATIONS IN WATER		
Sand or gravel	60	——
Sand or gravel and clay	65	——
Clay	80	——
River mud	90	——
Soil	70	——
Stone riprap	65	——
MINERALS		
Asbestos	153	2.1-2.8
Barytes	281	4.50
Basalt	184	2.7-3.2
Bauxite	159	2.55
Borax	109	1.7-1.8
Chalk	137	1.8-2.6
Clay, marl	137	1.8-2.6
Dolomite	181	2.9
Feldspar, orthoclase	159	2.5-2.6
Gneiss, serpentine	159	2.4-2.7
Granite, syenite	175	2.5-3.1
Greenstone, trap	187	2.8-3.2
Gypsum, alabaster	159	2.3-2.8
Hornblende	187	3.0
Limestone, marble	165	2.5-2.8
Magnesite	187	3.0
Phosphate rock, apatite	200	3.2
Porphyry	172	2.6-2.9
Pumice, natural	40	0.37-0.90
Quartz, flint	165	2.5-2.8
Sandstone, bluestone	147	2.2-2.5
Shale, slate	175	2.7-2.9
Soapstone, talc	169	2.6-2.8
STONE, QUARRIED, PILED		
Basalt, granite, gneiss	96	——
Limestone, marble, quartz	95	——
Sandstone	82	——
Shale	92	——
Greenstone, hornblende	107	——
BITUMINOUS SUBSTANCES		
Asphaltum	81	1.1-1.5
Coal, anthracite	97	1.4-1.7
Coal, bituminous	84	1.2-1.5
Coal, lignite	78	1.1-1.4
Coal, peat, turf, dry	47	0.65-0.85
Coal, charcoal, pine	23	0.28-0.44
Coal, charcoal, oak	33	0.47-0.57
Coal, coke	75	1.0-1.4
Graphite	131	1.9-2.3
Paraffine	56	0.87-0.91
Petroleum	54	0.87
Petroleum, refined	50	0.79-0.82
Petroleum, benzine	46	0.73-0.75
Petroleum, gasoline	42	0.66-0.69
Pitch	69	1.07-1.15
Tar, bituminous	75	1.20
TOP & BINDER	117#/in SY	
COAL AND COKE, PILED		
Coal, anthracite	47-58	——
Coal, bituminous, lignite	40-54	——
Coal, peat, turf	20-26	——
Coal, charcoal	10-14	——
Coal, coke	23-32	——
BCBC	110#/in SY	

The specific gravities of solids and liquids refer to water at 4°C., those of gases to air at 0°C. and 760 mm. pressure. The weights per cubic foot are derived from average specific gravities, except where stated that weights are for bulk, heaped or loose material, etc.

SOURCE: *Manual of Steel Construction*, 7th ed., American Institute of Steel Construction, Chicago, Ill., 1973.

YONKERS CONTRACTING COMPANY, INC
969 MIDLAND AVENUE · YONKERS · NEW YORK · 10704
914-965-1500

JOB Halstead - Quinn ATI Tank Farm
SHEET NO 2 OF 3
CALCULATED BY RW France DATE 1.11-03
CHECKED BY — DATE —
SCALE —

Concrete Rubble Load Out

DATE		# of Loads x Avg / Load	QTY (CY)
Monday	9.22.03	5 dump trailers x 30 cy/load	150 CY.
Tuesday	9.23.03	8 dump trailers x 30 cy/load	240 CY.
Wednesday	9.24.03	4 dump trailers x 30 cy/load	120 CY.
Thursday	9.25.03	2 dump trailers x 30 cy/load	60 CY.

$\Sigma \longrightarrow 570^{cy}$

$570^{cy} \times 27^{cf}/_{cy} = 15{,}390\ cf \times 125^{lb}/cf = 1{,}923{,}750^{lb}$

$1{,}923{,}750^{lb} \div 2000\ lb/ton = 961^{88} \approx \underline{962\ \text{TONS}}$

Notes: ① 35^{cy} Dump Trailer Was Assumed To Carry 30^{cy}/Load +/- (ie. reduction due to air voids)

② Concrete Rubble Assumed to weigh 125^{lb}/cf Per Attached Table

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 3
21 South Putt Corners Road, New Paltz, New York 12561-1696
Phone: (845) 256-3112 • FAX: (845) 255-2987
Website: www.dec.state.ny.us

September 23, 2003
Marc Tschantre
Royal Environmental Services
PO Box 967
Pelham, NY 10803

Faxed

RE: Spill # 0306169 and your letter dated September 22, 2003

Dear Mr. Tschantre,

Based on the information supplied by you in the above mentioned letter and the fact that existing spill numbers are to effect spill # 0306169 is considered closed and no further action is required on this spill #

Very truly yours

John K. O'Mara, P.E.
Environmental Engineer II

p.8

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"Regulatory & Compliance - Publications, Products & Services"

RAIGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No. 3B 431

Carrier's No. 1901

...e of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP
PO Box 967 - Pelham, NY 10803-0967

SCAC

Tank # 6

At __________ Date 8/27/03 From RTI 91 Alexander Av. Yonkers

Consigned to: Clean Water of NY

(Mail or street address of consignee — For purposes of notification only.)

Destination: 3249 Richmond Terrace, State: NY, County: Staten Island, Zip: 10303

Delivery Address*: Same

Route

(*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat.)

Delivering Carrier

Car or Vehicle Initials: T-12 VDC #2

No. Tank # 6

Number of Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*Weight (Sub. to Correction)	Class or Rate	Check Column
	5240 gallons of #2 oil			
	& sludge combustible			
	liquid NA 1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here "To be Prepaid"

Received $ __________ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per __________ (The Signature here acknowledges only the amount prepaid.)

Charges Advanced: $

...ct On Delivery $ | and remit to | C.O.D. Charge to be paid by: Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding __________ per __________

"This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."

Per

HM EMERGENCY RESPONSE TELEPHONE NUMBER 914 320-6577

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604).

Shipper. Per __________ 1 __________ Agent. Per __________

Permanent post-office address of shipper

FORM NO 1 BLS (Rev 10/91)

.AIGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No 38431

RECEIVED subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Original Bill of Lading.

(Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP
PO Box 967 - Pelham, NY 10803-0967
SCAC
Carrier's No 1902
Tank # 7

At ______ Date 8/27/03 From DTI 91 Alexander Ave Yonkers NY

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or lawfully filed tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to (Mail or street address of consignee — For purposes of notification only.)
Clean Water of NY

Destination 3249 Richmond Terrace State Staten Island County NY Zip 10303
Delivery Address* Same
Route
(*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat.)

Delivering Carrier ______ Car or Vehicle Initials TR vac # 2 No: Tank # 7

Number of Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*Weight (Sub. to Correction)	Class or Rate	Check Column
	290 gallons of # 2 oil			
	& Sludge combustible			
	liquid NA - 1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here, "To be Prepaid"

Received $ ______
to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per ______
(The Signature here acknowledges only the amount prepaid.)

Charges Advanced:

$ ______

Collect On Delivery $ ______ and remit to ______

C.O.D Charge to be paid by Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______ per ______

Where the applicable tariff provisions specify a limitation of the carrier's liability (NMFC Item 172), a mark is an indication of value declared by the shipper and the shipper does not declare a value of release the carrier's liability, that liability shall be limited to the extent provided by NMFC Item 172. Exclusions interstate shipments must comply with NMFC Item 173.

"This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."

Per ______

HM EMERGENCY RESPONSE TELEPHONE NUMBER 914 320-6545

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172 604).

______ Shipper, Per ______ 1 ______ Agent Per ______

Permanent post-office address of shipper.

FORM NO 1 BLS (Rev 10/91)

IGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No. 3D 431

(Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP SCAC Carrier's No NO 1903

PO Box 967 - Pelham, NY 10803-0967

Tank # 8

At Date 8/27/03 From ATI 91 Alexander Ave Yonkers NY

Consigned to Clear Water of NY (Mail or street address of consignee — For purposes of notification only.)

Destination 3249 Richmond Terrace State County Zip Staten Island NY 10303 Delivery Address* Same

Route

(*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat.)

Delivering Carrier | Car or Vehicle Initials T-12 Vac # 2 | No: Tank # 8

Number of Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS AND EXCEPTIONS	*Weight (Sub. to Correction)	Class or Rate	Check Column
	815 gallons of # 2 oil			
	& Sludge Combustible			
	liquid NA-1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here "To be Prepaid"

Received $ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per (The Signature here acknowledges only the amount prepaid.)

Charges Advanced:

$

Collect On Delivery $ | and remit to | C.O.D. Charge to be paid by Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______ per ______

"This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."

Per

HM EMERGENCY RESPONSE TELEPHONE NUMBER 914 320-6545

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604).

Shipper, Per ______ 1 ______ Agent, Per ______

Permanent post-office address of shipper

FORM NO 1 SLS (Rev 10/91)

AIGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No. 31-431

No 19061

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Original Bill of Lading

(Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP
PO Box 967 - Pelham, NY 10803-0967 SCAC ______ Carrier's No. Tank # 9

At ______ Date 8/27/03 From ATI 91 Alexander Ave Yonkers NY

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to Clean Water of New York (Mail or street address of consignee — For purposes of notification only.)

Destination 3249 Richmond Terrace State Staten Island County ______ Zip NY 11303 Delivery Address* Same

Route ______ (*To be filled in only when shipper desires and governing tariffs provide for delivery thereat.)

Delivering Carrier ______ Car or Vehicle Initials T12 Vac # 2 No. Tank # 9

Number of Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS AND EXCEPTIONS	*Weight (Sub. to Correction)	Class or Rate	Check Column
	270 gallons of diesel			
	& Sludge Combustible liquid			
	NA- 1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

______ (Signature of Consignor)

If charges are to be prepaid, write or stamp here "To be Prepaid".

Received $ ______ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per ______ (The Signature here acknowledges only the amount prepaid.)

Charges Advanced:

$ ______

Collect On Delivery $ ______ and remit to ______

C O D Charge to be paid by Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______ per ______

Where the applicable tariff provisions specify a limitation of the carrier's liability absent a release or a value declaration by the shipper and the shipper does not release the carrier's liability or declare a value, the carrier's liability shall be limited to the extent provided by such provisions. See NMFC Item 172. Commodities requiring special or additional care or attention in handling or stowing must be so marked and packaged as to ensure safe transportation with ordinary care. See Sec. 2(e) of NMFC Item 360.

"This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per ______

HM EMERGENCY RESPONSE TELEPHONE NUMBER 914 328-6549

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604)

______ Shipper, Per ______ 1 ______ Agent, Per ______

Permanent post-office address of shipper

FORM NO. 1 BLS (Rev. 10/91)

AIGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No. 3A-431

Carrier's No. № 1907

(Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP
PO Box 967 - Pelham, NY 10803-0967

SCAC TORCH 10

At ______ Date 8/27/03 From ATI 91 Alexander Ave Yonkers

Consigned to Clean Water of NY (Mail or street address of consignee — For purposes of notification only.)

Destination 3249 Richmond Terrace State County Zip Staten Island NY 10303 Delivery Address* Same

Route

(*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat.)

Delivering Carrier ______ Car or Vehicle Initials T-12 Vac #2 No. TORCH #10

Number of Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*Weight (Sub. to Correction)	Class or Rate	Check Column
	350 gallons of #2 oil			
	& Sludge Combustible Liquid			
	NA - 1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here "To be Prepaid"

Received $ ______ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per ______ (The Signature here acknowledges only the amount prepaid.)

Charges Advanced

$ ______

Collect On Delivery $ | and remit to | C.O.D. Charge to be paid by Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______ per ______

Where the applicable tariff provisions specify a limitation of the carrier's liability (NMFC Item 172), ... California intrastate shipments must comply with NMFC Item 173.

*This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per ______

HM EMERGENCY RESPONSE TELEPHONE NUMBER (914) 328-6545

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604).

______ Shipper Per ______ 1 ______ Agent Per ______

Permanent post-office address of shipper

FORM NO. 1 BLS (Rev 10/91)

STRAIGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No. 30-431
Carrier's No. No 1909

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Original Bill of Lading,

(Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP
PO Box 967 - Pelham, NY 10803-0967
SCAC Trk # 11

At ______ Date 8/27/03 From ATI 91 Alexander Ave Yonkers NY

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or a rail water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to Clean Water of NY (Mail or street address of consignee — For purposes of notification only.)

Destination 3249 Richmond Terrace State Staten Island NY County Zip Delivery Address*

Route (*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat.)

Delivering Carrier ______ Car or Vehicle Initials T-12 VAC #2 No. Trk # 11

Number of Packages	Kind of Package, Description of Articles, Special Marks, and Exceptions	*Weight (Sub. to Correction)	Class or Rate	Check Column
	415 gallons of #2 oil			
	& sludge combustible			
	liquid NA- 1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here "To be Prepaid"

Received $ ______ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per ______ (The Signature here acknowledges only the amount prepaid.)

Charges Advanced:

$ ______

Collect On Delivery $ | and remit to | C.O.D. Charge to be paid by Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______ per ______

Where the applicable tariff provisions specify a limitation of the carrier's liability (NMFC Item 172), if there is no selection or there is a selection by the shipper, and the shipper does not declare a value to release the carrier's liability, then liability shall be limited to the extent provided by NMFC Item 172. Otherwise limitations on shipments must comply with NMFC Item 172.

"This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."

Per

HM EMERGENCY RESPONSE TELEPHONE NUMBER (914) 328-6549

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604).

______ Shipper, Per ______ 1 ______ Agent, Per ______

Permanent post-office address of shipper.

FORM NO. 1 BLS. (Rev. 10/91)

'RAIGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No 30-431

Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP
PO Box 967 - Pelham, NY 10803-0967

SCAC. Tank 12

Carrier's No No 1910

At Date 8/27/03 From [illegible]

Consigned to Clear Water of NY

(Mail or street address of consignee — for purposes of notification only)

Destination 3249 Richmond Terrace State Staten Island NY County Zip 10303

Delivery Address* Same

Route

(*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat)

Delivering Carrier

Car or Vehicle Initials T-12 Vac #2 No. Tank # 12

Number of Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*Weight (Sub. to Correction)	Class or Rate	Check Column
	345 gallons of #2 oil			
	& sludge combustible			
	liquid NA- 1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here, "To be Prepaid"

Received $
to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per
(The Signature here acknowledges only the amount prepaid.)

Charges Advanced:
$

Collect On Delivery $ | and remit to

C O D Charge to be paid by Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______ per ______

"This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."

Per

HM EMERGENCY RESPONSE TELEPHONE NUMBER (914) 320-6594

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604)

Shipper Per ______ 1 ______ Agent. Per ______

Permanent postoffice address of shipper.

FORM NO 1 BLS (Rev 10/91)

STRAIGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No. 3A-431

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Original Bill of Lading.

(Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP SCAC ______ Carrier's No. No. 1911

PO Box 967 - Pelham, NY 10803-0967 Tank # 15

At ______ Date 8/28/03 From ATI 91 Bleaker Ave Yonkers NY

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to (Mail or street address of consignee — For purposes of notification only.)
Clear Water of NY

Destination State County Zip Delivery Address*
3249 Richmond Terrace Staten Island NY 10303 Same

Route (*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat.)

Delivering Carrier ______ Car or Vehicle Initials Tr12 VOC # 2 No. Tank # 15

Number of Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*Weight (Sub. to Correction)	Class or Rate	Check Column
	310 gallons of Petroleum oil & H2O			
	#2 oil & Sludge Combustible			
	liquid NA-1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here "To be Prepaid"

Received $ ______ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per ______
(The Signature here acknowledges only the amount prepaid.)

Charges Advanced:

$ ______

Collect On Delivery $ | and remit to | C.O.D. Charge to be paid by Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______ per ______

Where the applicable tariff provisions specify a limitation of the carrier's liability (NMFC Item 172), if there is no release or value declaration by the shipper, and the shipper does not release a value or conveys the carrier's liability, that liability shall be limited to the extent provided by NMFC Item 172. California intrastate shipments must comply with NMFC Item 172.

"This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."

Per ______

HM EMERGENCY RESPONSE TELEPHONE NUMBER (914) 328-6547

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604)

______ Shipper, Per ______ 1 ______ Agent, Per ______

Permanent post-office address of shipper

FORM NO 1 BLS (Rev. 10/91)

STRAIGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No. 3A 431

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of the Original Bill of Lading

(Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP
PO Box 967 - Pelham, NY 10803-0967

SCAC ____ Carrier's No. No 1914

At ____ Date 9-15-03 From tank #16 API 91 AlexOrder Ave Yonkers, ny

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to Clean Water of ny
(Mail or street address of consignee — For purposes of notification only.)

Destination 3249 Richmond Terrace State County Staten Island Zip ny 10303

Delivery Address* Same
(*To be filled in only when shipper desires and governing tariffs provide for delivery thereat.)

Route ____

Delivering Carrier ____ Car or Vehicle Initials T-12 VAC #2 No. tank #16

Number of Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*Weight (Sub. to Correction)	Class or Rate	Check Column
1	205 gallons of Petroleum			
	Additive, #2 oil & Sludge			
	Combustible liquid NA 1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here "To be Prepaid"

Received $ ____ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per ____
(The Signature here acknowledges only the amount prepaid.)

Charges Advanced:
$ ____

Collect On Delivery $ ____ and remit to ____

C.O.D. Charge to be paid by Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ____ per ____

Where the applicable tariff provisions specify a limitation of the carrier's liability (RMFC Item 172), if there is no release or value declaration by the shipper and the shipper does not release the carrier's liability, the liability shall be limited to the extent provided by RMFC Item 172. California intrastate shipments must comply with RMFC Item 173.

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per ____

HM EMERGENCY RESPONSE TELEPHONE NUMBER 914-325-4549
Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604)

____ Shipper. Per ____ 1 ____ Agent Per ____

Permanent post office address of shipper

FORM NO. 1 BLS (Rev. 10/91)

...AIGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No 34-431

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Original Bill of Lading.

(Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP PO Box 967 - Pelham, NY 10803-0967 SCAC

Carrier's No № 1915

At Date 9-19-03 From A.T.I 91 Alexander Ave Yonkers, ny

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier ... agrees to carry to its usual place of delivery at said destination ... [illegible]

Consigned to Clean Water

(Mail or street address of consignee — For purposes of notification only.)

Destination 3249 Richmond Terrace State Staten Island County ny Zip 10303

Delivery Address* Same

Route

(*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat.)

Delivering Carrier

Car or Vehicle Initials T12 VAC #2 No. miscellaneous pipes

Number of Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*Weight (Sub. to Correction)	Class or Rate	Check Column
	2745 gallons of gas, #2 oil			
	water & sludge combustible			
	liquid NA-1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here "To be Prepaid"

Received $ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per

(The Signature here acknowledges only the amount prepaid.)

Charges Advanced:

$

Collect On Delivery $ | and remit to

C.O.D. Charge to be paid by Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.

NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ________ per ________

Where the applicable tariff provisions specify a limitation of the carrier's liability ... [illegible]

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per

HM EMERGENCY RESPONSE TELEPHONE NUMBER 914-328-6547

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604).

Shipper, Per ________ Agent, Per ________

Permanent post-office address of shipper.

FORM NO. 1 BLS (Rev 10/91)

1

[illegible]GHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No. 3A-4131

No. 18611

Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP
PO Box 967 - Pelham, NY 10803-0967

SCAC ______ Carrier's No. TANK # 1

Date 8/25/03 From ATI 91 Alexander Ave Yonkers NY

Consigned to Clean Water of New York (Mail or street address of consignee — For purposes of notification only.)

Destination 3249 Richmond Terrace Staten Island NY 10303 State County Zip

Delivery Address* Same

(*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat.)

Route

Delivering Carrier

Car or Vehicle Initials T-12 Vac #2

No. Tank # 1

Number of Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*Weight (Sub. to Correction)	Class or Rate	Check Column
	28,905 gallons of Gasoline			
	& Water combustible liquid			
	NA- 1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here "To be Prepaid"

Received $ ______ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per ______
(The Signature here acknowledges only the amount prepaid.)

Charges Advanced

$ ______

Collect On Delivery $ | and remit to

C.O.D. Charge to be paid by: Shipper ☐ Consignee ☐

If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______ per ______

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per

HM EMERGENCY RESPONSE TELEPHONE NUMBER 914 328-6549

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604)

______ Shipper, Per ______ 1 ______ Agent, Per ______

Permanent post-office address of shipper.

FORM NO. 1 BLS (Rev. 10/91)

STRAIGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No. SIB-431

No 1862

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Original Bill of Lading

(Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP SCAC ______ Carrier's No.
PO Box 967 - Pelham, NY 10803-0967

Tank # 2

At ______ Date 9/2/03 From ATI 51 Alexander Ave Yonkers NY

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier ... agrees to carry to its usual place of delivery at said destination ... Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading ... hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to (Mail or street address of consignee — For purposes of notification only)
Clean Water of NY

Destination: 3249 Richmond Terrace — State: Staten Island NY — County — Zip: 10303 — Delivery Address*: Same

Route

(*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat)

Delivering Carrier ______ Car or Vehicle Initials T-12 Vacuum No. Tank # 2

Number of Packages	Kind of Package, Description of Articles, Special Marks, and Exceptions	*Weight (Sub. to Correction)	Class or Rate	Check Column
	1105 gallons of Gasoline			
	& Water Combustible Liquid			
	NA- 1993			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here, "To be Prepaid"

Received $ ______ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per ______
(The Signature here acknowledges only the amount prepaid.)

Charges Advanced:
$ ______

Collect On Delivery $ ______ | and remit to ______ | C.O.D. Charge to be paid by: Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______ per ______

Where the applicable tariff provisions specify a limitation of the carrier's liability (NMFC Item 172), ... to the extent provided by NMFC Item 172. Carriers must comply with NMFC Item 173.

"This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per ______

HM EMERGENCY RESPONSE TELEPHONE NUMBER 914 328-6549
Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604)

______ Shipper, Per ______ 1 ______ Agent, Per ______

Permanent post-office address of shipper.

FORM NO 1 BLS (Rev 10/91)

(STRAI)GHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No. 3D 931

No. 1863

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Original Bill of Lading

(Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP
PO Box 967 - Pelham, NY 10803-0967

SCAC ______ Carrier's No. Tank # 4

At ______ Date 8/27/03 From ATI 91 Alexander Ave Yonkers NY

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or lawfully filed tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or lawfully filed tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to (Mail or street address of consignee - - For purposes of notification only.)
Clean Water of NY

Destination 3249 Richmond Terrace State Staten Island County NY Zip 10303 Delivery Address* Same

Route

(*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat.)

Delivering Carrier ______ Car or Vehicle Initials T-12 Vac # 2 No. Tank # 4

Number of Packages	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS AND EXCEPTIONS	*Weight (Sub. to Correction)	Class or Rate	Check Column
	800 gallons of #2 oil			
	& Sludge NA- 1993 Combustible			
	liquid			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

______ (Signature of Consignor)

If charges are to be prepaid write or stamp here, "To be Prepaid."

Received $ ______ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per ______ (The Signature here acknowledges only the amount prepaid.)

Charges Advanced: $ ______

Collect On Delivery $ ______ and remit to ______

C O D Charge to be paid by Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______ per ______

Where the applicable tariff provisions specify a limitation of the carrier's liability (NMFC Item 172) ...

*This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Per ______

HM EMERGENCY RESPONSE TELEPHONE NUMBER 914 328-6549

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604).

______ Shipper, Per ______ 1 ______ Agent, Per ______

Permanent post-office address of shipper.

FORM NO. 1 BLS (Rev. 10/91)

AIGHT BILL OF LADING — SHORT FORM — Original — Not Negotiable

Shipper's No. 3D-431

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Original Bill of Lading,

(Name of Carrier) ROYAL ENVIRONMENTAL SERVICES CORP. SCAC ______ Carrier's No. № 1864

PO Box 967 - Pelham, NY 10803-0967

Talk # 5

At ______ Date 8/27/03 From ATI 91 Alexander Ave Yonkers NY

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to Clean Water of NY (Mail or street address of consignee — For purposes of notification only.)

Destination 3249 Richmond Terrace State Staten Island NY County Zip 10313 Delivery Address* Same

Route (*To be filled in only when shipper desires and governing lawfully filed tariffs provide for delivery thereat.)

Delivering Carrier ______ Car or Vehicle Initials T-12 Vac #2 No. Talk # 5

Number of Packages	Kind of Package, Description of Articles, Special Marks, and Exceptions	*Weight (Sub. to Correction)	Class or Rate	Check Column
	195 gallons of diesel			
	& ~~sludge~~ sludge NA-1993			
	Combustible liquid			

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid write or stamp here "To be Prepaid"

Received $ ______ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per ______
(The Signature here acknowledges only the amount prepaid.)

Charges Advanced
$ ______

Collect On Delivery $ ______ and remit to ______

C.O.D. Charge to be paid by Shipper ☐ Consignee ☐

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______ per ______

Where the applicable tariff provisions specify a limitation of the carrier's liability (NMFC Item 172), if there is no release or value declaration by the shipper, and the shipper does not disclaim a value or release the carrier's liability, that liability shall be limited to the extent provided in NMFC Item 172. California intrastate shipments must comply with NMFC Item 172.

"This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."

Per ______

HM EMERGENCY RESPONSE TELEPHONE NUMBER (914) 328-6545

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604).

______ Shipper, Per ______ 1 ______ Agent, Per ______

Permanent post-office address of shipper

FORM NO 1 BLS (Rev 10/91)

State of New Jersey
Department of Environmental Protection
Hazardous Waste Regulation Program
Manifest Section
P.O. Box 414, Trenton, NJ 08625-0414

5009193

Please print or type in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Document No.

2. Page 1 of

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address

A. State Manifest Document Number NJA 5009193

B. State Generator's ID (Gen. Site Address)

4. Generator's Phone

5. Transporter 1 Company Name

6. US EPA ID Number

C. State Trans. ID NJDEP 55811

D. Decal No.

E. Transporter's Phone (908) 355-5800

7. Transporter 2 Company Name

8. US EPA ID Number

F. State Trans. ID NJDEP

Decal No.

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address

10. US EPA ID Number

G. State Facility's ID

H. Facility's Phone

11. US DOT Description (Including Proper Shipping Name, Hazard Class or Division, ID Number and Packing Group) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.					
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
... scales from tanks 100%

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

ERG# 171

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

KOYAL

Log Number

ALLIED WASTE SERVICES, INC.

2153 MERRICK AVE., MERRICK, NY 11566 • TEL: 1-800-969-DIRT • FAX: 516-867-8480

NON-HAZARDOUS MATERIAL MANIFEST

GENERATOR

Generator Name Yonkers Alexander Redev Inc

Shipping Location SAME

Address Alexander Avenue

Yonkers NY

Address

Phone No.

Phone No.

Codes

Description of Material

Approval Number	Description of Material	Gross Weight / Tare Weight / Net Weight	Net Weight (Tons)
	NON HAZARDOUS CONTAMINATED SOIL DESTINED FOR RECYCLING		

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, is not a DOT hazardous substance as defined by 49 CFR Part 172 or any applicable state law, has been fully and accurately described above, classified, packaged and is in proper condition for transportation according to applicable regulations.

Agent As Generator

Generator Authorized Agent Name

Signature

9.24.03

Shipment Date

TRANSPORTER

Transporter Name Leticia Inc

Driver Name (Print) Javier R

Address

Vehicle License No./State AG 310T

Hillside NJ

Truck Number 102

State Permit # NJ 593

I hereby certify that the above named material was picked up at the generator site listed above.

Driver Signature

9-24-03.

Shipment Date

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature

9-24-03

Delivery Date

DESTINATION

Site Name CLEAN EARTH OF CARTERET

Phone No.

Address ~~24 MIDDLESEX AVENUE~~ CARTERET, NJ

State Permit # ~~1201-96~~ 0001-2

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing ... e and accurate.

Name of Authorized Agent

Signature

Receipt Date

FACILITY

Log Number ROYAL

ALLIED WASTE SERVICES, INC.

53 MERRICK AVE., MERRICK, NY 11566 • TEL: 1-800-969-DIRT • FAX: 516-867-8480

NON-HAZARDOUS MATERIAL MANIFEST

GENERATOR

Generator Name: YONKERS ALEXANDER-REDEV   Shipping Location: SAME

Address: ALEXANDER AVENUE, YONKERS, NY   Address:

Phone No.   Phone No.

Codes

Approval Number	Description of Material	Gross Weight / Tare Weight / Net Weight	Net Weight (Tons)
	NON HAZARDOUS CONTAMINATED SOIL DESTINED FOR RECYCLING		

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, is not a DOT hazardous substance as defined by 49 CFR Part 172 or any applicable state law, has been fully and accurately described above, classified, packaged and is in proper condition for transportation according to applicable regulations.

His Agent for Generator — Generator Authorized Agent Name
[signature] — Signature
9-24-03 — Shipment Date

TRANSPORTER

Transporter Name: LETICIA   Driver Name (Print): CARLOS ALARCON

Address: HILLSIDE, NJ   Vehicle License No./State: AG731B

Truck Number: #221

State Permit #: NJ 593

I hereby certify that the above named material was picked up at the generator site listed above.

Carlos Alarcón — Driver Signature
9-24-03 — Shipment Date

I hereby certify that the above named material was delivered without incident to the destination listed below.

Carlos Alarcón — Driver Signature
9-24-03 — Delivery Date

DESTINATION

Site Name: CLEAN EARTH OF CARTERET   Phone No.

Address: 24 MIDDLESEX AVENUE, CARTERET, NJ   State Permit #: 1201-96 CC01-2

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

Name of Authorized Agent   Signature   Receipt Date

FACILITY

ALLIED WASTE SERVICES, INC.

2163 MERRICK AVE., MERRICK, NY 11566 • TEL: 1-800-969-DIRT • FAX 516-867-6480

NON-HAZARDOUS MATERIAL MANIFEST

GENERATOR

Generator Name ~~YONKERS ALEXANDER-REDEV INC~~ Shipping Location SAME

Address ~~ALEXANDER AVENUE~~ Address

~~YONKERS, NY~~

Phone No Phone No

Approval Number	Description of Material	Codes	Gross Weight / Tare Weight / Net Weight	Net Weight (Tons)
	NON HAZARDOUS CONTAMINATED SOIL DESTINED FOR RECYCLING			

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, is not a DOT hazardous substance as defined by 49 CFR Part 172 or any applicable state law, has been fully and accurately described above, classified, packaged and is in proper condition for transportation according to applicable regulations.

has acct- for generator 9.24.03

Generator Authorized Agent Name Signature Shipment Date

TRANSPORTER

Transporter Name LEUCIA, INC. Driver Name (Print) CARLOS ALARCON

Address Vehicle License No./State AC 731

HILLSIDE, NJ Truck Number #221

State Permit # NJ 593

I hereby certify that the above named material was picked up at the generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below.

Carlos Alarcon 9-24-03 Carlos Alarcon 9-24-03

Driver Signature Shipment Date Driver Signature Delivery Date

DESTINATION

Site Name CLEAN EARTH OF CARTERET Phone No

Address 24 MIDDLESEX AVENUE CARTERET NJ State Permit # 1201-96 0001-2

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate

Name of Authorized Agent Signature Receipt Date

YCC copy

ROYAL

ALLIED WASTE SERVICES, INC.

2153 MERRICK AVE., MERRICK, NY 11566 • TEL: 1-800-989-DIRT • FAX: 516-867-6480

NON-HAZARDOUS MATERIAL MANIFEST

GENERATOR

Generator Name YONKERS ALEXANDER-REDEV DHO Shipping Location SAME

Address ~~ALEXANDER AVENUE~~ Address

~~YONKERS, NY~~

Phone No Phone No.

Approval Number	Description of Material	Codes	Gross Weight / Tare Weight / Net Weight	Net Weight (Tons)
	NON HAZARDOUS CONTAMINATED SOIL DESTINED FOR RECYCLING			

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, is not a DOT hazardous substance as defined by 49 CFR Part 172 or any applicable state law, has been fully and accurately described above, classified, packaged and is in proper condition for transportation according to applicable regulations.

As agent for generator 9.24.03

Generator Authorized Agent Name Signature Shipment Date

TRANSPORTER

Transporter Name LETICIA INC. Driver Name (Print) JAVIER RODREGUAZ

Address HILLSIDE, N.J. Vehicle License No./State AG 310T

Truck Number 102

State Permit # NJ593

I hereby certify that the above named material was picked up at the generator site listed above.

9.24.03

Driver Signature Shipment Date

I hereby certify that the above named material was delivered without incident to the destination listed below.

9.24.03

Driver Signature Delivery Date

DESTINATION

Site Name CLEAN EARTH OF CARTERET Phone No

Address 24 MIDDLESEX AVENUE CARTERET NJ State Permit # 1201-96 0001-2

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

Name of Authorized Agent Signature Receipt Date

FACILITY

CLEAN EARTH OF CARTERET, INC
24 Middlesex Avenue
Carteret, NJ 07008
(732)-541-8909
INCOMING LOAD TICKET

Date 9/24/03
Time 11:26 AM
Ticket# 38139

Approval # 203732

Type of Material	Gross	Tare	Net Tons	#Drums
GAS CONTAMINATION	73,700	29,100	22.30	

Signature

WM ID# 14 JOE DURANTE
Bill of Lading#
Manifest# 1
St. Manifest#

Trans. ID# 51
Transporter LETICIA INC.
Trans. Addr. 640 IRVINGTON AVE.
HILLSIDE, NJ 07205

DE-SW Permit# 18815

Driver CARLOS
Truck # BUSETAS 221

Customer ALLIED ENVIRONMENTAL GROUP, INC
Generator YONKER ALEXANDER REDEVELOPMENT INC
Generator Site ALEXANDER AVE
YONKERS, NY 10704

Contact 1 STU BERRY 800-969-DIRT
Contact 2 ALLAN PARKER 561 752-2490 FL

NOTES 1:
NOTES 2:

THANK YOU

CLEAN EARTH OF CARTERET, INC

24 Middlesex Avenue
Carteret, NJ 07008
(732)-541-8909

INCOMING LOAD TICKET

Date 9/24/03
Time 3:28 PM
Ticket# 38148

Approval # 203732

Type of Material	Gross	Tare	Net Tons	#Drums
GAS CONTAMINATION	85,650	28,550	28.55	

Signature

WM ID# 3 TOM DURANTE
Bill of Lading#
Manifest# 3
St. Manifest#

Trans. ID# 51
Transporter LETICIA INC.
Trans. Addr. 840 IRVINGTON AVE.
HILLSIDE, NJ 07205

DE-SW Permit# 18815

Driver JAVIER
Truck # CALI 102

Customer ALLIED ENVIRONMENTAL GROUP, INC
Generator YONKER ALEXANDER REDEVELOPMENT INC
Generator Site ALEXANDER AVE
YONKERS, NY 10704

Contact 1 STU BERRY 800-969-DIRT
Contact 2 ALLAN PARKER 561 752-2490 FL

NOTES 1:

NOTES 2:

THANK YOU

CLEAN EARTH OF CARTERET, INC
24 Middlesex Avenue
Carteret, NJ 07008
(732)-541-8909
INCOMING LOAD TICKET

Date 9/24/03
Time 11:27 AM
Ticket# 38140

Approval # 203732

Type of Material	Gross	Tare	Net Tons	#Drums
GAS CONTAMINATION	88,850	28,550	30.15	

WM ID# 14 JOE DURANTE
Bill of Lading#
Manifest# 2
St Manifest#

Signature

Trans. ID# 51
Transporter LETICIA INC.
Trans. Addr. 640 IRVINGTON AVE. HILLSIDE, NJ 07205

DE-SW Permit# 18815

Driver JAVIER
Truck # CALI 102

Customer ALLIED ENVIRONMENTAL GROUP, INC
Generator YONKER ALEXANDER REDEVELOPMENT INC
Generator Site ALEXANDER AVE YONKERS, NY 10704

Contact 1 STU BERRY 800-969-DIRT
Contact 2 ALLAN PARKER 561 752-2490 FL

NOTES 1:
NOTES 2:

THANK YOU

CLEAN EARTH OF CARTERET, INC

24 Middlesex Avenue
Carteret, NJ 07008
(732)-541-8909

INCOMING LOAD TICKET

Date 9/24/03
Time 3:32 PM
Ticket# 38149

Approval # 203732

Type of Material	Gross	Tare	Net Tons	#Drums
GAS CONTAMINATION	83,850	29,100	27.38	

Signature

WM ID# 3 TOM DURANTE
Bill of Lading#
Manifest# 4
St. Manifest#

Trans. ID# 51
Transporter LETICIA INC.
Trans. Addr. 640 IRVINGTON AVE.
HILLSIDE, NJ 07205

DE-SW Permit# 18815

Driver CARLOS
Truck # BUSETAS 221

Customer ALLIED ENVIRONMENTAL GROUP, INC
Generator YONKER ALEXANDER REDEVELOPMENT INC
Generator Site ALEXANDER AVE
YONKERS, NY 10704

Contact 1 STU BERRY 800-969-DIRT
Contact 2 ALLAN FARKER 561 752-2490 FL

NOTES 1:

NOTES 2:

THANK YOU

Clean Earth of Carteret, Inc. 36867
24 Middlesex Avenue • Carteret, NJ 07008
(732) 541-8909

GENERATOR: Yonkers Alex Redel
APPROVAL #: 203732
TRANSPORTER: Letica
TRUCK #: Busetas 221
MANIFEST #: 1
DATE: 9/24/03

GROSS WEIGHT
29100
TARE WEIGHT

Clean Earth of Carteret, Inc. 36877
24 Middlesex Avenue • Carteret, NJ 07008
(732) 541-8909

GENERATOR: Yonkers Kod
APPROVAL #: 203732
TRANSPORTER: Busetas
TRUCK #: 221
MANIFEST #: 4
DATE: 9/24/03

GROSS WEIGHT
29100
TARE WEIGHT

Appendix D

Yonkers Contracting AST Removal Report

FAXED 11.20.03
4PM

YONKERS CONTRACTING COMPANY, INC.

Main Office
Midland Ave
Yonkers, NY 10704
Tel: (914) 965-1500
Fax: (914) 378-8880

Field Office
Yonkers Wastewater Treatment Facility
1 Fernbrook Street
Yonkers, NY 10705
Fax: (914) 377-8484
R.France Cell: (914) 403-2887

November 20, 2003

Henningson, Durham, & Richardson
Architecture and Engineering, P.C.
711 Westchester Avenue
White Plains, NY 10604-3504
Tel: (914) 993-2012
Fax: (914) 993-2022

ATTN: Ms.Stephanie Nakai

RE: Halstead-Quinn ATI Tank Farm Project
Above Ground Storage Tank Removal Report

Dear Stephanie:

The following is an "Above Ground Storage Tank Removal" report, herinafter referred to as the "AST Removal" report:

I. Free Product Removal

Tank #	Size(Gal)	Sampled?	Date Cleaned	Gallons Removed	Product Type
1	1,152,000	Yes	8-28-03	28,905	Gasoline
2	1,152,000	Yes	9-2-03	1,105	Gasoline
4	708,000	Yes	8-27-03	800	#2 Oil
5	147,000	Yes	8-27-03	195	Diesel
6	157,000	Yes	8-27-03	240	#2 Oil
7	157,000	Yes	8-27-03	290	#2 Oil
8	1,022,000	Yes	8-27-03	815	#2 Oil
9	147,000	Yes	8-27-03	270	Diesel
10	147,000	Yes	8-27-03	350	#2 Oil
11	147,000	Yes	8-27-03	415	#2 Oil
12	147,000	Yes	8-27-03	345	#2 Oil
13	3,000	No (Dry)	8-28-03	0	Gasoline
14	3,000	No (Dry)	8-28-03	0	Diesel
15	2,000	Yes	8-28-03	310	Petroleum Additive
16	2,000	Yes	8-28-03	205	Petroleum Additive
Piping	N/A	N/A	8-26= 9-2-03	1,115	Gas, Oil, Diesel
Dock Lines	N/A	Yes	9-11-03 (?)	730	Water
Gas Racks	N/A	Yes	8-26= 9-2-03	410	Gas
Oil Racks	N/A	Yes	8-26= 9-2-03	490	Oil

Free Product was sampled, removed, and disposed of by Royal Environmental.

YONKERS CONTRACTING COMPANY, INC.

(cont'd)

II. Tank Demolition

15 Tanks varying in size (see Free Product Removal table) were demolished between 9-2-03, and 9-16-03 using a PC400 Komatsu Excavator with an attached LaBounty Shear. Tanks were demolished by Metals Mgmt, and sent to Metal Mgmt in New Jersey for scrap. Estimated weight on scrap = 400 tons.

III. Lead Chip Disposal

Flaking lead chips that fell off of tanks during demolition were gathered up, and put in 55 gallon drum, and sent to Cycle Chem for proper lead disposal.

IV. Lead Contaminated Soil & Oil Contaminated Soil (Contaminated by Yonkers Contracting NOT Existing)

Lead contaminated soil was disposed with oil contaminated soils to Clean Earth of Carteret. 4 loads total (40 CY +/-). Material was hauled by Leticia Inc. (minority subcontractor).

V. Concrete Rubble Demolition & Disposal

Approximately 570 CY of concrete rubble was removed from the jobsite from the demolition of the containment wall(s). This material was disposed of at Edison Avenue Recycling, Mt Vernon, NY.

VI. Pipe Sealing

All exposed perimeter piping was cut off flush to nearest wall, purged, and sealed with concrete.

Should you need any further information, please contact me at (914) 403-2887. Thank you.

Sincerely,

Rich France
Project Manager

cc: File

APPENDIX B

DOCUMENTATION FROM SUPERTRANS

SUPERTRANS NY Inc.

2 December 2004

Yonkers Alexander Street Redevelopment Inc
Attention: Tom Duggan
City of Yonkers - City Hall
40 South Broadway
Yonkers, NY 10701

Dear Mr. Duggan;

In response to your request for documentation of storage tanks removed from the property at 71-90 Alexander Street, we submit the following:

1. November 2003: Three 1000 gallon clean oil tanks removed by Tran Camp Contracting Corp. in conjunction with removal of small crumbling building in the Northwest corner of the property. Copy of Tran Camp letter and Brookfield Metal Company certification attached.

2. September 2004: Three 250-275 gallon clean oil tanks removed by Tran Camp Contracting Corp. from the building formerly known as Fitzpatrick Autobody in the Northeast corner of the property. Copy of Tran Camp letter and Brookfield Metal Company certification attached.

3. October 2004: Five 55 gallon drums of non-hazardous water/oil mix and one 55 gallon drum of non-hazardous solids removed by A-1 Environmental Recycling from outside the building in #2 above. Copy of A-1 Environmental work order and description attached.

This accounts for all storage tanks known to have been removed from the property. Please let me know if your need anything further.

Sincerely,

Ed Muto
President

Westchester
60 Alexander Street ♦ Yonkers, NY 10701
Phone (914) 968 3300 ♦ Fax (91[illegible]) [illegible]3 5455

Bronx
670 East 137th Street ♦ Bronx, NY 10472
Phone (718) 402 8000 ♦ Fax (718) 402 9834

(914) 423-3906

TRAN CAMP CONTRACTING CORP.

1270 Saw Mill River Road
Yonkers, N.Y. 10710
FAX # (914) 476-3794

DEMOLITION–GENERAL CONTRACTOR–SNOW PLOWING

DECEMBER 1, 2004

TO WHOM IT MAY CONCERN,

A YEAR AGO WE WERE HIRED BY SUPERTRANS TO CLEAN UP AND GRADE THE FORMER [illegible] PROPOERTY ON ALEXANDER STREET. PART OF THAT CLEAN UP INCLUDED [illegible] EMPTY, RUSTED ABANDONED 1,000 GALLON OIL TANKS. THESE TANKS WERE REMOVED FROM THE PROPERTY AND TRANSPORTED FOR RECYCLING TO:

BROOKFIELD METAL COMPANY
280 LAMONT STREET
ELMSFORD, NEW YORK 10523
914-592-5250
(COPY OF OUR CERTIFICATE TO BROOKFIELD IS ATTACHED)

IN SEPTEMBER 2004, WE WERE HIRED BY SUPERTRANS TO CLEAN OUT A VACANT BUILDING ON THE SAME PROPERTY IN PREPARATION FOR DEMOLITION. THERE WERE THREE 250 GALLON CLEAN OIL TANKS THAT WERE REMOVED AND ALSO TRANSPORTED TO BROOKFIELD METAL COMPANY AT THE ABOVE ADDRESS. A COPY OF THE S[illegible] PURCHASE TICKET IS ATTACHED.

LET ME KNOW IF YOU REQUIRE ANY FURTHER INFORMATION.

SINCERELY,

ALBERT A. TRANQUILLO
TRAN CAMP CONTRACTING CORP.

BROOKFIELD

METAL COMPANY

280 LAMONT STREET
ELMSFORD, NY 10523
(914) 592-5250
(914) 592-5337 FAX

SELLER'S CERTIFICATE STATEMENT

IN CONSIDERATION OF PURCHASE OF THIS USED STEEL TANK, THE SELLER CERTIFIES THAT THE TANK HAS BEEN THOROUGHLY CLEANED AND VENTED.

SELLER FURTHER AGREES TO INDEMNIFY AND HOLD BROOKFIELD AUTO WRECKERS INC. / BROOKFIELD METAL CO. HARMLESS FROM ANY CLAIM, PENALTY, FINE, FEE, COST, ATTORNEY'S FEES OR OTHER LIABILITY RESULTING IN WHOLE OR IN PART FROM SELLER'S BREACH OF THIS CERTIFICATION.

DATE: 11/19/03

DELIVERED: 3 oil tanks (1,000 gal size)

COMPANY: Tran Camp Contracting

ADDRESS: 1270 Saw Mill River Rd
Yonkers NY 10710

Signature

RECYCLING SCRAP METAL SAVES ENERGY !!

SCALE PURCHASE TICKET

BMC Brookfield
100 Lamont Street
Elmsford, NY 10523
914-592-5250

Weigh In: 09/27/2004 12:40
Weigh Out: 09/27/2004 13:10

Ticket: 11160
Customer: 75
Trancamp Wrecking Contractors

Trancamp Wrecking Contrac

Commodity	Gross	Tare	Net	Price	T
Light Iron	51740	42740	9000	/CW	

I hereby certify that I have the right to possess and sell th
This is a Bill of Sale to the above described scrap.
I hereby acknowledge payment in full.

Customer Signature

Please do not lose this ticket
Ticket required for payment.

Today's Forecast
Sunny High of 74

Tomorrow's Forecast
PM T-Storms High of 70

CLEAN TANKS
SCRAP MANIFEST

FORMER ATI SITE

c: M [illegible]
914-968-5755

A-1 ENVIRONMENTAL RECYCLING
95 SOUTH CHERRY STREET • WALLINGFORD, CT 06492
1-800-891-0959 • 1-203-265-5659 Fax (203) 265-6067

WORK ORDER
№ - 42240

DATE	VENDOR #	DRIVER	CUSTOMER P.O. #	MANIFEST #
10/5/04		Bob Q.		

CUSTOMER / LOCATION

NAME Supercross
ADDRESS 10 Alexander St
CITY/STATE Yonkers NY 10701
TEL. #
ATTENTION

BILL TO (IF DIFFERENT FROM LOCATION)

NAME
ADDRESS
CITY/STATE
TEL. #
ATTENTION

DESCRIPTION	QUANTITY	PRICE	SUB TOTAL
WASTE OIL CRO2			
WASTE ANTIFREEZE			
WASTE WATER / OIL MIX	Rem 5-dr.		
TRUCKING			
TEST			
USED OIL FILTERS - METAL / CLOTH			
REMOVAL OF SOLIDS / SPILL PADS	Rem 1-dr.	~~[illegible]~~	175.00
TANK / TOTE - REMOVAL / DELIVER			
EMPTY DRUMS - REMOVAL / DELIVER			
WASTE PAINT RELATED MATERIAL			
PARTS WASHER SERVICE			
SPILL MATERIAL - PADS / ROLLS Paid #3301			
WINDOW WASH 10/5/04			
REMANUFACTURED ANTIFREEZE			

Total Received: $ ______ ☐ Cash ☑ Check # ______ ☐ Charge my account TOTAL $ $ 175.00

CUSTOMER CERTIFIES AND REPRESENTS THAT THE MATERIALS PROVIDED TO A-1 ENVIRONMENTAL RECYCLING, LLC, HEREUNDER HAVE NOT BEEN MIXED, COMBINED, OR OTHERWISE BLENDED IN ANY QUANTITY WITH MATERIALS CONTAINING POLYCHLORINATED BIPHENYLS (PCB) OR ANY OTHER MATERIAL DEFINED AS A HAZARDOUS WASTE UNDER APPLICABLE LAWS, INCLUDING BUT NOT LIMITED TO 40 CFR PART 261. CUSTOMER AGREES TO INDEMNIFY AND HOLD A-1 ENVIRONMENTAL RECYCLING, LLC, HARMLESS FOR ANY DAMAGES, COSTS, ATTORNEY'S FEES, ETC. ARISING OUT OF OR IN ANY WAY RELATED TO A BREACH OF THE ABOVE WARRANTY BY THE CUSTOMER.

X ______________________
CUSTOMER SIGNATURE

CHARGE MY ACCOUNT FOR THIS TRANSACTION UNLESS OTHERWISE INDICATED IN THE PAYMENT RECEIVED SECTION.

INVOICES REFLECTING CHARGES TO CUSTOMER ARE SUBJECT TO AN INTEREST RATE OF THE LESSER OF 1½% PER MONTH (18% PER ANNUM) OR THE MAXIMUM RATE ALLOWED BY LAW ON ANY INVOICES THAT ARE NOT PAID WITHIN 30 DAYS. IN THE EVENT OF DEFAULT, A-1 ENVIRONMENTAL RECYCLING, LLC, SHALL BE ENTITLED TO RECOVER COSTS OF COLLECTION.

X ______________________
CUSTOMER SIGNATURE

CONNECTICUT • NEW YORK • MASSACHUSETTS • RHODE ISLAND • NEW JERSEY • PENNSYLVANIA

APPENDIX C

MSDS AND DATA SHEET FOR AER-O-FOAM COLD FOAM 3%

National Foam

MATERIAL SAFETY DATA SHEET #NMS110

Aer-O-Foam 3% Cold Foam

Protein Foam Liquid Concentrate

Section 1. CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification
Product: Aer-O-Foam 3% Cold Foam, Fire Fighting Foam Concentrate
Synonyms: Protein Foam
CAS No: Mixture - No single CAS # applicable

Company Identification
Manufacturer:
National Foam, Inc.
150 Gordon Drive
P.O. Box 695
Exton, PA 19341-0695
Emergency Phone Number (Red Alert): (610) 363-1400 (U.S.A.)
Fax (610) 524-9073
www.Kidde-Fire.com

Section 2. COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS Number	% Weight
Water	7732-18-5	23-46%
Protein Hydrolysate	69430-36-0	15-22%
Ethylene Glycol	107-21-1	18-22%
2-Ethoxyethanol	110-80-5	18-22%
Hexylene Glycol	107-41-5	2-5%
Ferrous Sulfate	7720-78-7	0.5-2.0%
2 Aminoethanol; Monoethanolamine	141-43-5	0.5-2.0%
Zinc Chloride	7646-85-7	0.5-2.0%

Section 3. HAZARDS IDENTIFICATION

Potential Health Effects

Inhalation
Vapors are minimal at room temperature. If product is heated or sprayed as an aerosol, airborne material may cause respiratory irritation.

Skin Contact
No significant signs of adverse health effects are expected to occur as a result of skin contact.

Eye Contact
No significant signs of adverse health effects are expected to occur as a result of eye contact.

Ingestion
Not a hazard in normal industrial use. Small amounts swallowed during normal handling operations are not likely to cause injury; swallowing large amounts may cause injury or irritation.

Additional Health Effects
Existing eye or skin sensitivity may be aggravated by exposure.

Carcinogenicity Information
No data available.

Section 4. FIRST AID MEASURES

Inhalation
No specific treatment is necessary since this material is not likely to be hazardous by inhalation. If exposed to excessive levels of airborne aerosol mists, remove to fresh air. Seek medical attention if effects occur.

Skin Contact
In case of skin contact, wash off in flowing water or shower. Launder clothing before reuse.

Eye Contact
In case of eye contact, flush eyes promptly with water for 15 minutes. Retract eyelids often to ensure thorough rinsing. Consult a physician if irritation persists.

Ingestion
Swallowing less than an ounce is not expected to cause significant harm. For larger amounts, do not induce vomiting. Give milk or water. Never give anything by mouth to an unconscious person. Seek medical attention.

Section 5. FIRE FIGHTING MEASURES

Flammable Properties
Flash Point – >200°F

Fire and Explosion Hazards
Avoid contact with water reactive materials, burning metals and electrically energized equipment.

Extinguishing Media
Product is an extinguishing media. Use media appropriate for surrounding materials.

Special Fire Fighting Instructions
This product will produce foam when mixed with water.

Section 6. ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)
NOTE: Review FIRE FIGHTING MEASURES and HANDLING (Personnel) sections before proceeding with clean-up. Use appropriate Personal Protective Equipment during clean-up.

Accidental Release Measures

Concentrate
Stop flow if possible. Use appropriate protective equipment during clean up. For small volume releases, collect spilled concentrate with absorbent material; place in approved container. For large volume releases, contain and collect for use where possible. Flush area with water until it no longer foams. Exercise caution, surfaces may be slippery. Prevent discharge of concentrate to waterways. Disposal should be made in accordance with federal, state and local regulations.

Foam/Foam Solution
See above. Flush with water. Prevent discharge of foam/foam solution to waterways. Do not discharge into biological sewer treatment systems without prior approval. Disposal should be made in accordance with federal, state and local regulations.

Section 7. HANDLING AND STORAGE

Handling (Personnel)
Avoid contact with eyes, skin or clothing. Avoid ingestion or inhalation. Rinse skin and eyes thoroughly in case of contact. Review HAZARDS and FIRST AID sections.

Storage
Recommended storage environment is between -20°F (-29°C) and 120°F (49°C). Store product in original shipping container or tanks designed for product storage.

Section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls
Special ventilation is not required.

Personal Protective Equipment

Respiratory
Recommended exposure limits (OSHA-PEL and ACGIH-TLV) have not been determined for this material. The need for respiratory protection should be evaluated by a qualified health specialist.

Protective Clothing
Rubber or PVC gloves recommended.

Eye Protection
Safety glasses, face shield or chemical splash goggles must be worn when possibility exists for eye contact. Contact lenses should not be worn. Eye wash facilities are recommended.

Other Hygienic Practices
Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before re-use.

Exposure Guidelines

Exposure Limits

Component	CAS Number	PEL (OSHA)	TLV (ACGIH)
Ethylene Glycol	107-21-1	50 ppm	50 ppm
2-Ethoxyethanol	110-80-5	200 ppm	50 ppm skin
Hexylene Glycol	107-41-5	25 ppm	25 ppm
Ferrous Sulfate	7720-78-7	1.0 mg/cu.M	1.0 mg/cu.M
2-Aminoethanol	141-43-5	3 ppm	3 ppm, 6ppm STEL

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Boiling Point:	Not applicable
Vapor Pressure:	Not applicable
Vapor Density:	Not applicable
Melting Point:	Not applicable
Evaporation Rate:	<1 (Butyl Acetate = 1.0)

Solubility in Water:	100%
pH:	7.3
Specific Gravity:	1.11 @ 20°C
Freezing Point:	-55°F (-48°C)
Odor:	Organic
Form:	Liquid
Color:	Dark Brown

Section 10. STABILITY AND REACTIVITY

Chemical Stability
Stable.

Incompatibility, Materials to Avoid
Avoid use of product on burning metals, electrically-energized equipment and contact with water reactive materials.

Polymerization
Will not occur.

Section 11. TOXICOLOGICAL INFORMATION

Mammalian Toxicity

Ingestion
This material was not toxic when administered to Sprague-Dawley rats at an acute oral dose of 5g/kg body weight.

Eye
Animal testing indicates this material is not a primary eye irritant when tested undiluted on New Zealand Albino Rabbits.

Skin
Animal testing indicates this material is not a primary skin irritant when tested undiluted on New Zealand Albino Rabbits.

Inhalation
No data available at this time.

Carcinogenic, Developmental, Reproductive, Mutagenic Effects
No data available on this material.

Section 12. ECOLOGICAL INFORMATION

Ecotoxicological Information Aquatic Toxicity
No data available.

Environmental Fate

BOD_5	Concentrate	223,000 mg/kg
COD	Concentrate	1,030,000 mg/kg

Section 13. DISPOSAL CONSIDERATIONS

Concentrate
Do not discharge into biological sewer treatment systems without prior approval. Specific concerns are high BOD load and foaming tendency. Low dosage flow rate or antifoaming agents acceptable to the treatment plant may be helpful. Do not flush to waterways. Disposal should be made in accordance with federal, state and local regulations.

Foam/Foam Solution
Aer-O-Foam 3% Cold Foam solution can be treated by waste water treatment facilities. Discharge into biological sewer treatment facilities may be done with prior approval. Specific concerns are high BOD load. Dilution will reduce BOD and COD factors proportionately. Low dosage flow rate or antifoaming agents acceptable to the treatment plant may be helpful. Do not flush to waterways. Disposal should be made in accordance with federal, state and local regulations.

NOTE: As a service to our customers, National Foam has approvals in place with disposal facilities throughout the U.S. for waste water treatment and solidification and landfill of our foam liquid concentrates and foam solutions. If required, National Foam, Inc. can also provide information on the disposal of drums used for shipping our concentrates. Please contact National Foam's Risk Management Administrator at (610) 363-1400 for additional information.

Section 14. TRANSPORTATION INFORMATION

Shipping Information
Proper Shipping Name: Fire Extinguisher Charges or Compounds N.O.I., Class 70
National Motor Freight Code: 69160 Sub 0
Hazard Class: None
UN Number: None

Section 15. REGULATORY INFORMATION

U.S. Federal Regulations

Toxic Substances Control Act (TSCA)
All components of this product are listed in the TSCA inventory.

Superfund Amendments and Reauthorization Act of 1986 (SARA), Title III

Section 302/304
There are no components of this material with known CAS numbers which are on the Extremely Hazardous Substances (EHS) list.

Section 311 & 312
Based on available information, this material contains the following components which are classified as the following health and/or physical hazards according to Section 311 & 312:

Ethylene Glycol	107-21-1	Health-Immediate and Chronic.
Hexylene Glycol	107-41-5	Health-Immediate
Zinc Chloride	7646-85-7	Health-Immediate

Section 313
This material contains the following chemical components subject to Section 313 reporting requirements.

Ethylene Glycol	107-21-1
2 Ethoxyethanol	110-80-5
Zinc Chloride	7646-85-7

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)
This material contains the following components subject to the reporting requirements of CERCLA.

Ethylene Glycol	107-21-1	less than 21% by weight
2 Ethoxyethanol	110-80-5	less than 21% by weight
Ferrous Sulfate	7720-78-7	less than 2% by weight
Zinc Chloride	7646-85-7	less than 1% by weight

OTHER REGULATORY INFORMATION
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA). All ingredients are listed on the DSL (Domestic Substance List).

STATE REGULATIONS

PENNSYLVANIA RIGHT-TO-KNOW HAZARDOUS SUBSTANCES LIST

PA Hazardous Substances present at levels greater than 1%:

Ethylene Glycol	107-21-1
2 Ethoxyethanol	110-80-5
Hexylene Glycol	107-41-5
Ferrous Sulfate	7720-78-7

Section 16 OTHER INFORMATION

NFPA Rating

Health 0
Flammability 0
Reactivity 0

WHMIS Rating

D2B

ADDITIONAL INFORMATION

Revision Summary

10/2/96 ....Revised to ANSI format.
2/5/99 ....Added MSDS number, updated Section 1, 3, 4, 6, 7, 8, 9, 11, 12, 13, 15.
08/10/00 ....Revised Section 1.
09/10/03 ....Updated Sections 2, 5, 9, 14, 15, 16.

For further information, see National Foam Product Data Sheet for Aer-O-Foam 3% Cold Foam.

The information contained herein is furnished without warranty either expressed or implied. This data sheet is not a part of any contract of sale. The information contained herein is believed to be correct or is obtained from sources believed to be generally reliable. However, it is the responsibility of the user of these materials to investigate, understand and comply with federal, state and local guidelines and procedures for safe handling and use of these materials. National Foam, Inc. shall not be liable for any loss or damage arising directly or indirectly from the use of this product and National Foam, Inc. assumes no obligation or liabilities for reliance on the information contained herein or omissions herefrom.

September 10, 2003

NATIONAL FOAM

DATA SHEET
#NFC110

AER-O-FOAM
3% COLD FOAM
Protein Foam Concentrate

Description

Aer-O-Foam® 3% Cold Foam is a superior quality protein based foam concentrate used at 3% concentration to extinguish fires involving hydrocarbon fuels. Aer-O-Foam 3% Cold Foam effects extinguishment in two ways. The foam blanket excludes oxygen from the fuel's surface, and the water in the foam provides cooling.

Features

- Stable long-lasting foam blanket provides excellent burnback resistance.
- Suitable for use with fresh or sea water.
- Compatible with standard proportioning and air aspirating foam making equipment.
- Suitable for use with foam compatible dry powder extinguishing agents.
- Minimum usable temperature -20°F(-29°C)

Aer-O-Foam 3% Cold Foam is manufactured utilizing a unique process which produces unmatched quality hydrolyzed protein to form the foundation for the concentrate formulation. The protein base provides a stable, long-lasting foam blanket highly resistive to the effects of heat. This prevents reignition and enhances burnback resistance.

Aer-O-Foam 3% Cold Foam concentrate is generally suitable for use with most types of 3% proportioning systems and venturi type proportioners (eductors). For more information on these devices, consult National Foam.

Applications

Aer-O-Foam 3% Cold Foam is used in fire suppression systems and manual applications to fight fires involving hydrocarbon fuels such as crude oil, gasoline, and fuel oils. It is not suitable for use on polar solvents or water miscible fuels such as alcohols, ketones, esters, and ethers. Typical storage tank systems include surface (topside) application. It is not suitable for subsurface application. Other uses include loading racks, docks, process areas marine tankers, spills, etc. For best performance protein foam concentrates should be used with aspirating nozzles and foam making equipment.

Typical Physical Properties

Appearance	Dark Brown Color
Specific Gravity at 68°F(20°C)	1.11
pH	7.3
Viscosity at 68°F(20°C)	21.0 csk
Freezing Point	-55°F(-48°C)
Minimum Usable Temperature	-20°F(-29°C)
Maximum Usable Temperature	120°F(49°C)

Storage and Handling

Aer-O-Foam 3% Cold Foam is ideally stored in its original shipping container or in tanks or other containers which have been designed for such foam storage. Recommended construction materials are carbon steel, high density cross linked polyethylene, or reinforced fiberglass polyester (isophthalic polyester resin) with a vinyl ester resin internal layer coating (50-100 mils).

Foam concentrates are subject to evaporation which accelerates when the product is exposed to air. Storage tanks should be sealed and fitted with a pressure vacuum vent to prevent free exchange of air. The recommended storage environment is with the UL Listed temperature range of -20°F to 120°F (-29°C to 49°C).

It is recommended that Aer-O-Foam 3% Cold Foam not be mixed with any other type of foam concentrate in long term storage. Such mixing could lead to chemical changes in the product and a possible reduction in or loss of firefighting capability. Most expanded foams are compatible for side-by-side application during an incident.
Aer-O-Foam 3% Cold Foam is suitable for use in combination with foam compatible dry chemical extinguishing agents.

Shelf Life, Inspection, and Testing

The shelf life of any foam concentrate is maximized by proper storage conditions and maintenance. Factors affecting shelf life are wide temperature changes, extreme high or low temperatures, evaporation, dilution, and contamination by foreign materials. Properly stored Aer-O-Foam 3% Cold Foam has been tested and shown no significant loss of firefighting performance, even after 25 years.

Annual testing of all firefighting foam is recommended by the National Fire Protection Association (NFPA). National Foam provides a Technical Service Program to conduct such tests.

Environmental and Toxicological Information

Aer-O-Foam 3% Cold Foam is biodegradable. However, as with any substance, care should be taken to prevent discharge from entering ground water surface water, or storm drains. With advance notice, Aer-O-Foam 3% Cold Foam can be treated by local biological sewage treatment systems. Since facilities vary widely by location, disposal should be made in accordance with federal, state and local regulations.

The biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) of Aer-O-Foam 3% Cold Foam are as follows:

BOD_5 223,000 mg/kg
COD 1,030,000 mg/kg

Results of Tests for acute oral toxicity, primary skin irritation and primary eye irritation have proved negative. Repeated skin contact will remove oils from the skin and cause dryness. Users are advised to wear protective equipment.

If Aer-O-Foam 3% Cold Foam enters the eyes, flush them well with water and seek immediate medical attention. For further details, see the Aer-O-Foam 3% Cold Foam Material Safety Data Sheet.

Ordering Information

CONTAINER	SHIPPING WEIGHT	PART NUMBER
5-Gallon Pails		
(19 litres)	49 lb. (22.3 kg)	1110-5340-6
55-Gallon Drums		
(208 litres)	531 lb. (241.4 kg)	1110-5481-6
275-Gallon IBC Reusable Tote Tank		
(1041 litres)	2691 lb. (1223.2 kg)	1110-5725-6
Bulk	9.25 lb./gal.(1.11 kg/l)	1110-5001-6

Palletizing of pails and drums is available upon request.

SHIPPING CUBE

5-Gallon Pail .... 1.13 cu. ft. (0.032 cu. m)
55-Gallon Drum .... 11.51 cu. ft. (0.326 cu. m)
275-Gallon IBC Tote Tank ...... 51.11 cu. ft. (1.1061 cu. m)

07/01 (Rev B) Printed in USA (NFC110-AOF3CF PMD)

NATIONAL FOAM, INC.
P.O. Box 695 • Exton, PA 19341-0695 • (610) 363-1400 • Fax: (610) 524-9073
www.Kidde-Fire.com

APPENDIX D

OCTOBER 2003 NYSDEC APPROVED FINAL WORK PLAN, FIELD SAMPLING PLAN/QUALITY ASSURANCE PROJECT PLAN, HEALTH AND SAFETY PLAN, CITIZEN PARTICIPATION PLAN, COMMUNITY AIR MONITORING PLAN, RESPONSE TO NYSDEC COMMENTS LETTER DATED OCTOBER 16, 2003, AND AUGUST 1, 2005 AMENDMENT LETTER #1 AND AMENDMENT LETTER #2

New York State Department of Environmental Conservation
Division of Environmental Remediation
'25 Broadway, Albany, New York 12233-7016
hone: (518) 402-9768 • FAX: (518) 402-9020
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

November 14, 2003

Joyce Mariani
Henningson, Durham & Richardson
Architecture & Engineering, P.C.
711 Westchester Avenue
White Plains, New York 10604

Re: Halstead-Quinn, 79-91 Alexander Street, Project # B00193

Dear Ms. Mariani,

The New York State Department of Environmental Conservation and the New York State Department of Health have reviewed the Revised Remedial Investigation Work Plan for the Halstead Quinn Oil Storage Terminal Facility in Yonkers, New York, submitted by HDR in October 2003. Based on this review, we find the work plan acceptable.

Please notify me at least one week in advance of the date you plan to begin field work at the site. If you have any questions, you may contact me at (518) 402-9768.

Sincerely,

Robert H. Filkins

Robert H. Filkins
Project Manager
Bureau of Eastern Remedial Action
Division of Environmental
Remediation

HDR ONE COMPANY | *Many Solutions* SM

October 16, 2003

Robert Filkins
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7016

Re: Halstead-Quinn, 79-91 Alexander Street, Project #B00193-3

Dear Mr. Filkins:

In accordance with the New York State Department of Environmental Conservation (NYSDEC) letter addressed to Joyce Mariani of Henningson, Durham & Richardson Architecture and Engineering, P.C. (HDR) and dated July 25, 2003, (HDR) has enclosed for your approval four (4) copies of the Final Site Investigation Work Plan for the property located at 79-91 Alexander Street, Yonkers, New York. In addition, please find a Response to Comments, provided as Attachment A to this letter, addressing the comments issued by the NYSDEC in the aforementioned letter. The Response to Comments also serves as a guide as to where the NYSDEC's comments are addressed in the Work Plan.

If you have any questions, please do not hesitate to contact me at (914) 993-2034.

Sincerely,

Noemi Castillo

Noemi Castillo
Assistant Project Manager

Enclosures

cc: Edward Sheeran (YASR)
Tom Dugan (YASR)
Linda Shaw (Knauf Shaw)
Joyce Mariani (HDR)
Stephanie Nakai (HDR)
File
Chron

Henningson, Durham & Richardson
Architecture and Engineering, P.C
711 Westchester Avenue
White Plains NY 10604-3504
Phone: (914) 993-2000
Fax: (914) 993-2022
www.hdrinc.com

ATTACHMENT A

Response to Comments

Final Site Investigation Work Plan
State Brownfield Site #B00193-3
79-91 Alexander Street, Yonkers, New York

In response to the New York State Department of Environmental Conservation (NYSDEC) letter dated July 25, 2003, please find below a response to comments for the Site Investigation Work Plan (Work Plan) for 79-91 Alexander Street, Yonkers, New York (site). These responses have been incorporated into the Final Work Plan.

Comment 1: Section 1.1

Purpose: The purpose of the remedial investigation is to not only delineate the nature and extent of contamination at the site but also to identify potential routes of exposure and potential receptors as well as evaluate fate and transport of contaminants. Please refine this paragraph accordingly.

Response 1: Section 1.1

Section 1.1 has been revised to include the following: "...(5) identify potential routes of exposure and potential receptors; and (6) evaluate fate and transport of contaminants."

Comment 2.a: Section 2.1

Site Description:

a. This section should include information pertaining to past and present industrial/commercial/business operations on properties adjoining the site.

Response 2.a: Section 2.1

Section 2.3 (Site History) has been revised to include the following: "A section of the Hudson River was filled between 1886 and 1898 to create the site. The site was occupied by two companies, Archibald Lumber Company and P.A. Deyo and Son Elevator, in 1898 shortly after the site was created. Afterwards, the Hudson Fuel Company and Harrigan Coal and Wood occupied the site by 1917. In 1919, two brick buildings were initially erected on the site, including a garage and stable. Hudson Fuel Company is listed as the site owner in 1919, 1923, and 1933. Hudson Fuel Company is believed to have owned the Site through 1951. From 1951 through approximately 1977 or 1978, the site was owned by Standard Oil (currently ExxonMobil Corporation). From 1917 through 1951, Standard Oil owned the site to the east. It sold that site to Polychrome, Inc. in 1951, and then acquired the subject site for the purpose of installing a tank farm. It installed nine ASTs on the northern portion of the Site (Tank Nos. 4, 5, 6, 7, 8, 9, 10, 11, 12) shortly after it acquired the site. Therefore, the site first became an operating oil terminal in the 1950s. In 1978, Standard Oil sold the site to A. Tarricone, Inc. (ATI). On or about December 1983, ATI installed two additional large ASTs (i.e., Tank Nos 1 and 2, which are 1,152,000 gallons each, for unleaded gasoline) south of the previous nine ASTs. A total of 11 large ASTs appear to have been present between 1978 and 1989. Eventually, 16 ASTs were registered, including the 11 large ASTs. Sometime between 1995 and 2001, ATI sold or changed its name to Halstead-Quinn Propane, Inc. In spring 2001, Halstead-Quinn Propane, Inc. declared bankruptcy. In July 2002, YASR took control of the property and remains the current owner. The site is no longer in operation as an oil storage facility and all of the ASTs within the containment area were removed from the site during the recent demolition work in September 2003.

As noted above, former adjacent property owners include Standard Oil, who operated the site to the east from 1917 through 1951 and Polychrome, Inc., who operated the site to the east from 1951 through 1995. Other industries that have bordered the site over the past 105 years have included oil, asphalt, feed and produce, lumber, coal, an alcohol brewery, a local post office and a county ferry office. "

Comment 2.b: Section 2.1

Site Description:

b. The second paragraph states that three USTs were removed during a previous site investigation. The location of those USTs must be identified on the site map. Also, please provide data regarding the removal of the tanks and excavation of potentially contaminated soils related to the USTs.

Response 2.b: Section 2.1

- Section 2.1 has been revised to include the following: "The location of the three USTs are identified to be behind the warehouse, as shown on Figure #2."
- Figure #2 – Site Plan has been revised to reflect the location of the three USTs.
- Please note that Henningson, Durham & Richardson Architecture & Engineering, P.C. (HDR) has added one additional soil boring location in the former area of the USTs since data regarding the removal of the tanks was not provided to YASR at the time of transfer of ownership. One subsurface soil sample will be collected from this additional boring (SB-17), as well as a groundwater sample (GW-17), using a temporary well. A surface sample (SS-17) will also be obtained if the area is unpaved.

Comment 3: Section 2.3

Site History: The first sentence is not clear. Did a gas light company operate within the boundary of the site or did this business operate on the adjacent property north of the site? Please clarify. Clarification is also needed for references to lumber, elevator and coal and wood company operations. Did this occur on site or at adjacent properties?

Response 3: Section 2.3

Please refer to Response 2.a

Comment 4: Section 3.2

Data Quality Objectives: The recent version of the USEPA "Guidance for the Data Quality Objectives Process" is dated August 2000 not 1994 as noted in this section.

Response 4: Section 3.2

Please note appropriate updates were made in Section 3.2 in regard to the 2000 revision of the 1994 US EPA "Guidance for the Data Quality Objectives Process" publication.

Comment 5: Section 3.3

Regulatory Standards and Guidelines: This section needs to state that all samples will be submitted to a New York State Department of Health ELAP (Environmental Laboratory Approval Program)-certified laboratory experienced in the analysis of environmental samples using the methods specified.

Response 5: Section 3.3

Section 3.3 and other relevant parts in the Work Plan have been revised to include the following: "All samples will be submitted to a New York State Department of Health Environmental Laboratory Approval Program (ELAP) certified laboratory experienced in the analysis of environmental samples using the methods specified."

Comment 6: Section 4.3

Planned Field Sampling: The field sampling plan needs to include a provision to collect on-site surface soil samples (0 to 2 inches) in areas not covered by asphalt or buildings (see comment #9b). In addition to on-site surface soil samples, at minimum, five off-site background surface soil samples need to be collected. Background samples need to be collected from locations unaffected by current and historic site operations. Agency personnel must approve sampling locations.

Response 6: Section 4.3

Section 4.3 and other relevant parts in the Work Plan have been revised to include the collection of on-site surface soil samples (0 to 2 inches) in areas not covered by asphalt or buildings. The remaining comment has been omitted due to the fact that HDR plans to use only the NYSDEC Technical and Administrative Guidance Memorandum 4046 for comparison of soil results, therefore no background samples are necessary.

Comment 7.a: Section 4.3.2

Continuous Soil Sampling:

a. Soil borings should not be limited to 15 feet below ground surface. Borings should continue (with continuous sampling) until groundwater is reached or equipment refusal.

Response 7.a: Section 4.3.2

Section 4.3.2 and other relevant parts in the Work Plan have been revised to include the following: "Borings shall continue (with continuous sampling) until groundwater is reached or equipment refusal."

Comment 7.b: Section 4.3.2

Continuous Soil Sampling:

b. Last paragraph: Exact locations of the soil borings will be selected in the field in consultation with agency staff.

Response 7.b: Section 4.3.2

Section 4.3.2 has been revised to include the following: "Exact locations of the soil borings will be selected in the field in consultation with agency staff."

Comment 8.a: Section 4.3.3

Monitoring Well Installation and Groundwater Sample Collection:

a. Following the installation and development of groundwater monitoring wells, a reasonable period of time (i.e.: one week) should lapse prior to purging of the well for the collection of groundwater samples.

Response 8.a: Section 4.3.3

Section 4.3.3 and other relevant parts in the Work Plan have been revised to include the following: "Groundwater Sampling will not take place until the monitoring well has recharged to 100 percent of its original depth to water. The original depth to water will be determined prior to well development."

Comment 8.b: Section 4.3.3

Monitoring Well Installation and Groundwater Sample Collection:

b. It is recommended that a groundwater sample be collected from soil boring SB-8 or SB-6 to assist in evaluating groundwater conditions at the southern edge of the site.

Response 8.b: Section 4.3.3

Section 4.3.3 and other relevant parts in the Work Plan have been revised to include a groundwater sample to be collected from a temporary monitoring well and soil boring GW-12/SB-12 (former location of SB-8) to assist in evaluating groundwater conditions at the southern edge of the site.

Comment 9.a: Section 4.3.5

Aboveground Storage Tank Removal:

a. This section talks about two AST's outside of the secondary containment area (one 1,000-gallon and one 550-gallon) that are marked for removal. Figures 2 and 3 only depict one 1,000-gallon UST and one 275-gallon tank (AST? or UST?) outside of the containment area. Please clarify all locations and description of storage tanks.

Response 9.a: Section 4.3.5

Section 4.3.5 and other relevant parts in the Work Plan have been revised to include the following: "In addition, one 275-gallon AST, registered and believed to be containing waste oil, is located next to the garage/warehouse building. One AST assumed to be 1,000 gallons and one AST assumed to be 550 gallons are located in the boiler house along the northern perimeter of the property. Neither of these tanks is registered and their contents are unknown. An additional AST assumed to be 550 gallons is located in the foam house along the eastern border of the property, has unknown contents and is unregistered."

Comment 9.b: Section 4.3.5

Aboveground Storage Tank Removal:

b. Soil samples to be collected beneath the removed ASTs (within the containment area) are not considered surface soil samples since they are beneath 1 foot of gravel and a Claymax liner. Soil borings with sample collection should be completed in these areas.

Response 9.b: Section 4.3.5

Section 4.3.5 and other relevant parts in the Work Plan have been revised to include the collection of soil borings (with continuous sampling) instead of surface soil sampling beneath the ASTs.

Comment 9.c: Section 4.3.5

Aboveground Storage Tank Removal:

c. Please clarify the sentence containing a reference to 'NYSDEC December 20, 2000 Memorandum'. What is this memo in reference to? – TAGM 4046 cleanup objectives? STARS objectives?

Response 9.c: Section 4.3.5

Section 4.3.5 and other relevant parts in the Work Plan have been revised to include the following: "Soil results will be compared with the tables for gasoline contaminated soils and fuel oil contaminated soils provided in the NYSDEC's December 20, 2000 Memorandum regarding determination of soil cleanup objectives. The Memorandum states that NYSDEC Recommended Soil Cleanup Objectives (RSCOs) in the Technical and Administrative Guidance Memorandum Hazardous Waste Remediation (TAGM HWR)-94-4046 are to be substituted for the quantitative values in the tables in STARS #1."

Comment 10: Section 4.3.9

Planned Sample Analysis: MTBE needs to be included in all sample analysis. All samples need to be analyzed by an ELAP approved lab (see comment #5).

Response 10: Section 4.3.9

Section 4.3.3 and other parts in the Work Plan have been revised to include the analysis of MTBE and that all samples will be analyzed by an ELAP-approved laboratory.

Comment 11: Section 5.0

Final Remedial Investigation/ Remedial Alternatives Report: The report needs to contain an Exposure Assessment section characterizing the exposure setting, potential routes of exposure and an evaluation of contaminant fate and transport. Information pertaining to the nearest municipal water supply and private well usage should be included.

Response 11: Section 5.0

Section 4.3.5 in the Work Plan has been revised to include the following bulleted item: "Exposure Assessment – This section will characterize the exposure setting, potential routes of exposure and an evaluation of contaminant fate and transport. In addition, information pertaining to the nearest municipal water supply and private well usage will also be included."

Comment 12: Community Air Monitoring Plan

While the consultant may not 'expect environmental concerns or compliance issues', it is recommended that particulate monitoring be conducted continuously at the upwind and downwind perimeters of the exclusion zone.

Response 12: Community Air Monitoring Plan

The Community Air Monitoring Plan in the Work Plan has been revised to include continuous particulate monitoring at the upwind and downwind perimeters of the exclusion zone.

Comment 13: Appendix A

Please note that there are some blank pages in the Acronym section.

Response 13: Appendix A

Please note that page 13 of 13 of the Acronym section has been confirmed to not include any information, however, it is part of the printout of the NYSDEC's website.

General Comments and Responses:

General Comment 1:

The work plan needs to include a sampling plan to investigate the existing catch basin, oil/water separator and associated drain lines.

General Response 1:

Section 4.3.4, Oil/Water Separator (formerly UST Removal), as well as other relevant parts of the Work Plan have been revised to include the following: "One water sample of the standing water in the oil/water separator will be collected and analyzed for VOCs (including MTBE) and SVOCs."

General Comment 2:

What is the status of the spill number 8912251 and 9801601?

General Response 2:

Section 2.3 has been revised to include the following: "Spill #8912251, as reported in the SCS Phase I Environmental Site Assessment, was listed with a 1989 #6 fuel oil Leaking Underground Storage Tank (LUST) spill #8912251. The spill report provided by Halstead-Quinn indicates 4,000-gallons of #6 fuel oil was recovered and pumped back into tanks and 1,000-gallons of contaminated product was placed into drums for disposal. Halstead-Quinn personnel stated that because of the consistency of #6 fuel oil in the cold of February, almost all product was scraped up and recovered for reuse or disposed of off-site. Any sheen in the recovery wells was removed by submerging a spill pad in the well."

Please note that regarding LUST Spill #9801601, there is no spill recorded with that LUST spill number at this site.

Section 2.3 has been revised to include the following: "Spill #9801901, as reported in the SCS Phase I Environmental Site Assessment, was a result of the #2 fuel oil pipe leak discovered on May 13, 1998. Data provided by the owner indicated approximately 10,372 gallons of #2 fuel oil was spilled in June 1998 and 8,575 gallons was recovered through December 31, 1998. The Scavenger Oil Recovery System recovery rate started at approximately 200 gallons per day when first installed July 1, 1998, and was down to approximately 7 gallons per day in January 1999. Halstead-Quinn personnel monitored the system."

Both spill # 8912251 and 9801901 are believed to still be active.

General Comment 3:

To facilitate review of future documents please provide tabbed sections for figures, tables, and appendices.

General Response 3:

We have provided tabs for each of the five parts of the work plan (including (1) Work Plan; (2) Field Sampling Plan/Quality Assurance Project Plan; (3) Health and Safety Plan; (4) Community Air Monitoring Plan; and (5) Citizens Participation Plan). In addition, tabs have been provided for the appendices for each of the five parts.

FINAL

REMEDIAL INVESTIGATION WORK PLAN

HALSTEAD-QUINN OIL STORAGE TERMINAL FACILITY

79-91 ALEXANDER STREET

YONKERS, NEW YORK

Site #B00193-3

Part A

Site Investigation Work Plan

Part B

Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP)

Part C

Project-Specific Health and Safety Plan (HASP)

Part D

Community Air Monitoring Plan (CAMP)

Part E

Citizens Participation Plan (CPP)

PART A

FINAL

REMEDIAL INVESTIGATION WORK PLAN
HALSTEAD QUINN OIL STORAGE TERMINAL FACILITY
79-91 ALEXANDER STREET
YONKERS, NEW YORK
Site # B00193-3

October 2003

Henningson, Durham & Richardson
Architecture and Engineering, P.C.
711 Westchester Avenue
White Plains, New York 10604

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APPENDICES

Appendix A – Summary of SCS Site Screening Investigation Results

Appendix B - ASTM D 5743-97 Drum Sampling

Appendix C – DUSR Resume

1.0 INTRODUCTION

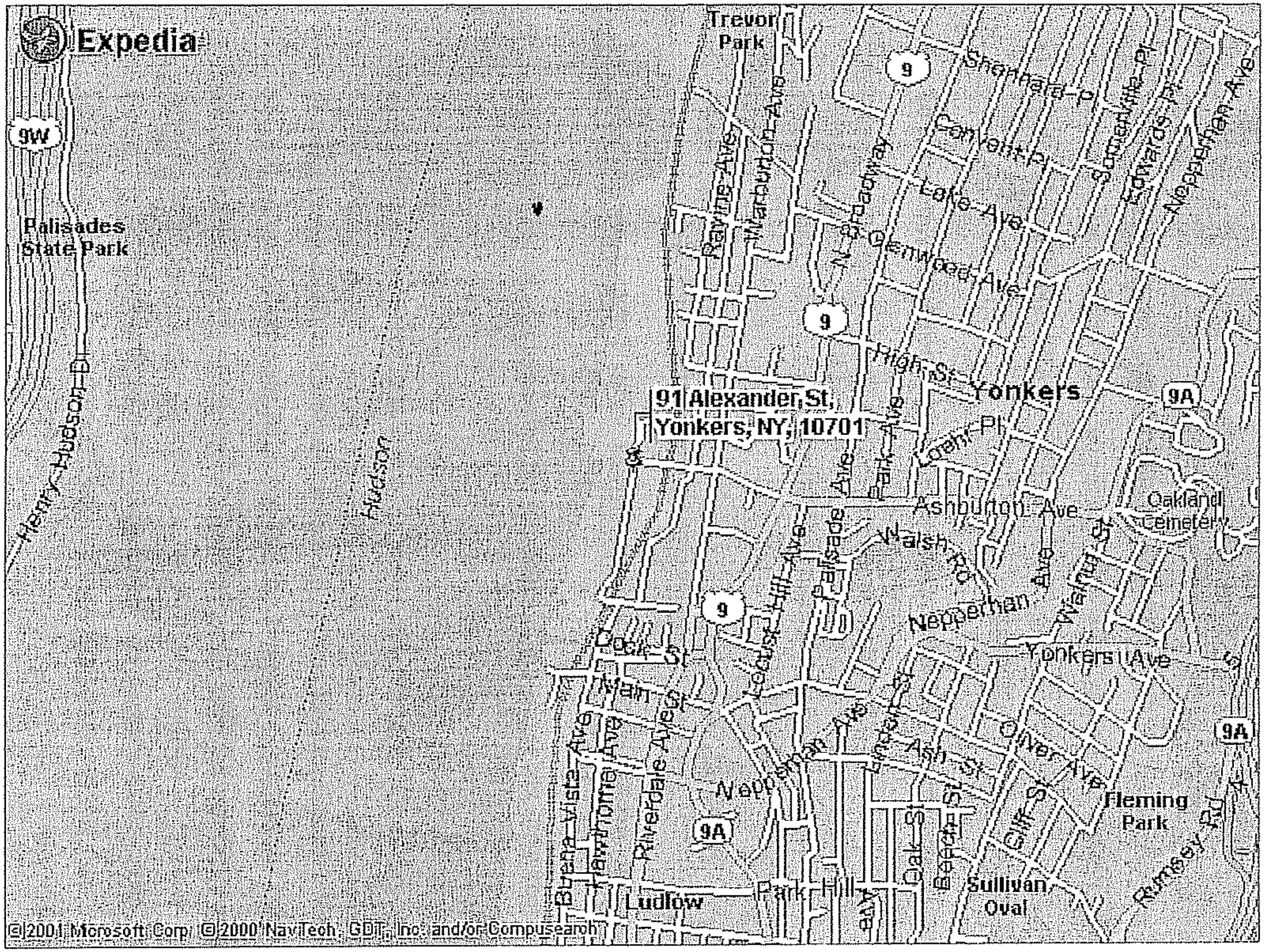
This Work Plan, prepared by Henningson, Durham & Richardson Architecture and Engineering, P.C. (HDR), is for the Remedial Investigation to be conducted on behalf of Yonkers Alexander Street Redevelopment, Inc. (YASR) at the Halstead-Quinn Major Oil Storage Facility (MOSF #3-2440) located at 79-91 Alexander Street in Yonkers, New York (site). The site is located in the City of Yonkers, Westchester County, New York (see Figure 1) and includes Tax Section 2, Block 2610, Lots 18, 22, 30 and 35. Figure 2 shows a plan view of the property. This Work Plan was developed using the following sources:

- A Phase I Environmental Site Assessment Report, dated March 5, 1999, prepared by SCS Engineers, P.C (SCS) for Halstead Quinn Propane, Inc,;
- A Phase I Environmental Site Assessment Report (Phase I Report), dated September 11, 2001, prepared by SCS for Bernard W. Costich, Esq., CPA (as Halstead-Quinn Propane, Inc. Supervising Party);
- A Site Screening Investigation Report (Investigation Report), dated September 5, 2001, prepared by SCS for Bernard Costich, Esq., CPA; and
- A Remedial Action Work Plan, dated October 2001, prepared by SCS for Bernard Costich, Esq., CPA.

Specific guidance documents and regulatory requirements are referenced where used throughout this document.

1.1 Purpose

The purpose of the Remedial Investigation is to: (1) conduct a supplemental site investigation to identify the existence and potential sources of soil and groundwater contamination on the site; (2) vertically and horizontally define the extent of contamination in on-site soils and groundwater; (3) conduct an asbestos and lead survey and lead-based paint survey of the structures on site; (4) prepare alternatives for remedial activities, if required; (5) identify potential routes of exposure and potential receptors; and (6) evaluate fate and transport of contaminants.



BLOCK DESCRIPTION:

FIGURE #1-SITE LOCATION MAP

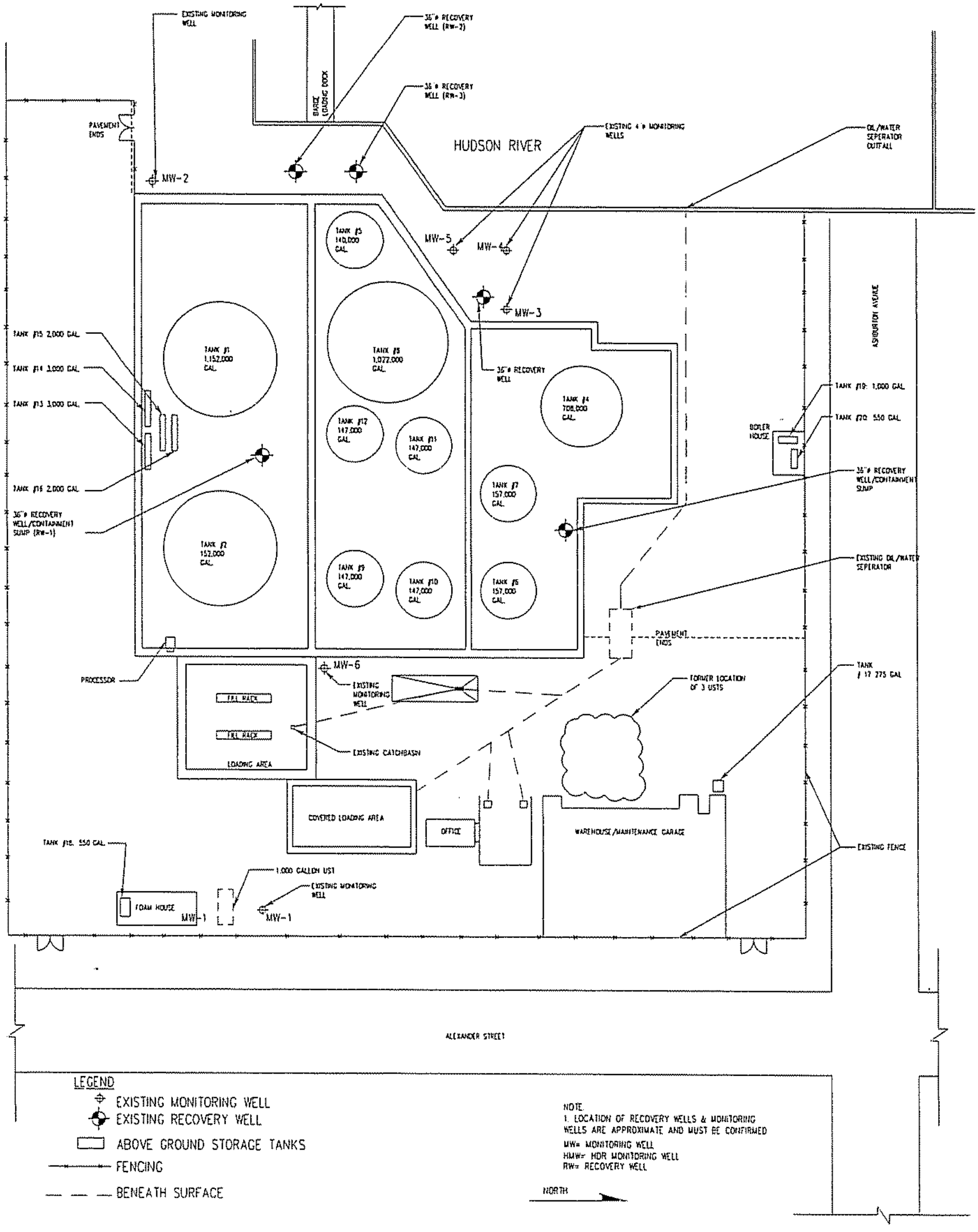
BLOCK NAME:

PLAN VIEW

PROJECT:

CITY OF YONKERS-ATI

Henningson, Durham
& Richardson
Architecture & Engineering, P.C.
711 Westchester Avenue
White Plains, NY 10604



SITE PLAN

SCALE: N T S

DESCRIPTION:	
FIGURE #2-SITE PLAN	
BLOCK NAME: PLAN VIEW	PROJECT: CITY OF YONKERS-ATI

HDR

Henningson, Durham & Richardson Architecture & Engineering, P C
711 Westchester Avenue
White Plains, NY 10604

1.2 Scope

HDR's current proposed scope of services (scope) consists of three tasks. Under Task 1, HDR has reviewed the documents listed above to determine appropriate locations for the soil samples and groundwater samples to prepare this Work Plan, Field Sampling Plan/Quality Assurance Project Plan, and Site-Specific Health and Safety Plan for the field activities. Under Task 2, HDR will provide the YASR with technical assistance related to the approval of this Work Plan from regulatory agencies, such as the New York State Department of Environmental Conservation (NYSDEC). Under Task 3, HDR will provide general technical assistance related to the site.

1.3 Work Plan Organization

The Work Plan is organized with the following sections:

Part A

Site Investigation Work Plan

Section 1.0 – Introduction
Section 2.0 – Site Description and History
Section 3.0 – Investigation Approach and Decision-Making Process
Section 4.0 – Site Investigation
Section 5.0 – Project Schedule

Part B
Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP)

Part C
Project-Specific Health and Safety Plan (HASP)

Part D
Community Air Monitoring Plan

Part E
Public Participation Plan

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description

The site is located on the east bank of the Hudson River in Yonkers, New York. The site is listed on Tax Section 2 as Block 2610, Lots 18, 22, 30 and 35. According to the Phase I Report, the site is approximately 2.8 acres. The site is bordered by the Hudson River on the west, Ashburton Avenue on the north, Alexander Street on the east and an industrial property on the south. Currently, the Department of Social Services is located to the north; Pennysaver, Atlantic Express and Lisa Choice Fundraising are located to the east; and a number of commercial buildings are located to the south.

The site was formally used as a Major Oil Storage Facility (MOSF) containing 16 registered aboveground storage tanks (ASTs) that were used to store a total capacity of 5,093,000 gallons of diesel and fuel oil. Table 1, below, lists the ASTs and the product that was previously stored in each. Fifteen (15) of the ASTs, AST Tank #1 through 16 (AST Tank #3 does not exist), were located in a secondary containment area consisting of a concrete wall and Claymax lined bottom under at least six of the ASTs. The 15 ASTs, along with piping within the containment area, were surveyed for lead based paint. Five of the ASTs tested positive for lead-based paint. In addition, all green piping located within the AST containment area and attached to the fuel fill racks also tested positive for lead. These 15 ASTs were drained and cleaned in August 2003 and demolished in September 2003 for the purpose of this investigation. One 275-gallon AST, registered and believed to be containing waste oil, is located next to the garage/warehouse building. One AST assumed to be 1,000-gallons and one AST assumed to be 550-gallons are located in the boiler house along the northern perimeter of the property. Neither of these tanks are registered and their contents are unknown. An additional AST assumed to be 550-gallons is located in the foam house along the eastern border of the property, and has unknown contents and is unregistered.

Table 1
Aboveground Storage Tanks

AST Tank #	Tank Size (gallons)	Product Previously Stored
1	1,152,000	Unleaded Gasoline
2	1,152,000	Unleaded Gasoline
4	708,000	#1, #2, or #4 Fuel Oil
5	147,000	Diesel
6	157,000	#1, #2, or #4 Fuel Oil
7	157,000	#1, #2, or #4 Fuel Oil
8	1,022,000	#1, #2, or #4 Fuel Oil
9	147,000	Diesel
10	147,000	#1, #2, or #4 Fuel Oil
11	147,000	#1, #2, or #4 Fuel Oil
12	147,000	#1, #2, or #4 Fuel Oil
13	3,000	Unleaded Gasoline
14	3,000	Diesel
15	2,000	#1, #2, or #4 Fuel Oil
16	2,000	#1, #2, or #4 Fuel Oil
17	275	#1, #2, or #4 Fuel Oil
18	550	#1, #2, or #4 Fuel Oil
19	1,000	#1, #2, or #4 Fuel Oil
20	550	#1, #2, or #4 Fuel Oil

The site is occupied by four buildings totaling approximately 5,000 square feet. The buildings include a warehouse/maintenance garage, a dispatch office, a fire suppression foam pumphouse, and an inactive boiler building. The buildings are single story, except for a section of the warehouse/maintenance garage that has a second floor office space (not in use). The buildings are brick and concrete block structures with no basements.

The site contained four truck drive-through fuel-fill racks and vehicle fuel dispensers. The rack areas were covered with corrugated metal roofs and are fully bermed with asphalt. The fuel-fill racks and vehicle fuel dispensers were demolished in September 2003. Catch basins located inside the bermed areas discharge to an oil-water separator that was permitted for discharge to the Hudson River. Since the closing of the site as a MOSF, the valves to discharge to the Hudson River were closed at the request of the NYSDEC.

A barge loading dock with four 8-inch diameter pipelines extends approximately 100 feet out into the Hudson River. The four 8-inch diameter pipelines were drained in August 2003 and were removed from the site in September 2003. An approximate 50-gallon capacity catch basin is located under the pipe header to contain minor spills. A guard/monitoring house is at the end of the dock from where vessel to tank farm fueling operations were formerly monitored.

There are six groundwater monitoring wells, three 3-foot diameter recovery wells, and two stormwater sumps/containment sumps on site (see Figure 2). One monitoring well was installed upgradient of the tank farm. Several monitoring wells and one recovery well were installed as a result of a 1989 #6 fuel oil spill (spill #8912251 – see below). Two additional recovery wells and four monitoring wells were installed in 1998 as a result of a pipe leak in which approximately 10,375 gallons of #2 fuel oil was released (spill #9801901 – see below). These recovery wells are not currently in use. A Scavenger Recovery System was previously used to recover product from the groundwater table at these recovery wells. Recovered product was pumped into a tank truck. The two stormwater sumps/containment sumps are located inside the containment area.

The following two spill reports are believed to still be active for the site:

Spill #8912251, as reported in the SCS Phase I Environmental Site Assessment, the site was listed with a 1989 #6 fuel oil Leaking Underground Storage Tank (LUST) spill #8912251. The spill report provided by Halstead-Quinn indicates 4,000-gallons of #6 fuel oil was recovered and pumped back into tanks and 1,000-gallons of contaminated product was placed into drums for disposal. Halstead-Quinn personnel stated that because of the consistency of #6 fuel oil in the cold of February almost all product was scraped up and recovered for reuse or disposed of off-site. Any sheen in the recovery wells were removed by submerging a spill pad in the well.

Spill #9801901, as reported in the SCS Phase I Environmental Site Assessment, was a result of the #2 fuel oil pipe leak discovered on May 13th, 1998. Data provided by the owner indicated approximately 10,372-gallons of #2 fuel oil was spilled in June 1998 and 8,575-gallons was recovered through December 31st, 1998. The Scavenger Oil Recovery System recovery rate started at approximately 200-gallons per day when first installed in July 1st, 1998, and was down to approximately 7-gallons per day in January 1999. Halstead-Quinn personnel monitored the system.

Spill #0306169 occurred during the demolition of the ASTs in September 2003 and was reported on September 10, 2003, at 3:50pm by Linda Shaw, Esq., environmental counsel to YASR, less than two hours after receiving notice. The spill was not from one of the tanks, but from a cut off drum serving as a containment unit for a draining pipe that was inadvertently run over by equipment during demolition work. Neither the contractor nor the consultant knew the exact quantity or concentration of the spilled matter, but the consulting team decided it was appropriate to report the spill. The source material was removed shortly after the incident, and additional removal of the material was conducted down to the existing Claymax liner. A closure report was submitted to the NYSDEC by Royal Environmental Services, a subcontractor to the demolition contractor. The NYSDEC has closed the spill number.

2.2 Hydrogeology

The geology of the site consists mainly of historic fill material. The site is located within a 100-year flood zone area. The groundwater under the site is tidally influenced and flows toward the Hudson River, which is a Tidal Estuary. The groundwater table is located approximately six feet below ground surface. The majority of the area is paved with asphalt. A stormwater collection system, consisting of asphaltic berms, storm drains and an oil/water separator, is located on-site to collect the stormwater, which is then discharged into the Hudson River via an outfall (NYSDEC State Pollutant Discharge Elimination System (SPDES) Permit number NY-0099538) to the Hudson River located in the northwest border of the site.

2.3 Site History

A section of the Hudson River was filled between 1886 and 1898 to create the site. The site was occupied by two companies, Archibald Lumber Company and P.A. Deyo and Son Elevator, in 1898 shortly after the site was created. Afterwards the Hudson Fuel Company and Harrigan Coal and Wood occupied the site by 1917. In 1919, two brick buildings were initially erected on the site, including a garage and stable. Hudson Fuel Company is listed as the site owner in 1919, 1923, and 1933. Hudson Fuel Company is believed to have owned the site through 1951. From 1951 through approximately 1977 or 1978, the site was owned by Standard Oil (currently ExxonMobil Corporation). From 1917 through 1951, Standard Oil owned the site to the east. It sold that site to Polychrome, Inc. in 1951, and then acquired the subject site for the purpose of installing a tank farm. It installed nine ASTs on the northern portion of the site (Tank Nos. 4, 5, 6, 7, 8, 9, 10, 11, 12) shortly after it acquired the site. Therefore, the site first became an operating oil terminal in the 1950s. In 1978, Standard Oil sold the site to A. Tarricone, Inc. (ATI). On or about December 1983, ATI installed two additional large ASTs (i.e., Tank Nos. 1 and 2, which are 1,152,000 gallons each, for unleaded gasoline) south of the previous nine ASTs. A total of 11 large ASTs appear to have been present between 1978and1989. Eventually, 16 ASTs were registered, including the 11 large ASTs. Sometime between 1995 and 2001, ATI sold or changed its name to Halstead-Quinn Propane, Inc. In spring 2001, Halstead-Quinn Propane, Inc. declared bankruptcy. In July 2002, YASR took control of the property and remains the current owner. The site is no longer in operation as an oil storage facility and all of the ASTs within the containment area were removed from the site during the recent demolition work in September 2003.

As noted above, former adjacent property owners include Standard Oil, who operated the site to the east from 1917 through 1951 and Polychrome, Inc., who operated the site to the east from 1951 through 1995. Other industries that have bordered the site over the past 105 years have included oil, asphalt, feed and produce, lumber, coal, an alcohol brewery, a local post office and a county ferry office.

2.4 Past Waste Management Practices

2.4.1 Target Compounds

Based on past waste management practices and results of previous investigations, potential contaminants expected at the site can be classified into the following categories:

- Volatile and Semi-Volatile Organic Compounds (VOCs and SVOCs) in the soil/groundwater;
- Resource Conservation Recovery Act (RCRA) metals in the soil/groundwater;
- Lead-based paint in building materials; and
- Asbestos Containing Material (ACM) in building materials.

2.4.2 Previous Investigations

The following Environmental Reports were used in developing this Work Plan:

1. September 2001 Phase I Environmental Site Assessment Report, prepared by SCS. The Phase I Report noted the following recommendations for the site:
    - Submit necessary documents to the NYSDEC to close all open spill numbers for the site.
    - Register the 275-gallon ASTs containing waste oil and the three USTs that were recently removed.
    - Submit tank closure reports for the three removed USTs.
    - Remove or register the one UST still on-site.
    - Conduct a future investigation to determine if more USTs exist on site.
    - Submit the Investigation Work Plan required under the Consent Order.

2. September 2001 Site Screening Investigation Report, prepared by SCS. The Site Investigation Report identified the following issues and actions for the site:
    - Conduct an additional site characterization sampling event for analyses of VOCs, SVOCs and metals in the groundwater and soil.
    - Remove remaining USTs.
    - Remove known soil hot spots in the immediate area where the three USTs were removed. (This action was recently performed by Bernard Costitch, Esq. in 2002).
    - Characterize groundwater flow conditions.

The results of the SCS Site Investigation are summarized in Appendix A to this Work Plan.

3.0 INVESTIGATION APPROACH AND DECISION-MAKING PROCESS

3.1 Introduction

This section outlines the investigation approach and details the criteria to be used in the decision-making process. The data quality objective (DQO) process (subsection 3.2) is used to identify the decisions that need to be made and the data types (quantity, type, and quality) that are needed to make the decisions.

3.2 Data Quality Objectives

The DQO process, as outlined in "Guidance for the Data Quality Objectives Process," United States Environmental Protection Agency (EPA, 2000), was used in developing this Work Plan. The DQO process is a strategic planning approach and is intended to ensure that task objectives are clearly defined, determine what environmental data are necessary to meet these objectives, and ascertain if the data collected are sufficient and of adequate quality for the intended usage. The DQO process is an iterative process designed to focus on the decisions that must be made, and ensure that data needed for the decisions are obtained.

The DQO process has seven steps. Although the seven steps are discussed sequentially in this document, they are undertaken in an interactive and iterative manner whereby the DQO elements are continually reviewed and re-evaluated. The DQO process is integrated with development of the data collection program and may be revised, as needed, based upon the results of each data collection activity.

- Step 1: State the Problem – The purpose of this step is to identify the planning team members including decision makers, describe the problem, develop a conceptual model of the environmental hazard to be investigated and to determine resources.

- Step 2: Identify the Decision – The purpose of this step is to identify the principle study questions, define alternative actions, develop a decision statement and to organize multiple decisions.

- Step 3: Identify the Inputs to the Decision – The purpose of this step is to identify the information needed, determine sources for this information, determine the basis for determining the Action Level and to identify sampling and analysis methods that can meet the data requirements.

- Step 4: Define the Boundaries of the Study – The purpose of this step is to define the target population of interest, specify the spatial boundaries that clarify what the data must represent, determine the time frame for collecting data and making decisions, determine the practical constraints on collecting data and to determine the smallest subpopulation, area, volume or time for which separate decisions must be made.

- Step 5: Develop a Decision Rule – The purpose of this step is to specify an appropriate population parameter, confirm the Action Level exceeds measurement detection limits and to develop a decision rule.

- Step 6: Specify Tolerable Limits on Decision Errors – The purpose of this step is to determine the range of the parameter of interest, choose a null hypothesis, examine consequences of making an incorrect decision, specify the range of values where consequences are minor and to assign probability values to points above and below the Action Level that reflect tolerable probability for potential decision errors.

- Step 7: Optimizing the Design for Obtaining Data – The purpose of this step is to review the DQO outputs, develop data collection design alternatives, formulate mathematical expressions for each design, select the sample size that satisfies the DQOs, decide on the most resource-effective design or agreed alternative and to document details in the QA Project Plan.

For the site under investigation within this Work Plan, a problem is specifically defined. A decision (or series of decisions) is identified to address the problem. For each decision, the data necessary to make the decision are described.

The DQOs are designed to provide sufficient data which, in addition to the information obtained during previous investigations, will be used to better characterize the site and evaluate to what extent past activities may impact human health and the environment. Based on the investigation results, an impact determination will be made. If no problems exist, no further action will be necessary. If potential impacts are identified, additional work may be recommended to further define and rectify the problem.

For all analytical data, quality assurance objectives describe the minimum quality of data necessary to support the specified decision. These quality assurance standards include precision, accuracy, representativeness, comparability, and completeness.

3.3 Regulatory Standards and Guidelines

Analytical methods utilized by the laboratory are to be those detailed in EPA and NYSDEC Analytical Services Protocol (ASP) 2000 documents. Site-specific data from media will initially be compared with applicable regulatory criteria. All samples will be submitted to a New York

State Department of Health Environmental Laboratory Approval Program (ELAP) certified laboratory experienced in the analysis of environmental samples using the methods specified. The following regulatory standards and criteria (with a discussion of their applicability to an industrial site) will be used:

- NYSDEC Recommended Soil Cleanup Objectives (RSCO) identified in NYSDEC's Technical and Administrative Guidance Memorandum (TAGM) HWR-94-4046, and/or other applicable soil cleanup objectives that will be developed and will be applicable to projects being conducted under the Bond Act Brownfields Restoration Program Title 56 of the Environmental Conservation Law.

- NYSDEC 6NYCRR Part 703, Surface and Groundwater Quality Standards (NYSDEC Standards).

4.0 SITE INVESTIGATION

The following subsections present decisions to be made, data objectives, and the planned field effort for the site. The general field procedures are also described. Please refer to Part B of this Work Plan (FSP/QAPP) for additional field sampling information and for specific Technical Procedures (TPs) as appropriate.

4.1 Site Decisions

Soil and groundwater investigation activities will be conducted to evaluate the potential environmental contamination at the site. The concentrations of contaminants detected in these media will determine the extent of further action at this site. If contaminant concentrations are below the regulatory standards or guidance values, if standards do not exist, as specified, no further action will be necessary at this site. If contaminant concentrations exceed the regulatory standards or guidance values, HDR will prepare an estimate of costs and remedial options as part of a Remedial Alternatives Report.

Lead-based paint and surveys will be conducted on the on-site buildings. The lead-based paint survey will determine what measures a contractor will need to take with respect to lead-based paint prior to demolishing the existing structures. An asbestos survey will also be conducted. The asbestos survey will be used to: (1) determine if ACM, materials that contain greater than1% asbestos, are present at the site; and (2) quantify the ACM that will require removal prior to demolition.

4.2 Data Objectives and Needs

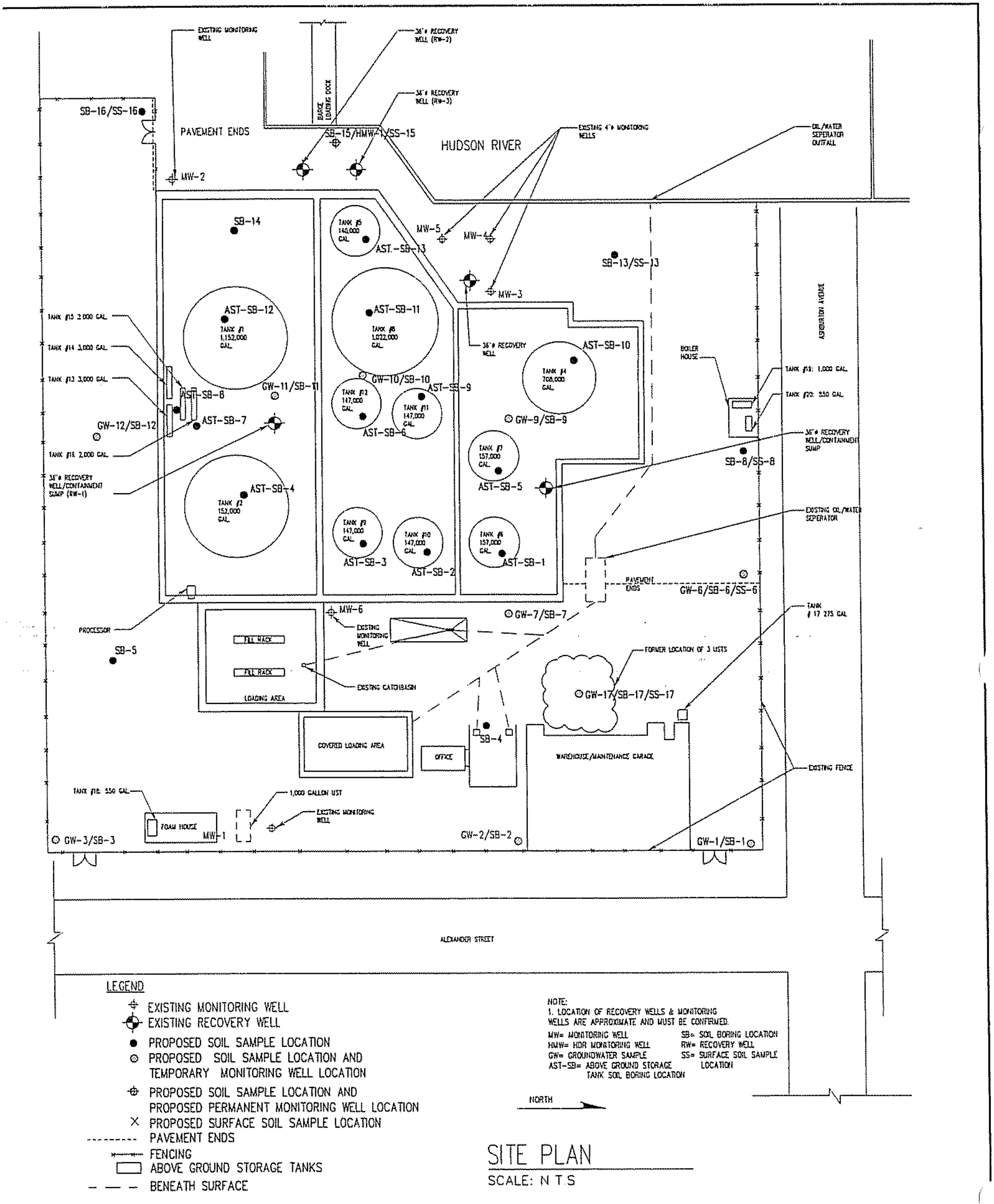
The objective of sampling at this site is to supplement data obtained during the Site Investigation to determine the extent of remaining petroleum contamination of site soils and/or groundwater, and if existing structures contain asbestos and/or lead-based paint Data needed to meet this objective include the collection and analyses of surface soil, subsurface soil and groundwater samples for VOCs (including methyl-Tertiary Butyl Ether (MTBE)), SVOCs and RCRA metals and the collection of building materials and paint samples to determine whether ACM or lead-based paints are present at the site. Groundwater sampling will not take place until the monitoring well has recharged to 100 percent of its original depth to water. The original depth to water will be determined prior to well development. All samples will be submitted to a New York State Department of Health Environmental Laboratory Approval Program (ELAP) certified laboratory experienced in the analysis of environmental samples using the methods specified.

4.3 Planned Field Sampling

Planned sampling at this site (see Figure 3 for proposed groundwater and soil sampling locations) includes:

- Continuous sampling of subsurface soils at 17 soil boring locations;
- Collection of on-site surface soil samples (0 to 2 inches) at the 6 soil boring locations which are located in non-paved areas;
- Installation of one permanent groundwater monitoring well;
- Continuous sampling of subsurface soils at one groundwater monitoring well location;
- Groundwater sampling from 10 temporary monitoring wells, 6 existing groundwater monitoring wells and one permanent groundwater monitoring well to be installed;
- Measuring groundwater levels and free product thickness, if any, from the above-mentioned monitoring wells ;
- Surface water sampling from the water located in the oil/water separator;
- The sampling of subsurface soils in the immediate area at 13 soil boring locations within the AST containment area;
- The removal of four ASTs, located outside of the containment area;
- Removal of one UST and associated petroleum contaminated soil;
- Drum Sampling to determine contents;
- Collecting building material samples for asbestos and lead-based paint analysis; and
- Asbestos and lead survey and lead-based paint survey of the structures on site.

The procedures to be used for the groundwater level measurements are described in Appendix A of the project FSP/QAPP. The field sample collection procedures are outlined in the following subsections with detailed TPs contained in the FSP/QAPP.



BLOCK DESCRIPTION:		HDR
FIGURE #3-SAMPLING LOCATIONS		Henningson, Durham & Richardson Architecture & Engineering, P.C. 711 Westchester Avenue White Plains, NY 10604
BLOCK NAME: PLAN VIEW	PROJECT: CITY OF YONKERS-ATI	

4.3.1 Asbestos Survey and Lead-Based Paint Survey

HDR will use Adelaide Associates (Adelaide) as a subcontractor to complete the asbestos survey and the lead-based paint survey. Adelaide will prepare a New York State asbestos survey and a lead-based paint survey in accordance with applicable requirements.

4.3.2 Continuous Soil Sampling

The collection of on-site surface soil samples (0 to 2 inches) will be at soil boring locations that are not paved or covered by buildings (SS-6, SS-8, SS-13, SS-15, SS-16 and SS-17). Subsurface soil samples will be collected at two-foot sample intervals from 17 soil boring locations (SB-1 through SB-17) and 1 groundwater monitoring well location (HMW-1) at the site. Surface and subsurface soil sampling will be conducted at SB-17, located in the former location of three USTs, since previous data from the UST removal process was not provided to YASR at the time of transfer of ownership. Continuous soil sampling techniques will be used to collect the soil samples in 2-foot intervals, from the ground surface to the depth of groundwater, or to a depth of equipment refusal, whichever is less. A geoprobe will be used to advance the borehole to the top of the 2-foot sample interval. Each of the soil samples collected will be field screened for the presence of VOC vapors using a photoionization detector (PID). A sample from the depth exhibiting the highest PID reading will be submitted to the laboratory for analysis. If no organic vapors, odors or signs of staining are detected in any samples from a given sampling location, the sample collected nearest to the soil-water interface will be submitted for analysis. Soil samples will be analyzed for VOCs (including MTBE), SVOCs and RCRA metals, unless soils saturated with free product is encountered, in which case, the soil sample will only be analyzed to determine the type and date of the free product.

Exact locations of the soil boring sampling points will be selected in the field prior to commencing sampling activities. The sampling locations will be placed to obtain representative coverage of the site. Specific technical procedures for obtaining the soil boring soil samples are described in Part B of this Work Plan (FSP/QAPP). Exact locations of the soil borings will be selected in the field in consultation with NYSDEC staff.

4.3.3 Monitoring Well Installation and Groundwater Sample Collection

One of the soil boring sample locations (SB-15) will be converted to a permanent, flush-mounted, shallow (expected to be no greater than 20 feet) groundwater monitoring well (HMW-1), after soil sampling is complete. The groundwater monitoring well will be developed, purged and a single sample obtained from the well. Groundwater Sampling will not take place until the monitoring well has recharged to 100 percent of its original depth to water. The original depth to water will be determined prior to well development. It is expected that groundwater will be encountered within 6 to 20 feet below ground surface. The groundwater monitoring well will be constructed in accordance with the TP-9-001, as included in Part B of this Work Plan. The well will be screened from 3 to 5 feet above the groundwater level, and 10 feet below the water table. In addition, one groundwater sample will be obtained from each of the existing six groundwater monitoring wells (MW-1 through MW-6) and each of the ten proposed temporary monitoring well locations (GW-1 through GW-3, GW-6, GW-7, GW-9 through GW-12, and GW-17). Figure 3 depicts the temporary monitoring well and existing monitoring well locations. Specific procedures for obtaining the groundwater samples are also described in the Quality Assurance Project Plan (QAPP) included in Part B of this Work Plan. Prior to obtaining a groundwater sample, the groundwater level and free product thickness, if any, will be measured with an oil/water interface probe. The Groundwater samples will be analyzed for VOCs (including MTBE), SVOCs and RCRA metals, unless free product is encountered, in which case, a sample of the free product will be obtained, rather than a groundwater sample, and analyzed to determine the type and date of the free product.

4.3.4 UST Removal

One UST is suspected to exist near the fire suppression foam. A trench will be created to expose the UST for draining and cleaning of the UST. Prior to the draining and removal of the UST, the UST will be registered and a work permit will be obtained for draining and removing the UST from the Westchester County Department of Health (WCDOH) who has jurisdiction over all petroleum bulk storage tanks in Westchester County. In addition, petroleum-contaminated soil encountered during the UST removal process will be removed and properly disposed of off-site.

The UST and its contents will be properly disposed of. Post-excavation samples will be obtained from the UST trench in accordance with the NYSDEC Spill Technology and Remediation Series (STARS) Memo #1. Subsequent to the completion of the UST removal process, a UST Closure Report will be prepared and provided as an appendix to the Remedial Investigation Report.

4.3.5 Aboveground Storage Tank Removal and Continuous Soil Sampling

All ASTs located within the secondary containment area were drained and cleaned during 2002. Unfortunately, the initial cleaning, performed by the previous owner, did not remove all of the residue material in the tanks, therefore, these ASTs were redrained in August 2003 and demolished in September 2003 to allow for continuous soil sampling beneath the tanks. One 275-gallon AST, registered and believed to be containing waste oil, is located next to the garage/warehouse building. One AST assumed to be 1,000-gallons and one AST assumed to be 550-gallons are located in the boiler house along the northern perimeter of the property. Neither of these tanks are registered and their contents are unknown. An additional AST assumed to be 550-gallons is located in the foam house along the eastern border of the property, and has unknown contents and is unregistered. These four ASTs that currently remain at the site will be removed from the site during the investigation. These four ASTs will be drained and cleaned, and all product/sludge will be properly disposed of in accordance with appropriate regulatory requirements. Prior to commencement of this work, all ASTs not registered will be registered and a work permit for the removal of all ASTs will be obtained. Soil in the immediate area of the former location of the ASTs within the containment wall will be sampled and analyzed in accordance with all federal, state and local regulations.

Subsurface soil samples will be collected at two-foot sample intervals from 13 soil boring locations (AST-SB-1 through AST-SB-13) at the site. Continuous soil sampling techniques will be used to collect the soil samples in 2-foot intervals, from the ground surface (below approximately one foot of gravel and a ¼" Claymax Liner gravel and Claymax liner) to the depth of groundwater, or to a depth of equipment refusal, whichever is less. A geoprobe will be used to advance the borehole to the top of the 2-foot sample interval. Each of the soil samples collected will be field screened for the presence of VOC vapors using a photoionization detector (PID). A sample from the depth exhibiting the highest PID reading will be submitted to the laboratory for analysis. If no organic vapors, odors or signs of staining are detected in any samples from a given sampling location, the sample collected nearest to the soil-water interface will be submitted for analysis.

The approximate locations of the samples in the AST containment area are depicted in Figure 3. It is estimated that one sample will be designated for each of the 11 large ASTs and two samples will be designated for the remaining four tanks. Exact locations of the soil boring sampling points will be selected in the field prior to commencing sampling activities. The sampling locations will be placed to obtain representative coverage of the site. Specific technical procedures for obtaining the soil boring soil samples are described in Part B of this Work Plan (FSP/QAPP). Exact locations of the soil borings will be selected in the field in consultation with NYSDEC staff.

The samples will be analyzed for the constituents listed in the tables for gasoline contaminated soils and fuel oil contaminated soils provided in the NYSDEC's December 20, 2000 Memorandum regarding determination of soil cleanup objectives. The Memorandum states that NYSDEC Recommended Soil Cleanup Objectives (RSCOs) in the Technical and Administrative Guidance Memorandum Hazardous Waste Remediation (TAGM HWR)-94-4046 are to be substituted for the quantitative values in the tables in STARS #1. However, if soil saturated with free product is encountered during the sampling, the sample will only be analyzed to determine the type and date of the free product, rather than for the constituents listed in the NYSDEC TAGM #4046 tables for gasoline contaminated soils and fuel contaminated soils. The sample results will be used to determine the appropriate remedial alternative for the site, which will be evaluated in the Remedial Site Investigation/Remedial Alternatives Report.

4.3.6 Drum Sampling

There are various unlabelled 5-gallon and 55-gallon drums on-site. For proper disposal of these drums and their contents, they will be sampled in accordance with the American Society for Testing and Materials (ASTM) D 5743-97, provided in Appendix B to this Work Plan.

4.3.7 Equipment Decontamination

All equipment and measuring devices used in obtaining samples shall be decontaminated in a manner consistent with the procedures that follow prior to use, between sampling points and intervals, and prior to leaving the site. The following procedures shall be used for decontaminating sampling equipment that will be used for obtaining multiple samples:

- Disassemble the sampling equipment, if required;
- Rinse with potable water to remove large soil particles;
- Scrub with Alconox solution;
- Sequentially rinse with potable water and deionized water (also include steps as described in the FSP/QAPP for samples requiring organics and metals additional analysis);
- Air dry equipment in a clean area;
- Reassemble equipment, as required; and
- Wrap in aluminum foil, if required, for transport or temporary storage.

Drilling equipment that comes in contact with the soil (Geoprobe, etc.) will be decontaminated using a high-pressure power wash, as discussed in the FSP/QAPP. Disposable bailers will be used for groundwater monitoring well sampling, so bailer decontamination is not required.

4.3.8 Sample Handling

Samples will be labeled as shown in Table 2. Samples will be labeled immediately before or after collection and shipped in coolers with ice. Specific requirements for sample handling are included in the FSP/QAPP.

4.3.9 Planned Sample Analyses

Historic information available for the site indicates that various chemicals of concern, including petroleum, may be present at the site. To evaluate these target compounds, a range of analyses will be completed on the soil and groundwater samples to evaluate impacts to the site media. All samples will be analyzed by an ELAP approved laboratory. The analytical parameters planned for the soil and groundwater samples include VOCs (including MTBE), SVOCs, and RCRA metals. However, soil samples obtained from the soil underlying the former location of the

ASTs will be analyzed for parameters listed in the NYSDEC TAGM #4046 tables for gasoline contaminates soils and fuel oil contained soils. However, if free product or soils saturated with free product is encountered a sample will be obtained and analyzed to determine the type and date of the petroleum. In addition, a Data Usability Summary Report (DUSR) will be performed. Both the Category B deliverables and the DUSR will be provided with the Final Investigative Report.

Tables 2 through 4 summarize specific analytical methods for the planned soil and groundwater samples, and Table 5 summarizes the sample container, preservation, and holding time information at the site.

Table 2

Planned Soil Sampling Summary

Sample Identification	EPA Method 8260B (VOCs including MTBE)	EPA Method 8270 (SVOCs)	EPA Method 6010/7000 (RCRA Metals)	Comments
Soil Boring Soil Samples				
SB-1	✓	✓	✓	Location 1
SB-2	✓	✓	✓	Location 2
SB-3	✓	✓	✓	Location 3
SB-4	✓	✓	✓	Location 4
SB-5	✓	✓	✓	Location 5
SB-6	✓	✓	✓	Location 6
SB-7	✓	✓	✓	Location 7
SB-8	✓	✓	✓	Location 8
SB-9	✓	✓	✓	Location 9
SB-10	✓	✓	✓	Location 10
SB-11	✓	✓	✓	Location 11
SB-12	✓	✓	✓	Location 12
SB-13	✓	✓	✓	Location 13
SB-14	✓	✓	✓	Location 14
SB-15	✓	✓	✓	Location 15
SB-16	✓	✓	✓	Location 16
SB-17	✓	✓	✓	Location 17
Surface Soil Samples				
SS-6	✓	✓	✓	Location 6
SS-8	✓	✓	✓	Location 8
SS-13	✓	✓	✓	Location 13
SS-15	✓	✓	✓	Location 15
SS-16	✓	✓	✓	Location 16
SS-17	✓	✓	✓	Location 17
Monitoring Well Soil Samples				
HMW-SB-1	✓	✓	✓	Location 1
Soil QC Samples				
SB-18 (Duplicate)	✓	✓	✓	Duplicate
SB-19 (Duplicate)	✓	✓	✓	Duplicate
SB-20 (MS/MSD)	✓	✓	✓	MS/MSD
RINSATE –1	✓	✓	✓	Rinsate

Notes:
MS/MSD: Matrix Spike/Matrix Spike Duplicate
HMW-SS: HDR Monitoring Well-Soil Sample
QC: Quality Control
SB-SS: Soil Boring-Soil Sample

Table 3

Planned AST Soil Sampling Summary

Sample Identification	Gasoline Contaminated Soils(1)	Fuel Oil Contaminated Soils(1)	Comments
AST Soil Boring Soil Samples			
AST-SB-1	✓	✓	Location 1
AST-SB-2	✓	✓	Location 2
AST-SB-3	✓	✓	Location 3
AST-SB-4	✓	✓	Location 4
AST-SB-5	✓	✓	Location 5
AST-SB-6	✓	✓	Location 6
AST-SB-7	✓	✓	Location 7
AST-SB-8	✓	✓	Location 8
AST-SB-9	✓	✓	Location 9
AST-SB-10	✓	✓	Location 10
AST-SB-11	✓	✓	Location 11
AST-SB-12	✓	✓	Location 12
AST-SB-13	✓	✓	Location 13
AST Soil QC Samples			
AST-14 (Duplicate)	✓	✓	Duplicate
AST-15 (Duplicate)	✓	✓	Duplicate
AST-16 (MS/MSD)	✓	✓	MS/MSD
RINSATE-1	✓	✓	Rinsate

<u>Notes:</u>

(1) NYSDEC TAGM #4046 tables for gasoline contaminated soils and fuel oil contaminated soils as listed in the NYSDEC's December 20, 2000 Memorandum regarding determination of soil cleanup objectives.

AST-SB: Aboveground Storage Tank-Soil Boring

MS/MSD: Matrix Spike/Matrix Spike Duplicate

Table 4
Planned Groundwater Sampling Summary

Sample Identification	EPA Method 8260B (VOCs)	EPA Method 8270 (SVOCs)	EPA Method 6010/7000 (RCRA Metals)	Comments
Temporary Monitoring Well Groundwater Samples				
GW-1	✓	✓	✓	Location 1
GW-2	✓	✓	✓	Location 2
GW-3	✓	✓	✓	Location 3
GW-6	✓	✓	✓	Location 6
GW-7	✓	✓	✓	Location 7
GW-9	✓	✓	✓	Location 9
GW-10	✓	✓	✓	Location 10
GW-11	✓	✓	✓	Location 11
GW-12	✓	✓	✓	Location 12
GW-17	✓	✓	✓	Location 17
New Permanent Monitoring Well Groundwater Sample				
HMW-1	✓	✓	✓	Location 1
Existing Monitoring Well Groundwater Samples				
MW-1	✓	✓	✓	Location 1
MW-2	✓	✓	✓	Location 2
MW-3	✓	✓	✓	Location 3
MW-4	✓	✓	✓	Location 4
MW-5	✓	✓	✓	Location 5
MW-6	✓	✓	✓	Location 6
Groundwater QC Samples				
HMW-2 (Duplicate)	✓	✓	✓	Duplicate
GW-17 (MS/MSD)	✓	✓	✓	MS/MSD
GW-18 (MS/MSD)	✓	✓	✓	MS/MSD
RINSATE-1	✓	✓	✓	Rinsate

Notes:
GW: Groundwater Sample
MS/MSD: Matrix Spike/Matrix Spike Duplicate
MW: Monitoring Well
HMW: HDR Monitoring Well
QC: Quality Control

Table 5

Soil and Groundwater Sample Containers, Preservation and Holding Times

Analyses	Sample Containers	Preservation	Holding Time
Soil			
EPA Method 8260B (VOCs)	1-8 oz. Jar	4^oc	7 days from VTSR
EPA Method 8270 (SVOCs)	1-8 oz. Jar	4^oc	Extract – 5 days from VTSR Analyze – 40 days from VTSR
RCRA Metals	1-8 oz. Jar	4^oc	6 months from VTSR 26 days from VTSR for Hg 12 days from VTSR for CN
Groundwater			
EPA Method 8260B (VOCs)	3-40 mL Vials	$H_2SO_4/4^oc$	10 days from VTSR
EPA Method 8270 (SVOCs)	2-1 L Amber glass bottles	4^oc	Extract – 5 days from VTSR Analyze – 40 days from VTSR
RCRA Metals (filtered)	1-500 mL Poly bottle	$HNO_3/4^oc$	6 months 26 days from VTSR for Hg 12 days from VTSR for CN

Notes:
°c: Degrees Celsius
CN: Cyanide
Hg: Mercury
L: Liter
mL: milliliters
oz.: Ounce
VTSR: Verified Time of Sample Receipt

5.0 FINAL REMEDIAL INVESTIGATION/REMEDIAL ALTERNATIVES REPORT

Upon completion of the remedial investigation described in this Work Plan and receipt of laboratory and other data results, HDR will prepare a Final Remedial Investigation Report/Remedial Alternatives Report. The Final Remedial Investigation/Remedial Alternatives Report will consist of the following:

- Executive Summary – This section will provide a brief summary of the Final Remedial Investigation/Remedial Alternatives Report.
- Site Description and History – This section will provide the description and history of the site. A USGS map will be included in this section. In addition, all known previous investigations will be summarized in this section.
- Site Investigation Methodology and Assumptions – This section will provide the procedures utilized for all field activities performed during the site investigation and any significant field observations. In addition, the actual number of samples and location of samples will be described in this section and provided in site maps.
- AST Demolition Summary – This section will describe the procedures used to demolish and dispose of the ASTs.
- UST Removal Summary – This section will describe the procedures used to remove and dispose of the UST.
- Investigation Results – This section will describe the results of the site investigation as well as provide summary tables of the soil and/or groundwater results and comparison of the results to applicable NYSDEC criteria. In addition, the following will also be provided: (1) a plume map will be developed and provided indicating the extent of the plume, if any, in both the groundwater and soil; and (2) a geological profile will be developed from the soil borings obtained from the site investigation. The results of the Lead-based Paint and Asbestos Survey will also be provided in this section.
- Exposure Assessment – This section will characterize the exposure setting, potential routes of exposure and an evaluation of contaminant fate and transport. In addition, information pertaining to the nearest municipal water supply and private well usage will also be included.
- Conclusion – This section will provide the conclusions of the site investigation, which will include: (1) any soil and/or groundwater contamination and the probable source of the contamination; (2) any lead-based paint and/or ACM found on the site; and (3) the groundwater flow direction and approximate thickness and volume of free product on site, if any. In addition, recommendations for further action at the site, if necessary, will be made.
- Proposed RAP – This section will evaluate the alternatives that could be implemented at the site based on the recommendations provided in the Conclusion. A feasibility, impacts and costs evaluation for each alternative will be provided, and a proposed Remedial Action Plan will be developed and recommended to the NYSDEC based on the alternative(s) proposed.

- Appendices – The appendices will include: (1) field activity pictures; (2) field logs; (3) boring logs and monitoring well construction logs; (4) Adelaide Associates Lead-based Paint/Asbestos Survey Report; (5) UST Closure Report; (6) Category B deliverables for the laboratory analyses; (7) DUSR; and (8) waste disposal manifests for waste generated during the site investigation.

6.0 PROJECT SCHEDULE

An estimated project schedule for the Remedial Investigation Work to be conducted at 79-91 Alexander Street located in Yonkers, New York is shown below.

Begin Field Operations	
Conduct Field Operations	30 days
Receive Analytical Data from Laboratory	14 days from completion of field operations
Receive DUSR Report	Fifteen (15) business days from receipt of Category B deliverables from laboratory
Submit Draft Remedial Investigation/Remedial Alternatives Report	30 days from receipt of all analytical data

PART A APPENDICES

APPENDIX A

Summary of SCS Site Screening Investigation Results

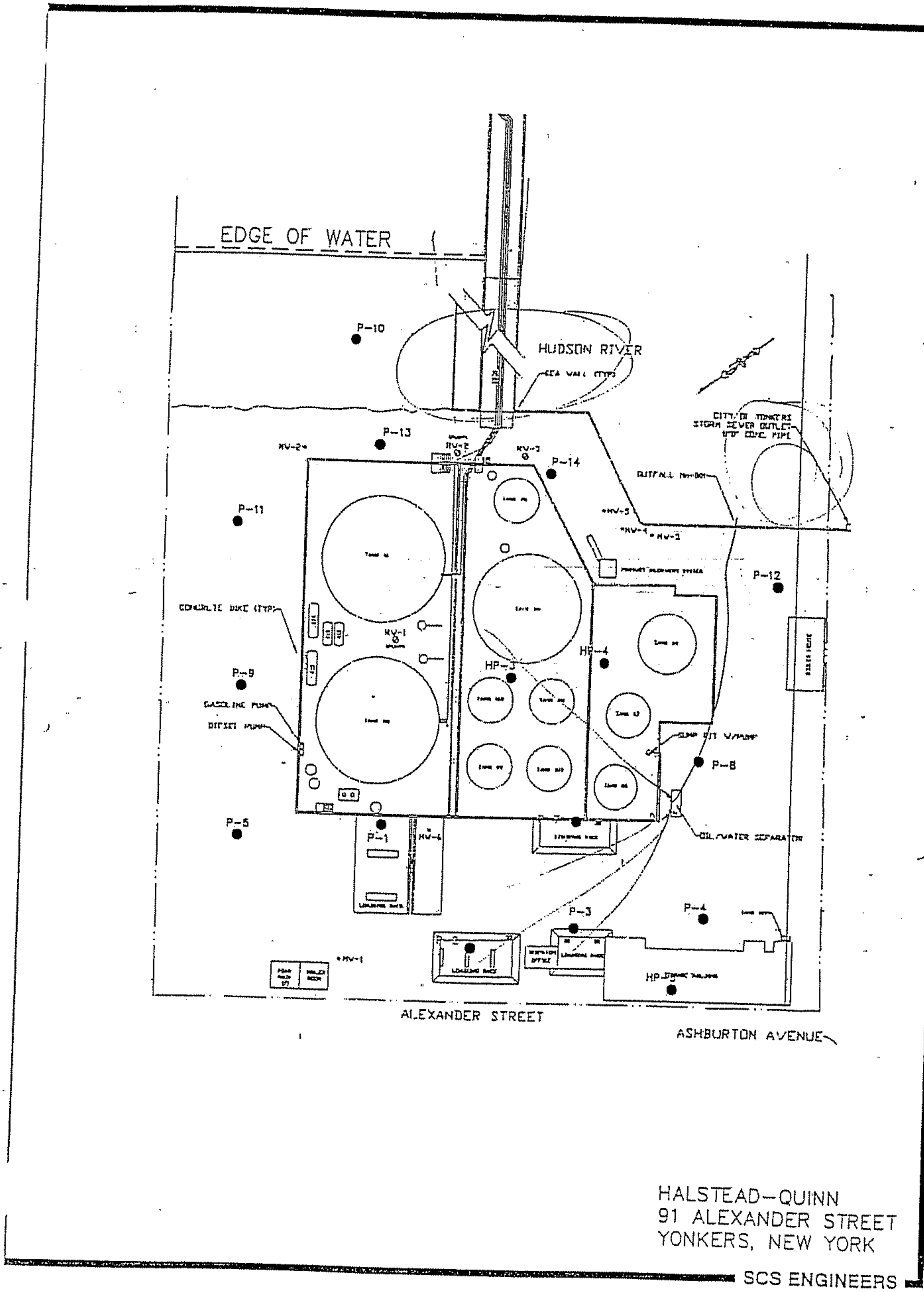


FIGURE 1-1. SITE PLAN

TABLE A-1

GROUNDWATER MONITORING WELL SAMPLES – 4" DIAMETER SEMI-VOLATILE AND VOLATILE ORGANIC COMPOUNDS

Parameter	NYS Water Quality A(A)[1]/4046[2]	MW-1 ppb	MW-2 ppb	MW-3 ppb	MW-6 ppb
SVOC					
Anthracene	35/50	<5	<5	<5	<5
Fluorene	4.8/50	<5	<5	<5	<5
Phenanthrene	45/50	<5	<5	<5	<5
Pyrene	42/50	<5	<5	<5	<5
Acenaphthalene	48/20	<5	<5	<5	<5
Benzo(a)anthreacene	0.23/.002	<5	<5	<5	<5
Fluoranthene	*[3]/50	<5	<5	<5	<5
Acenaphthalene	NL/20	<5	<5	<5	<5
Benzo(b)fluoranthene	*/.002	<5	<5	<5	<5
Benzo(k)fluoranthene	*/.002	<5	<5	<5	<5
Chrysene	*/.002	<5	<5	<5	<5
Benzo(a)pyrene	*/5	<5	<5	<5	<5
Benzo(g,h,l)pyrene	NL/5	<5	<5	<5	<5
Indeno(1,2,3-cd)pyrene	*/.002	<5	<5	<5	<5
Dibenz(a,h)anthracene	NL/50	<5	<5	<5	<5
VOC					
Benzene	760/0.7	<5	8	<5	6
Ethylbenzene	150/5	<5	31	<5	4
Toluene	480/5	<5	10	<5	<1
m-Xylene & p-Xylene	NL/5	<5	120	<5	<1
o-Xylene	NL/5	<5	30	<5	<1
Isopropylbenzene	23/NL	<5	20	<5	4
n-propylbenzene	NL	<5	11	<5	5
p-Isopropyltoluene	NL	<5	<3	<5	<1
1,2,4-Trimethylbenzene	NL	<5	78	<5	<1
1,3,5-Trimethylbenzene	NL	<5	27	<5	<1
n-Butylbenzene	NL	<5	21	<5	4
1,3,5-Trimethylbenzene	NL	<5	27	<5	<1
n-Butylbenzene	NL	<5	21	<5	4
Sec-Butylbenzene	NL	<5	<3	<5	3
t-Butylbenzene	NL	<5	<3	<5	<1
Naphthalene	110/NL	<5	40	<5	5
MTBE	NL	<5	55	<10	<20

Notes:
(1)Water Type A(A) Fish Survival (fresh water) Surface Water Guidance Value.
(2)TAGM 4046 Groundwater Standard.
(3)* – No Guidance listed for Type A(A) waters
NL – Not listed

TABLE A-2

GROUNDWATER MONITORING WELL SAMPLES – 1" DIAMETER
SEMI-VOLATILE AND VOLATILE ORGANIC COMPOUNDS

Parameter	NYS Water Quality A(A)[1]/4046[2]	P-1 ppb	P-5 ppb	P-8 ppb	P-14 ppb
SVOC					
Anthracene	35/50	<5	<5	<5	<5
Fluorene	4.8/50	<5	<5	<5	<5
Phenanthrene	45/50	<5	<5	<5	<5
Pyrene	42/50	<5	<5	<5	<5
Acenaphthalene	48/20	<5	<5	<5	<5
Benzo(a)anthreacene	0.23/.002	<5	<5	<5	<5
Fluoranthene	*[3]/50	<5	<5	<5	<5
Acenaphthalene	NL/20	<5	<5	<5	<5
Benzo(b)fluoranthene	*/.002	<5	<5	<5	<5
Benzo(k)fluoranthene	*/.002	<5	<5	<5	<5
Chrysene	*/.002	<5	<5	<5	<5
Benzo(a)pyrene	*/5	<5	<5	<5	<5
Benzo(g,h,l)pyrene	NL/5	<5	<5	<5	<5
Indeno(1,2,3-cd)pyrene	*/.002	<5	<5	<5	<5
Dibenz(a,h)anthracene	NL/50	<5	<5	<5	<5
VOC					
Benzene	760/0.7	11	<1	5	<1
Ethylbenzene	150/5	13	<3	1	<1
Toluene	480/5	6	<1	0.6	<1
m-Xylene & p-Xylene	NL/5	28	8	5	<1
o-Xylene	NL/5	27	1	4	<1
Isopropylbenzene	23/NL	<5	2	1	<1
n-propylbenzene	NL	7	4	1	<1
p-Isopropyltoluene	NL	<5	1	<0.5	<1
1,2,4-Trimethylbenzene	NL	42	17	5	2
1,3,5-Trimethylbenzene	NL	12	6	0.7	<1
n-Butylbenzene	NL	17	13	2	5
Sec-Butylbenzene	NL	<5	1	1	1
t-Butylbenzene	NL	<5	<1	<0.5	<1
Naphthalene	110/NL	67	14	1	1
MTBE	NL	140	<20	13	<20

Notes:
(1)Water Type A(A) Fish Survival (fresh water) Surface Water Guidance Value.
(2)TAGM 4046 Groundwater Standard.
(3)* – No Guidance listed for Type A(A) waters.
NL – Not listed
ppb – parts per billion

TABLE A-3
GROUNDWATER AND SOIL SAMPLES
TOTAL PETROLEUM HYDROCARBONS

Sample ID	TPHC in Groundwater (mg/L)	TPHC in Soil (mg/Kg)[1]
P-1	7.8	650
P-2	3.7	20,000
P-3	<1	11
P-4	<1	1,300
P-5	4.1	19,000
P-6	<1	5,600
P-7	<1	6,700
P-8	2.7	26,000
P-9	<1	14,000
P-10	<1	63
P-11	<1	16
P-12	<1	620
P-13	230	7,500
P-14	<1	15,000
HP-3	1.1	2,500
HP-4	5.1	11,000

Notes:
[1]Soil samples taken immediately above the water table.
mg/Kg – milligrams per kilogram
mg/L – milligrams per liter
TPHC – Total Petroleum Hydrocarbons

TABLE A-4

GROUNDWATER (1" Temporary Well) AND SOIL SAMPLE (Augur) RESULTS

Parameter	NYS Water Quality A(A)[1]/4046[2]	NYS GW Protection ppb	HP-4 (soil) ppb	P-4 (groundwater) ppb
SVOC				
Anthracene	35/50	7,000,000	520	<5
Fluorene	4.8/50	350,000	850	<5
Phenanthrene	45/50	220,000	1900	<5
Pyrene	42/50	665,000	980	<5
Acenaphthalene	48/20	90,000	720	<5
Benzo(a)anthreacene	0.23/.002	3,000	<450	<5
Fluoranthene	*[3]/50	1,900,000	<450	<5
Acenaphthalene	NL/20			<5
Benzo(b)fluoranthene	*/.002	1,100	<450	<5
Benzo(k)fluoranthene	*/.002	1,100	<450	<5
Chrysene	*/.002	400	<450	<5
Benzo(a)pyrene	*/5	11,000	<450	<5
Benzo(g,h,l)pyrene	NL/5	800,000	<450	<5
Indeno(1,2,3-cd)pyrene	*/.002	3,200	<450	<5
Dibenz(a,h)anthracene	NL/50	165,000,000	<450	<5
VOC				
Benzene	760/0.7	60	<560	<1
Ethylbenzene	150/5	5,500	2,200	<1
Toluene	480/5	1,500	<560	<1
m-Xylene & p-Xylene	NL/5	1,200	<560	6
o-Xylene	NL/5	NL	<560	<1
Isopropylbenzene	23/NL	NL	<560	2
n-propylbenzene	NL	NL	6,900	2
p-Isopropyltoluene	NL	NL	<560	<1
1,2,4-Trimethylbenzene	NL	NL	6,100	24
1,3,5-Trimethylbenzene	NL	NL	5,100	5
n-Butylbenzene	NL	NL	12,000	6
Sec-Butylbenzene	NL	NL	1,700	1
t-Butylbenzene	NL	NL	<560	<1
Naphthalene	110/NL	13000	2,600	16
MTBE	NL	NL	<12,000	<20

Notes:
(1)TAGM 4046 Groundwater Standard
(2)Water Type A(A) Fish Survival (fresh water) Surface Water Guidance Value
(3)* – No Guidance listed for Type A(A) waters
NL – Not listed
ppb – parts per billion

TABLE A-5

UST REMOVAL – SOIL AND GROUNDWATER SAMPLING[1]

Parameter	NY GW Protection 4046[2]	NY GW Standard 4046	South Wall	North Wall	West Wall	GW
SVOC						
Anthracene	7,000,000	50	1,300	<440	1,300	<5
Fluorene	350,000	50	1,400	<440	1,300	<5
Phenanthrene	220,000	50	5,200	<440	4,800	6
Pyrene	665,000	50	3,100	<440	1,600	<5
Acenaphthalene	90,000	20	1,200	<440	1,100	<5
Benzo(a)anthracene	3,000	.002	1,900	<440	480	<5
Fluoranthene	1,900,000	50	3,900	<440	2,200	<5
Benzo(b)fluoranthene	1,100	.002	1,200	<440	550	<5
Benzo(k)fluoranthene	1,100	.002	430	<440	<390	<5
Chrysene	400	.002	1,800	<440	580	<5
Benzo(a)pyrene	11,000	5	660	<440	<390	<5
Benzo(g,h,l)perylene	800,000	5	<380	<440	<390	<5
Indeno(1,2,3-cd)pyrene	3,200	.002	<380	<440	<390	<5
Dibenz(a,h)anthracene	165,000,000	50	<380	<440	<390	<5
Naphthalene	13,000	10	950	1,100	2,200	<1
VOC[2]						
Benzene	60	0.7	<94	<83	<97	<1
Ethylbenzene	5,500	5	330	<83	780	<1
Toluene	1,500	5	<94	<83	1,300	5
m-Xylene & p-Xylene	1,200	5	<94	88	150	<1
o-Xylene	NL	5	120	510	220	<1
Isopropylbenzene	NL	NL	110	<83	130	<1
n-Propylbenzene	NL	NL	610	<83	440	2
p-Isopropyltoluene	NL	NL	1,200	<83	2,100	2
1,2,4-Trimethylbenzene	NL	NL	260	84	310	2
1,3,5-Trimethylbenzene	NL	NL	690	<83	1,500	3
n-Butylbenzene	NL	NL	2,300	<83	4,500	7
Sec-Butylbenzene	NL	NL	320	<83	1,100	2
t-butylbenzene	NL	NL	<94	<83	<97	<1
MTBE	NL	NL	<1,900	<1,700	<2,000	<20

Notes:
[1]All concentrations in ppm, Methods 8270-SVOC and 8021-VOC.
[2]TAGM 4046 Groundwater Standard.
NL – Not listed

APPENDIX B

ASTM D 5743-97 Drum Sampling

AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
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Standard Practice for Sampling Single or Multilayered Liquids, With or Without Solids, in Drums or Similar Containers[1]

This standard is issued under the fixed designation D 5743; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers typical equipment and methods for collecting samples of single or multilayered liquids, with or without solids, in drums or similar containers. These methods are adapted specifically for sampling drums having a volume of 110 gal (416 L) or less. These methods are applicable to hazardous material, product, or waste. Specific sample collection and handling requirements should be described in the site-specific work plan.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary statements are given in 7.2.7.1 and Notes 1 and 2.

2. Referenced Documents

2.1 *ASTM Standards:*

D 4687 Guide for General Planning of Waste Sampling[2]

D 5088 Practice for the Decontamination of Field Equipment Used at Non-Radioactive Waste Sites[3]

D 5283 Practice for Generation of Environmental Data Related to Waste Management Activities: Quality Assurance and Quality Control Planning and Implementation[2]

D 5495 Practice for Sampling with a Composite Liquid Waste Sampler (COLIWASA)[2]

2.2 *Other Documents:*

Drum Handling Practices at Hazardous Waste Sites, EPA/600/2-86/013, PB 165362, January 1986[4]

Accident Prevention Manual for Industrial Operations, 1992[5]

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, No. 85-115, October 1985[4]

3. Terminology

3.1 *Definitions:*

3.1.1 *bonding*—touching the sampling equipment to the drum to form an electrically conductive path to minimize potential electrical differences between the sampling equipment and drum, reducing the buildup of static electricity.

3.1.2 *bung*—usually a 2-in. (5.1-cm) or ¾-in. (1.3-cm) diameter threaded plug designed specifically to close a bung hole.

3.1.3 *bung hole*—an opening in a barrel or drum through which it can be filled, emptied, or vented.

3.1.4 *deheading*—removal of the lid of a closed-head drum; it is usually accomplished with a drum deheader.

3.1.5 *drum*—implicitly any drum, barrel, or non-bulk container of 5 to 110-gal (19 to 416-L) capacity.

3.1.6 *pail*—a small container, usually of 5-gal (19-L) capacity. Pails typically have bungs or spouts, or the entire lid can be removed.

3.1.7 *paperwork*—all required site documentation, which may include the manifests, waste profiles, material safety data sheets (MSDS), site forms, sample labels, seals, and chain of custody forms.

3.1.8 *sludge*—any mixture of solids that settles out of solution. Sludges contain liquids that are not apparent as free liquids.

3.1.9 *work plan*—a plan specific to a particular site; it is for conducting activities specified in the plan.

4. Summary of Practice

4.1 The drum and its contents are inspected, and appropriate sampling equipment is selected. A clean sampling device is lowered slowly into the liquid to be sampled. After the material has entered the device, it is removed from the drum. The contents of the device are discharged into a sample container. The sampling device is then either disposed of or cleaned and decontaminated.

5. Significance and Use

5.1 This practice is intended for use in collecting samples of single and multilayered liquids, with or without solids, from drums or similar containers, including those that are unstable, ruptured, or otherwise compromised. Special handling procedures (for example, remote drum opening, overpressurized drum opening, drum deheading, etc.) are described in *Drum Handling Practices at Hazardous Waste Sites.*

6. Interferences

6.1 The condition of the materials to be sampled, and the

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[1] This practice is under the jurisdiction of ASTM Committee D-34 on Waste Management and is the direct responsibility of Subcommittee D34.01 on Sampling and Monitoring.

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[2] *Annual Book of ASTM Standards,* Vol 11.04.

[3] *Annual Book of ASTM Standards,* Vol 04.09.

[4] Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

[5] Available from National Safety Council, P.O. Box 558, Hasca, IL 60143-0558.

condition and accessibility of the drums, will have a significant impact on the selection of sampling equipment.

7. Pre-Sampling

7.1 *General Principles and Precautions:*

7.1.1 Samples should be collected in accordance with an appropriate work plan (Practice D 5283 and Guide D 4687). This plan must include a worker health and safety section because there are potential hazards associated with opening drums as well as potentially hazardous contents. See the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* for information on health and safety at hazardous waste sites.

7.1.2 Correct sampling procedures must be applied to conditions as they are encountered. It is impossible to specify rigid rules describing the precise manner of sample collection because of unknowns associated with each liquid sampling situation. It is essential that the samples be collected by a trained and experienced sampler because of the various conditions under which drummed liquids must be sampled.

7.1.3 To be able to make probability or confidence statements concerning the properties of a sampled lot, the sampling procedure must allow for some element of randomness in selection because of possible variations in the material. The sampler should always be on the alert for possible biases arising from the use of a particular sampling device or from unexpected segregation within the material.

7.1.4 The sampling equipment, sample preparation equipment, sample containers, etc. must be clean, dry, and inert to the material being sampled. All equipment, including sample containers, must be inspected before use to ensure that they are clear of obvious dirt and contamination and are in good working condition. Visible contamination must be removed, and the equipment must be decontaminated with the appropriate rinse materials. Decontaminated sampling equipment should be protected from contamination. This may include, but not be limited to, storage in aluminum foil, plastic bags, polytetrafluoroethylene (PTFE) film, or other means of protection that will not impact the sample quality or intended analysis.

7.2 *Basic Pre-Sampling Practices:*

7.2.1 Review all paperwork.

7.2.2 Select the sampling equipment and sample containers appropriate for the material in the drum, as detailed in the work plan.

7.2.3 Enter the work zone.

7.2.4 Inspect all drums to be sampled visually. Note any abnormal conditions (for example, rust marks, stains, bulges, or other signs of pressurization or leaks) that may require special handling. The work plan should clearly define the limiting conditions under which special handling procedures shall be initiated. See *Drum Handling Practices at Hazardous Waste Sites* for information on opening overpressurized drums and the use of remotely operated drum opening equipment.

7.2.5 Stage the drums to be sampled in a designated work area if they cannot be sampled in their current location. See *Drum Handling Practices at Hazardous Waste Sites* for further information on staging drums.

7.2.5.1 Move the drums to upright stable positions if necessary. Sufficient space shall be left between drums to prevent movement hazards.

7.2.5.2 Allow adequate time for the drum contents to stabilize if movement of a drum is required. The settling time is dependent on the type of material expected.

7.2.5.3 Number or identify uniquely all drums to be sampled.

7.2.6 Perform a detailed inspection of individual drums.

7.2.6.1 Record all relevant information from drum labels, markings, data sheets, and so forth, in the field log book or on forms specified in the work plan.

7.2.6.2 Verify that there are no discrepancies with existing paperwork.

7.2.6.3 Any discovered inconsistency from the paperwork (such as evidence of crystals on the drum exterior) should be noted in the field log book.

7.2.7 Slowly remove the bung or loosen the ring that secures the lid, allowing any pressure or vacuum to equalize.

7.2.7.1 *Precautionary Notes:*

(*1*) If the drum or pail appears to be under positive or negative pressure (that is, a slight bulge or dimple in the lid), control the release of pressure until it has equalized. For example, if the drum or pail is equipped with bungs, loosen the smaller bung first since doing so will make it easier to control the release of pressure.

(*2*) Pails equipped with snap-on lids may be difficult to open. Care must be exercised when opening to minimize the potential of splashing of the contents.

(*3*) If the top of the drum is dished inward (dimpled), it may "pop" when equalizing pressure, spraying the sampler with any material that is sitting on top of the drum.

(*4*) If there is evidence of a chemical reaction or sudden pressure buildup, the sampler should leave the area immediately and evaluate whether remote drum opening equipment should be used.

(*5*) For flammable or explosive materials, the drum and sampling equipment should be grounded if the generation of static electricity while opening or sampling the drum is a possibility. The drum and sampling equipment should be grounded to a ground stake or to an existing ground (building ground, grounded water pipes, etc.). New glass, plastic thiefs, or composite liquid waste samplers (COLIWASAs) may have some residual static electrical charge due to the materials in which they are packed and shipped. The work plan should specify whether grounding is required. See the *Accident Prevention Manual for Industrial Operations* for information on grounding and bonding.

7.2.7.2 Drums should be opened, sampled, and closed individually to minimize the risk of volatilization and exposure.

7.2.7.3 *Drums (or Pails) with Bungs*—When using a manual bung wrench, cover it with a wipe or cloth to control potential liquid spray. Use non-sparking tools.

7.2.7.4 *Drums with Removable Lids*—Loosen the ring slowly with a manual wrench or air impact wrench. Use non-sparking tools.

7.2.7.5 *Pails with Removable Lids (Side-Lever Lock Ring)*—Release the lever slowly.

7.2.7.6 *Pails with Removable Lids (Snap-On)*—Pry the lid loose slowly with a pail lid opener.

7.2.8 Manual or remote puncturing or deheading will be required if the drum has a stuck bung or the lid cannot be removed. See *Drum Handling Practices at Hazardous Waste Sites* for further information on manual or remote drum opening.

7.2.9 If required, insert a measuring rod (graduated in litres or gallons) into the drum to measure the liquid volume and determine the presence of solids at the bottom and estimate their percentage. (If minimal disturbance of the contents is required, the measuring rod can be inserted in the vent bung hole when working with a bung-top-drum.) The rod can be graduated in litres or gallons for a specific size drum, or it can be graduated in linear units (inches, centimetres, and so forth), with the liquid depth converted to volume using an appropriate volume conversion. The measuring rod should be nonreactive to the waste being contacted.

NOTE 1: Caution—Before inserting the measuring rod into the drum, touch the rim gently with the rod (bonding) opposite from the bung to equalize any static charge that the drum may exhibit. The work plan should specify whether bonding is required.

7.2.9.1 For many liquids, the sampling equipment can serve as a substitute measuring device. This can be accomplished by measuring the length of the liquid column as it is being held over the drum and applying an appropriate volume conversion (for example, 1 in. (2.54 cm) equals 1.7 gal (6.43 L) in a 55-gal (208-L) drum).

NOTE 2: Caution—The sampling equipment or measuring rod should be at or near the temperature of the drummed liquid to minimize any reaction caused by temperature differences.

7.3 *Sampling Equipment, Selection*— Table 1 summarizes selection criteria for equipment by the material to be sampled.

7.4 *Sampling Equipment, Materials of Construction*— Each of the sampling devices listed should be constructed from materials that are inert to any materials that may be encountered at a specific site. These devices are usually made of glass, stainless steel, aluminum, brass, or plastic. Devices with permanent coatings or liners of an inert nonreactive material, such as PTFE, may be substituted, if approved by the work plan.

7.5 *Generic Equipment List:*

7.5.1 A list of equipment generally required for sampling liquids follows:

7.5.1.1 Sample containers, lids, and liners;

7.5.1.2 Sample labels;

7.5.1.3 COLIWASAs, drum thiefs, sludge samplers, or equivalent devices;

7.5.1.4 Measuring rods;

7.5.1.5 Chain of custody forms;

7.5.1.6 Field log books;

7.5.1.7 Sample cooler;

7.5.1.8 Wipes or cloths, or both;

7.5.1.9 Ice or gel ice;

7.5.1.10 Grounding cables with alligator clips and emery cloth; and

7.5.1.11 Portable monitoring equipment (combustible gas indicator, organic vapor detectors, radiation survey meter, etc.).

7.5.2 Equipment needed to open drums should be nonsparking (brass or beryllium copper) and include, but not be limited to, the following:

7.5.2.1 Bung wrenches (one straight and one bent),

7.5.2.2 Flathead screwdriver,

7.5.2.3 Breaker bar (½ in. (13 mm)),

7.5.2.4 Ratchet (½ in. (13 mm)),

7.5.2.5 Speed handle (½ in. (13 mm)),

7.5.2.6 Adjustable wrenches (10 and 12 in. (25 and 30 cm)),

7.5.2.7 Air impact wrench and sockets, and

7.5.2.8 Pail lid opener.

TABLE 1 Selection Criteria for Equipment

Equipment	ASTM Standard	One Liquid Layer	Two or More Liquid Layers	Liquid and Solid (Sludge) Layers
Drum thief		X[A]	X	X
COLIWASA	D 5495	X	X	N[B]
Syringe-type sampler		N	N	X
Coring-type sludge sampler		—[C]	—	X
Piston-Type Sampler		X	X	N

[A] X = equipment may usually be used with this type of waste

[B] N = not the equipment of choice, but it may be used

[C] — = equipment is probably unsuitable

8. Sample Collection

8.1 *Basic Sampling Practice:*

8.1.1 Bond the sampling equipment to the drum, if specified in the work plan.

8.1.2 Collect a sample from the drum. Whenever possible, do not sample where the measuring rod has been inserted; however, bung-type drums might not permit avoidance of the disturbed region.

8.1.3 Note the physical characteristics, including any discrepancies (such as solidified contents or crystalline material).

8.1.4 Place the collected material in a sample container.

8.1.5 Close the sample container.

8.1.6 Wipe the outside of the sample container. Dispose of the wipe cloth properly.

8.1.7 Record in the field log book all of the relevant conditions and physical characteristics associated with the sample.

8.1.8 Fill out all of the required paperwork for each sample, as required by the work plan.

8.1.9 Complete and attach a label to the side of the sample container before or after sampling, as directed by the work plan. The sample label should include the following:

(*1*) Sample ID number,

(*2*) Name of sampler,

(*3*) Sampler's initials or signature,

(*4*) Date and time of sampling, and

(*5*) Sample location.

The sample label can also include the following:

(*1*) Sampling information (for example, grab or composite),

(*2*) Preservative or preservation required,

(*3*) Special instructions, and

(*4*) Analysis request.

8.2 *Sampling with a Drum Thief:*

8.2.1 *General Description*—A tube of small diameter, which yields a vertical representation of the contents of a drum when lowered and sealed (see Fig. 1).

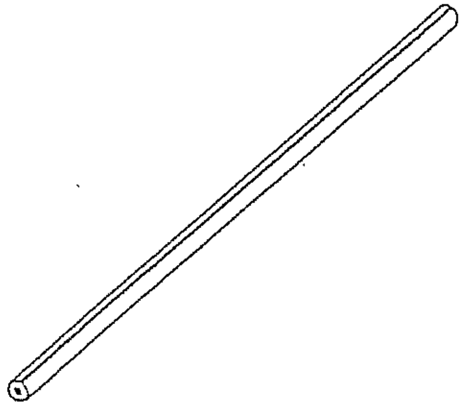

FIG. 1 Drum Thief

NOTE 3—When sampling liquids of high specific gravity, it may be difficult to retain the entire sample in the drum thief. A smaller-diameter drum thief may overcome this problem. The use of a COLIWASA or similar device may be necessary if the problem persists.

8.2.2 *Operation and Use*—Slowly insert the tube vertically until it reaches either the bottom of the drum or the liquid layer to be sampled. The sampling device should be lowered at a rate that permits the liquid level inside and outside the tube to be approximately the same.

NOTE 4—Multiple sample increments are usually necessary to provide enough sample volume for analysis and quality control (QC). Drum contents will become increasingly disturbed with each successive insertion of the drum thief.

8.2.2.1 Cover the top of the tube with the thumb or a rubber stopper to form a seal. Use gloves or a stopper, as described in the work plan.

8.2.2.2 Withdraw the tube carefully.

8.2.2.3 Use a clean cloth or paper towel to wipe the tube as it is being extracted from the liquid, to prevent unnecessary dripping.

8.2.2.4 Note the proportions of any layers or solids.

8.2.2.5 Place the bottom end of the tube into the sample container, and release the contents slowly.

8.3 *Sampling with a COLIWASA:*

8.3.1 *General Description*—A glass, plastic, or metal tube with an end closure that can be opened while the tube is immersed in the waste to be sampled (see Practice D 5495). The COLIWASA will yield a vertical representation of a drum's contents when immersed in the open position into a drum (see Fig. 2).

NOTE 5—Multiple sample increments are usually necessary to provide enough sample volume for analysis and QC. Drum contents will become increasingly disturbed with each successive insertion of the COLIWASA.

8.4 *Sampling with a Syringe-Type Sampler:*

8.4.1 *General Description*—A tube with a manually operated piston that can be used as a syringe for high-viscosity liquids or as a coring device for sludge (see Fig. 3).

8.4.2 *Operation and Use*—(*1*) For high-viscosity liquids, the tube is lowered to the sampling point and the piston is pulled out to collect the sample. (*2*) For sludge, the tube is lowered to the surface of the sludge. The sampler body is pushed into the sludge while allowing the piston to move up within the sampler body.

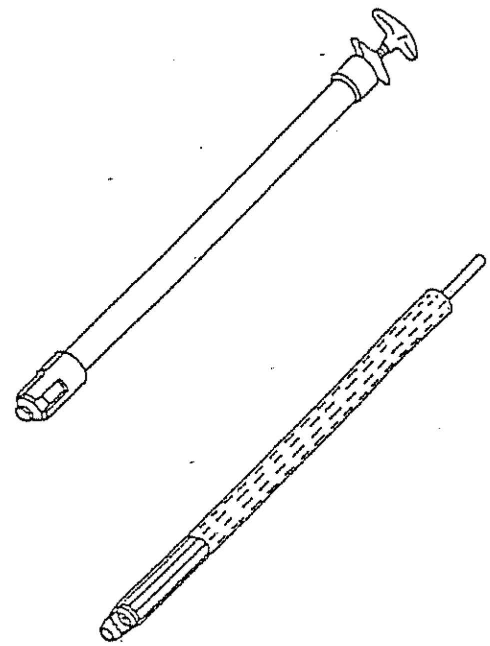

FIG. 2 COLIWASAs (Typical)

8.4.2.1 Assemble with the piston at the lower end of the sampler body. Attach the bottom valve (for high-viscosity liquids) or the coring tip (for sludge).

(*1*) For high-viscosity liquids, lower to the sampling point and withdraw the piston to collect the sample. Close the bottom valve by pushing against the side or bottom of the container with the sampler body.

(*2*) For sludge, lower to the surface of the material to be sampled. Push the sampler body into the material while allowing the piston to move up within the sampler body.

8.4.2.2 Use a clean cloth or paper towel to wipe the sampler body as it is being extracted from the liquid or sludge, to prevent unnecessary dripping.

8.4.2.3 Transfer the sample into the sample container by opening the bottom valve, if fitted, and pushing the piston down.

8.5 *Sampling with a Coring-Type Sampler:*

8.5.1 *General Description*—A coring-type sampler consists of a cylinder, a coring tip (or auger tip) with a retaining device, a top cap, and an extension with a cross handle (see Fig. 4). A thin-walled internal sleeve may be used to contain the sample.

8.5.2 *Operation and Use*—The coring-type sampler is pushed (pushed and rotated with an auger tip) into the sludge to collect the sample and removed. The retaining device allows the sludge to enter the cylinder when pushing the sampler. The retaining device closes to hold the sludge in the cylinder while removing the sampler.

8.5.3 Remove the top cap and transfer the sample from the cylinder into a sample container. If equipped with an internal sleeve, remove the top cap and place an end cap on the internal sleeve. Invert, remove the internal sleeve from the cylinder, and place an end cap on the open end of the sleeve.

8.6 *Sampling with a Plunger-Type Sampler:*

8.6.1 *General Description*—A liquid sampling device that consists of a sample tube, sample line or rod, headsection,

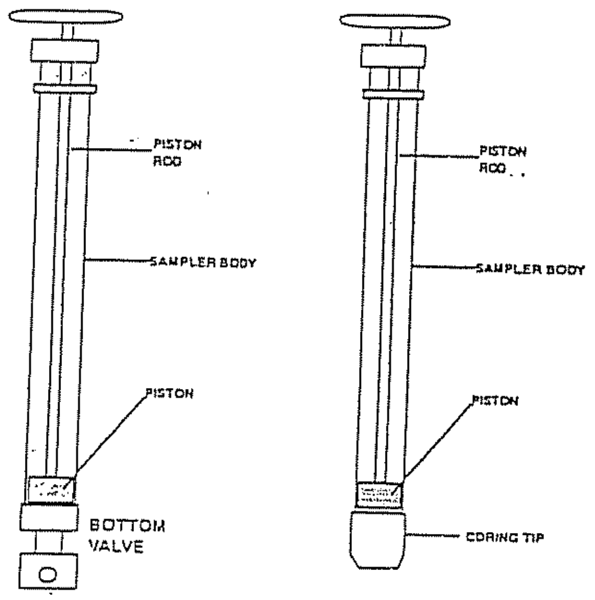

FIG. 3 Syringe-Type Sampler (Typical)

and plunger (see Fig. 5). The sample jar is connected to the headsection and the sample tube is lowered into the material to be sampled. After insertion the plunger is engaged into the sample tube lifting the sampled materials directly into a sample jar.

8.6.2 *Operation and Use*—Slowly insert the sampler vertically into the material to be sampled. Lower the sampler at a controlled rate to allow for representative sample collection. When the sampler reaches the bottom, or desired depth, the plunger mechanism is engaged. This secures the sample within the sample tube.

8.6.3 Without removing the sampler from the container and with the plunger lodged inside the sample tube, apply a constant and continual upward force on the sample line or rod. Retract the plunger at a rate that allows for a controlled delivery of the material into the sample jar. Continue to retract the plunger until the unit is seated into the headsection. Prior to removing the sample jar from the headsection, allow sufficient time for residual materials to drain.

9. Post-Sampling

9.1 Remove all sampling equipment from the work zone.

9.2 Transfer all reusable sampling equipment that was in contact with the waste to a predesignated decontamination area. Decontaminate the equipment according to the protocol established in the work plan (Practice D 5088). Decontaminated sampling equipment should be protected from contamination. This may include, but not be limited to, storage in aluminum foil, plastic bags, PTFE film, or other means of protection that will not impact the sample quality or intended analysis.

9.3 Dispose properly of all used (disposable) contacting equipment.

. Data Quality Objectives

10.1 The objectives for sampling and testing of liquids and sludges should be specified in the work plan.

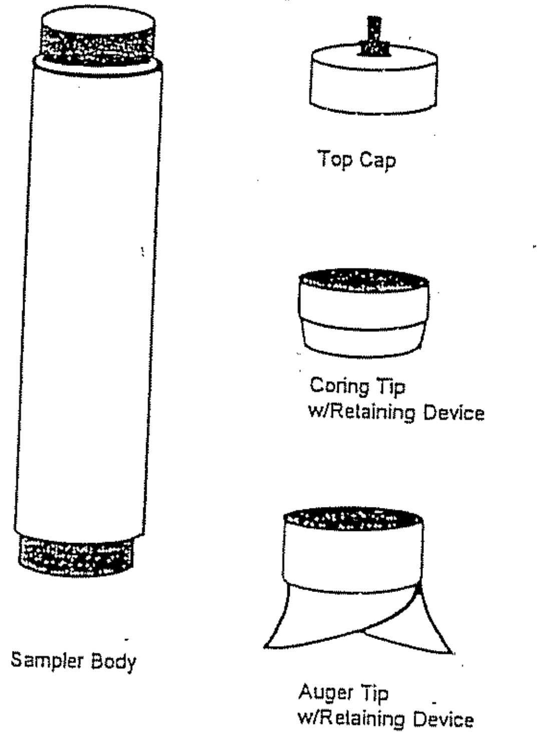

FIG. 4 Corer-Type Sampler (Typical)

11. Quality Control

11.1 Quality Control (QC) samples (for example, equipment blanks, trip blanks, and duplicates) must be collected as required by the work plan. These QC samples must be evaluated to provide a determination of the quality of the sampling and reliability of the resulting analytical data.

12. Keywords

12.1 COLIWASA; drum; drum thief; liquid; pail; sampling; sludge sampler; waste

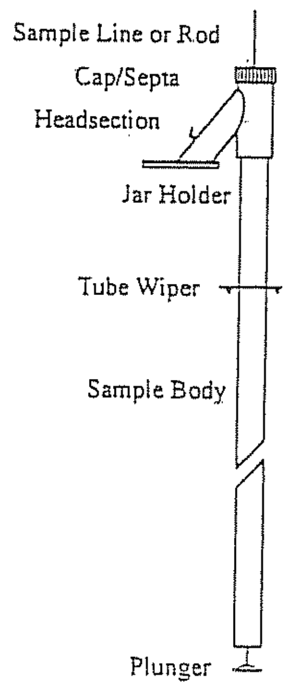

FIG. 5 Plunger-Type Sampler (Typical)

APPENDIX C

DUSR Resume

Premier Environmental Services.

RENEE G. COHEN

Experience **PREMIER ENVIRONMENTAL SERVICES, Merrick, New York**

1993-Present Perform organic and inorganic data validation according to the various protocols from the EPA CLP, NYS ASP and USEPA Test Methods for the Evaluation of Solid Waste, Methods for the Chemical Analysis of Water and Waste and the Federal Register Use the USEPA National Functional Guidelines for Organic and Inorganic Data Validation (where applicable) as well as State (NYS DEC ASP) and Region requirements to report on laboratory data quality and data usability. Review and write Quality Assurance Project Plans using Regional and State guidelines for Remedial Investigations, Ground Water Monitoring programs and Superfund Programs Review data and work plans as they relate to project data quality objectives. Conducts seminars on client specific topics. Perform on-site laboratory QA/QC audits as required by the client and site specific work plans. Perform ASTM Phase 1 Assessments for engineering firms.

February 1999-Present – Consultant - KeySpan Laboratory Services. Developed laboratory QAPP (in accordance with NELAC) and Chemical Hygiene Plan Modified and updated laboratory SOP's. Perform audits in the different work areas Review data for completeness and QC criteria. Implemented client inquiry system Performed QC training and method training for bench and field chemists. Developed protocols and documentation for field PCB wipe sampling Update/maintain laboratory certifications.

NYTEST ENVIRONMENTAL INC., Port Washington, New York

1994-1998 Responsible for the overall quality program at the laboratory. This included the auditing of test methods, systems and data reporting Performed the review of 10% of all data reports prior to submission to client. Oversaw the training program of new employees. Maintain the documentation of the training records. Review and maintain state certification paperwork and SOP files. Update and file annual MDL datum. Work with sales and customer service to insure that client needs are met Respond to client data inquires. Work with state and federal auditors for review of laboratory to receive certification. Successfully lead the laboratory to an Army Corp of Engineer validation

1989-1993 **ENSECO EAST, Somerset, New Jersey**

QA/QC Scientist - Performed organic and inorganic audits of the laboratory Performed and coordinated corrections and revisions to data reports Wrote and reviewed laboratory Quality Assurance Project plans (QAPjP's) for client specific projects. Developed and led seminars for both client and employees on a number of topics including; data quality objectives, data review vs data validation and laboratory QC Interacted with clients, project managers and state personnel for regulatory concerns and data/lab issues Performed lab audits for method compliance and project specific requirements. Acted as the Technical Representative for Ensecos EPA 3/90 Organic CLP Contract.

Premier Environmental Services.

Renee Cohen – Page 2

1988-1989 **INTECH BIOLABS, East Brunswick, New Jersey**

QA/QC Manager - Responsible for the review of all organic and inorganic data. Performed general laboratory and safety audits. Recorded and charted all QA/QC data. Reviewed and assembled all CLP organic data reports.

1986-1988 **INTERNATIONAL TECHNOLOGIES CORPORATION, Edison, New Jersey**

Central Laboratory Chemist - REAC and EERU Contract for the Emergency Response Branch (ERB) of the USEPA. Responsible for the organic and inorganic extraction of environmental samples according to EPA Methods. This included both metals digestion as well as organic extraction's for semivolatiles, pesticides and PCB's. Performed Volatile Organic analyses using Gas Chromatography, Total Petroleum Hydrocarbon Analysis by IR, Metal Analyses by both Graphite Furnace AA and ICP. Field experience included s on site analyses for both metals and GC volatiles

1985-1986 **U.S. TESTING COMPANY, Hoboken, New Jersey**

Chemist - Responsible for the digestion and analysis of both soil and aqueous samples for metals according to USEPA CLP and SW 846 protocols. Responsible for the analysis of sample digestates using the Varian Graphite Furnace Atomic Absorption Spectrophotometer and a Jerall Ash ICP-61.

Education

B.S. Environmental Science, December 1984
B.S. Biology, May 1984
Old Dominion University, Norfolk, Virginia

16 hours of Chemistry coursework

Graduate Coursework - Rutgers University, New Brunswick, New Jersey
Long Island University at C.W. Post, Glen Cove, New York

Continuing Education

Good Laboratory Practice (GLP) - June 1992, Center for Professional Development, East Brunswick, New Jersey

40 Hour Course, Region II-Edison, NJ (1987)
24 Hour Refresher Course (1988, 1989, 1991)

References

Available upon request

PART B

FINAL

FIELD SAMPLING PLAN/
QUALITY ASSURANCE PROJECT PLAN
REMEDIAL INVESTIGATION
HALSTEAD QUINN OIL STORAGE TERMINAL FACILITY
79-91 ALEXANDER STREET
YONKERS, NEW YORK
Site # B00193-3

October 2003

Henningson, Durham & Richardson
Architecture and Engineering, P.C.
711 Westchester Avenue
White Plains, New York 10604

FINAL

FIELD SAMPLING PLAN/
QUALITY ASSURANCE PROJECT PLAN

REMEDIAL INVESTIGATION

HALSTEAD QUINN OIL STORAGE TERMINAL FACILITY

79-91 ALEXANDER STREET

YONKERS, NEW YORK

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HENNINGSON, DURHAM & RICHARDSON
ARCHITECTURE AND ENGINEERING, P.C.

APPROVAL SIGNATURES

HDR Project Manager	Date
HDR QA/QC Coordinator	Date

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Appendix A Technical Procedures (TPs)

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A.2 No. TP-8-001, Project Custody Documentation
A.3 No. TP-8-002, Drum Labeling
A.4 No. TP-8-003, Sample Identification Coding System
A.5 No. TP-9-001, Monitoring Well Installation
A.6 No. TP-9-003, Soil Sample Collection
A.7 No. TP-12-001, HNU PI101 Photoionization Detector
A.8 No. TP-13-001, Sample Labeling, Packing and Shipping

Appendix B Quantitative Limits

B.1 Reporting Limits

A PROJECT MANAGEMENT

1.0 PROJECT/TASK ORGANIZATION

This Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP) is intended to provide specific guidance and quality assurance requirements for activities associated with the Remedial Investigation at 79-91 Alexander Street, Yonkers, New York (site). Henningson, Durham & Richardson Architecture and Engineering, P.C. (HDR) will conduct the Remedial Investigation.

This FSP/QAPP was prepared using United States Environmental Protection Agency (EPA) Guidance for Quality Assurance Project Plans, EPA QA/G-5 (EPA 1998a) and EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, EPA QA/R-5 (EPA 1998b).

1.1 Roles and Responsibilities

The organizational structure described herein is intended to provide adequate project quality assurance to meet the objectives of the remedial investigation. The roles of the key project personnel are described in the following subsections.

1.1.1 Henningson, Durham & Richardson Architecture and Engineering, P.C. (HDR)

1.1.1.1 HDR Project Manager

HDR's Project Manager, Joyce Mariani, P.E., has the primary responsibility for the implementation of the FSP/QAPP. The Project Manager is responsible to Yonkers Alexander Street Redevelopment, Inc. (YASR) for planning, scheduling, cost control, and overall implementation of the project. The Project Manager monitors all project personnel including subcontractors.

1.1.1.2 HDR Quality Assurance Coordinator

HDR's Quality Assurance Coordinator, Mark Taylor, P.G., is assigned by HDR's Corporate Quality Assurance Officer to review, monitor, and report on the implementation of FSP/QAPP requirements for project activities.

1.1.1.3 HDR Field Manager

HDR's Field Manager, Noemi Castillo, is assigned by HDR's Project Manager to implement assigned project activities. The Field Manager reports to HDR's Deputy Project Manager. Each member of HDR's project staff is responsible to HDR's Field Manager for completion of assigned project activities. Project staff is responsible for understanding and implementing this FSP/QAPP as it applies to their project activities.

1.1.2 Subconsultants

HDR will use subconsultants for this project for the lead and asbestos surveys, and to collect soil borings, install monitoring wells and conduct the laboratory analysis. Each subsconsultant's Project Manager is responsible to HDR's Field Manager for planning, scheduling, and completion of assigned tasks. The subconsultants' Project Managers are responsible for implementing this FSP/QAPP as it applies to each assigned task. Each member of the subconsultants' project staff is responsible to each subconsultant's Project Manager for completion of assigned project activities.

1.1.3 Client

Linda Shaw, Esq., Knauf Shaw as attorneys for the YASR, is the primary point of contact at the YASR for this Remedial Investigation.

1.2 Qualifications of Personnel

All personnel assigned to the project, including subconsultants, will be qualified to conduct the tasks to which they are assigned. Personnel will be compared to the requirements of the job assignment with regard to relevant experience and training. On-the-job training is acceptable, provided a person qualified to conduct the trainee's assignment conducts such training.

1.2.1 Training

All personnel assigned field sampling duties will possess the appropriate level of health and safety training, and other training as specified in the Site-Specific Health and Safety Plan (HASP).

Specifically, all HDR personnel working on the site will be trained in accordance with, and in compliance with, all applicable local, state and federal health and safety regulations. These personnel will have specifically received the 40-hour training as required by 29 CFR 1910.120 and 29 CFR 1926.65, *Hazardous Waste Site Operations*. The Occupational Safety and Health Administration (OSHA) requires formal training on various other hazards, and appropriate training will be provided to site personnel on these hazards as identified.

1.2.2 Certification

All certificates and/or documentation representing completion of specialized training will be maintained in personnel files.

2.0 PROBLEM STATEMENT/BACKGROUND

2.1 Problem Statement

This FSP/QAPP presents the purpose, organization, and technical procedures necessary to conduct the remedial investigation activities at 79-91 Alexander Street. Implementation of the procedures described in this FSP/QAPP is required to obtain fully documented data to support the collection of the following information:

- Soil sampling and analysis from those soil boring sampling locations identified in the Work Plan;
- Groundwater sampling and analysis from existing groundwater monitoring well and temporary monitoring well locations identified in the Work Plan;
- Surface water sampling from the water located in the oil/water separator;
- Asbestos and lead-based paint surveys of the on site structures;
- UST Removal;
- Demolition of the four remaining Aboveground Storage Tank (AST); and
- Drum contents sampling.

This FSP/QAPP will be used in conjunction with the Remedial Investigation Work Plan for 79-91 Alexander Street.

2.2 Site Description and History

2.2.1 Site Description

The site is located on the east bank of the Hudson River in Yonkers, New York. The site is listed on Tax Section 2 as Block 2610, Lots 18, 22, 30 and 35. According to the Phase I Report, the site is approximately 2.8 acres. The site is bordered by the Hudson River on the west, Ashburton Avenue on the north, Alexander Street on the east and an industrial property on the south. Currently, the Department of Social Services is located to the north; Pennysaver, Atlantic Express and Lisa Choice Fundraising are located to the east; and a number of commercial buildings are located to the south.

The site was formally used as a Major Oil Storage Facility (MOSF) containing 16 registered aboveground storage tanks (ASTs) that were used to store a total capacity of 5,093,000 gallons of diesel and fuel oil. Fifteen (15) of the ASTs, AST Tank #1 through #16 (AST Tank #3 does not exist), were located in a secondary containment area consisting of a concrete wall and Claymax lined bottom under at least six of the ASTs. The 15 ASTs, along with piping within the containment area, were surveyed for lead based paint. Five of the ASTs tested positive for lead-based paint. In addition, all green piping located within the AST containment area and attached to the fuel fill racks also tested positive for lead. These 15 ASTs were drained and cleaned in August 2003 and demolished in September 2003 for the purpose of this investigation. One 275-gallon AST, registered and believed to be containing waste oil, is located next to the garage/warehouse building. One AST assumed to be 1,000 gallons and one AST assumed to be 550 gallons are located in the boiler house along the northern perimeter of the property. Neither of these tanks is registered and their contents are unknown. An additional AST assumed to be 550 gallons is located in the foam house along the eastern border of the property, and has unknown contents and is unregistered.

One Underground Storage Tank (UST) is believed to currently exist on the site. During the site investigation performed by SCS, three USTs were removed from the site The site also includes four buildings occupying an area of approximately 5,000 square feet, including a dispatch office area, foam pump house, garage/storage building and inactive boiler room. The site included four truck fuel fill racks and vehicle fuel dispensers, however these were demolished in September 2003. The site includes a barge dock with four 8-inch diameter pipelines and walkway that extends approximately 220 feet west of the site into the Hudson River. The pipelines were drained in August 2003 and removed from the site in September 2003. In addition, the site currently contains six groundwater monitoring wells, three recovery wells and a containment sump

2.2.2 Site History

A section of the Hudson River was filled between 1886 and 1898 to create the site. The site was occupied by two companies, Archibald Lumber Company and P.A. Deyo and Son Elevator, in 1898 shortly after the site was created. Afterwards the Hudson Fuel Company and Harrigan Coal and Wood occupied the site by 1917. In 1919, two brick buildings were initially erected on the site, including a garage and stable. Hudson Fuel Company is listed as the site owner in 1919, 1923, and 1933. Hudson Fuel Company is believed to have owned the site through 1951. From 1951 through approximately 1977 or 1978, the site was owned by Standard Oil (currently ExxonMobil Corporation). From 1917 through1951, Standard Oil owned the site to the east. It sold that site to Polychrome, Inc. in 1951 and then acquired the subject site for the purpose of installing a tank farm. It installed nine ASTs on the northern portion of the site (Tank Nos. 4, 5, 6, 7, 8, 9, 10, 11, 12) shortly after it acquired the site. Therefore, the site first became an operating oil terminal in the 1950s. In 1978, Standard Oil sold the site to A. Tarricone, Inc. (ATI). On or about December 1983, ATI installed two additional large ASTs (i.e., Tank Nos. 1 and 2, which are 1,152,000 gallons each, for unleaded gasoline) south of the previous nine ASTs. A total of 11 large ASTs appear to have been present between 1978 and 1989. Eventually, 16 ASTs were registered, including the 11 large ASTs. Sometime between 1995 and 2001, ATI sold or changed its name to Halstead-Quinn Propane, Inc. In spring 2001, Halstead-Quinn Propane, Inc. declared bankruptcy. In July 2002, YASR took control of the property and remains the current owner. The site is no longer in operation as an oil storage facility and all of the ASTs within the containment area were removed from the site during the recent demolition work in September 2003.

As noted above, former adjacent property owners include Standard Oil, who operated the site to the east from 1917 through 1951 and Polychrome, Inc., who operated the site to the east from 1951 through 1995. Other industries that have bordered the site over the past 105 years have included oil, asphalt, feed and produce, lumber, coal, an alcohol brewery, a local post office and a county ferry office.

3.0 PROJECT/TASK DESCRIPTION

3.1 Measurements

Properties to be studied during the investigation are chemical concentrations for the chemicals of concern in various environmental media (e.g., soil, groundwater, building materials). Measurement processes include chemical analyses of field-collected samples. The chemicals of concern for this site include Volatile Organic Compounds (VOCs including methyl-tertiary Butyl Ether (MTBE)), Semi-Volatile Organic Compounds (SVOCs), and Resource Conservation and Recovery Act (RCRA) metals. However, soil samples obtained from the soil underlying the former location of the ASTs will be analyzed for parameters listed in the NYSDEC TAGM #4046 tables for gasoline contaminates soils and fuel oil contained soils. All samples will be submitted to a New York State Department of Health Environmental Laboratory Approval Program (ELAP) certified laboratory experienced in the analysis of environmental samples using the methods specified.

3.2 Applicable Technical Quality Standards or Guidance Values

Site-specific data from soil and groundwater will initially be compared with applicable regulatory standards and guidance values in a screening-level human health risk evaluation.

Soil results will be compared to the Technical and Administrative Guidance Memorandum Hazardous Waste Remediation (TAGM HWR)-94-4046 and/or other applicable soil cleanup objectives that will be developed and will be applicable to projects being conducted under the Bond Act Brownfields Restoration Program Title 56 of the Environmental Conservation Law. .However, soil samples obtained from the soil underlying the former location of the ASTs will be compared to the tables for gasoline contaminates soils and fuel oil contained soils provided in the NYSDEC's December 20, 2000 Memorandum regarding determination of soil cleanup objectives. The Memorandum states that NYSDEC Recommended Soil Cleanup Objectives (RSCOs) in the Technical and Administrative Guidance Memorandum Hazardous Waste Remediation (TAGM HWR)-94-4046 are to be substituted for the quantitative values in the tables in STARS #1. Groundwater results will be compared to the groundwater standards listed in the NYSDEC 6NYCRR

Part 703, or, if a standard is not listed, the result will be compared to the guidance value provided in the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1. The NYSDEC standards and guidelines are listed in Appendix B of this FSP/QAPP.

Subsequent action taken at the site will depend on whether chemical concentrations exceed the applicable regulatory standards or guidance values. If regulatory standards or guidance values are not exceeded in the analysis of the soil and groundwater, no further investigation of the site will be necessary. A site-specific risk analysis may be recommended to be performed if a chemical concentration in soil or groundwater exceeds regulatory standards or guidance values. The site-specific risk analysis would be used to determine site-specific cleanup levels that are protective of human health and will be performed in accordance with EPA's Risk Assessment Guidance for Superfund (RAGS) (EPA 1989b). If detected site concentrations do not exceed the site-specific cleanup goals, no further investigation will be needed at the site. If detected site concentrations exceed the site-specific cleanup goals, a Remedial Action Work Plan may be created to address residual contamination.

4.0 DATA QUALITY OBJECTIVES (DQO)

4.1 Project Quality Objectives

The seven-step DQO process described in EPA Guidance (EPA 2000) was used to define the data objectives and quality assurance objectives for the Remedial Investigation. This seven-step process includes:

- Step 1: State the problem.
- Step 2: Identify the decision.
- Step 3: Identify the inputs to the decision.
- Step 4: Define the boundaries of the study.
- Step 5: Develop a decision rule.
- Step 6: Specify tolerable limits on decision errors.
- Step 7: Optimize the design.

In general, the DQOs for the site are as follows:

- Obtain data, which characterize the existing nature and extent of the soil, and groundwater contamination at the site;
- Identify and quantify the presence of Asbestos Containing Material (ACM) and lead-based paint in the building; and
- Have sufficient data to evaluate potential remedial alternatives.

To meet the project objectives of this Remedial Investigation, certain data of specific quantity and quality must be collected and validated for the decision-makers. The data set required to meet the stated project objectives at the site includes chemical concentrations in site media.

A problem is specifically defined. A decision (or series of decisions) is then identified to address the problem. For each decision, the data necessary to make the decision are described. The specific data set needed to meet the above-stated objectives, including number, kind and quality of samples, is also presented in the Work Plan.

4.2 Measurement Performance Criteria

To develop data of sufficient quality, the following approach will be utilized:

- EPA SW-846 Methodology (EPA 1996) approved methods will be used for sample preparation/extraction and analysis of samples obtained;
- HDR will review the data for the PARCC parameters (precision, accuracy, representativeness, completeness, and comparability); and
- Internal Quality Assurance/Quality Control (QA/QC) samples and procedures will be utilized by the laboratory and full documentation will be provided.
- All samples will be submitted to a New York State Department of Health Environmental Laboratory Approval Program (ELAP) certified laboratory experienced in the analysis of environmental samples using the methods specified.
- An independent data review of the samples analyzed will be performed by Premier and a DUSR will be compiled

5.0 DOCUMENTATION AND RECORDS

5.1 Information Included in the Reporting Packages

5.1.1 Field Operation Records

5.1.1.1 General Field Procedures

A bound field notebook with sequentially numbered pages is used to document all field activities. The purpose of the bound field notebook is to provide a complete and permanent record that will allow reconstruction of field activities, thereby validating the data collected. Date, time, and field crew are recorded upon site entry. Weather conditions, malfunctioning equipment, and any pertinent observations are also recorded. Information is recorded in the field notebook during calibration and maintenance of instrumentation, soil and water sampling activities, and obtaining QC samples. Entries are made with a permanent, indelible pen. The person recording information signs his or her name under the final entry for each day's activities.

5.1.1.2 Sample Collection Logs

This log contains a record of all samples (including QC) sent off-site for analytical procedures, as well as samples being held by the laboratory. Field records are completed at the time the sample is collected and prepared for shipment. Records contain the following information:

- Sample identification number;
- Date and time sample is taken;
- Source of sample (name, location, type);
- Preservation details;
- Analysis required;
- Name of collector;
- Field data;
- Sample observations and characteristics;
- Identification numbers on seals; and
- Number and types of containers filled.

5.1.1.3 Boring Logs

Boring logs document all activities conducted during the collection of soil borings. An example of a boring log is included as an attachment to Technical Procedure (TP) 9-003, Soil Sample Collection (see Appendix A).

5.1.1.4 Chain-of-Custody Records

A chain-of-custody (COC) record accompanies all samples including QC samples, which are submitted to the analytical laboratory. COC records allow for the tracing of possession and handling of the samples from the time of field collection through laboratory analysis. TP-8-001, Project Custody Documentation (located in Appendix A), details the procedures for completing COCs.

5.1.1.5 QC Sample Records

QC sample information is recorded both in the field notebooks and sample collection logs.

5.1.1.6 Corrective Action Reports

Any non-conformance with the procedures described in this FSP/QAPP will be corrected prior to additional work being conducted, which is dependent upon the non-conforming activity. This will apply to both field and laboratory activities.

HDR's Field Manager will evaluate the implementation of this FSP/QAPP on a day-to-day basis. Sample collection, preservation, and labeling, etc. will be checked for completeness. Where procedures are not strictly in compliance with this FSP/QAPP, the deviation will be documented and reported to HDR's Quality Assurance Coordinator. HDR's Field Manager and HDR's Project Manager will determine corrective actions. HDR's Field Manager will be responsible for implementing and documenting the corrective action.

5.1.1.7 Non-Conformance Forms

A non-conformance form details any deviation(s) from the Work Plan during sampling activities.

5.1.1.8 Incident/Accident Reports

These reports are discussed in the HASP for the site.

5.1.2 Laboratory Records

The flow of documented information on a sample received in the laboratory includes: sample labels and custody seals, COC records, sample log-in records, internal sample custody records, sample preparation logs, sample run logs, sample analysis logs, client reports, and sample disposal logs.

5.1.2.1 Sample Receipt

All samples received in the laboratory are handled and processed by the sample custodian. For those samples received without a COC record, the laboratory sample custodian will create a COC from the time of arrival at the laboratory. The sample custodian will inspect the samples and document the observations on a checklist upon receipt of the sample package. Any discrepancies between the COC and sample package will be noted. The HDR Project Manager will be contacted if samples arrive at the laboratory in damaged containers, are improperly preserved, etc. Problems such as these are documented on the COC form, along with any corrective action.

The person accepting custody of the samples at the analytical laboratory shall break the custody seals on the coolers and check the samples against the COC. The receiving personnel enter all arriving samples into a laboratory log book and note any problems or discrepancies between the samples, the COCs, sample containers, and seal conditions and report them immediately. If no problems or discrepancies are apparent, the receiving personnel signs the COC records. A copy of the original COC, the checklist and the completed COC is sent to the HDR Project Manager as confirmation of receipt of the samples. Any field documentation, the original COC form, and any other relevant information is kept in the project file.

The laboratory assigns a sequential work order number (e.g., 635), which is equivalent to the project number for each group of samples received by the laboratory as one batch on the same day. Each sample in the work order has a unique laboratory number (635001, 635002, etc.). The unique laboratory number is cross-referenced to the original field sample number, recorded in the laboratory notebook, and reported in the laboratory report. The analytical laboratory retains one copy of the COC, and returns one copy of the COC to the HDR Project Manager.

5.1.2.2 Sample Login

After the COC record is completed and signed, a copy of the COC form is used as the sample log-in and tracking form. The information on this form includes:

- Date/time of sample receipt;
- Courier used by the sample shipper (including shipping records);
- Project name and number;
- Name and signature of person receiving the samples;
- Sample delivery group number;
- Sample numbers;
- Date/time of sample collection;
- Client sample identifiers from COC form;
- Sample matrix;
- Date due;
- Analyses required;
- Condition of the shipping container and bottles;
- Appropriate preservation of the samples;
- Presence or absence of traffic reports;
- Sample tag identification numbers cross-referenced to the client sample numbers;
- Presence/absence of custody seals on shipping container; and
- Any discrepancies.

5.1.2.3 Sample Storage

After log-in, the samples are stored in designated areas (based on the type of analyses to be performed) until analytical processing begins. The storage location is noted on the COC login form. The storage location is also noted on the sample containers.

5.1.2.4 Sample Preparation

The preparation technician documents the sample extraction and digestion in sample extraction or digestion logs for each type of analysis. The logs contain the following information:

- Preparation date;
- Analytical method;
- Extraction method;
- Sample number;
- Sample weight or volume;
- pH;
- Final extraction volume; and
- Dilution factor.

5.1.2.5 Sample Analyses

The sample analysis is documented in sample analysis logs specific to each analysis type and instrument. All samples will be analyzed by an ELAP approved laboratory. Analytical methods requirements are discussed in Section 7.0

5.1.2.6 Sample Disposal

The laboratory Project Manager is responsible for specifying the proper sample disposal procedure. Disposal requirements are outlined on the sample disposal record. After all analyses are complete, the disposal record is given to the laboratory sample custodian who will dispose of the samples as indicated. The disposal record is then filed.

5.1.2.7 QA/QC Reports

General QC records, such as initial demonstration of capability, instrument calibration, calibration verification, etc., are documented in maintenance log books specific to a piece of equipment/instrument. Project-specific information from the QA/QC checks, such as blanks, spikes, replicates, etc., will be included in the laboratory data delivery package submitted to HDR.

5.1.3 Data Handling Records

The laboratory maintains protocols used in data reduction, verification and validation.

5.2 Data Reporting Package Format and Documentation Control

A copy of the laboratory data delivery package will be included in the final report. A data package presented to HDR will be in computer printout format.

5.3 Data Reporting Package Archiving and Retrieval

The data delivery package is stored in the laboratory for a period of at least three years after completion of the project. The data reporting package will include Category B deliverables and a DUSR.

B MEASUREMENT/DATA ACQUISITION

6.0 SAMPLING STRATEGY

6.1 Rationale for the Sampling Strategy

The sampling strategy for the site is based on several factors:

- Past waste management practices;
- Results of previous investigations; and
- End use of the data (i.e., comparison to applicable regulatory standards and criteria in a screening level human health risk evaluation).

6.2 Sampling Strategy Assumptions

The sampling strategy for the site is presented in the Work Plan. Data collection strategy assumptions for the investigation include:

- Homogeneity of the medium to be sampled; and
- Independence in the collection of individual samples.

However, exceptions to the proposed sampling plan may be encountered during field activities. The HDR Project Manager will consider changes in the operating procedures, if necessary. In some situations (e.g., persistent dry hole conditions), the client will be contacted for further instructions.

6.3 Procedures for Locating and Selecting Environmental Samples

The rationale for selecting specific sampling locations is presented in the Work Plan. When decisions on the number and location of samples will be made in the field, the process is also described in the Work Plan.

6.4 Sampling Methods Requirements

6.4.1 Sample Collection, Preparation, and Decontamination Procedures

6.4.1.1 Asbestos Survey and Lead-Based Paint Survey

HDR's subcontractor, Adelaide Associates will prepare a New York State asbestos survey and a lead-based paint survey in accordance with applicable requirements.

6.4.1.2 Soil Boring Soil Sampling

Subsurface soil samples will be collected from the direct-push sampling locations. The soil samples will be collected in accordance with the procedures described in TP-9-003, Soil Sample Collection, contained in Appendix A of this FSP/QAPP, and the associated project-specific modifications.

In general, continuous soil samples will be collected. Soils will be field-screened for headspace at 2-foot intervals using the procedures described in TP-12-001, HNU PI101 Photoionization Detector, contained in Appendix A. Soil headspace field-screening information will be used as criteria for collecting soil samples for laboratory analysis. A soil sample from the depth exhibiting the highest Photoionization Detector (PID) reading will be submitted to the laboratory for analysis, unless no organic vapors or signs of staining are detected in any samples from a given sampling location, in which case the sample collected nearest to the soil-water interface will be submitted for analyses. Soil samples will be analyzed for VOCs (including MTBE), SVOCs and RCRA metals, or the tables for gasoline contaminates soils and fuel oil contained soils provided in the NYSDEC's December 20, 2000 Memorandum regarding determination of soil cleanup objectives, unless soils saturated with free product is encountered, in which case, the soil sample will only be analyzed to determine the type and date of the free product. Exact locations of the soil borings will be selected in the field in consultation with agency staff. In addition, soil samples will be obtained for chemical analysis as described in the Work Plan. The collection of on-site surface soil samples (0 to 2 inches) will be at the surface soil sample locations SB-6, SB-8, SB-13, SB-15, SB-16 and SB-17.

6.4.1.3 Monitoring Well Installation and Sampling

One monitoring well will be installed and sampled in accordance with NYSDEC requirements. Monitoring well installation procedures to be utilized are described in TP-9-001, Monitoring Well Installation, in Appendix A. Groundwater Sampling will not take place until the monitoring well has recharged to 100 percent of its original depth to water. The original depth to water will be determined prior to well development. Groundwater from the monitoring well will be sampled once during this investigation in accordance with the procedures described in TP-3-002, Groundwater Sampling, in Appendix A.

In addition, one groundwater sample will be obtained from each of the existing monitoring wells and each of the proposed temporary monitoring well locations where soil boring samples are taken.

The Groundwater samples will be analyzed for VOCs (including MTBE), SVOCs and RCRA metals, unless free product is encountered, in which case, a sample of the free product will be obtained, rather than a groundwater sample, and analyzed to determine the type and date of the free product.

6.4.1.4 Oil/Water Separator

One grab sample will be obtained from the standing water located in the oil/water separator and analyzed for VOCs (including MTBE), SVOCs and RCRA metals.

6.4.1.5 Water Level Measurements

Water level measurements will be taken on all groundwater sampling points, before the collection of groundwater samples. General procedures for obtaining the water level measurements are as follows:

- Using an electronic water level dip-meter or an electronic oil/water interface probe where petroleum product presence is possible, a measurement of the depth to the water surface will be made at each sampling location. This measurement will be referenced to the top of the well casing. Measurements to the nearest 0.01-foot will be attempted.

- Water level measurements will be recorded in the field log book in tabular format.

In addition, the presence or absence of free product at all groundwater sampling points will be confirmed by using an oil/water interface probe, before the collection of groundwater samples.

6.4.1.6 UST Removal

One UST will be removed and disposed of in accordance with all applicable laws. Prior to the draining and removal of the UST, the UST will be registered and a work permit for draining and removing the UST from the Westchester County Department of Health (WCDOH) who has jurisdiction over all petroleum bulk storage tanks in Westchester County. In addition, petroleum-contaminated soil encountered during the UST removal process will be removed and properly disposed of. The UST and its contents will be properly disposed of.

6.4.1.7 Drum Sampling

Drum sampling will be performed in accordance with the American Society for Testing and Materials (ASTM) D 5743-97, provided in Appendix B to the Work Plan.

6.4.1.8 IDW Management

Investigative Derived Wastes (IDW) generated during field sampling activities will be containerized pending waste characterization and proper disposal. Types of IDW that may be generated include:

Aqueous

- Decontamination fluids from small tool and large equipment decontamination activities; and
- Groundwater purged during development and sampling of groundwater monitoring wells.

All decontamination fluids and purged groundwater will be containerized in 55-gallon drums.

Solid

- Soil cuttings from monitoring well installations; and
- Leftover soil sample material from direct-push soil sampling activities.

Soil IDW will be containerized in 55-gallon drums.

All drums will be labeled as presented in technical procedure TP-8-002, Drum Labeling, in Appendix A of this FSP/QAPP.

All field refuse, including gloves, used personal protective equipment, paper towels, plastic bags, and other general refuse, will be disposed of. A subjective determination will be made in the field as to the condition of the refuse. Most refuse will have little potential for contamination and will be double-bagged and disposed of in a solid waste receptacle. If gross contamination of any refuse is suspected, it will be containerized in a 55-gallon drum until the completion of field work, at which time it will be disposed of at a proper treatment, storage or disposal facility. It is not anticipated that any refuse will require containerization based on the type of sampling planned for the site, the type and quantity of refuse likely to be generated, and the general decontamination and housekeeping practices to be used during field sampling.

IDW Characterization

At the completion of all fieldwork at the site, the aqueous and solid IDW will be sampled for waste characterization to determine proper disposal actions. The analyses that will be completed on the soil for waste characterization are shown on Table 6.4-1.

Based on the results of the waste characterization sampling of stockpiled soils, the soils will be disposed of in a manner consistent with all applicable federal, state, and local regulations.

The analyses that will be completed on the aqueous IDW for waste characterization are shown on Table 6.4-2.

If the aqueous IDW is found to be non-characteristic, a suitable location for the disposal of the water will be determined at the direction of the City of Yonkers. This location may include a sanitary sewer, or another location to allow discharge and evaporation of the water. If a suitable location is not available for the water disposal, or if the water is found to be characteristic, arrangements will be made at that time to dispose of the water at a suitable off-site location

Table 6.4-1

Soil IDW Characterization Analyses

Procedure	Method[1,2,3]	Preservative	Holding Time	Hazardous Limit
VOCs	8260/1311/5035	Cool to 4°C	7 days from VTSR	Compound-Specific
SVOCs	8270C/1311/3510	Cool to 4°C	Extract – 5 days from VTSR Analyze – 40 days from VTSR	Compound-Specific
Arsenic	6010/3510	Cool to 4°C	6 months	5 mg/L
Barium	"	"	"	100 mg/L
Cadmium	"	"	"	1.0 mg/L
Chromium	"	"	"	5.0 mg/L
Lead	"	"	"	5.0 mg/L
Mercury	7471/1311/3510	"	28 days	0.2 mg/L
Selenium	"	"	"	1.0 mg/L
Silver	"	"	"	5.0 mg/L

<u>Notes:</u>
(1) 40 CFR, Parts 260 to 299, Protection of Environment (CFR, 1997)
(2) Test Methods for Evaluating Solid Wastes, Third Edition (EPA, 1996)
(3) Methods for Chemical Analysis of Water and Wastes (EPA, 1983)
°C – Degrees Celsius
mg/L = milligrams per liter
SVOCs = Semi-Volatile Organic Compounds
VOCs = Volatile Organic Compounds
VTSR = Verified Time of Sample Receipt

Table 6.4-2
Aqueous IDW Characterization Analyses

Procedure	Method[1,2,3]	Preservative	Holding Time	Hazardous Limit[4]
VOCs	8260/1311/5030	HCl/4°C	10 days from VTSR	Compound-Specific
SVOCs	8270C/1311/3510	Cool to 4°C	Extract – 5 days from VTSR Analyze – 40 days from VTSR	Compound-Specific
Arsenic	6010/3510	HNO_3/ 4°C	6 months	5 mg/L
Barium	"	"	"	100 mg/L
Cadmium	"	"	"	1.0 mg/L
Chromium	"	"	"	5.0 mg/L
Lead	"	"	"	5.0 mg/L
Mercury	7471/1311/3510	"	28 days	0.2 mg/L
Selenium	"	"	"	1.0 mg/L
Silver	"	"	"	5.0 mg/L

Notes:
(1) 40 CFR, Parts 260 to 299, Protection of Environment (CFR, 1997).
(2) Test Methods for Evaluating Solid Wastes, Third Edition (EPA, 1996).
(3) Methods for Chemical Analysis of Water and Wastes (EPA, 1983).
°C – Degrees Celsius
mg/L = milligrams per liter
SVOCs = Semi-Volatile Organic Compounds
VOCs = Volatile Organic Compounds
VTSR = Verified Time of Sample Receipt

6.4.1.9 Decontamination

Decontamination will be used to ensure that environmental sampling equipment is as free of residual contamination as possible, and to minimize the potential for cross-contamination of environmental samples. Decontamination will be completed on all sampling equipment that is not dedicated. Types of equipment that will require decontamination include:

- Hand utensils (knives, trowels, hand augers, spoons, bowls, dippers);
- Direct push sampling barrels and drive-rods;
- Direct-push soil sampler stainless steel insert sleeves; and
- Drill rigs, drilling augers, drill bits, and drill rods.

Before commencement of any field activities requiring decontamination, a source of potable water will be determined for decontamination use. A suitable tap will be located, at the direction of HDR's Field Manager, for the potable water supply source. In addition, a supply of deionized, organic-free water will be obtained either from the analytical laboratory, or from another suitable source (reverse osmosis, deionized water from Culligan®), for use as a final rinse during decontamination procedures.

Decontamination procedures to be used for the various sampling equipment are as follows:

Small Sampling Equipment/Hand Utensils

For equipment such as spoons, knives, bowls, trowels, hand augers, bailers, direct-push samplers and surface water sampling devices (dippers), the following procedures will be used:

1. Initial wash with potable water/alconox soap mixture. Scrub brushes will be used to remove all residual dirt or other debris.

Potable water wash to remove all soap residue.

2. Rinse with distilled/deionized water.

3. Wrap decontaminated equipment in plastic or aluminum foil to prevent recontamination.

For sampling in areas where free-product petroleum (NAPL) is encountered, the following additional steps will be added between Steps 2 and 3, above:

2a. Methanol Rinse

2b. Hexane Rinse

2c. Methanol Rinse

For sampling in areas where elevated metal concentrations are a concern, the following additional step will be added between Steps 2 and 3 above:

2a. Rinse with diluted (10%) nitric acid (HNO_3).

Large Sampling Equipment

For equipment, such as drill rigs, augers, drill rods, etc., the following procedures will be used:

1. Spray with a hot water/high pressure sprayer (Hotsy) using on-base potable water supply.
2. Stubborn soil or residue may be washed with a potable water/alconox soap mixture. Scrub brushes will be used to remove all residual dirt or other debris.
3. Place decontaminated equipment in a secure location, or wrap in plastic to prevent recontamination.

6.4.1.10 Soil Classification

Soil samples obtained during the installation of soil borings and direct-push soil sampling will be used to develop geological boring logs. Soil sample characteristics will be evaluated using the Unified Soil Classification System (USCS).

6.4.2 Sampling Containers, Preservation, and Holding Time Requirements

Refer to the Work Plan for tables showing the sampling containers, preservation, and holding time requirements.

6.5 Sample Handling and Custody Requirements

6.5.1 Sample Identification

HDR's Field Manager is ultimately responsible for all samples collected in the field. The HDR Field Manager is to ensure that all samples are collected, stored, and transferred in accordance with all specifications outlined in this FSP/QAPP. The laboratory sample custodian is responsible for sample receipt and inspection, sample log-in, sample storage, and sample disposal.

In the field, each sample is assigned a unique sample identification number to allow for proper data management. These sample numbers are included on the sample label, in the daily field log book to identify notes pertaining to the sample, and on the COC records. The sample identification scheme that can be used is described in TP-8-003, Sample Identification Coding System (located in Appendix A).

Examples of forms and labels used to maintain sample custody and document sample handling in the field and during shipping are described in TP-8-001, Project Custody Documentation (located in Appendix A). The method of sealing shipping containers with COC seals are described in TP-13-001, Sample Labeling, Packing, and Shipping, located in Appendix A. The procedures to maintain the COC and document sample handling during transfer from the field to the laboratory are also discussed in this TP. Any field documentation, the original COC form, and any other relevant information will be kept in the project file at HDR.

The procedures for within-laboratory COC, document disposal and consumption of samples are described in Section 5.1.2 of this FSP/QAPP.

6.5.2 Sample Labeling, Packing, and Shipping

TP-13-001, Sample Labeling, Packing, and Shipping (located in Appendix A) describes labeling, packing, and shipping procedures for samples obtained during the Remedial Investigation.

7.0 ANALYTICAL METHODS REQUIREMENTS

The contract laboratory for all analytical work performed under the Work Plan and FSP/QAPP has not been determined as of the writing of this document The analytical methods used by the laboratory selected will be those specified by the NYSDEC ASP 2000. Methods used are recognized, published methods, which are maintained as Standard Operating Procedures (SOPs) in the laboratory library.

The selected laboratory will be a New York State Department of Health (NYSDOH) ELAP and CLP certified laboratory.

7.1 Analytical Methods

The analytical laboratory procedures to be used to analyze the samples obtained during the investigation are presented in this section. Compounds of interest include VOCs (including MTBE), SVOCs, and RCRA metals (40 CFR 265, Appendix III). All analyses will be conducted in accordance with NYSDEC ASP 2000. Table 7.1-1 details the preparation and analysis methods for the compounds of interest listed above.

Table 7.1-1

Preparation and Analysis Methods for Compounds of Interest

Compound of Interest	Matrix	Preparation Method	Analysis Method
VOCs	Soil/Sediment	5035	8260B
	GW/SW	5030	8260B
SVOCs	Soil/Sediment	3550	8260C
	GW/SW	3510	8260C
RCRA Metals[(1)] (total)	Soil/Sediment	3050/7000	6010/7000[(2)]
	GW/SW	3010/7000	6010/7000[(2)]

Notes:

[(1)] RCRA metals as listed in 40 CFR 265, Appendix III. RCRA metals include arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

[(2)] The ICP method (6010B) will be the primary metals analytical method for all the metals with the exception of mercury. If the detection limit attainable by this method is not low enough to make the appropriate project decisions (e.g., non-detectable (ND) results for arsenic, lead selenium and thallium in groundwater), these samples will be analyzed by GFAA (7000 series) for lower detection limits (low ppb range). Results based on both methods will be reported for ND. Positive results will be reported based on the technique that is most appropriate for the concentration range (ICP for high concentrations, and GFAA for low concentrations). This procedure will assure optimal data quality for the project. All aqueous samples will be digested both ways, for ICP and GFAA analysis, upon receipt. Soil digestates can be analyzed by both instrumental techniques.

GW = Groundwater

SW = Surface Water

8.0 QUALITY CONTROL REQUIREMENTS

8.1 Field QC Requirements

8.1.1 Sampling Process Design

This section identifies the planned field QC samples as well as procedures for QC sample preparation and handling. Field QC samples will be obtained and analyzed to check for sampling and laboratory reproducibility. Field sampling QC samples will include duplicates, and matrix spike/matrix spike duplicates (MS/MSD). These field QC samples will be submitted to and analyzed by the analytical laboratory to help assess the quality of the data resulting from the field sampling program. The analysis of field QC samples will provide data quality indicators as follows:

- Duplicates: Check sampling and laboratory reproducibility.
- MS/MSD: Matrix spike and matrix spike duplicate samples will be collected in the field and submitted to the laboratory along with the associated sample. The MS/MSD samples will be used to evaluate possible matrix effects on the sample analyses. An attempt will be made to collect the MS/MSD samples from sampling locations that are expected to contain low contaminant concentrations.
- Rinsate Blanks: Monitor decontamination procedures.
- Trip Blanks Measure contamination introduced during collection, shipping and storage of aqueous samples.

Duplicate samples will be obtained in the field at the rate of 1 in 10 field samples per analyte per matrix. MS/MSD samples will be collected at the same time as the associated field sample at a frequency of 1 MS/MSD sample for every 20 field samples, per analyte, per matrix (solid or aqueous). All QC samples will be prepared and handled in the same manner as all other field-collected samples.

8.1.2 Sample Handling and Custody Requirements

QC devices employed to ensure that samples are not tampered with (e.g., custody seals) are described in TP-8-001, Project Custody Documentation and TP-13-001, Sample Labeling, Packing, and Shipping included in Appendix A.

9.0 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, CALIBRATION AND MAINTENANCE REQUIREMENTS

Calibration and maintenance of field and laboratory instrumentation will be conducted prior to and during continued use to establish that the equipment is functioning properly with the desired sensitivity. Personnel will follow the manufacturer's instructions and EPA specifications to ensure the equipment is functioning within tolerances established by the manufacturer and the EPA method-specific analytical requirements. At a minimum, the following information will be recorded in the field or laboratory notebook at the time instrument calibration or maintenance activities are completed:

- Date and time of calibration;
- Name of person conducting the calibration;
- Type of equipment being serviced;
- Reference standard used for calibration;
- Calibration and/or maintenance procedure used; and
- Other pertinent information.

9.1 Field Instrumentation

The calibration and general maintenance of field instrumentation is the responsibility of the appropriate field personnel. In this case, HDR's Field Manager will be responsible for calibrating and maintaining sampling instrumentation and health and safety instrumentation.

9.1.1 pH, Temperature and Specific Conductivity Meter Sampling, Calibration, and Maintenance

The pH, temperature, and specific conductivity meter used during field sampling is calibrated before each use. The sampling team conducts routine cleaning and maintenance of the meter. All calibration and maintenance is conducted in accordance with manufacturer's instructions. The meters are sent to the manufacturer for repair on an as-needed basis.

9.1.2 Photoionization Detector (PID) Sampling, Calibration, and Maintenance

A PID will be used for monitoring VOCs during intrusive activities during the Remedial Investigation. TP-12-001, HNU PI101 Photoionization Detector, in Appendix A, details the procedures for using these instruments. Calibration and maintenance of these instruments will be conducted in accordance with manufacturer's recommendations. The sampling team conducts routine cleaning and maintenance of the instruments, while the manufacturer conducts repairs on an as-needed basis.

9.2 Inspection/Acceptable Requirements for Supplies and Consumables

All sample containers, sampling equipment, and other supplies that could potentially affect sample integrity will be maintained and inspected before use to minimize negative impacts to the analytical data. Only new, pre-cleaned sample containers supplied by the analytical laboratory will be used for sample collection. Pre-preserved sample containers will be evaluated for expiration dates and all expired sample containers will be discarded. Consumables, such as resealable plastic bags, paper towels, aluminum foil, etc. will not be reused and will be used only in a new condition directly from the product container. Consumables will be kept in large plastic bags in the field to prevent potential contamination of these materials. The HDR Field Manager will be responsible for the inspection and maintenance of all supplies and consumables.

10.0 RECONCILIATION WITH DATA QUALITY OBJECTIVES

As the part of the assessment phase that follows, data validation assessment determines how well the validated data can support their intended use. The Work Plan outlines the basic approach to data collection and the decisions to be made based on the collected data. The sampling to be completed at the site is designed to primarily determine if potential site-related contaminants are present in site media. The following data assessment process will be used:

- Review the Data Quality Objectives (DQO) and sampling design:
  a. Review the DQO outputs to ensure that they are still applicable.
  b. Review the sampling design to determine if any essential data are missing.

- Conduct a preliminary data review:
  a. Review data validation reports that document the sample collection, handling, analysis, data reduction, and reporting procedures used.
  b. Review quality control reports from the laboratory.
  c. Review Method Detection Limits (MDL).
  d. Identify patterns, relationships, or potential anomalies in the data and verify data quality.

- Summarize and analyze the data:
  a. Data collected at each sampling location will be summarized by medium (i.e., surface soil, subsurface soil, groundwater, surface water, and sediment).
  b. For the screening level human health risk evaluation, a table will be generated to show the medium, chemicals detected, and the sample the chemical is detected in. Data without qualifiers, qualified "U" (nondetect) or qualified "J" (estimated), will be presented in the table. The maximum detected concentration will be selected from these results.

- Draw conclusions from the data.

- Evaluate options for resampling a medium (or media):
  a. No one sample is considered critical to the decision-making process.
  b. If more than 30% of samples are qualified "R" (rejected) for a particular medium (surface soil, subsurface soil, groundwater, surface water, sediment considered separately), additional samples will be collected for that medium.

11.0 REFERENCES

40 Code of Federal Regulations (40 CFR), 1997. July 1, 1997 Revision.

United States Environmental Protection Agency (EPA), 1983. Methods for Chemical Analysis of Water and Wastes. EPA/600/4-79-020.

United States Environmental Protection Agency (EPA), 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002. December 1989

United States Environmental Protection Agency (EPA), 1994a. Guidance for the Data Quality Objectives Process, EPA/600/R-96/055, EPA QA/G-4. September 1994.

United States Environmental Protection Agency (EPA), 1996. Test Methods for Evaluating Solid Waste Physical/Chemical Methods, SW-846, Third Edition. December 1996.

United States Environmental Protection Agency (EPA), 1998a. EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5. Office of Research and Development, EPA/600/R-98. February 1998.

United States Environmental Protection Agency (EPA), 1998b. EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, EPA QA/R-5. External Review Draft Final. October 1998.

United States Environmental Protection Agency (EPA), 1999. EPA Region IX Preliminary Remediation Goals. December 1999.

PART B APPENDICES

APPENDIX A
TECHNICAL PROCEDURES (TPs)

APPENDIX A TECHNICAL PROCEDURES (TPS)/GENERAL PROCEDURES (EXAMPLES REFERENCED IN TEXT)

APPENDIX A.1	No. TP-3-002, Groundwater Sampling
APPENDIX A.2	No. TP-8-001, Project Custody Documentation
APPENDIX A.3	No. TP-8-002, Drum Labeling
APPENDIX A.4	No. TP-8-003, Project Sample Identification
APPENDIX A.5	No. TP-9-001, Monitoring Well Installation
APPENDIX A.6	No. TP-9-003, Soil Sample Collection
APPENDIX A.7	No. TP-12-001, HNU PI101 Photoionization Detector
APPENDIX A.8	No. TP-13-001, Sample Labeling, Packing and Shipping

APPENDIX A.1
TP-3-002
Groundwater Sampling

TECHNICAL PROCEDURE
NO. TP-3-002
GROUND WATER SAMPLING

1.0 PURPOSE

The purpose of this document is to describe the groundwater sampling techniques to be followed to ensure that the groundwater samples obtained are representative of the environment they are intended to characterize.

2.O APPLICABILITY AND SCOPE

The requirements of this procedure are applicable to subsurface sampling of groundwater from a monitoring well. The scope of this document is limited to project activities involving the withdrawal, preparation and delivery of groundwater samples from monitoring wells.

The extent of the project activities identified by this procedure is under the direction of the Project Manager.

3.0 REFERENCES-

3.1 Technical Procedure No. TP-5-002, Sampling and Analysis Plan

3.2 Quality Assurance Program Plan and implementing procedures

3.3 Procedure No. TP-12-001, HNU PI101 Photoionization Detector

3.4 Procedure No. TP-8-001, Project Custody Documentation

3.5 Procedure No. TP-8-002, Drum Labeling

3.6 Procedure No. TP-12-002, Foxboro Organic Vapor Analyzer

3.7 Procedure No. TP-13-001, Packing, Shipping, and Labeling

3.8 Procedure No. TP-8-003, Project Sample Identification

4.0 DEFINITIONS

4.1 NAPLs

Non-aqueous Phase Liquids that do not readily dissolve in water and can exist as a separate fluid phase are known as non-aqueous phase liquids (NAPLs).

4.2 LNAPLs

Light non-aqueous Phase Liquids-NAPLs are subdivided into classes. Those that are lighter than water are Light non-aqueous phase liquids (LNAPLs).

4.3 DNAPLs

Dense Non-aqueous Phase Liquids-NAPLs are subdivided into classes. Those with a density greater than water are dense non-aqueous phase liquids (DNAPLs).

4.4 Site Coordination/Site Geologist-Manages field operations, executes the work plan and schedule, coordinates with the Site Safety Officer in determining protection level, enforces site control, documents field activities and sample collection, and serves as a liaison with public officials.

5.0 PROCEDURES

5.1 Prerequisites (Prior to mobilization for sampling site)

5.1.1 Obtain equipment identified in Attachment 7.1 prior to leaving for the site.

5.1.2 Obtain and read Reference documents listed in 3.0, References.

5.2 Site Information

5.2.1 Obtain the information in Attachment 7.2 for each site and each well. This information will be provided in a data packet or site-specific work plan.

5.2.2 Project Manager or Project Engineer is to contact the Client Representative in advance of sampling activities. Confirm that this covers the sampling of off-site wells or make the appropriate contacts separately.

5.2.3 Review the completed Chain-of-Custody form or other sample identification and analyte request information for each site.

Verify sample identification numbers, check numbers using Procedure No. TP-8-003, Project Sample Identification (Reference 3.0).

Verify phases (water or visible non-aqueous phase liquids) and analytes to be analyzed.

Verify wells where replicates or matrix spike (MS) and matrix spike duplicates (MSD) are to be taken.

Verify that the laboratory has been notified regarding any and all preservatives required and that they will be available before leaving for the field. Adjust the number of bottles required for sampling. Where duplicate samples are required, two or more sets of samples are to be taken (sample and replicate). Where matrix spike (MS) and matrix spike duplicates (MSD) are required, three sets of samples are to be taken (sample, matrix spike and matrix duplicate).

5.2.4 Review site-specific issues with the Project Manager or Site Technical Director.

5.2.5 Obtain up-to-date site map with wells and other sampling locations marked.

5.2.6 Determine whether State or other representatives are expected for the sampling event. Discuss approaches for-split samples or other requirements.

5.2.7 Verify that the appropriate number of drums is available or that another purge water disposal system is adequate. Verify where the filled drums are to be stored.

5.2.8 Obtain a list of the most recent depth to water measurements and use them as a guide. This may cut down on decontamination time for the water level measuring devices.

5.3 Arrival On Sampling Site

Upon arriving at site, identify yourselves to the Client Representative and sign-in (if required).

Obtain the proper quality of water for decon, if needed.

Water sources containing analytes in excess of quantitation levels will not be used for decontamination.

5.4 Approach to Well

Unlock well cap** using graphite lubricant on the lock if necessary. While opening cap, monitor for volatile emissions using a PID or FID. Refer to criteria listed in the Health and Safety Plan - operate instruments according to Procedures TP-12-001 and TP-12-002 (Reference 3.0). Record instrument number, calibration dates and measurements.

** Note: Record in the field logbook if the cap or lock have been damaged or opened. Also, note any other conditions affecting well integrity.

5.5 Measure Depth To Water

5.5.1 The objective is to determine the depth to water to the nearest one hundredth of a foot (0.01 ft.) at all wells. If the well contains a dedicated pump assembly, move the well plate to one side to gain access.

Measure and record the depth to water at each well on the site before purging begins in any well.

Use as a guide the most recent depth to water measurements obtained prior to leaving for the site.

Measure the depth to water from the reference point which is inscribed on the inner casing. Measurements should be taken to the point on the inner casing adjacent to the marking on the outer casing, if the inner casing is not marked.

If the depth to water is measured from any point other than the inscribed reference mark, the difference must be measured and recorded. The depth from the reference mark needs to be calculated and recorded.

If casing is not inscribed, notch the casing with a chisel or file. During the first round of sampling, a special effort needs to be made to inscribe the reference marks even where they were previously marked with indelible marker. On double-cased wells, reference mark should always be on the inner casing.

Rinse measuring device with DI water before lowering into well. Use care in lowering the probe, particularly into wells with floating visible light non-aqueous phase liquids (LNAPLs). Those parts of the device that contact the LNAPLs must be decontaminated.

Care should be taken in wells with dedicated pumps so as not to tangle the probe in the tubing. Use the stilling tube in any well which contains such a stilling tube.

5.5.2 Record the depth to water (to the nearest one hundredth [0.01] of a foot) in the sampling logbook and on the Groundwater Monitoring/Sampling Log Form, Attachment 7.3 and compare to the last reading. Generally, the depth to water will show similar changes between wells, i.e. higher or lower, and by similar amounts. Try to explain unusual changes in the depth to water.

5.5.3 Where visible LNAPLs are not present (Section 5.6), decontaminate those parts of the measuring device that contacted the water with Alconox and rinse with DI water.

Where visible LNAPLs are present (Section 5.6), decontaminate the parts of the measuring device that contacted the LNAPLs with:

Alconox Solution
Potable Water Rinse
Methanol
Hexane
Methanol
DI water

Wipe the probe and wire with paper towels and rinse again with DI water.

Inspect to see if the probe tip or popper is clean. If it looks or feels oily, repeat the decon procedure above.

Small bottles are preferred for the first five decon solutions while a plastic squirt bottle may be used for the DI rinse.

5.5.4 Keep measuring device clean between wells, such as, off the ground, etc.

5.6 Determine Presence of Floating Visible Oil

The objective is to determine the presence and thickness of the floating visible Light Non-aqueous phase liquids (LNAPLs) in wells where they have previously been noted and to verify that they have not migrated to wells where it was not observed previously.

For wells with floating visible LNAPLs, slowly lower a top-loading bailer to the fluid surface. Upon retrieval, visually describe and estimate the thickness of the LNAPLs and emulsion layer if possible. The bailer may be dedicated to the well and left hanging in the well between sampling rounds. Wash bailer with Alconox solution and rinse with DI water after using.

For wells where visible LNAPLs are not anticipated, use a top-loading bailer to collect a surface sample. Describe the surface of the water upon retrieval. If no visible LNAPLs are observed, purge and sample well as described in Section 5.7.

If visible LNAPLs are present, do not purge; call the Technical Director or Project Manager for instructions. Decontaminate water-level device as instructed in Section 5.5.4 for wells with visible oil.

The bailer may be left hanging in the well between rounds, at the discretion of the Site Coordinator. Bailers left in wells where oils or other films were observed should be decontaminated with Alconox solution and rinse with DI water after using.

5.7 Sampling Wells Where No Visible Non-aqueous Phase Liquids Are Detected

5.7.1 Prerequisites, Set-up for Purging and Sampling

5.7.1.1 Well Selection

Plan to purge and sample low yielding wells first, so that sufficient water volume will be available for sampling prior to vacating the site. Allow sufficient time for water recovery which will be slow in low yielding wells.

A sheet of visqueen plastic may be spread around the well for bottles, equipment, and other materials used for sampling.

If needed, locate and position drums or other purge water containment system.

- Do not place the drums on the plastic as it will be difficult to remove the plastic when the drums are full.
- Set-up on a flat surface in a location where drums are easily retrievable by truck and backhoe.
- Drums should be located downslope from the well to be sampled, if possible.
- Drums should be opened prior to the beginning of purging.

5.7.1.2 Calculate Standing Water Volume

Using the well and pump specifications supplied by the Site Coordinator, current depth to water measurements (Section 5.5), and Attachment 7.4, Table for Determining Purge Water Volumes, calculate the volume of standing water in the well. Fully document the volume calculation in the sampling logbook and on the Groundwater Monitoring/Sampling Log Form, Attachment 7.3.

This purge water volume may be calculated as follows:

1. Subtract the depth to water (measured, Section 5.5) from the total well depth to calculate the standing water column (ft).

2. Utilizing Attachment 7.4, move down the left hand column (Depth of Standing Water in Well) until you come to a depth that closely corresponds to the one calculated. Then move laterally across to the column that matches the well's inner diameter and read the corresponding purge volume (gallons) Interpolate as necessary.

3. Multiply the one casing volume by 3 and 5 to compute the estimated purge volumes.

5.7.1.3 **<u>Calculate Purge Time</u>**

Divide the estimated purge volume by the pump discharge rate to obtain an estimated purge time. The kinds of purge pumps used and their ranges of discharge rates are listed below.

bladder pump (BP) 0.5 - 1.5 gpm

pneumatic pump (PN) 2.5 - 5.0 gpm

submersible pump (SP) 7.0 - 14.0 gpm

During well purging, discharge rate will be measured a minimum of 4 times, initially and after each casing volume. Recalculate the purge time using the measured discharge rates and adjust the purge time accordingly. Record each adjustment and recalculated purge time.

Divide the purge time into 3 intervals and enter the number of minutes in the Sampling Information section of the logbook and on the Groundwater Monitoring/Sampling Log Form, Attachment 7.3. After purging is initiated, field parameters (temperature, pH, and specific conductance), depth to water, and discharge will be measured at each of those intervals.

Should water in the well become evacuated ("run dry") prior to removal of 3 to 5 purge water volumes, record the total volume removed and the time required for the removal.

5.7.2 Measure and record in sampling logbook and on the Groundwater Monitoring/Sampling Log Form, Attachment 7.3 the following field parameters (temperature, pH, specific conductance), depth to water, and discharge at four times during purging. These will be taken:

(1) Upon start of purging, within 3 minutes;

(2) 1/3 purge time;

(3) 2/3 purge time; and

(4) immediately prior to sampling, before shutting off pump.

The number of such measurements may be reduced for subsequent sampling efforts, depending upon the stabilization rate of the field parameters. These measurements will be made until the relationship between the amount of purging, contaminant levels, and the field parameters are better understood. The assumption in making these measurements is that their stabilization is indicative of adequate purging of the well. Another school of thought centers on the purging of 3 to 5 well casing volumes which has become the regulatory standard.

The field parameter measurements may be made by taking a grab sample with a plastic beaker from the pump discharge tube.

5.7.2.1 pH Measurement

Measurements of pH will be made with a portable pH meter. It should be calibrated between wells with the buffer solution standards supplied with the instruments (normally pH 4,7,10). Measurements may be verified by testing with indicator paper. The probe should be triple rinsed with DI water between wells and remain moist.

Check the instrument before departing for the field and each morning prior to leaving for the site. An extra meter should be taken for extended sampling trips.

The following procedure may be used for measuring pH with a pH meter:

1. Keep the tip of the electrode moist. Most field probes have plastic caps with moistened cotton inserts. Put a few drops of DI water on the cotton daily.

2. Rinse the electrode with DI water.

3. Immerse the electrode in pH 7 buffer solution.

4. Adjust the temperature compensator to the purge water temperature.

5. Adjust the pH meter to read 7.0 (Note: If the sample is known to be acidic or alkaline, calibrate the meter with pH 4 or pH 10 buffer solution, respectively).

6. Remove the electrode from the buffer and rinse with DI water.

7. Immerse the electrode in the purge water.

8. Read and record the pH of the purge water, after adjusting the temperature compensator to the sample temperature.

9. Rinse the electrodes with DI water.

10. Three readings should be measured and recorded for each purge water.

11. Keep the electrode moist with DI water when not in use.

12. Protect the instrument and standards from freezing during winter sampling

The following procedure maybe used for measuring or verifying pH with indicator paper:

1. Immerse a strip of indicator paper into the purge water.

2. Remove the paper from the purge water and compare the color with the indicator colors given on the pH paper container.

3. Record the pH. (Note: If the indicator paper is suspected ~~of being~~ old or deteriorated, do not use. It may be checked by immersing it in the buffer solutions and checking the color that develops against the standards.

Check acid preserved samples to confirm that pH of the preserved sample is appropriate. The following procedures should be used.

This procedure is performed after the sample has been added to the preservative and has been well mixed by closing and inverting the container several times.

1. Remove the cap from container.

2. Immerse clean glass rod into preserved sample. Remove rod and touch it with pH paper of appropriate sensitivity If a clean glass rod is not a available, a few drops of the sample may be poured into another container and the indicator paper dipped into the drops Do <u>not</u> dip the indicator paper into the sample container.

3. If pH is less than 2.0, close container.

4. If pH is above 2.0, add several drops of Nitric acid (HNO_3) and recheck pH.

5. Dispose of glass rod.

All results are to be recorded in the sampling logbook.

** NOTE: Preservative for metals is Nitric Acid ($HN0_3$). Handle with care.

Check pH of purge water samples to be analyzed for Cyanide to verify that the pH exceeds 12.0. Check as above. Add a few drops of Potassium Hydroxide (KOH), if necessary.

** NOTE: Preservative for Cyanide is Potassium Hydroxide (KOH). Handle with care.

5.7.2.2 <u>Temperature and Specific Conductance Measurement</u>

Purge water temperature and specific conductance should be measured with a conductivity meter. Calibrate prior to initiating activities each day and between wells. Triple rinse the probe with DI water between wells. Check the instrument before departing for the field and each morning prior to leaving for the field.

The steps involved in taking specific-conductance measurements are listed below:

1. Rinse the jar with one or more portions of the sample to be tested.

2. Immerse the electrode in the sample and measure the conductivity.

3. Read and record the results. Adjust the temperature setting to the sample temperature.

4. Three readings should be collected for each sample.

Results are to be recorded in the sampling logbook and on the Groundwater Monitoring/Sampling Log Form(s), Attachment 7.3.

5.7.3 <u>Purging Procedures</u>

Well purging involves pumping for a period of time in order to obtain a sample that is representative of the groundwater within the geologic formation. Purge the well of stagnant water in the well, so that the well contains only water freshly drawn from the aquifer.

If the purging rate is greater than the well yield <u>and</u> the purge pump is located at the well bottom, then the well may be 'pumped dry.'

This is detected by significantly reduced or discontinuous discharge while insuring that there are no malfunctions in the pumping equipment.

For this case, purging can be discontinued before the standard three volumes and the well may be sampled as soon as the water column recovers above the level of the sampling pump.

If the purge pump is not located on the well bottom and the water in the well has been evacuated to the pump intake, then purging needs to be interrupted until the water level has recovered enough to purge for another significant length of time. This procedure should be repeated until the specified purge volume or time has been reached (See Section 5.7.1).

The expected discharge rates of these pumps range from 0.5 to 1.5 gallons per minute (gpm) for the bladder pumps, 2.5 to 5.0 gpm for the pneumatic purge pumps, and 7.0 to 14.0 gpm for the electric submersible pumps. If a pump does not perform to its expected discharge rate, then one of the following conclusions can be made: the pump is not being operated properly, the water level is at the pump intake, or the pump is faulty. If the pump is determined to be faulty, call the Project Manager for instructions.

The discharge rate, field parameters, and depth-to-water need to be measured and recorded a minimum of four times during purging:

initial, within 3 minutes of start-up;
1/3 purge time;
2/3 purge time; and
final, immediately before shutting off the purge pump.

For bladder and pneumatic pumps measure the time required to fill a bucket or other container of known volume.

For the submersible pump, measure the length of time required to fill a 5 gallon bucket.

Record the time in minutes and volume in gallons.

Record pump discharge rates and pump settings in the sampling logbook and on the Groundwater Monitoring Sampling Log Form(s), Attachment 7.3. Also record any changes in the pump settings and the time at which the changes are made. This should eliminate much of effort required to optimize the flow during the next sampling activity.

Upon reaching the desired purge water volume or time, shut-off the purge pump. Make water level measurements during a 10 minute recovery period prior to sampling (Section 5.7.4.2).

Detach and rinse extended purge tubing which extends from the well head to the drums or other purge water disposal system. Use water of appropriate quality.

Do not sample through the extended purge tubing.

Purge water from some wells may be disposed on site depending on the concentration of analytes. The Site Coordinator will instruct the field team regarding this.

Follow instructions in Procedure No. TP-8-002, Drum Labeling (Reference 3.0), and refer to the data packet or site-specific work plan to verify wells where purge water is to be disposed on-site, and check requirements for other purge water containment or disposal systems.

5.7.3.1 Bladder Pump

The bladder pump is an air driven device which pumps water to the land surface in pulses. The key to its use is to optimize the flow rate by correctly timing the pulses.

The purging system is powered by a driver/controller assembly which is an air compressor that sends filtered air through a pneumatically-powered controller. An air line runs from the controller to an air intake quick-connect nipple that protrudes from the well head adjacent to the discharge line.

During operation, the compressor forces air through the controller at 100 psi. During the pressure phase the forced air compresses the bladder that is driving the water toward the land surface. The air does not contact the well water. During the vent cycle, the formation water refills the bladder.

Five to 15 pumping cycles are required to purge the air from the pump and tubing before water begins to flow from the sample discharge line.

The setup procedure is as follows:

- Inspect both the air intake and the water discharge lines. The air lines should be tightly connected and the well discharge should lead into a 5-gallon bucket (if containerization is deemed necessary for the particular well) with other drums readily available. The well discharge tubing and elbow should be located on the well cap with the elbow resting on the plate and the tubing within the well.
- The compressor gas tank should be full. The running time is 2 hours per tank of gas. Oil must be added to the engine and checked between wells. The oil should be changed after 24-hours of operation. Both oil fill caps must be opened during oil refill.

The greatest potential flow rate occurs when the air pulse (discharge) interval is exactly long enough to squeeze the total amount of water from the bladder and the intake interval equals the exact time necessary to fill the bladder.

To optimize pumping efficiency do the following:

- Adjust the refill and discharge cycles to 10-15 seconds each. Measure the water volume discharged during a single discharge cycle. If the volume collected in a graduated cylinder is less than 350 to 450 ml, increase the refill cycle time until this range in volume is achieved.

- Shorten the discharge cycle period (counter clockwise knob adjustment) until the end of the discharge cycle begins to coincide with the end of the water flow from the pump outlet tube.

- Shorten the refill cycle until the water volume of the discharge cycle decreases noticeably. Important -- a lag of two to three cycles precedes each noticeable change, therefore care should be taken not to change the settings quickly. Also, these settings may have to be readjusted periodically to account-for the changing water level above the pump during purging.

- Measure and record the discharge rates and all pump settings in the sampling logbook and on the Groundwater Monitoring/Sampling Log Form, Attachment 7.3.

Detach and rinse the extended purge tubing prior to sampling.

Do not sample through the extended purge tubing.

5.7.3.2 Pneumatic Pump

The pneumatic pump is also powered by the compressor/controller and it cannot be used for sampling. The caps of wells with pneumatic pumps contain two air lines. The air line which drives the pneumatic pump is adjacent to the pump discharge tubing which is larger in diameter than that for the bladder pump. Pneumatic pump setup is identical to that of the bladder pump setup procedure with a few exceptions:

- The maximum discharge per pulse is slightly more than three gallons.

- The expected discharge rate is 2.5 to 5.0 gpm (Section 5.7.3).

- The pneumatic pump discharge needs to be measured and adjusted during the discharge cycle. Unlike the bladder pump, the discharge does not automatically cease when the pump is empty.

- If the refill time is too short, the discharge volume will drop steadily.
- If the refill time is too long, the purge water will be sprayed as compressed air is discharged through the water tube.
- Measure and record the pump discharge and pump settings.

Record pump settings in the sampling logbook and on the Groundwater Monitoring/Sampling Log Form(s), Attachment 7.3. Record initial settings and any changes in the settings. Record the time at which a change in pump settings is made after the flow is optimized.

For most sites, the well head discharge tubing and elbow will be a single unit used from well to well and rinsed between wells. Samples must not be taken from the pneumatic or Grundfos pumps or from the extended purge tubing.

Detach and rinse extended purge tubing upon completion of purging.

5.7.3.3 Submersible Pump

The submersible pump operates on electricity normally supplied from a portable gas-driven generator. The switch on the generator needs to be set to the proper voltage requirements for the pump (220/115 volts). After the generator is connected, the pump should start in conjunction with the generator. During purging, constant monitoring is required. If the purge water is to be containerized, then drums will be rapidly rotated, since these pumps discharge at rates ranging from 7 to 14 gallons per minute. Also, the pump needs to be shut off as soon as it runs dry, otherwise the motor may be permanently damaged. Submersible pumps are not recommended for sampling. They are to be used for purging only.

Record the pump setting used for purging and verify the pump discharge rate at those settings by measuring the time required to fill a drum.

Record the time and calculate the discharge rate in gallons per minute.

Detach and rinse extended purge tubing with site water except as noted in Section 5.3.

5.7.4 Measure Depth to Water During Drawdown and Recovery

5.7.4.1 Measure Drawdown

In order to estimate well yields, periodic depth to water measurements (Section 5.5) will be taken and recorded during purging. These measurements will be taken with a standard electronic depth to water meter.

Make depth to water measurements at the following times:

1/3 purge time
2/3 purge time and
end purge time before shutting off pumps.

At 2/3 purge time, make depth to water measurements at nearby wells, within about 100 feet. Record the measurements.

5.7.4.2 Measure Recovery

Allow the water level in the well to recover for 10 minutes after the purge pump is shut off and prior to sampling.

Measure and record depth to water at the following times:

15 sec
30 sec
1 min
2 min
5 min
10 min

If samples are to be collected with a bladder pump, perform the following steps:

Compare the depth to water at 10 minutes to the depth of the sample pump. The sample pump depth is the depth of the intake of the sample pump.

Where the sample pump is submerged by at least 5 feet of water, collect the sample.

Where the sample pump is above the water level, measure and record water levels every 15 minutes for 45 minutes or until the sample pump depth is submerged by 5 feet of water.

If, after 55 minutes following purging, the sample pump is not under water, return and measure the water level periodically, about every 60 minutes until the sample pump is submerged.

Decon water level probe, as described in Section 5.5.4 when measurements are completed.

If samples are to be collected with a bailer, allow well to recover at least 10 minutes while making recovery measurements and sample well when sufficient water is in the well to fill the sample container.

5.7.5 Sampling Procedures

NOTE: Personnel handling gasoline will not be permitted to take samples or handle sample containers.

5.7.5.1 Sampling with a Bailer

If samples are to be collected with a bailer, perform the following:

1. Allow water level to recover until sufficient water exists to obtain samples.
2. Use a decontaminated teflon bailer.
3. Lower bailer slowly through the fluid surface.
4. Fill sample containers upon retrieving bailer.
5. Take VOA samples from the bottom of the bailer utilizing a bottom emptying stopcock.
6. If the bailer is to used to sample other wells, decon with:

   Alconox Solution
   Potable Water Rinse
   DI Water

7. Proceed with sampling as described in Section 5.7.5.3

5.7.5.2 Sampling Requirements

NOTE: Record the bottle lot numbers in the sampling logbook.

When taking a sample for VOAs, fill VOA vials completely and check that no air bubbles are present when the vial is inverted. If bubbles are observed refill the vial and recheck until no bubbles are observed.

Hold vial at an angle to reduce aeration while filling.

Fill vial until a positive meniscus forms.

Replace septum and screw cap.

Avoid trapping air between sample and cap.

Turn vial upside down and tap gently, if bubbles appear refill vial until no bubbles are observed.

If no bubbles appear, seal and label the sample container.

If dissolved metals are specified in the Sampling and Analysis Plan (SAP) then utilize a 0.45 micron disposable filter in either a barrel filter holder or backflushing filter holder using a peristaltic pump as the driving force behind the filtration.

Samples to be analyzed for metals must be as free from suspended solids (clay particles) as possible, as the metals tend to plate-out and be absorbed by clay particles within hours of collection.

Secure the teflon-lined caps.

Fill-out the labels using the numbers, provided by the Site Coordinator (on the Chain-of-Custody).

Attach labels and custody seals.

Place in a Ziploc plastic bag.

Record all pertinent information in the sampling logbook.

Complete the sample Chain-of-Custody form in accordance with Procedure No. TP-8-001, Project Custody Documentation, Reference 3.0.

** NOTE: Analytes requested on the Chain-of-Custody Form should be the same as the labels on the sample bottles. For HSLs, full VOA scans are run. For reduced analytes, BTEX or other subsets of volatile organic compounds may be run. Be sure to specify only the analytes desired (VOA vs BTEX).

Verify that QC samples, such as replicates or matrix spike and matrix spike duplicates, have been collected, as requested.

** Note: Try to return QC samples during the first shipment of samples from a site, particularly if sampling is to last more than 1 day.

Place the samples on ice in the coolers for shipping. See Section 5.9.1 for additional shipping and packing information. Groundwater samples are to be considered environmental samples.

5.7.6 Field Blanks

5.7.6.1 Trip Blank

A trip blank is a sampled laboratory reagent water placed in a VOA vial at the laboratory and accompanies the cooler from the time it is shipped to the field until the cooler is returned with samples for analysis.

Two 40 ml VOA vials are required for each cooler containing VOAs.

List the trip blank identification number on the Chain-of-Custody using a separate line on the form.

5.7.6.2 DI Water Field Blank

Sample each source of deionized or distilled water, or other rinse material used for the final rinse step in decontaminating non-disposable sampling equipment. The DI water rinse field blank needs to be analyzed for the maximum range of analytes requested for each sampling event, matrix, and site. The Field Team will document the source of the decontamination water in the field logbook. A decontamination rinse field blank provides a check of potential introduction of contamination from the final rinse water used for decontamination.

If no sampling equipment is decontaminated, a DI water field blank is not required.

5.7.6.3 Sampling Equipment Field Blank

A sample of laboratory-grade (HPLC) water poured appropriately over or through the sample collection device will be collected in a sample container and returned to the laboratory for analysis.

Sampling equipment field blanks are collected following the decontamination of the non-disposable sampling device that contacts the sample matrix. A sampling equipment field blank needs to be collected for each sampling event, matrix and site and analyzed for the maximum range of analytes requested for each matrix sampled at the site. The sampling equipment blank provides a check on the effectiveness of the decontamination process.

If no sampling equipment is decontaminated, a sampling equipment field blank is not required.

5.7.7 Replicate Samples

Collect at least one set of duplicates for every 20 field samples at each site. Field samples include samples of groundwater collected from wells, seeps, springs, or other groundwater samples.

Collect replicates at a well selected by the Site Coordinator. The well should show previous degradation or have had questionable results.

To collect a duplicate, fill one set of bottles in addition to those required for the field sample.

List the replicates on the Chain-of-Custody using a separate line of the form.

5.7.8 Split Samples

Where EPA or other State representatives are expected to participate in sampling or are expected to take split samples they should:

- Abide by the HDR Health and Safety Plan;
- Abide by HDR Procedures; and,
- Provide their own personal protective gear and sample containers

Split samples will be relinquished when the representative is on site and provides the sample container. The Site Coordinator should document which samples were split, the agency, and the agency sample numbers in the field logbook. Also note the location and sample numbers for any additional samples collected by the agency.

5.8 Sampling Wells with Floating Visible LNAPLs

The objective is to obtain a representative sample of the visible LNAPLs and return it to the laboratory for analysis.

Use an appropriate top-loading bailer.

Prior to being used for sampling, sampling equipment other than disposable sampling-equipment will be decontaminated with:

Alconox Solution
Potable Water Rinse
Methanol
Hexane
Methanol
DI Water

Collect a sample of the fluid surface using the bailer.

For the volatile fraction sample, transfer the sample to 40 ml, laboratory-sampled prepared, septum vials.

Where the visible LNAPLs are present as a thin film, do not overfill the vial to a positive meniscus. Fill it to the base of the threads on the vial. Seal it. Do not check for bubbles.

For FID analyses, fill 1 40 ml VOA vial with sample. Fill to base of threads on vial. Do not form positive meniscus.

Where the visible LNAPLs are present in sufficient quantity to occupy most of the volume of the vial, overfill each vial to eliminate void space; a convex meniscus should be present at the top of vial. Secure the teflon-lined caps on the containers. Invert the vial, tap gently, and observe for any bubbles. If bubbles are observed remove the cap, overfill the vial, reseal and recheck. Repeat until vial contains no bubbles.

** NOTE: For LNAPLs samples, do not rinse bottles before filling.

Attach labels and custody seals.

Place in a Ziploc plastic bag.

Record all pertinent information in the sampling logbook.

Collect one field blank for every 20 wells sampled. The requirements for the field blank shall be the same as the composite of all the different analyses required at the site. Fill empty sample bottles for each different type of analysis required with DI water. Label, pack and ship accordingly.

Complete the Chain-of-Custody form. See Procedure No. TP-8-001, Project Custody Documentation, Reference 3.0.

Place the containers on ice in the coolers for shipping.

Pack, label, and ship visible oil samples as environmental samples where oil is a thin film.

** NOTE: Where samples are shipped as hazardous materials:

- use proper packing
- pack in a separate cooler
- list on a separate Chain-of-Custody

Environmental and hazardous samples are to be shipped separately.

5.9 Sampling Demobilization

During cold weather check to see that the purge tubing from the bladder pump to the surface is draining. Lift the well plate and watch for the fluid level to drop in the tubing. If this does not occur, call the Project Manager.

5.9.1 Packing, Shipping, and Labeling Samples

Groundwater Samples collected from monitoring wells as described in this procedure are to be handled as environmental samples. This includes those samples which may contain visible oil.

Follow instructions in Procedure No. TP-13-001, Packing, Shipping, and Labeling, Reference 3.0.

5.9.2 Drum Labeling

As each drum is filled, it will be labeled with a paint marker. Both the top and side should be labeled. Use the black marker on the white top and the white marker on the black sides. The paint should be applied to dry surfaces.

See Procedure No. TP-8-002, Drum Labeling, Reference 3.0 for detailed description/requirements.

Count the number of empty drums remaining on-site and the number of filled drums. Make separate tallies of liquid and solid drums. Record these tallies in the sampling logbook before leaving the site. This information will facilitate planning of additional drilling operations and future sampling activities.

5.9.3 Daily Reports

Call the Project Manager about daily sampling activities from the site as requested by the Project Manager.

Daily report will include:

- Work completed (wells sampled)
- Sample shipment
- Equipment resupply requirements
- Problems technical, personnel
- Schedule for next day

Describe any operations which deviate from those described in this manual. The Project Manager will consider changes in the operating procedures, if necessary.

If upon phoning daily report and the Project Manager is not available, speak with the Technical Director.

5.9.4 The Site Coordinator needs to check the sampling logbook(s) and Groundwater Monitoring/Sampling Log Form(s), Attachment 7.3 daily to see that data have been clearly and accurately recorded. The Site Coordinator is to indicate review of the field log entries by initialing each page of entries.

5.9.5 Leave the site in good condition. Pick-up disposable products and all supplies.

5.9.6 Sign out and notify site personnel team is leaving (if required).

5.10 Field Documentation

Carefully document each aspect of groundwater sampling. Use the sampling logbook and the groundwater sampling task sheet, if possible. Attachment 7.3 contains an example of a log sheet to be completed for each well. Fill in the requested observations and measurements, most of which are also discussed in sections of this operating procedure.

Field logbooks will contain the following:

- Name and location of site
- Date(s) and times of sample collection or event
- Names and affiliation of Field Team Members
- Field observations
- Summary of equipment preparation procedures
- Number and type of samples taken and sample identification numbers
- A cross-reference of sample identification numbers to sampling points that are indicated on annotated maps
- A description of sampling methodology by reference to the site specific, work plan and applicable Technical procedures.

6.0 QA RECORDS

- Field Log books
- Field data sheets and records, if required by Project.

7.0 ATTACHMENTS

7.1 Attachment 2 - Sample, Well, and Pump Specification Checklist

7.2 Attachment 3 - Groundwater Monitoring/Sampling Log

7.3 Attachment 4 - Table for Determining Purge Water Volumes

ATTACHMENT 7.1

SAMPLE, WELL, AND PUMP SPECIFICATIONS CHECKLIST

Verify the following for all sites and all wells at each site.

HDR Data - All Sites

Site Coordinator
______Name
______Phone, office
______Phone, evening

Site Geologist
______Name
______Phone, office
______Phone, evening

Well Data - All wells
______Well Identification
______Well Phase
______Floating Visible LNAPLs (Yes/No)
______Recent Depth to Water
______Analyses
______Purge Water Disposal
______Off-Site Wells (purge water containment and discharge limitations)
______Well Depth (TOC) (ft)
______Inner Casing Depth (TOC) (ft)
______Inner Casing Diameter (in)
______Open Borehole Diameter (in)
______Screened Interval (top-bottom)
______Purge Pump Type
______Sample Pump Depth
______Water Surface Sample ("pre-purge" sample)
______Max Depth to Water During Purging
______Total Well Yield

______Other Data
____________Seeps and Springs to be sampled
______Locations
______Identification
______Analytes
______Sampling Procedure

______Tap Water Samples
______Location
______Identification
______Analytes
______Sampling Procedure

Reserve for **ATTACHMENT 7.2, GROUNDWATER MONITORING/SAMPLING LOG**

ATTACHMENT 7.3

TABLE FOR DETERMINING PURGE WATER VOLUMES (gallons)

DEPTH OF STANDING WATER IN WELL (ft)	CASING INSIDE DIAMETER (inches)			
	2 IN volume in gallons	4 IN volume in gallons	6 IN volume in gallons	8 IN volume in gallons
5'	0.8	3.3	7.4	13.1
10'	1.6	6.6	14.7	26.2
15'	2.4	9.8	22.1	39.2
20'	3.3	13.1	29.4	52.3
25'	4.1	16.3	36.8	65.3
30'	4.9	19.6	44.1	78.4
35'	5.7	22.9	51.4	91.4
40'	6.5	26.2	58.8	104.5
45'	7.3	29.4	66.9	117.5
50'	8.2	32.7	73.5	130.6
55'	9.0	35.9	80.8	143.7
60'	9.8	39.2	88.2	156.7
65'	10.6	42.5	95.5	169.8
70'	11.4	45.7	102.9	182.8
75'	12.2	49.0	110.2	195.9
80'	13.0	52.3	117.5	208.9
85'	13.9	55.5	124.9	222.0
90'	14.7	58.8	132.2	235.0
95'	15.5	62.1	139.6	248.1
100'	16.3	65.3	146.9	261.1
105'	17.1	68.5	154.3	274.2
110'	17.9	71.8	161.6	287.3
115'	18.7	75.1	168.9	300.3
120'	19.6	78.4	176.3	313.4

APPENDIX A.2
TP-8-001
Project Custody Documentation

TECHNICAL PROCEDURE
NO. TP-8-001
PROJECT CUSTODY DOCUMENTATION

1.0 PURPOSE

The purpose of this procedure is to describe the requirements for completing a Chain-of-Custody Record in order to ensure that there is an accurate and complete record of the custody and transfer of custody for all samples collected that require custody documentation.

2.0 APPLICABILITY

This procedure is applicable to those project activities involving the acquisition of samples for laboratory analysis. The scope of activities identified by this procedure is limited to work conducted under the authorization of a Project Manager.

3.0 REFERENCES

3.1 Quality Assurance Project Plan (FSP/QAPP) and Implementing Procedures

4.0 DEFINITIONS

4.1 Chain-of-Custody Record

The Chain-of-Custody Record is a form designed to identify samples, sample location, sample type, sample analysis, samplers and to document the transfer of samples from the field to the laboratory. As such, the form is designed to summarize the contents of the shipment, the dates and time of any custody transfer, and signatures of all parties relinquishing and receiving the samples.

5.0 PROCEDURES

5.1 Legal Considerations

All samples collected and personal observations made during the performance of client services may ultimately end up in a court of law as evidence. Evidence may consist simply of a persons impressions and opinions formed while at the scene. It also may consist of tangible objects. A person conveys impressions and opinions by testifying as a witness in a hearing. Tangible objects are displayed for the judge, jury, or hearing officer, who forms impressions and opinions about the objects. Tangible objects are either self-displaying (i.e., samples) or are recording (i.e., photographs, tape recordings, computer records, documents or Chain-of-Custody Records). In addition, evidence may be facts judicially or officially noticed, such as scientific principles or geographical landmarks.

5.2 Chain-of-Custody Procedures

As in any other activity that may be used to support litigation, HDR must be able to provide the chain of possession and custody of any samples which are offered for evidence or which form the basis of analytical test results introduced as evidence. Written procedures must be available and followed whenever evidence samples are collected, transferred, stored, analyzed, or destroyed. The primary objective of this procedure is to create an accurate written record which can be used to trace the possession and handling of the sample from the moment of its collection through analysis and its introduction as evidence. In addition, other information such as sample holding times from the field to the laboratory can be verified.

It is necessary to demonstrate that a sample is the same sample that was taken at the site and that it has not been changed or altered (except for the portion that has been analyzed) since the time of sampling. A written record is kept for this purpose. This record, a trail, unambiguously shows that the sample was in custody every step of the way.

A sample is in someone's custody if

- It is in a person's actual physical possession; or
- It is in a person's view, after being in a person's physical possession; or
- It is in a person's physical possession and then locked up so that no one can tamper with it; or
- It is kept in a secured area, restricted to authorized personnel only.

The custody record must be signed twice: when a sample is created and when a sample is surrendered.

5.3 Custody Transfer Record Requirements

5.3.1 A Chain-of-Custody form shall be initiated and completed during collection of the sample. (Refer to Attachment 7.1).

5.3.2 Possession of every sample shall be recorded from the time of collection until the analytical results are fully documented by the laboratory.

5.3.3 The Site Coordinator shall be responsible for proper completion of the Chain-of-Custody form.

5.3.4 The completed Chain-of-Custody form (pink copy) shall be retained by the Site Coordinator following shipment/delivery of samples to the laboratory and given to the Project Manager upon returning to the office or within several days of collecting the sample, whichever is sooner.

5.4 Completing the Chain-of-Custody Form

5.4.1 Use a black ball point pen, as blue does not photocopy as well. Press firmly; the form has 3 pages.

5.4.2 Record the Project name in the spaces designated for "Project name" (see Attachment 6.1). Samples from only one site may be recorded on each Chain-of-Custody.

5.4.3 Record the appropriate Project number in the space designated for "Project No."

5.4.4 Record analytical laboratory name and address the samples that are being shipped for analysis in the space designated for "Lab: Address".

5.4.5 Complete field sample identification code (see Reference 3.1) in the block labeled "Field Sample Number". List each sample once and only once. Be especially careful when more than one bottle is required to meet analytical requirements. Distinguish the number zero from the letter O by drawing a slash through the number zero (Ø).

5.4.6 Field replicate samples are assigned unique sample identification numbers and are considered separate samples, therefore, record each field replicate sample on a separate line.

5.4.7 Record the collection date for each sample.

5.4.8 Record the number of sample containers for "# Containers".

5.4.9 Determine if sample is a composite or grab sample and mark appropriate box with an "X".

5.4.10 Record the preservation methods under the heading "Remarks." This includes the addition of ice to coolers (e.g. 4° C).

5.4.11 List parameters on the chain-of-custody form that the samples are being analyzed for under the Parameters section. Use a separate column for each analysis. If extra space is needed, use an asterisk and describe the analysis under the heading "Remarks." See Technical Procedure No. TP-3-004, Guide to Environmental Analytical Methods, for additional guidance.

5.4.12 Use a check to designate the analyses requested for each sample. A separate check is required for each sample; do not use arrows to identify the analysis requested.

5.5 Documenting Changes and Errors Prior to Custody Transfer

5.5.1 Cross out and initial any information incorrectly entered on the Chain-of-Custody form, such as for samples that have not actually been collected or, will not be included in this particular shipment.

5.5.2 Cross out and initial any entries which have errors or are illegible. Legibility is very important. Rewrite correct and legible entry on a separate line.

5.5.3 Verify all numbers prior to custody transfer.

5.6 Quality Review in the Field

5.6.1 Cross check the sample identification numbers on the Chain-of-Custody form with those on the labels of the sample containers.

5.6.2 The Site Coordinator shall conduct a detailed review of the completed Chain-of-Custody form.

5.6.3 Verify the legibility of the bottom page of the Chain-of-Custody form.

5.7 Documenting Transfer of Sample Custody

5.7.1 In the case of more than one cooler per shipment, the coolers to be prepared for shipment shall be numbered on the outside of the coolers and recorded in the field logbook. The Chain-of-Custody form(s) associated with each cooler shall indicate the cooler number and the forms shall be given sheet numbers (i.e., Sheet 1 of 3).

** NOTE: Samples from only one site shall be in each cooler.

5.7.2 The Chain-of-Custody form shall accompany the samples at all times while the samples are in transit.

5.7.3 All individuals relinquishing and receiving samples shall sign, date, and indicate the time in the lower portion of the Chain-of-Custody form.

5.7.4 The Site Coordinator shall maintain the pink copy (bottom sheet) as a record of field custody transfer.

5.8 Custody Transfer in the Laboratory

5.8.1 The Sample Custodian shall receive the samples at the laboratory. The individual relinquishing the samples will sign and date the release, and the Sample Custodian shall sign the Chain-of-Custody form, indicating acceptance of the samples.

5.8.2 The Chain-of-Custody form shall accompany samples sent to subcontracting laboratories for analysis. Sample custody shall be documented by individuals relinquishing and receiving samples.

5.8.3 The original (white copy) of the completed Chain-of-Custody form shall be maintained at the laboratory until submittal of analytical results, at which time the original (white copy), or a photocopy if other laboratories are involved, is remitted with the analytical results. A copy of the completed Chain-of-Custody shall be maintained by the project.

5.9 <u>Documenting Changes After Custody Transfer</u>

5.9.1 Errors on the Chain-of-Custody, discovered after custody transfer, can be corrected by contacting Project Manager/Site Coordinator and notifying the laboratory ASAP. Corrections shall be documented with all organizations with whom the data will be submitted.

6.0 QA RECORDS

- Field log books
- Field Data Sheets and records, if required by Project

7.0 ATTACHMENTS

7.1 Attachment 7.1 - Example of Chain-of-Custody.

7.2 Attachment 7.2 - Chain of Custody Record Flow Diagram

CHAIN O. .USTODY RECORD ATTACHMENT 7.1
PAGE ____ OF ____

Project No.	Project Name	No of Containers	Parameters	☐ Environmental	Hazardous ☐ Low ☐ Med ☐ High
Samplers: (Signature)	(Printed)			Lab: Address	

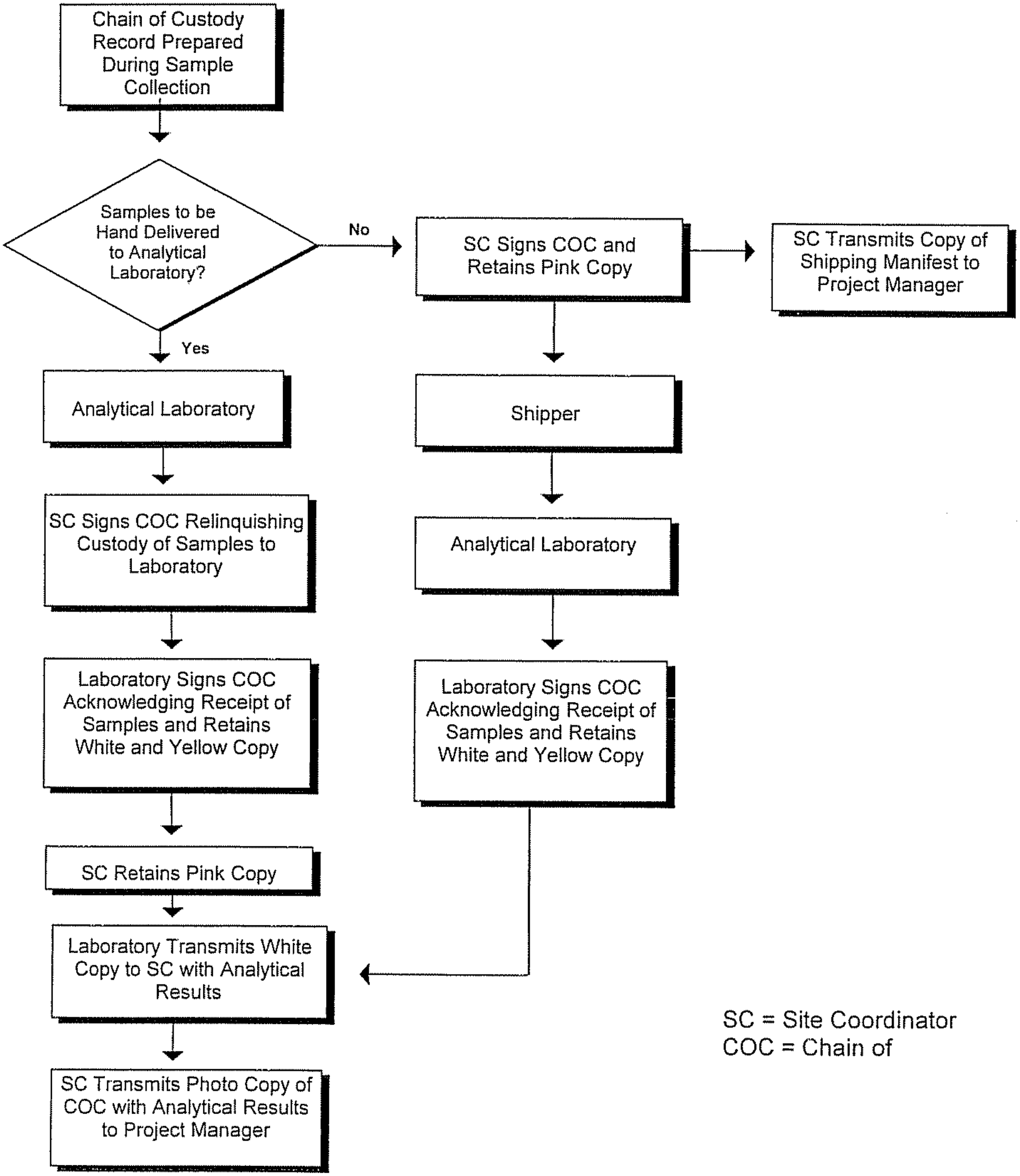
Field Sample Number	Date	Time	Comp	GRAB	Station Location	No of Containers							Remarks

Relinquished By: (Signature)	Date	Time	Received by: (Signature)	Relinquished By: (Signature)	Date	Time	Received By: (Signature)
(Printed)			(Printed)	(Printed)			(Printed)

Relinquished By: (Signature)	Date	Time	Received for Laboratory By: (Signature)	Date	Time	Results to:
(Printed)			(Printed)			

ATTACHMENT 7.2

Chain of Custody Record
Flow Diagram



SC = Site Coordinator
COC = Chain of

APPENDIX A.3
TP-8-002
Drum Labeling

TECHNICAL PROCEDURE
NO TP-8-002
DRUM LABELING

1.0 PURPOSE

The purpose of this procedure is to describe the requirements for labeling drums which contain waste materials derived during field activities.

2.0 APPLICABILITY

The requirements of this procedure are applicable to drums used to containerize materials and wastes generated as a result of field sampling activities.

The scope of these requirements is applicable to activities under the direction of the Project Manager.

3.0 REFERENCES

3.1 49 CFR (Code of Federal Regulations) Chapter 1, Parts 100-199 as applicable.

4.0 DEFINITIONS

See Plan Section 2 - QUALITY ASSURANCE PROGRAM, paragraph 1.3, Definitions.

5.0 PROCEDURES

5.1 Prerequisites (prior to leaving the site)

5.1.1 Verify that the proper quantity of drums are available to containerize wastes generated during site activities and that the drums meet applicable client or regulatory specifications.

5.1.2 Obtain appropriate tools to open/close and secure drums.

- Bung wrench with handle for liquid drums
- Crescent or socket wrench for solids drums

5.1.3 Obtain weather proof permanent markers to write labels on drums. Use marker colors which will legibly contrast against the color of the drum.

5.2 Field Operations

5.2.1 Use open top drums for solids only.

5.2.2 Use drums with bungs for liquids.

5.2.3 A plastic liner will be used with all solids drums.

5.2.4 Seal each drum tightly upon completion of site activities.

5.2.5 In liquid drums allow adequate empty space volume within the drum for fluid expansion due to temperature variations.

5.3 Label Drums

5.3.1 Use a weather-proof permanent marker or paint pen to label each drum as it is filled.

- Brands of markers which have been recommended are as follows:
  1) Uni-Paint
  2) Mean Streak
  3) Testors' paint marker

- NOTE: Do not use magic marker or ink-filled pen.

5.3.2 Drum labels will contain the following information as specified by the Project Manager:

- Project Name

- HDR project-No. (09233-001-134)

- SWMU Number where IDW was generated

- Sampling area designations from which wastes were generated (e.g., Boring ID, direct-push sampling point ID or other sampling location I.D.)

- Type of Material:
  DC Drill Cuttings and Soils
  GW Groundwater
  DW Decontamination Water and Fluids

- Moisture content:
  Saturated (SAT) or Unsaturated (UNSAT)

- Solid (SOL) or Liquid (LIQ)

- Date the drum was filled and sealed in
  Military format (e.g., 9 May 92)

5.3.3 Format for labels, from left to right

Line 1: Project Name - Proj. Number -SWMU - Sample location ID

Line 2:	Type of - Material	Moisture - Content	Liquid or Solid

Line 3: Date

- Each code is to be separated by a hyphen.

5.4 Clean Drums

- Clean outside of drum, if necessary.

5.5 Inventory Drums

- Prior to leaving the site, Inventory the number of drums on site.

Liquid Empty	______
Filled	______
Solids Empty	______
Filled	______

- Record the tallies for each of the above in the field logbook.

- All drums will be moved daily to the contractor staging area ~~north~~ of the Civil Engineering building (building 948). Notify client of the disposition of all drums, if required by Project.

6.0 QA RECORDS

- Field log books

- Field data sheets and records, if required by Project.

7.0 ATTACHMENTS

None.

APPENDIX A.4
TP-8-003
Sample Identification Coding System

TECHNICAL PROCEDURE
NO. TP-8-003
SAMPLE IDENTIFICATION CODING SYSTEM

1.0 PURPOSE

This procedure identifies the requirements for documenting sample identification. It is established to provide control and traceability of samples and sample results. It addresses the recording of locations and other specific considerations associated with sample acquisition.

2.0 APPLICABILITY

The requirements of this procedure are applicable to all project activities involved with the acquisition and labeling of samples. The scope of this procedure is limited to work performed under the authorization of a Project Director.

3.0 REFERENCES

3.1 Technical Procedure No. TP-8-001, Project Custody Documentation

3.2 Work Plan

3.3 Quality Assurance Project Plan

4.0 DEFINITIONS

Site Coordinator/Field Manager - Responsible for organizing and ensuring that all field work is completed according to work plan specifications. Responsible for coordinating communications between field sampling personnel and project manager, and client technical manager (USACE TM).

5.0 PROCEDURES

5.1 Sample Identification

5.1.1 All samples collected will be uniquely identified and labeled at the time of collection. The decision to stake and/or survey the sample location is the responsibility of the Field Manager.

5.1.2 The format in Attachment 7.1 of this procedure will be followed in assigning sample identification codes. It is the responsibility of the Site Coordinator to incorporate the details of the sample identification system into the work plans. The Site Coordinator must also keep track of sequentially numbered and grided sample locations so that samples collected at different times can be numbered consecutively. For example, if five soil borings were previously sampled at the site, the next boring location should be 006. This information will be available in the project database or project files.

5.1.3 The sample identification coding system will vary between sample matrices but must be uniform across the project. The decision to vary from this procedure should be discussed with the Project Manager and the Data Management Project Manager and documented in the project files. The sample identification must be clearly documented in a field logbook and on a site map, site sketch or photograph, if available.

5.1.4 The Field Sampling Team Leader will be responsible for identification integrity.

5.1.5 The complete sample identification code will be placed on the sample container label and recorded on the Chain-of-Custody (Reference 3.0, Procedure No. TP-8-001, Project Custody Documentation).

5.2 Correction of Sample Identification

5.2.1 In order to minimize errors in the sample identification code, all documentation should be carefully completed. The alpha character letter O will be distinguished from the numeric zero by drawing a slash through the zero. Errors detected prior to shipment may be corrected by drawing a line through the mistake on the Chain-of-Custody and initialing. The information should be entered correctly on another line of the form. Errors detected later in sample identification may be corrected by using the Document Change Notice (see Attachment 7.5). The completed Document Change Notice must be approved by the appropriate Project Manager and Project Quality Assurance Coordinator before the correction is made in the data base.

5.2.2 A copy of the approved Document Change Notice will be sent to the Laboratory Project Manager and Data Management Project Manager, if applicable.

5.2.3 The Laboratory Project Manager and Data Management Project Manager will be responsible for making the change in the identification, as approved by the Document Change Notice, in the respective data systems.

5.2.4 The Document Change Notice will be retained in file in accordance with the requirements for Project Document Control and Retention.

6.0 QA RECORDS

- Field log books
- Field data sheets and records, if required by Project

7.0 ATTACHMENTS

7.1 Attachment 7.1 - Sample Identification Coding System

7.2 Attachment 7.2 - Document Change Notice

ATTACHMENT 7.1

SAMPLE IDENTIFICATION CODING SYSTEM

A unique 13-character sample identification code will be assigned to each sample collected. The sample identification code consists of 4 fields, separated by dashes, in the following format:

______	-	______	-	______	-	______
Project/ SWMU ID		Location ID		Sample Type Code		Sample Depth

Example: 1. M102 - 001 - DPW - 010

1.0 PROJECT/SWMU ID

The Project ID and SWMU ID will identify which SWMU at McConnell AFB that the sample was collected from. The letter "M" will always signify McConnell AFB, and the 3-character SWMU number will be appended to the letter.

2.0 LOCATION ID NUMBERS

The Location ID uniquely specifies an x-y point where samples are taken at a given facility. Locations can be reoccupied and resampled on different dates. The Location ID consists of a 3-character numeric number specifying the sample location number for that particular SWMU.

Example: 001 - Location number 1.
010 - Location number 10.

3.0 SAMPLE TYPE IDs

The Sample Type ID string consists of 2 or 3 alpha characters signifying the sampling methodology and the sample matrix. The following codes will be used for the different types of samples:

SS = Surface Soil
DPS = Direct-push Soil
DPW = Direct-push Groundwater
HAS = Hand Auger Soil
HAW = Hand Auger Groundwater
SW = Surface Water
HPW = Hydropunch Groundwater
DIW = Deionized water blank sample
POT = Potable water sample (decontamination water source)

4.0 SAMPLE DEPTH/QC SAMPLE CODE

The Sample Depth field contains a 3 character numeric field signifying the actual bottom depth where the sample was collected. The depth, in whole numbers, will be designated by rounding the sample interval bottom depth to the next highest whole number, and entering that number in the sample depth field.

Example: **M102-001-DPS-001** - A direct-push soil sample collected at location 001 at SWMU102 at a maximum depth of 1-foot.
M103-003-SS-002 - A surface soil sample collected from SWMU 103 at location 003 at a depth of 0.5 to 1.5-feet.
M108-002-DPW-016 - A direct-push groundwater sample collected from SWMU 108 at location 002 at a depth of 16-feet.

This field will also be used to designate QC samples collected. A unique 3 digit numeric code will be used to signify the various QC sample types. The codes to be used and the QC sample types include:

097 - Deionized water blank sample.
098 - Duplicate (replicate) sample.
099 - Rinsate blank sample.
100 - Potable water sample.

Examples of sample numbers include:

Example: **M102-001-DPS-098** - A duplicate direct-push-soil sample collected at location 001 at SWMU102 (Note: A field logbook entry will be made signifying the complete sample number associated with the duplicate sample).
M103-003-SS-099 - A surface soil sampling device rinsate sample collected after collection of the surface soil sample at SWMU 103 at location 003, after decontaminating the sampling utensil(s).

5.0 OTHER SAMPLE IDs

Several additional sample types may be collected. These other sample types include:

1. Matrix Spike/Matrix Spike Duplicates (MS/MSDs) - MS/MSD samples, if collected, will include samples of solid (soil) and aqueous (groundwater and surface water) matrices. MS/MSD samples should be collected at the frequency of 1 in 20 samples per matrix per analyte. For soil samples, no additional sample containers will be collected; however, after the sample number on the sample jar label and on the chain-of-custody, the letters MS/MSD will be added. For aqueous samples, additional sample containers must be filled for both the MS and MSD samples (triple volume). The sample number on the MS or MSD sample will include the original sample number, plus either "MS" or "MSD" appended to the sample number.

ATTACHMENT 7.2

DOCUMENT CHANGE NOTICE

Project: ______________________________ Date: __________________

State and Site: ____

Document(s) Effected: ____

____

____

Reason for Change: ____

____

____

Correction to be Made: ____

____

____

<u>Approval</u> <u>Approval</u>

_________________________ _______________________________

Project Manager Quality Assurance Manager

APPENDIX A.5
TP-9-001
Monitoring Well Installation

TECHNICAL PROCEDURE
NO. TP-9-001
MONITORING WELL INSTALLATION AND DEVELOPMENT
(HOLLOW-STEM AUGERS)

1.0 PURPOSE

The purpose of this procedure is to describe the techniques to be followed in order to ensure acceptable, consistent monitoring well installation and development.

2.0 APPLICABILITY

This manual is applicable to subsurface drilling and monitoring well construction and completion. The scope is limited to work performed under the authorization of a Project Manager.

3.0 REFERENCES

3.1 Driscoll, F.G., Groundwater and Wells, 1986, 2nd Edition, Johnson Division, St. Paul, Minn., 1089 pp

3.2 Technical Enforcement Guidance Document, EPA, OSWER-9950.1, (9/86)

3.3 Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells, EPA 600/4-89/034, 1989.

3.4 Ground Water Handbook, EPA - 625/6-87/016, 3/87

3.5 Nebraska Department of Environmental Control Title 178, Regulations Governing Water Well Construction, Pump Installation and Water Well Abandonment Standards.

3.6 Technical Procedure No. TP-5-002, Sampling and Analysis Plan Preparation

3.7 Quality Assurance Program Plan and Implementing Procedures

3.8 Technical Procedure No. TP-3-002, Groundwater Sampling

3.9 Technical Procedure No. TP-12-001, HNU PI101 Photoionization Detector

3.10 Technical Procedure No. TP-12-002, Foxboro Organic Vapor Analyzer

3.11 Technical Procedure No. TP-8-002, Drum Labeling

3.12 Technical Procedure No TP-8-003, Project Sample Identification

3.13 Technical Procedure No. TP-13-001, Packing, Shipping and Labeling

3.14 Technical Procedure No. TP-3-001, Soil Boring and Sub-Surface Sample Collection

4.0 DEFINITIONS

4.1 Bedrock (Competent) - Rock which is structurally sound and will maintain an open annulus without failure.

4.2 Bedrock (Weathered) - Rock which has been physically disintegrated, and/or chemically decomposed.

4.3 Overburden - The loose soil, silt, sand, gravel and other unconsolidated material overlying bedrock, either transported or formed in place. Also referred to as regolith.

4.4 Ream - (In Hollow Stem Auger Drilling) - to clean the hole of unconsolidated materials not removed during drilling by spinning the auger and lifting the augers up and down the annulus.

4.5 Depth to Water - The depth to water in a well which is not being affected by withdrawal of groundwater.

4.6 Non-aqueous Phase Liquids - Liquids that do not readily dissolve in water and can exist as a separate fluid phase are known as non-aqueous phase liquids (NAPLs).

4.7 Light Non-aqueous Phase Liquids - NAPLs are subdivided into classes. Those that are lighter than water are Light non-aqueous phase liquids (LNAPLs).

4.8 Dense Non-aqueous Phase Liquids - NAPLs are subdivided into classes. Those with a density greater than water are dense non-aqueous phase liquids (DNAPLs).

4.9 Site Coordinator/Site Geologist - Manages field operations, executes the work plan and schedule, coordinates with the Site Safety Officer in determining protection level, enforces site control, documents field activities and sample collection, and serves as a liaison with public officials.

4.10 Governing Agency - Federal, state or local regulatory agency that has legal authority governing environmental regulations.

5.0 PROCEDURES

5.1 Site Location and Clearance

The locations of the monitoring wells will be submitted to the client and, if required, to the appropriate governing agency (local, state or federal) prior to the commencement of well installation.

Site Coordinator or Site Geologist is to contact the client representatives, for utility-clearance and, if necessary, right-of-way access.

5.2 Prerequisites

The Site Coordinator is to ensure the following prior to leaving for site:

5.2.1 Obtain a copy of the Sampling/Analysis Plan from the Project Manager.

5.2.2 Review and sign out the equipment in Attachment 7.1 from HDR's equipment program or from an appropriate rental agency.

5.2.3 Discuss the specific objectives for the installation and development of monitoring wells to be installed with Site Coordinator and Site Geologist.

5.2.4 Verify the proposed location and identification for each monitoring well to be installed. Discuss any site-specific issues or problems with the Site Geologist. Notify the Drilling Coordinator of any difficulties with well installation which occurred during previous monitoring well installation activities or any which occur during current field activity.

5.2.5 Obtain up-to-date site map with proposed monitoring well locations.

5.2.6 If required by client or governing agency, verify that the appropriate number of drums, drum liners or other suitable containers are available for containing liquid and solid wastes. The approximate linear feet of borehole that can be contained in one 55-gallon drum is listed below:

Borehole Size (Inches)	Number of Linear Ft/drum
6	25
8	15
10	10
14	5

(Note - add three to the number of solids drums calculated for each borehole to allow for containment of visqueen and other disposable solids.)

5.2.7 Obtain the proper Borehole Log Reports and Well Completion Forms (Attachment 7.2) and complete a set for each well to be installed.

5.2.8 Obtain a copy of the completed Borehole Log Reports and Well Completion Forms for monitoring wells which have already been installed at the site.

5.2.9 Obtain a list of previous depth to water measurements. Obtain the order or sequence in which depth to water levels need to be measured from the Site Coordinator or the Site Geologist.

5.2.10 Verify appropriate well permits have been acquired, if necessary.

5.2.11 Confirm with the client availability and quality of decontamination water and location of decontamination pad.

5.2.12 Verify that monitoring well locations have been staked and identified (HDR or client personnel), approved and utility cleared.

5.3 Arrival On Site

5.3.1 Identify yourselves to the client representative and sign in (if required).

5.3.2 The on-site geologist should verify that the driller has the appropriate permits, Health and Safety Training and insurance, and is licensed to drill.

5.3.3 Obtain water for decontamination. Only water containing concentrations of contaminants below quantitation limits may be used for decontamination. Record the source of water in the field logbook.

5.3.4 Before drilling activities begin, the location of the monitoring wells will be staked by the Site Geologist or Site Coordinator. The location will be utility-cleared and approved by a client representative and, for off-site drilling locations, the appropriate local utilities, to ensure that underground cables, water pipes or other potentially dangerous features will not be encountered. Sufficient time, prior to the start of drilling, must be allowed for utility clearance. At a minimum allow one week for well location and/or clearing or relocation.

If required, the precise location will be adjusted based on site access, property boundaries, and surface obstructions. The client representative or other appropriate utility representative must sign the Site Coordinator map and/or the onsite geologist's logbook when the staked locations are utility-cleared.

5.3.5 The drilling rig and materials are to arrive onsite in clean condition. The rig will be steam cleaned prior to drilling if the onsite coordinator/geologist determines that the rig is not clean and free of oil, grease and debris.

Visually inspect the rig for any significant fluid leaks. In order to minimize surface contamination of soils, isolate leaking fluids by wrapping plastic around source.

5.3.6 Ensure that the drill rods, tools, drill-bits and split spoons are steam cleaned prior to the start of drilling. Use potable water from an approved source for steam cleaning. Well casings and screens will be steam cleaned prior to installation in the borehole. Visually inspect the cleaned materials to see that residues such as machine oils have been removed.

5.3.7 Perform initial decontamination of the drill rods, tools, drill-bits and split spoons away from and preferably downgradient of staked locations and existing monitoring wells. The initial decontamination is to be performed onsite and the liquid and solid wastes will not be collected. Decontamination of the drill rods, tools, drill-bits and split spoons between boreholes will be performed in a designated decontamination area. If necessary, wastes generated will be collected in 55-gallon drums.

5.3.8 Mobilize the drilling rig to the staked location, set up the exclusion or safety zone, and have the subcontractor construct the decontamination area.

5.3.9 Obtain the anticipated number of solid and liquid 55-gallon drums required to contain the overburden and auger cuttings, drilling fluids, purged groundwater and decontamination waste from the staging area for empty drums (refer to Section 5.2.5), if required.

5.4 Monitoring Well Construction and Completion

During monitoring well installation activities, an FID or PID monitoring instrument will be used to monitor the vapors in the worker breathing zone or area and at the borehole as specified in the Health and Safety Plan. Procedure No. TP-12-001, HNU PI-101 Photoionization Detector and Procedure No. TP-12-002, Foxboro Organic Vapor Analyzer (Reference 3.0) give operational guidelines.

The onsite geologist will maintain drilling and geologic logs as described in Attachment 7.2.

If necessary, shrouds, canopies, or directional pipes will be used to contain and direct the drill cuttings and fluids into 55-gallon drums. In some cases it may be more practical to collect the cuttings and fluids in the visqueen-lined drilling area and then shovel the cuttings into 55-gallon lined drums and pump the liquids into unlined drums.

Soil samples from the proposed screened interval will be collected in glass containers and identified with site name, well number, sample depth interval, and collection date. Samples will be stored onsite labeled with site name, well number, sample depth interval, and collection date. Samples from the representative well borehole will be retained onsite for inspection until completion of the characterization activities. A sample of the sand used as a filter pack in screened wells should also be collected in a labeled glass container and stored with the downhole samples.

Visually inspect samples and water from uppermost water-bearing zone for signs of a non-aqueous phase liquids (NAPLs). It is important to note the presence or absence of NAPLs in the field logbook (see Attachment 7.2).

If a borehole is not completed once started, such as overnight, the borehole should be securely covered for protection. This can be achieved by leaving the drill rod in the borehole, placing a temporary cap on the well or securely taping visqueen on the opening.

A flush mount protective well cover with lockable cap will be installed into the grout seal of each monitoring well. Allow a minimum 6-inch clearance between the inner casing and well cap.

A concrete pad will be installed around the flush mount well cover. The inside of each well cap will be permanently stamped with the well number. The well number (and permit number, if applicable) will be permanently marked on the outer protective casing with a stencil and paint.

5.4.1 Hollow-Stem Augering

At sites where groundwater is anticipated to be present in unconsolidated surficial material, monitoring wells will be installed utilizing hollow-stem augers. Split spoon samples will be collected at 5-foot intervals or at smaller intervals if changes in subsurface lithology or a water horizon are encountered. Continuous-split spoon samples will be collected at one well boring associated with each spot, unless specified otherwise in the sampling plan, and retained on site for agency inspection as described in Section 5.4. Those samples obtained for laboratory analysis will be sampled according to Procedure No. TP-8-001, Soil Boring and Subsurface Sample Collection, identified according to Procedure No. TP-8-005, Project Sample Identification and packaged, shipped and labeled according to Procedure No. TP-13-001, Packing, Shipping and Labeling.

After the objectives of the sampling plan are satisfied, the well screen and riser pipe will be placed inside the auger string. The appropriate water-yielding unit will be screened according to the specifications outlined in the Sampling/Analysis Plan.

As the auger string is gradually removed from the borehole, the annular space around the screen will be filled with a clean uniform commercially bagged sand pack to a minimum of two feet above the top of the screen. The on-site geologist should be aware of sticking problems when withdrawing the auger from the screen. Reasonable force can be applied if the screen is stuck in the auger; however, too much force can cause damage to the screen and it should be pulled for inspection if this occurs. A cap or cover will be placed over the top of the well casing or riser before pouring the sand pack to prevent any filter pack materials or sealing materials from falling inside the well screen. To ensure that the sand pack provides an adequate cover over the screen, the depth to the top of the sand pack will be plumbed with a weighted tape.

When the sand pack is at the desired level, a one foot layer of fine sand shall be placed above the filter pack; a two foot layer of bentonite pellets will be placed on the top of the filter pack. The pellets will be slowly poured down the annulus to minimize bridging. Add potable water (if necessary) to the annulus after the pellets are poured to allow for expansion of the bentonite seal. If the sides of the borehole are unstable or there are problems with using pellets, a slurry will be pumped through a tremie pipe on top of the filter packs. The slurry will be mixed at a ratio of 1.5 pounds of bentonite per one gallon of water. The slurry will be initially directed into a bucket to determine if the mixture is pumpable.

The top of the bentonite seal will be measured with a weighted tape to verify that the proper thickness of the seal has been placed in the annulus.

If the subsurface materials along the sides of the borehole are unstable, the hollow-stem auger string will be left in the hole during bentonite seal placement to the extent practical. The auger string will be removed as the level of the bentonite slurry or pellets rise.

The remaining annular space will be grouted with a Portland cement/bentonite mixture to ground surface. The grout mixture will consist of approximately 3 to 4 pounds of pure bentonite per 94 pound bag of Portland Type IA cement with about 7 gallons of potable water. The mixture will be pumped through a tremie pipe until undiluted grout rises from the annulus to the ground surface.

In materials that will not maintain an open borehole, the hollow-stem auger string will be left in the hole during grouting to the extent practical. The auger string will be removed as the level of the grout rises above the bottom of the auger string.

To ensure that the top of the grout is at or above the ground surface, additional grout can be added to compensate for the removal of casing, augers and the tremie pipe before the grout is cured.

Quantities of materials utilized for sand pack and various soils shall be noted and recorded in the field logbook.

5.4.2 Air Rotary Drilling

Air rotary or percussion drilling techniques can be used to install both shallow and deep bedrock monitoring wells. The air from the compressor on the drilling rig will be filtered through an Oil/Water

Separator. The separator will be emptied and wiped clean between wells to ensure that oil from the compressor is not introduced into the groundwater system. Potable water can be added to the borehole if required for dust control.

5.4.2.1 Shallow Well Construction (Single Cased)

Air rotary techniques will be used to drill a minimum 10-inch diameter borehole, unless specified otherwise in the work plan, through the overburden to at least 5 feet into competent bedrock. Cuttings will be collected every five feet or more frequently as necessary to describe the subsurface conditions.

If saturated soils or cuttings are observed and the objective is to monitor the uppermost water-bearing unit, a waiting period may be required prior to casing installation. As appropriate, the borehole may be completed as a screened well with or without casing into bedrock (see Section 5.4.2.3) if water is observed to enter the borehole after a waiting period.

If water is not observed in the borehole after a waiting period, an 8-inch well casing will be installed from the base of the borehole to approximately two feet above ground surface according to specifications outlined in the work plan.

The annular space around the casing will be sealed by pumping grout through a tremie pipe from the base of the borehole to ground surface. The grout will consist of 3 to 4 pounds of pure powdered bentonite for each 94 pound bag of Portland Type IA cement, mixed with approximately 7 gallons of potable water. A sample of the grout will be collected and allowed to cure, submersed in water, in an undisturbed area. To allow proper curing of the grout, no drilling activities will proceed for a minimum of 12 hours after emplacement. The onsite geologist will determine when drilling can proceed.

A nominal 6-inch diameter open borehole will be drilled below the base of the 8-inch casing, and will be completed as an open borehole or screened well. Drilling will advance the borehole to the appropriate water bearing zone, as determined by the onsite geologist. A recovery period may be required if the borehole produces very low yields. Estimate the recovery with a water level probe and stopwatch.

If the depth of standing water specified in the work plan has been obtained after a reasonable waiting period, the well will be completed.

If the specified saturated thickness has not been obtained after a reasonable waiting period, the borehole will be extended to a depth which will satisfy the work plan.

5.4.2.2 Deep Well Construction (Double Cased)

Deep bedrock monitoring wells may be part of nested pairs and will be double cased.

Unless specified otherwise in the work plan, a minimum 14-inch diameter open borehole will be drilled through the unconsolidated material to at least 5 feet into competent bedrock. Representative cuttings will be collected at least every five feet or more frequently as required to describe the subsurface conditions.

A 10-inch diameter well casing will be installed according to the specifications in the work plan and will be tremie-grouted in place, from the base of the borehole to the ground surface. This casing will be cut off at 6 inches above ground surface. Grout and curing times will be consistent with the shallow well construction methods.

After the grout has cured properly, an 8-inch diameter borehole will be drilled through the base of the casing to the appropriate water-bearing zone specified in the work plan as determined by the onsite geologist.

The borehole will be cleaned of drill cuttings and, unless specified otherwise in the work plan, a 6-inch diameter inner well casing will be installed.

The inner casing will be either tremie-grouted through the annular space between the outer and inner casing or pressure grouted through the center of the casing by displacing the grout with pressurized potable water. Both methods are acceptable and either may be employed.

The grout mixture and curing times will be consistent with the shallow well construction specification. A grout sample will be taken and placed in water to monitor the curing rate of the grout in the annulus.

After the grout seal has cured, an open borehole will be drilled below the base of the casing to the water-bearing zone specified in the work plan or as determined by the onsite geologist. Each deep well will be completed as an open borehole, unless the borehole is unstable, in which case the well will be screened as described in Section 5.4.2.3

5.4.2.3 Screened Bedrock Wells

If the sides of the open borehole are unstable during drilling, the monitoring well will be completed with a 4-inch diameter, stainless steel casing and screen, unless specified otherwise a work plan. The stainless steel casing will extend approximately two feet above ground surface.

The annular space around the screen will be packed with a clean uniform commercially bagged sand one to two feet above the top of the screen. A 2-foot thick layer of bentonite pellets will be placed above the sand pack and tamped to minimize bridging and ensure uniform packing. The remaining annular space will be tremie-grouted to the surface with a cement-bentonite slurry as previously described in Section 5.4.2.1.

5.4.3 Mud Rotary Drilling

Mud rotary drilling may be used when borehole stability problems preclude the use of hollow-stem augering or air rotary methods.

Potable water and natural formation materials will be used unless it is determined that a mud additive is required. If a commercial additive is used, a chemical analysis of the additive will be obtained from the manufacturer, if available, and submitted to the appropriate agencies. A record of the specific additive used (brand name, chemical composition and amount used) will be entered into the field logbook.

Subsurface soil samples will be collected using split spoon, split-barrel or Shelby tube samplers at least every five (5) feet, or more frequently if necessary to determine critical changes in lithology. A drilling record, complete with soil descriptions will be maintained by the site geologist, as described in Appendix 6.2.

Once the appropriate depth is reached, the boring will be reamed as necessary to a diameter that will allow unrestricted installation of the 4-inch well casing or other casing as specified in the work plan.

If possible, the boring will be flushed prior to installation of well casing. Otherwise, the borehole will be flushed through the well screen to remove the drilling fluid.

The well will be completed with a 4-inch diameter, Schedule 5, No. 304 stainless steel casing and screen with slot openings of 0.01-inch, or other casing as specified in the work plan. Joints of all casings and screens will be made with flush threads, threaded couplings or butt-welded seams. The screen will be fitted with an end cap and will be coupled with an appropriate length of stainless steel casing, which will extend two feet above ground surface.

The annular space around the screen will be packed with a clean uniform commercially bagged sand to a height of one to two feet above the top of the screen. A 2-foot thick layer of bentonite pellets or bentonite slurry will be placed above the sand pack, and the remaining annular space will be grouted to the ground surface as described in Section 5.4.1.

5.5 Visible Light Non-aqueous Phase Liquids Determination

The objective is to determine if a visible Light Non-aqueous Phase Liquids (LNAPLs) phase is present in the monitoring well and to measure the thickness of the LNAPLs, if applicable, prior to well development. The presence or absence of visible LNAPLs phase in a well needs to be recorded in the field logbook.

An interface probe, top loading bailer or other sampling device utilizing disposable products will be used to collect samples from the surface of the water. The samples will be visually inspected upon retrieval.

If a visible LNAPLs phase is not observed, several bailer volumes may be combined in a clear glass jar and left undisturbed to allow for separation of the NAPL phase, if it is present. A description of the sample will be recorded in the field logbook.

If a visible LNAPLs phase is present, a description of the sample and the thickness of the visible LNAPLs and emulsion layer (if present) will be recorded in the field logbook. The bailer may remain hanging in the well and decontaminated in accordance with Section 5.6.6 or may be disposed.

If an LNAPLs phase is not observed, the well will be developed as described in Section 5.7. The bailer may be decontaminated and remain in the well or be disposed in accordance with instructions from the Site Geologist.

If a visible LNAPLs phase is present, the Site Coordinator will contact the Project Manager/Technical Director for instruction prior to well development.

5.6 Depth To Water Determination

The objective is to determine the depth to water to within a hundredth of a foot (0.01 ft).

5.6.1 The water level in the newly installed monitoring well will be measured and recorded before well development begins.

5.6.2 Water levels measurements will be made from top of well casing (TOC). The top of the casing will serve as the established reference for subsequent water level measurements.

5.6.3 The depth to water and bottom of casing (BOC) will be determined from a standard reference point on the innermost casing. This reference point will be marked with a chisel or file after the measurements are complete.

5.6.4 The measuring device will be rinsed with DI water before it is lowered into the well. Those parts of the measuring device that contact water in the well will be decontaminated.

5.6.5 Alconox and DI water will be used to decontaminate the measuring device except where oil is known to exist (see Section 5.5).

5.6.6 If a visible LNAPLs phase is present, the parts of the measuring device that penetrated the LNAPLs will be decontaminated with:

Alconox Solution
Potable water rinse
Methanol
Hexane
Methanol
DI Water

The probe and wire will be wiped with paper towels and rinsed again with DI water.

The measuring device should be visually inspected to determine if it looks or feels oily. The decontamination procedure above will repeated if the measuring device looks or feels oily.

Small bottles are preferred for the first five decon solutions while a plastic squirt bottles may be used for the DI rinse.

5.7 Well Development

The monitoring well will be developed until the formation water discharged from the well is as clean and free of sand and fines as practical to ensure that the well provides representative aquifer samples.

The monitoring well will be developed after the grout seal has properly cured as determined by the onsite geologist. Typically, 48-hour waiting period is required.

- The monitoring wells completed in bedrock can be developed using air purging, a surface pump, or a stainless steel submersible pump.

- The monitoring wells completed in unconsolidated sediments can be developed using surge-block techniques followed by purging with air, a submersible bladder pump, or a surface pump.

The Field Team will monitor the vapors in the working zone with an FID or PID during well development as described in the Health and Safety Plan.

5.7.1 Methods of Well Development

Effective well development requires movement of water in both directions through screen openings. Reverse flow helps to reduce bridging of sand and fines.

5.7.1.1 Air Development by Surging and Pumping

The compressed air source supplied by the rotary drilling rig will be filtered to ensure that oil from the compressor is not introduced into the groundwater system.

Air is injected into the well to lift the water to the surface. A shroud or canopy may be used to direct the water that is blown out of the top of the well into a lined collection pit.

The purged water will be pumped from the plastic-lined collection pit into 55-gallon drums or other suitable containers.

The drilling rig and pumping equipment used for well development will be decontaminated as described in Section 5.11.1.

5.7.1.2 Overpumping

A surface or submersible pump will be used to develop the well by this method.

To ensure proper development by this method, the pump intake will be initially set at the bottom of the well and then moved toward the top of the borehole or screen as development proceeds.

The water will be collected in 55-gallon drums or other suitable containers.

To ensure that the well will be free of sediment during sampling, the well will be pumped at a high rate during development.

Low-yield wells can require long recovery time in between pumping.

5.7.1.3 Surge-Block Techniques

This method forces fluids into the formation as the surge-block is lowered or pushed down the borehole. The upstroke motion loosens the fluids and pulls lose sediment from the formation into the well. The well will be purged as often as possible between surging to remove lose sediment.

The purged water will be collected in a plastic-lined collection pit and pumped into 55-gallon drums or other suitable containers.

5.7.2 If applicable, measure the drawdown in nearby well(s) during development to characterize the interconnections of the wells.

5.7.3 The initial color, clarity and odor of the purged water shall be noted and recorded in the field logbook.

5.7.4 Measure the initial pH, temperature and specific conductance of the water as outlined in Procedure No. TP-3-002, Groundwater Sampling. Periodic measurements (10 minute intervals) of these parameters should be taken during development to monitor for stabilization of the water chemistry. These measurements should be recorded in the field logbook.

5.7.5 No water will be added to assist monitoring well development without approval by the project manager and client. If a monitoring well cannot be cleaned of fines to produce formation water because the aquifer yields insufficient water, small amounts of potable water may be injected to clean-up the poorly yielding well. The volume and source of potable water will be recorded in the field logbook and a sample obtained for analysis.

5.7.6 The well will be developed until the water discharged is as clean and free of sand and fines as practical.

5.7.7 The rate of purging will be determined by measuring the length of time required to fill a 55-gallon drum or a five gallon-bucket.

5.7.8 The final color, clarity and odor of the water will be noted and documented in the field logbook.

5.7.9 The final pH, temperature and specific conductance of the water will be measured and recorded in the field logbook.

5.7.10 After development of the monitoring well is complete, allow the water level to recover. The depth to water will be determined as described in Section 5.6.

5.7.11 The following information shall be maintained in the field logbook by the onsite geologist:

a. Development time
b. Development method
c. Rate and volume of discharge water
d. Description of water color, clarity and odor prior to and subsequent to development
e. Depth to water level readings before and after well development
f. Well yield

5.7.12 All of the development liquids will be containerized in 55-gallon drums or other suitable containers and labeled as specified in Procedure No. TP-8-002, Drum Labeling.

5.8 Well Location And Elevation Survey

After the well is completed, the location (state plane coordinates) and elevation of the well relative to a standard datum will be established. The monitoring well will be accurately located and referenced by a licensed surveyor.

The Field Team can obtain preliminary survey data upon well completion if a survey level and tripod are available. The TOC reference point will serve as the precise reference point on the monitoring well. The well location needs to be surveyed from a standard reference or arbitrary datum such as an adjacent monitoring well. Also survey the well elevation and elevation of the undisturbed land surface adjacent to the newly installed well. The difference between these two elevations is equal to the amount of casing stickup.

5.9 Well Abandonment

Abandoned wells, including uncompleted and completed wells, will be sealed in accordance with the governing state regulations.

The depth and thickness of each layer of all sealing and backfilling materials will be noted and recorded in the field logbook. The quantity of sealing material used will also be noted and recorded in the field logbook. Water level measurements will be taken prior to sealing.

5.10 Field Documentation and Daily Reports

Notify the Site Geologist or Drilling Coordinator upon completion of daily drilling activities. Notify client site personnel and sign out (if required).

Daily Report will include:

- Work completed (wells installed, wells developed)
- Basic well construction and lithology
- Well yield
- Equipment resupply
- Technical problems, personnel schedules
- Schedule for next day

Describe deviations from requirements described in this procedure or the work plan. The Site Geologist and Site Coordinator will consider suggestions to improve monitoring well installation and development procedures.

Complete all required data collection forms as specified in the Sampling/Analysis Plan.

The Site Coordinator needs to check the field logbook(s) daily to see that data and observations have been completely and accurately recorded. The Site Coordinator is to indicate review of field logbook entries by initialing each page of entries.

5.11 Clean-Up And Demobilization

5.11.1 After well completion, steam clean the drilling rig, all drill rods, augers, tools, drill bits and samplers used during drilling and well development to prevent cross-contamination between each borehole.

5.11.2 The surface or submersible pump will be cleaned by pumping Alconox solution and then potable water through the pump.

5.11.3 Containerize the solids and liquids generated during well installation, well development and decontamination in marked 55-gallon drums as specified in Procedure No. TP-8-002 Drum Labeling. Drums containing waste liquids and solids will be left onsite for proper disposal.

5.11.4 Disassemble the work area. Regrade and, to the extent possible, return site to its original condition. Pick up all trash.

5.11.5 Count and record the number of used and empty drums. Record these counts in the field logbook before leaving the site. Make individual inventories of liquids and solid drums.

6.0 QA RECORDS

- Field log books
- Field data sheets and records, if required by Project

7.O ATTACHMENTS

7.1 Attachment 7.1 - Equipment Checklist For Well Installation and Development

7.2 Attachment 7.2 - Borehole Log Reports and Well Completion Forms

7.3 Attachment 7.3 - Field Logbook Requirements

ATTACHMENT 7.1

EQUIPMENT CHECKLIST
FOR WELL INSTALLATION AND DEVELOPMENT

1. Health and Safety Items (see Site Specific Health and Safety Plan):

_____ Personal protective gear, to include, but not limited to, the following:

- Saranox or Tyvex
- Respirators, cartridges, wipes
- Latex booties
- Gloves (surgical and Nitrile)
- Duct tape
- Hard hat
- Steel-toed boots
- Rain gear

_____ Field first aid kit

_____ Eye wash

_____ HNU (PID) or OVA (FID)

_____ Tri-Level Detector

_____ Drager Pump and Tubes

2. Logistical Items:

_____ Sledge hammer

_____ Tool box, to include, but not limited to, the following:

- Chisel
- File
- Hammer
- Bung wrench

_____ Paint markers for drum labeling (two contrasting colors)

_____ Stopwatch/clock (for determining well recovery/yield)

_____ Wooden stakes

_____ Flagging

_____ Grundfos pump (or other suitable pump for well development)

_____ Stencil for well installation markings

3. Paperwork

_____ Procedures listed as References 3.5 through 3.8

_____ Field logbooks and black ballpoint pens

_____ Daily report forms

_____ Forms (Borehole Log Report, Well Completion Report)

_____ Field binder to include the following:

- Work plan
- Site map with existing and proposed monitoring well location clearly marked
- Sequence for depth to water measurements
- List of past depth to water measurements
- Water table or potentiometric surface map (if available)

_____ Health and Safety Plan

_____ Chain-of-Custody

4. Measuring and Surveying Equipment

_____ Water level probes

_____ Measuring tape or ruler (calibrated in hundredths of a foot)

_____ 5-gallon plastic bucket graduated in gallons

_____ Weighted rope and chalk (back-up for water level probe)

5. Sampling Equipment

_____ Ziploc bags (1-gallon and l-quart)

_____ Markers for labeling sample bags

_____ Sample bottles

_____ Bottle labels

_____ Strainer/sieve

6. Decontamination Equipment

_____ Caution tape

_____ Visqueen

_____ Drum liners

_____ Trash bags

_____ Paper towels

_____ Squirt bottles

_____ Alconox

_____ HPLC-Grade water for field blanks

_____ Deionized water

_____ Methanol and hexane

_____ Decontamination tubs

_____ Long handle brushes

_____ Funnel

ATTACHMENT 7.2

BOREHOLE LOG REPORTS AND WELL COMPLETION FORMS

Project Name				Project No.		Drilling Company	
Boring No.		Location		Ground Surface El.		Drilling Rig Type and Drilling Method	
Sample No	Time	Depth (feet)	TRPH (mg/kg)	OVA Reading (ppm)		Description (USC)	Remarks
				Cuttings	Hole		
Water						Logged By:	Sampled By:
While Drilling:		After Drilling:		Hours After Drilling:		Date Started:	Date Completed:

ATTACHMENT 7.3

FIELD LOGBOOK REQUIREMENTS

1. The onsite geologist field logbook will include:

   a. Arrival times and departure of all individuals, (especially visitors or client representatives, neighbors, reporters)

   b. Health and Safety-related issues.

   c. Daily drilling materials used (cement bags, casing footage)

   d. Summary of day (i.e. decontamination time, drilling time, development time, down time, etc.)

   e. Other pertinent information (i.e. weather, changes in weather)

   f. A sketch showing the well locations with appropriate utility clearance signatures.

   g. Split spoons and sample ID numbers (if applicable)

2. The onsite geologist will maintain geologic and drilling logs for:

   a. Description of lithology;

   <u>For Soil</u>

   - Depth
   - Color
   - Texture + Grain Size
   - Plasticity
   - Moisture content
   - Blow counts (if split-spoon samplers are used)
   - Time samples were collected
   - HNU or OVA readings
   - Drillers' comments
   - Presence or absence of a NAPL phase

- Other observances (i.e., staining, odor, etc.)

b. Summary of well construction;

(1) Drilling method, well completion depth, and in what stratigraphic well was completed

(2) Depth to the bottom of the outer carbon steel casing

(3) Stick-up of outer casing.

(4) Well yield

(5) If borehole is screened, the drilling notebook should also include:

a. Depth to top of screen

b. Length and diameter of screen

c. Type of screen (i.e., stainless steel type 304, slot size, etc.)

d. Riser pipe length

e. Stick-up of riser pipe (i.e., length of pipe from the ground surface to top)

f. The difference between the inner and outer casing on double cased wells.

g. Depth to top of sand/gravel pack

h. Depth to top and bottom of bentonite-pellet seal

i. Ratio of grout/water/bentonite powder mixture

(6) Time started, time completed

(7) Diameter of borehole

(8) Schematic diagram of the borehole lithology with labeled information, depth intervals, and other pertinent information

(9) Any problems or unusual observations which occurred during well installation

(10) Description of the water produced during development(i.e. initially turbid - then clear after pumping at 2 gpm for 1 hour)

(11) Drawdown measurements in nearby wells during development

APPENDIX A.6
TP-9-003
Soil Sample Collection

TECHNICAL PROCEDURE
NO TP-9-003
SOIL SAMPLE COLLECTION

1.0 PURPOSE

The purpose of this procedure is to describe methods for collection of discrete surface soil samples and to describe the direct-push and soil boring methods and subsurface sample collection techniques to be followed to ensure acceptable, consistent collection of samples for chemical and physical analysis and physical description.

2.0 APPLICABILITY

The requirements of this procedure are applicable to project activities involving surface soil sampling, direct-push soil sampling, soil borings, sample collection, sample logging, examination and classification.

The extent of project activities identified by this procedure is controlled at the direction of the Project Manager.

3.0 REFERENCES

3.1 Project Health and Safety Plan

3.2 Project Work Plan

3.3 Quality Assurance Project Plan

3.4 Technical Procedure No TP-8-001, Project Custody Documentation

3.5 Technical Procedure No TP-8-002, Drum Labeling

3.6 Technical Procedure No TP-12-001, HNU PI101 Photoionization Detector

3.7 Technical Procedure No TP-8-003, Project Sample Identification

3.8 Technical Procedure No TP-13-001, Packing, Shipping and Labeling

4.0 DEFINITIONS

- Surface Soils – Surface soils are generally classified as soils between the ground surface and 6 to 12 inches below ground surface. Surface soil sampling to a maximum of 2-feet below ground surface will be considered a surface soil sample.

- Subsurface Soils – Subsurface soils are generally classified as soils greater than 12 inches below ground. The shallow subsurface interval may be considered to extend from 2-feet below ground to a site-specific depth at which sample collection using manual methods becomes impractical

5.0 PROCEDURES

5.1 Prerequisites

The Team Leader is to ensure the following prior to leaving for the site:

5.1.1 Obtain a copy of the Work Plan from the Project Manager. Verify contact names and phone numbers in the Work Plan and site specific Health and Safety Plan. Check analytes to be sampled; obtain and inventory the sample containers to ensure the number and appropriate sample containers (include QC samples) with preservatives (if required) have been received and properly stored. (See Attachment 6.1 for sample container types)

5.1.2 Obtain a map of the site with proposed surface soil and subsurface soil sampling locations identified before leaving for the site.

5.1.3 Obtain the equipment listed in Attachment 6.2 prior to leaving the site.

5.1.4 Verify with the Project Manager that the locations are appropriately labeled on a site map.

5.1.5 Verify sample identification protocols (refer to Procedure No TP-8-003) for field samples and blanks. Check identification and depth for each location and boring.

5.1.6 Verify that the appropriate number of clean, empty solid and liquid 55-gallon drums and drum liners are on site or that other suitable containers will be available for containing drill cuttings and decontamination solids and liquids.

5.1.7 Verify that the sampling locations have been staked and identified (by either HDR or the client) and a utility clearance has been obtained by the client and/or the appropriate utility representative. (Note: Utility clearances, digging permits, are only required for intrusive activities below 1-foot of depth where powered sampling equipment will be used). Surface soil samples will typically not require a digging permit. In addition, if the location is off site, obtain a utility clearance and written permission through the client that work can be conducted on the property of the appropriate property owner.

5.2 Arrival On Site

5.2.1 The Field Team Leader, when applicable, shall notify client site personnel that the Field Team is on site and sign in if required.

5.2.2 The Field Team Leader is responsible for proper completion of the field logbook. Refer to Attachment 6.3 and the Sampling/Analysis Plan for a description of the field logbook requirements.

5.2.3 The Field Team Leader shall ensure that the Field Team members and any visitors to areas of field activity read and sign the site specific Health and Safety Plan.

5.2.4 Obtain water of appropriate quality for decontamination, and sample for all analytes outlined in the FSP/QAPP if needed.

5.3 Site Mobilization and Set-Up

5.3.1 The sampling equipment, including drill rigs, geoprobe rigs, etc. and materials need to arrive on site in a clean condition and should be free of oil, grease and debris. The Field Team Leader shall inspect the rigs for any significant fluid leaks. If leaking fluids are present, they should be repaired or contained.

5.3.2 Ensure that any down-hole drilling or sampling equipment, rods, tools, and drill bits are steam cleaned prior to the start of drilling. Inspect the cleaned materials for residues such as machine oils. If residues are observed, steam clean the equipment until such residues are removed.

5.3.3 To the extent practical, perform initial decontamination away from marked boring locations and existing monitoring wells, preferably at a location away from and downgradient of proposed boring locations and existing wells. This will minimize surface contamination at soil boring and monitoring well locations.

5.3.4 Perform decontamination procedures between boreholes and monitoring well installations.

5.3.5 Set up the decontamination area for sampling equipment, and decontaminate any nondisposable sampling equipment prior to use.

5.3.6 Use potable water for decontamination.

5.3.7 If required, obtain the anticipated number of solid and liquid 55-gallon drums and drum lines required to contain the soil and decontamination waste, and have lined drums or a rolloff container ready for drilling activities.

5.4 Surface Soil Sampling

5.4.1 Surface soil samples will be collected to a maximum depth of 2-feet using a stainless steel trowel, stainless steel spoon, piston corer, king-tube sampler, bucket auger, hand-auger, or similar device. When surface soil samples are collected in conjunction with soil borings and subsurface samples, direct-push soil sampling techniques will be used as described in Section 5.7.8. Vegetation, rocks, leaves, debris, and other obstructions, which interfere with soil sample collection, will be removed from the sample location prior to sampling. In general, the top 6-inches of material will be removed from the sampling location before collecting the surface soil sample. If this is not possible, sample locations may be adjusted with the approval of the Field Team Leader. Any relocated point should be carefully described in the field logbook and shown on the site map.

5.4.2 For each sample, the Field Team Leader needs to record the following in the field logbook:

- Sample Identification Code
- Date and time of collection
- Diameter of split spoon (if split-spoon sampler is used)
- Qualitative description of the soil sample to include the information specified in Attachment 6.4

5.4.3 One or more cores or scoops will be taken at each sample location. If more than one core or scoop is obtained, they will be taken a few inches apart at each sampling location and they will be placed into appropriate sample containers (see Attachment 6.1). The portion of the sample for non-volatile analysis will be homogenized in a stainless steel or tempered glass container. These samples may also be sieved through a ¼ or 3/8 inch sieve. The sieving is for the purpose of (1) removing non-soil debris (rocks, sticks), (2) size reduction, and (3) to promote sampling homogeneity. Samples will be placed in sample containers with the sampling tool. Samples may be collected at shallower depths because of rock or other refusal at the sampling locations. Any exceptions should be noted in the field logbook.

Note: Record the sample bottle lot number (if present on the container) in the field logbook.

5.4.4 Surface soil samples for volatile organic analysis will be collected directly from the sides of the hole immediately after the hole is dug to minimize aeration of the sample.

5.4.5 Outer gloves, such as latex gloves, worn by sampling personnel will be removed and discarded between samples to minimize the potential for cross contamination of samples by contact with gloves.

5.4.6 The sampling equipment will be decontaminated between samples as described in Section 4.2.12 of the FSP/QAPP.

5.5 Soil Borings

5.5.1 All locations will be utility cleared by the client and/or the appropriate Base utility representative and, if applicable, the appropriate property owner. The Field Team Leader, when required by the client, shall obtain a current Base digging permit for each boring location.

5.5.2 Mobilize equipment to the staked location; prepare the exclusion or safety zone

5.5.3 If required, the proposed boring locations may require field adjustment based on site access, property boundaries and/or surface obstructions. The Field Team Leader shall check to make sure utility clearance has not been adversely compromised.

5.5.4 The safety level for soil borings and related activities is specified in the site specific Health and Safety Plan.

Throughout the soil boring activities, a Flame Ionization Detector (FID) or Photoionization Detector (PID) monitoring instrument shall be used to monitor the vapors in the worker operating zone as specified in the site specific Health and Safety Plan. These instruments will be used to screen soil samples for organic vapors. Refer to Procedure No. TP-12-001 for operating instructions.

5.5.5 Drilling will continue to the depth specified in the Work Plan.

5.5.6 All soil borings will be logged on the approved USACE HTRW boring log contained in attachment 6.5 of this Technical Procedure.

5.5.7 Equipment will be decontaminated between relocation to boreholes as specified in Section 4.2.12 of the FSP/QAPP.

5.6 <u>Subsurface Soil Sample Collection – Manual Collection Techniques and Equipment</u>

5.6.1 Hand-auguring is the most common manual method used to collect subsurface samples. Typically, 4-inch auger-buckets with cutting heads are pushed and twisted into the ground and removed as the buckets are filled. The auger holes are advanced one bucket at a time. The practical depth of investigation using a hand-auger is related to the material being sampled. In sands, auguring is usually easily accomplished, but the depth of investigation is controlled by the depth at which sands begin to cave. At this point, auger holes usually begin to collapse and cannot practically be advanced to lower depths, and further samples, if required, must be collected using some type of pushed or driven device.

5.6.2 When a vertical sampling interval has been established, one auger-bucket is used to advance the auger hole to the first desired sampling depth. If the sample at this location is to be a vertical composite of all intervals, the same bucket may be used to advance the hole, as well as to collect subsequent samples in the same hole. However, if discrete grab samples are to be collected to characterize each depth, a <u>new bucket</u> must be placed on the end of the auger extension immediately prior to collecting the next sample. The top several inches of soil should be removed from the bucket to minimize the chances of cross-contamination of the sample from fall-in of material from the upper portions of the hole.

5.6.3 Another hand-operated piece of soil sampling equipment commonly used to collect shallow subsurface soil samples is the Shelby® or "push tube". This is a thin-walled tube, generally of stainless steel construction and having a beveled leading edge, which is twisted and pushed directly into the soil. This type of sampling device is particularly useful if an undisturbed sample is required. The sampling device is removed from the push-head, and then the sample is extruded from the tube into the pan with a spoon or special extruder. Even though the push-head is equipped with a check valve to help retain samples, the Shelby tube will generally not retain loose and watery soils, particularly if collected at lower depths.

5.7 Subsurface Soil Sample Collection - Powered Sampling Devices

5.7.1 Powered sampling devices and sampling aids may be used to acquire samples from any depth but are generally limited to depths of 20 feet or less. Among the common types of powered equipment used to collect or aid in the collection of subsurface soil samples are Little Beaver® type power augers; split-spoon samplers driven with a drill rig drive-weight assembly or hydraulically pushed using drill rig or Geoprobe rig hydraulics; continuous split-spoon samplers; specialized hydraulic cone penetrometer rigs; and back-hoes. The use of each of these is described below.

5.7.2 Power Augers: Power augers are commonly used to aid in the collection of subsurface soil samples at depths where hand augering is impractical. This equipment is a sampling aid and not a sampling device, and 20 to 25 feet is the typical lower depth range. It is used to advance a hole to the required sampling depth, at which point a hand auger is usually used to collect the sample.

5.7.3 Drill Rigs: Drill rigs offer the capability of collecting soil samples from greater depths. For all practical purposes, the depth of investigation achievable by this method is controlled only by the depth of soil overlying bedrock, which may be in excess of 100 feet.

5.7.4 Spit-Spoon Samplers: When used in conjunction with drilling, split-spoon samplers are usually driven either inside a hollow-stem auger or inside an open borehole after rotary drilling equipment has been temporarily removed. The spoon is driven with a 140-pound hammer through a distance of up to 24 inches and removed. If geotechnical data are also required, the number of blows with the hammer for each six-inch interval should be recorded.

5.7.5 Continuous Split-Spoon Samplers: Continuous split-spoon samplers may be used to obtain five-foot long, continuous samples approximately 3 to 5 inches in diameter. These devices are located inside a five-foot section of hollow-stem auger and advanced with the auger during drilling. As the auger advances, the central core of soil moves into the sampler and is retained until retrieval.

5.7.6 Cone Penetrometer Rigs: This method uses a standard split-spoon has been modified with a releasable tip which keeps the spoon closed during the sampling push. Upon arrival at the desired depth, the tip can be remotely released and the push continued. During the subsequent push, the released tip floats freely up the inside of the spoon as the soil core displaces it. Split-spoon soil samples, therefore, can be collected without drilling, as has historically been required, by simply pushing the device to the desired depth. This technique is particularly beneficial at highly contaminated sites, because cuttings are not produced as with drill rigs. The push rods are generally retrieved with very little residue. This results in minimal exposure to sampling personnel and very little contaminated residue is produced as a result of equipment cleaning.

5.7.7 Back-Hoes: Back-hoes are often utilized in shallow subsurface soil sampling programs. Samples may either be collected directly from the back-hoe bucket or they may be collected from the trench wall if proper safety protocols are followed. Trenches offer the ability to collect samples from very specific intervals and allow visual correlation with vertically and horizontally adjacent material. Prior to collecting samples from trench walls, the wall surface must be dressed with a stainless steel shovel, spatula, knife, or spoon to remove the surface layer of soil which was smeared across the trench wall as the bucket passed. If back-hoe buckets are not cleaned according to the procedures described in Section 5.10, samples should be collected from material which has not been in contact with the bucket surface.

5.7.8 Direct-push: Soil sampling will be accomplished by utilizing either the Geoprobe® Large Bore or Macro-Core® samplers. Interval soil sampling is accomplished using the 24" x 1.5" OD Large Bore (Soil core size 1.0625" x 22", volume = 318 Ml), retractable piston-type soil sampler. Before the sampler is driven, it is fitted with either, clear acetate, Teflon® , or stainless steel liners. The sampler is driven to the desired depth, and locked in the closed position. The piston lock is then released. As the sampler is driven further, the soil enters the sampler. The sample is then brought to the surface, extracted from the liner by sliding the soil sample from the liner onto plastic (in some cases the liner may need to be cut longitudinally to removed the sample from the liner), placed in the appropriate laboratory containers, sealed, labeled and cooled to 4° C to preserve chemical integrity pending transport to the laboratory. Additionally, these samples are used for geologic logging.

Continuous sampling is also available utilizing the Geoprobe® Macro-Core® Sampler (Soil core size 1.750" x 46", volume = 1303 Ml). The Macro-Core® sampler is a preferred method for continuous soil core sampling. Geoprobe® has developed two (2) types of Macro-Core® samplers, the open barrel and the closed barrel. Both types of samplers can be used for "Direct Push" applications. The Macro-Core® closed barrel sampler is used in the same fashion as the interval sampler (Large Bore Sampler) described above. The advantage to this sampler is the ability to sample greater depths continuously without the concern of borehole collapse.

The Macro-Core® open barrel sampler is driven at four (4) ft intervals into the subsurface and retrieved after each consecutive push. The cutting shoe is removed from the end of barrel and the stainless steel liners are removed from the sampler. Should the sample be compacted in the liner, it may be necessary to cut the liner to expose the soil-core for inspection and subsequent packing into sample containers and/or logging.

5.8 Subsurface Soil Sampling

5.8.1 For each sample, the Field Team Leader needs to record the following in the field logbook:

- Sample Identification Code
- Date and time of collection
- Depth of sample collection
- Sample recovery
- Diameter of split spoon (if split-spoon sampler is used)
- Qualitative description of the soil sample to include the information specified in Attachment 6.4

5.8.2 As specified in the Work Plan, a representative sample will be collected and placed in the appropriate sample container(s). (See Attachment 6.1.) The core sample will be homogenized in a stainless steel, tempered glass, or aluminum container. Samples will be placed in sample bottles with a stainless steel implement.

Note: Record the sample bottle lot number (if present on the container) in the field logbook.

5.8.3 The soil samples for volatile organic analyses will be obtained first and placed immediately in the proper sample bottles to minimize volatilization of such compounds. These samples should be collected in a manner that minimizes disturbance of the sample. For example, when sampling with a hand auger, the sample for VOC analysis may be collected directly from the auger bucket or immediately after an auger bucket is emptied into the pan. The sample should be placed in the appropriate container with no head-space, if possible, as is the practice with water samples. Samples for VOC analysis are not mixed.

5.8.4 Outer gloves (latex) worn by sampling personnel will be removed and discarded between samples to minimize the potential for cross-contamination of samples by contact with gloves.

5.8.5 The sampling equipment will be decontaminated between each sampling interval as described in Section 4.2.12 of the FSP/QAPP.

5.9 Field Quality Control Samples

5.9.1 Sample Batching

Note: Review Work Plan and laboratory agreements to determine sample segregation by site, matrix requirements, and batch quantity processing.

5.9.2 DI Water Field Blank

Sample each source of deionized or distilled water or other rinse water material used for the final rinse step in decontaminating non-disposable sampling equipment. The DI water rinse field blank shall be analyzed for the maximum range of analytes requested for each sampling event, matrix, and site. The Field Team Leader shall document the source of the decontamination water in the field logbook. A decontamination rinse field blank provides a check of potential introduction of contamination from the final rinse water used for decontamination.

If no sampling equipment is decontaminated, a DI water field blank is not required.

5.9.3 Sampling Equipment Field Blank (rinsate)

A sample of organic-free, deionized water poured appropriately over or through the sample collection device will be collected in a sample container and returned to the laboratory for analysis. Sampling equipment field blanks are collected following the decontamination of the nondisposable sampling device that contacts the sample matrix. A sampling equipment field blank needs to be collected for each sampling event, matrix, and type of reusable sampling equipment. The sampling equipment blank provides a check on the effectiveness of the decontamination process.

If no sampling equipment is decontaminated, a sampling equipment field blank is not required.

5.9.4 Trip Blank

A trip blank is a laboratory prepared sample of laboratory reagent water that is placed in a glass bottle or vial and that accompanies field samples requiring analysis for volatile organic compounds. A trip blank (two 40 ml glass vials with septum caps) will accompany each cooler containing samples to be analyzed for volatile organic compounds. Trip blanks provide a check of potential sample contamination originating from sample transport, shipping, and site conditions.

5.9.5 Field Replicate Samples

If replicate samples are specified in the Work Plan, they will be collected from the same stainless steel, tempered glass or aluminum container of homogenized soil as the routine field sample.

5.9.6 Split Samples

Where EPA or other State representatives are expected to participate in sampling or are expected to take split samples, they should:

Abide by the HDR Health and Safety Plan, Abide by HDR Procedures, and provide their own personal protective gear and sample containers.

Split samples will be relinquished when the representative is on site and provides the sample container. The Field Team Leader shall document which samples were split, the agency, and the agency sample numbers in the field logbook. Also note the location and sample numbers for any additional samples collected by the agency.

5.10 Sealing the Borehole

Each borehole will be sealed utilizing a grout mixture prepared from water, cement, and bentonite A mixture of approximately 30:1 cement:bentonite, by weight, will be used. The borehole will be sealed from the bottom to the ground surface using a tremie pipe and grout pump. Quantity of grout utilized to seal borehole should be entered in the field notebook.

- Grout (Be familiar with the different mix specifications for the following:)
  - Neat Cement: Seven gallons of water per bag of Portland cement (one cubic foot or 94 lbs)
  - Sand Cement: Mixture of Portland cement, sand, and water (2 parts by weight of sand to one part cement to seven gallons clean water)
  - Concrete: Mixture of Portland cement, sand, coarse aggregate, and water (at least six bags cement per cubic yard of concrete to not more than seven gallons water per bag of cement)
  - Bentonite: Powdered sodium bentonite and clean water (1/2 pound bentonite to one gallon water) or bentonite pellets or granular bentonite may be used

- Grout Placement
  - Grout slurries shall be placed so they do not drop free fall more than ten feet
  - Grout slurries should be placed by tremie (a long, small diameter pipe used to carry grout or gravel pack material to the bottom of the hole)
  - In areas of grout, the casing shall be centered in the borehole: applies to all water wells (Preferred method is to use centralizers)

5.11 Sample Handling, Labeling and Documentation

5.11.1 A record of each sample and the required analysis will be completed at the time of sample collection on the Chain-of-Custody as described in Procedure No TP-8-001 Project Custody Documentation.

5.11.2 The outside of the sample containers will be washed and wiped clean with a paper towel moistened in potable water prior to packaging if necessary.

5.11.3 Each sample will be labeled with the following information:

- Sample Identification Code (Refer to Procedure No TP-8-003, Project Sample Identification)
- Type of Sample ;
- Collection Date/Time
- Preservatives
- Analysis

5.11.4 In general, soil boring samples will be considered <u>environmental samples.</u> At the discretion of the Field Team Leader, in conjunction with the Project Manager, the soils may be shipped as hazardous materials samples. The samples will be marked, labeled packaged, and shipped in accordance with federal requirements. (Refer to Procedure No TP-13-001, Packing, Shipping and Labeling.)

5.12 <u>Daily Report</u>

5.12.1 The Field Team Leader shall call in, at a minimum daily, to the Project Manager as appropriate. Examples of progress items reported include the following:

- Work completed
- Schedule for next day
- Problems/solutions
- Equipment and material resupply
- Sample pick-up or shipment
- Sample identification codes for samples as listed on the completed Chain-of-Custody
- Agency sample number for splits and corresponding sample identification codes
- General comments (i.e. weather, agency representatives on site, etc)

5.13 <u>Decontamination and Cleanup</u>

5.13.1 Decontaminate sampling equipment between samples in a decontamination area established in a manner consistent with the Health and Safety Plan as follows:

- Disassembly of the equipment, if required
- Water rinsing to remove large soil particles
- Scrubbing with an Alconox solution

- Sequential rinsing with potable water (methanol, hexane, methanol, if needed) and deionized water
- Air drying of the equipment in a clean area
- Reassembly of the equipment, if required

The field personnel will use a new pair of outer gloves before handling sampling equipment after it is cleaned.

5.13.2 Steam clean the drill rig, drill rods, augers, tools, drill bits and split spoon samplers used during drilling to prevent cross contamination between each test boring. Inspect the rig for any residues after steam cleaning. If the equipment is not clean, repeat the steam cleaning procedure. Conduct decontamination of the drill rig and associated equipment in a containment area or collection device established in a manner consistent with the Health and Safety Plan.

5.13.3 Store soil cuttings generated during the drilling procedure in lined 55-gallon drums or other suitable containers (if required). All solid and liquid wastes produced throughout the entire soil boring and sampling procedure will be contained in 55-gallon drums, or other suitable containers, prior to mobilization to the next location.

5.14 Demobilization

5.14.1 Disassemble work area. Pick up all equipment, trash and debris.

5.14.2 Containerize the visqueen and discardable protective clothing.

5.14.3 Seal the 55-gallon drums and label them as described in Procedure No TP-8-002, Drum Labeling. Drums containing waste liquids and solids will be transported daily to the contractor storage area north of building 948.

5.14.4 Inventory and record in the field logbook the number of solid and liquid 55-gallon drums (if any). Keep a separate inventory of full and empty drums.

5.14.5 Notify the client of the current disposition of all drums before leaving the site, if required.

5.14.6 When applicable, the Field Team Leader shall inform the client that the Field Team is leaving the site and describe any future activities, if appropriate, and sign out on the client's registry if required.

5.14.7 The Field Team Leader shall obtain a completed Borehole Log Report (see Attachment 6.5) for each borehole completed.

6.0 ATTACHMENT

6.1 Table 1 – Sample Containers for Soil Samples and Blank Samples

6.2 Equipment Checklist for Soil Sampling

6.3 Field Logbook Requirements

6.4 HDR Applied Soil Identification and Description Format

6.5 USACE HTRW Drilling Log

ATTACHMENT 6.1

TABLE 1
SAMPLE CONTAINERS FOR SOIL AND BLANK SAMPLES

Matrix	Analysis	Container
Soil Boring Samples		
Soil	VOCs	1-40 ml VOC vial
Soil	SVOCs	1-8 oz. clear glass/Teflon lids
Soil	Pesticides/PCBs	1-8 oz. clear glass/Teflon lids
Soil	Explosives	1-8 oz. clear glass/Teflon lids
Soil	TPH	1-8 oz. clear glass/Teflon lids
Soil	RCRA Metals	1-8 oz. clear glass/Teflon lids
Blank Samples		
Water	VOCs	3-40 ml vials w/Teflon lined lid
Water	SVOCs	2-1 L amber glass
Water	Pesticides/PCBs	2-1 L amber glass
Water	Explosives	" "
Water	TPH	1-1 L amber glass
Water	RCRA Metals	1-500 mL plastic bottle

ATTACHMENT 6.2

EQUIPMENT CHECKLIST FOR SOIL SAMPLING

1. Health and Safety Items:

___ Personnel protective gear, including, but not limited to the following:

- Tyvex
- Respirator, cartridges, wipes
- Latex booties
- Gloves (surgical, nitrile)
- Duct tape
- Hard hat
- Steel-toed boots
- Rain gear
- Hearing protection

___ Field first aid kit

___ Eye wash

___ OVA/HNU

2. Decontamination Items:

___ Visqueen

___ Rinse bottle

___ Trash bags

___ Paper towels

___ Deionized water

___ Methanol, hexane (if required)

___ Carboy for potable water

___ Decontamination tubs

___ Long handle brushes

___ Alconox

___ HPLC - grade water for field blanks

3. Paper Work

___ Work Plan

___ Technical Procedures applicable to tasks in work plan

___ Health and Safety Plan

___ Field logbook and black ball point pens

___ Sampling/Analysis Plan

___ Daily report form

___ Site map

___ Chain-of-Custody forms

4. Measuring Equipment

___ Folding ruler marked in tenth's of an inch

___ 100-foot fiberglass tape measure

5. Sampling Equipment

___ Stainless steel trowels

___ Stainless steel scoopulas

___ Stainless steel bucket auger

___ Stainless steel bowls

6. Shipping Supplies

___ Sample containers, including bottles for QC requirements

___ Airbills such as Federal Express or Airborne

___ Mailing labels

___ Bottle labels (HDR)

___ Chain-of-custody tape

___ "This End Up" stickers

___ "Cargo Aircraft Only" stickers

___ "Arrow Up" stickers

___ "Inner Packages Comply with Prescribed Specifications" stickers

___ Ziploc bags (1 quart + 1 gallon size)

___ l-quart paint cans

___ Packing Tape

___ Packing Material

___ Coolers

7. Miscellaneous

___ Camera and film

___ Stakes

___ Flagging

___ Caution tape

___ Identification tags for staked locations

___ Paint Markers

___ Bung wrench/crescent wrench

___ Applicable hand tools and tool box

ATTACHMENT 6.3

FIELD LOGBOOK REQUIREMENTS

1. The Field Team Leader or personnel who make Journal entries will initial and date all field entries to the Field logbooks at the end of each day.

2. Information may be entered in the field logbooks by the appropriate team member.

3. The Field logbook will include the following general information:
   - Name and location of site
   - Name and affiliation of Field Team Leader
   - Names of team members and responsibilities
   - Time of arrival on site on a daily basis
   - Weather conditions on a daily basis
   - Arrival and departure times of visitors on a daily basis (i.e. agency or client representatives, neighbors, reporters)
   - Health and Safety-related issues
   - Summary of day (i.e. drilling time, decontamination time, down time, etc.)
   - Dates of sample collection or event
   - Numbers and types of samples taken and sample identification numbers or references to task logbooks, if appropriate
   - A description of sampling methodology, or reference to appropriate logbook
   - A record of phone calls and/or contact with people at the site on daily basis.

   Individual logbooks will contain the above information only as applicable to the specific sampling event or task.

4. The following observations about each sample collected (includes samples for laboratory analysis and descriptive analysis) will also be recorded in the Site Geologist's logbook:

   - Dates and time of sample collection
   - Sample number
   - Sample interval - length
   - Sample depth
   - Sample recovery (in percent)
   - Type of sample (i.e., geotechnical or environmental analysis)
   - Sample matrix (i.e., soil or water)
   - Soil Description (to be described in the order of significant properties) Examples of a soil description are as follows:
     A. Hard, moderately compressible, blue-gray, medium plastic clay
     B. Dense, well graded, clayey, sandy, well rounded gravel
     C. Loose, brown, uniform, angular fine sand
        - Any discolorations or other observances (presence or absence of water)
        - Type(s) of laboratory analysis requested, if any
        - Any changes in sampling locations and reason (these changes are also to be indicated on site map).

5. The Site Geologist's logbook will also include the following general information:

- Name of Site Geologist
- Name of driller, driller's helper and affiliation
- Date well started and completed
- Location of well or well number
- Drilling and sampling types
- Reference elevation for all depth measurements
- Depth of each change of formation
- Description of each formation, including:
    1) Color
    2) Constituents such as:
        a) Sand and gravel; note size of grains, cementation of, tightness of the formation, and roundness of grains
        b) Silt
        c) Clay
        d) Hard rock and indicate type
    3) Moisture content
    4) Unified soil classification symbol
- Depth of first encounter of ground water
- Any changes in water level
- Static water level depth and hours elapsed from first encounter or completion of drilling
- Quantity of grout (cement/bentonite mixture) used to seal borehole
- Diagram of completed boring
- Any and all other pertinent information needed for a complete boring log

ATTACHMENT 6.4

HDR APPLIED SOIL IDENTIFICATION AND DESCRIPTION FORMAT

PURPOSE: To provide a consistent method for describing and recording physical soil characteristics at the site. The information will be used in identifying:

- Future remediation needs and requirements;
- Modeling of transport processes;
- Correlation of contamination to soil conditions and properties.

FORMAT: In order to keep the recorded information consistent between field personnel, the following format is to be used in describing soil samples.

SAMPLE DESCRIPTION: SAMPLE DEPTH, COLOR, TEXTURE, ADDITIONAL DESCRIPTIONS, MOISTURE, and CONSISTENCY. LOCATION OBSERVATIONS. REFUSAL DEPTH.

SAMPLE DEPTH: Recorded in appropriate units below ground surface.

Surface Soil inches
Soil Boring feet

COLOR: Color will be determined by visual estimate, use of the Munsell Color Chart is optional. Use full word or accepted abbreviations:

Example: Dark brown: dk brn

Color abbreviations:

dark: dk	black: bk	green : gn	white: wh
light: lt	blue: bl	orange: or	yellow: yw
medium: med	brown: brn	red: rd	
discoloration: dis	grey: gry	tan : tn	

If more than one color is present the dominant soil color is recorded first and additional colors are noted afterward.

Example: Dk brn with lt gry variations.

TEXTURE: The soil texture identifies the percentages of individual soil separates. Soil separates are classified on the basis of particle size.

SOIL SEPARATES SIZE OF INDIVIDUAL SEPARATES (USDA)

Gravel	76.00 – 2.0 mm
Sand	2.00 – 0.05 mm
Silt	0.05 – 0.002 mm
Clay	< 0.002 mm

TEXTURE DESCRIPTIONS:

- The predominant soil separate is identified with capital letters.

  Example: 0-6" Dk brn SILT.

- Additional soil separates are not capitalized and the percentages of these soil separates are identified by the following adjectives:

ADJECTIVE	PERCENTAGE	ABBREVIATION
and	35-50	a.
some	20-35	s.
little	10-20	l.
trace	1-10	t.

  Example: 0-6" Dk brn SILT with little sand.

- Sands are additionally subclassed by size:

SAND SUBCLASSIFICATION	SIZE RANGES (USDA)
Coarse (c) sand	2.0 – 0.5 mm
Medium (m) sand	0.5 – 0.25 mm
Fine (f) sand	0.25 – 0.10 mm
Very fine (vf) sand	0.10 – 0.05 mm

  Example: 0-6" Dk brn SILT with little fine sand.

- Gravel is classified by size and shape.

GRAVEL SUBCLASSIFICATION	SIZE RANGES (USDA)
Coarse (c) gravel	76-13 mm (1-3")
Fine (f) gravel	13-2 mm

  GRAVEL SHAPES

  Angular - Sharp edged
  Subangular - Rounded and sharp edged
  Rounded - Cobbles

  Example: 0-6" Dk brn SILT with little fine sand, trace coarse angular gravel.

ADDITIONAL DESCRIPTIONS:

- Organic matter
  Example: 0-2" Dk brn SILT with 1. f sand mixed with some roots and organic material.

- Rock fragment - Describe percentage, shape and size.
  Example: 0-6" Dk brn SILT with 1. f. sand with some >1" long shale fragments

- Discoloration
  Example: 0-6" Dk brn SILT with 1. f. sand with orange markings.

MOISTURE CONTENT: Described as dry, slightly moist, moist, or wet.

Dry	- no moisture
Slightly moist	- little moisture
Moist	- moist
Wet	- saturated

Example: 0-6" Dk brn SILT with 1. f. sand, slightly moist.

CONSISTENCY: Refers to the degree to which soil particles are holding together.

loose	- Soil does not hold together, falls apart easily.
friable	- Soil will hold together but can be easily broken apart.
firm	- Soil breaks apart under increasing pressure.

Example: 0-6" Dk brn SILT with 1. f. sand, slightly moist, loose.

GENERAL LOCATION COMMENTS: (not obvious from map) Note any unique location conditions such as swales, dirt roads, surface rock, boulders.

Example: 0-6" Dk brn SILT with 1. f. sand, slightly moist, loose. Located in slight drainage swale.

REFUSAL DEPTH: Record depth and reason for refusal.

Example: 0-4" dk brn SILT with l. f. sand, slightly moist, loose. Located in slight swale. Refusal at 4" due to rocks

EXAMPLE SOIL SAMPLE DESCRIPTION:

TE-PAI-SHE-AC01-001F 0-2" Dk brn SILT with little fine sand mixed with decaying leaf and organic material, slightly moist, loose

2-6" Redbrn SILT with little fine sand, some l" long redbrn rock fragments, slightly moist, firm. Located along salted road.

BASIC DESCRIPTION FORMAT:

COLOR		TEXTURE		ADDITIONAL DESCRIPTION	MOISTURE	CONSISTENCY
dk	CLAY	and	clay	organic	dry	loose
lt	SILT	some	silt	rock	sl. moist	fri
	SAND	little	sand	discolors	moist	firm
bl	GRAVEL	trace	gravel		wet	
brn						
gry						

ATTACHMENT 6.5

USACE HTRW DRILLING LOG

APPENDIX A.7
TP-12-001
HNU PI101 Photoionization Detector

TECHNICAL PROCEDURE
NO. TP-12-001
HNU PI101 PHOTOIONIZATION DETECTOR

1.0 PURPOSE

This procedure outlines the technical requirements and operational use of the HNU PI-101 photoionization detector (HNU).

2.0 APPLICABILITY

The requirements of this procedure are applicable to all project activities which include the use of the HNU instrument. The HNU is a photoionization detector that is utilized as a general air monitor/survey instrument. The HNU can detect various classes of volatile organics and some inorganic vapors. The data generated with the HNU are used to determine levels of personal protection and designated "safe" zones.

3.0 REFERENCES

3.1 HNU PI-101 Photoionization Detector Owners Manual, HNU Systems, Mass., December 1985.

4.0 DEFINITIONS

4.1 Central Equipment Stores (CES) - HDR's central equipment storage location in Omaha, NE. This group is responsible for securing, maintaining, and distributing equipment.

4.2 HNU Components - survey probe with ultraviolet lamp (10.2 or 11.7 eV); needle meter readout; nickel-cadmium battery or lead-acid battery; span potentiometer; range selector; zero control.

4.3 Mode of Operation - ultraviolet light photons are generated by the UV lamp and directed at the sample. If the energy of the photons are sufficient, they will ionize the molecules of vapor/gas in the sample. The amount of energy necessary to photoionize a molecule is represented by its ionization potential (IP). Thus the lamp energy must be equal to or greater than the IP of a compound. Once ionized, the freed electrons are collected at an electrode to generate an electrical current. The greater the current the higher the concentration.

4.4 Shop Calibration - the instrument is calibrated to isobutylene by the manufacturer. HDR's central equipment store personnel will verify accurate calibration and affix that calibration tag to the instrument prior to it leaving the CES facility. A calibration form should also accompany the instrument. This form becomes part of the project file along with other calibration records.

4.5 Field Calibration - the field calibration is designed to verify that the internal instrument calibration is within + 10% accuracy. The field calibration utilizes the manufacturer calibration gas (isobutylene) and the span for minor adjustment.

Internal adjustment is required for more reliable calibration. Consult manual and CES for assistance.

4.6 Calibration Gas - the calibration gas is a mixture of isobutylene and air contained in a manufactured compressed gas cylinder. The calibration gas system comes complete with regulator and tygon tubing. Note: (10.2 eV lamp at span 9.8 equals 58 ppm, 11.7 eV lamp at span 5.0 equals 64 ppm)

5.0 PROCEDURES

5.1 Start Up Procedure

5.1.1 Using the equipment checklist contained in Appendix 7.1, make sure all necessary equipment is provided with the HNU.

5.1.2 Before attaching the probe, check the function switch on the control panel to ensure that it is in the off position. Attach the probe by plugging it into the interface on the top of the readout module. Use care in aligning the prongs in the probe.

5.1.3 Turn the function switch to the battery check position. The needle on the meter should read in the upper portion of the green battery arc on the scale. If not, recharge the battery. The red indicator light on the instrument panel indicates that the battery needs recharging.

5.1.4 Turn the function switch to "On". Listen for the dull hum of the fan motor.

5.1.5 To zero the instrument, turn the function switch to the standby position and rotate the zero adjustment until the meter reads zero. A calibration gas is not needed because this is an electronic zero adjustment. If the span adjustment setting is changed after the zero is set, the zero should be rechecked and adjusted, if necessary. Wait 15 to 20 seconds to ensure that the zero reading is stable. If necessary, readjust the zero.

5.2 Operational Check (To be performed prior to each use.)

5.2.1 Follow the start up procedure.

5.2.2 With the instrument set on the 0-20 range, briefly hold a solvent-based magic marker cap near the probe tip. If the meter deflects up-scale, the instrument is working. Repeat throughout day as necessary.

5.3 Field Calibration Procedure

(To be performed daily prior to use.)

5.3.1 Follow the start-up procedure and the operational check. Check the date CES last performed its calibration. If more than 30 days has elapsed, the unit should be returned to CES for recalibration. However, if it is impossible to immediately return the unit, it can be used if it can be properly field calibrated.

5.3.2 Set the function switch to the range setting for the concentration of the calibration gas.

5.3.3 Attach a regulator to a disposable cylinder of isobutylene gas. Connect the regulator to the probe of the HNU with a piece of clean tygon tubing. Turn on the regulator.

5.3.4 After fifteen seconds, adjust the span dial until the meter reading equals the concentration of the calibration gas used. Be careful to unlock the span dial before adjusting it. If the span has to be set below 9.0 (with 10.2 eV probe) or 4.5 (with 11.7 eV probe), return to CES for calibration or call for assistance in internal calibration.

5.3.5 Record in the field logbook; the instrument ID no., the serial number if the instrument is a rental, the initial and final span settings, the initial and final readings, the date and time, the concentration and type of calibration used, and the name of the person who calibrated the instrument. In addition, indicate the date of the shop calibration.

5.3.6 If the HNU does not start up, fails the operational check, or will not calibrate properly, return the instrument to CES.

5.4 Operation

5.4.1 Follow the start up procedure (Section 5.1), operational check (Section 5.2), and calibration procedure (Section 5.3).

5.4.2 False readings may occur under the following conditions: ambient relative humidity greater than 90 percent, temperature below 32°F or above 105°F, high winds, high electrical field (such as near overhead power lines), or probe too far from the source. Alternate detection equipment or increased levels of personal protection may be necessary in those situations.

5.4.3 No reading will occur if a gas or vapor is present that has an ionization potential greater than that of the lamp. The operator should review Reference 3.1 to determine if chemicals anticipated to be present are within the range of the lamp. Some compounds whose ionization potential exceeds that of the 11.7 eV lamp are: methane (IP=12.98 eV), sulfur dioxide (12.34 eV), cyanide (15.13 eV), and hydrogen cyanide (13.91 eV). Lamps with a lower energy can detect fewer compounds. For example, propane (IV=11.07 eV) can be detected by the 11.7 eV lamps but not by the others.

5.4.4 Some models of the HNU are intrinsically safe; they will not cause an explosion if exposed in an explosive atmosphere. If the unit does not indicate that it is intrinsically safe on its label then it is not and should not be used in a potentially explosive atmosphere.

5.4.5 Set the function switch to the appropriate range. If the concentration of gases or vapors is unknown, set the function switch to the 0-20 ppm range. Adjust it if necessary.

5.4.6 Monitor the work activity as specified in the Health and Safety Plan.

5.4.7 When the activity is completed or at the end of the day, carefully clean the outside of the HNU with a damp disposable towel to remove any visible dirt. Return the HNU to a secure area and place on charge if battery charge is showing less than one half charge.

5.4.8 With the exception of the probe's inlet and exhaust, the HNU can be wrapped in clear plastic to prevent it from becoming contaminated and to prevent water from getting inside in the event of precipitation.

5.5 Field Screening Samples Using the HNU PI-101

5.5.1 The HNU will be used to field screen the headspace of soil samples during soil boring activities. The general procedures for field-screening are as follows:

5.5.2 Determine the sampling interval to collect field screening samples. At those sample intervals collect approximately 8 oz. of soil. Place the soil into a new or decontaminated 16 oz canning jar. Place a square of new aluminum foil over the mouth of the jar and replace the outer ring portion of the lid. Tighten the outer ring until snug. Mark the boring number, date, depth, and time of the sample on the aluminum foil with a marker pen.

5.5.3 Allow the jar to sit in a warm place (at least approximately 60 °F) for ½ hour to equilibrate the headspace in the jar.

5.5.4 After ½ hour insert the probe tip of the HNU PI-101 directly into the jar through the aluminum foil (be careful not to insert the probe tip into the soil in the jar).

5.5.5 Note the maximum HNU reading on the scale. A quick spike is more indicative of organic vapors as opposed to a slow, gradual needle climb which could be due to moisture. Note the following in the field logbook and on the boring log:

- Boring Number
- Date
- Time sample taken
- Time sample analyzed
- PID reading (in PPM)

5.5.6 After completion of all headspace readings in a boring the soil should be emptied from the jars and placed into the soil stockpile area. The headspace jars will then be decontaminated according to the procedures in Section 4.2.12 of the FSP/QAPP.

5.6 Record Keeping/Documentation

5.6.1 The instrument calibration information should be recorded daily, as indicated in Section 5.3.5.

5.6.2 HNU readings should be documented in the field log book relative to span setting, calibration concentration, calibration date, CES personnel performing calibration, and probe electron volt potential. This information can be recorded once daily and be referenced as "units" with each reading.

6.0 QA RECORDS

- Field log books
- Field data sheets and records, if required by Project

7.0 ATTACHMENT

7.1 Attachment 7.1 - Photoionization Detector Equipment Checklist

ATTACHMENT 7.1

PHOTOIONIZATION DETECTOR EQUIPMENT CHECKLIST

________ PID

________ Operating Manual

________ Probes: 10.2eV ______________, 11.7eV______________

________ Battery Charger for PID

________ Jeweler's Screwdriver for Adjustments

________ Tygon Tubing

________ Calibration Gas (Type) Isobutylene

________ Field Data Forms

________ Field Logbook

________ Intake Assembly Extension

________ Strap for Carrying PID

________ Teflon Tubing for Downhole Measurements

________ Plastic Bags for Protecting the PID from Moisture and Dirt

APPENDIX A-8
TP-13-001
Sample Labeling, Packing and Shipping

TECHNICAL PROCEDURE
NO. TP-13-001
PACKING, SHIPPING AND LABELING

1.0 PURPOSE

The purpose of this document is to describe the standard operating procedures to ensure proper packing for sample preservation and compliance with IATA Dangerous Goods Regulations.

2.0 APPLICABILITY

This procedure is applicable to the shipment of samples for site investigations. Specifically, it is applicable only to samples shipped under IATA regulations for environmental samples or other regulated substances, and DOT regulations for compressed non-flammable gases.

The scope include requirements for labeling, packing, and shipping of environmental samples, hazardous materials samples and/or compressed non-flammable gases.

This procedure is not applicable to shipments of poisons, radioactive materials, explosives, biological hazards, flammable gases, etc.

The extent of project activities identified by this procedure is under the direction of the Project Manager.

3.0 REFERENCES

3.1 International Air Transportation Association (IATA) Dangerous Goods, Regulations.

3.2 Procedure No. TP-8-001, Project Custody Documentation.

3.3 Procedure No. TP-8-003, Sample Identification Coding System

4.0 DEFINITIONS

4.1 Environmental Samples - in general, environmental samples are collected from streams, farm ponds, shallow lakes, monitoring wells, temporary wells/drive sampling points, and soils that are not expected to be contaminated with hazardous materials or high concentrations of contaminants. **All samples collected are expected to be classed as environmental samples.**

4.2 Hazardous Material Samples - samples of highly-contaminated on-site soils and materials collected from drums, bulk storage tanks, highly-contaminated wells, surface impoundments, and leachates from hazardous waste sites, are considered hazardous material samples.

4.3 Central Equipment Stores (CES) - HDR's central equipment storage location in Omaha, NE. This group is responsible for securing, maintaining, and distributing equipment.

5.0 PROCEDURES

5.1 Prerequisites

5.1.1 Check with the mailroom, if there are any questions about shipping samples.

5.1.2 Check with the Project Manager regarding the sample types, compounds, and concentration ranges anticipated.

5.1.3 Verify classification of samples with the Project Manager as environmental or hazardous as listed in the Sampling and Analysis Plan or standard operating procedure (as mentioned, all samples are expected to be classed as environmental samples).

5.1.4 If an HNU and/or OVA is to be shipped by public carrier, see Section 5.4.

5.1.5 Obtain packing, shipping and labeling materials (listed in Attachment 7.1) from the CES facility.

5.1.6 Verify holding times and preservatives required.

5.2 Environmental Samples

Environmental samples should be prepared for shipment in the following manner:

5.2.1 Collect sample in specified container and provide complete sample identification information required on the label. Refer to Procedure No. TP-8-003, Project Sample Identification (Reference No. 3.0). Wipe sample containers with disposable wipe, if appropriate. Seal container with custody tape.

** NOTE: BE SURE YOU HAVE RECORDED THE BOTTLE LOT NUMBERS IN THE FIELD LOGBOOK.

5.2.2 Place labeled sample container in Ziploc bag and seal. Use one bag per sample container.

5.2.3 Place samples in a cooler. Surround samples in glass containers with packing material for stability during transport.

5.2.4 Place sufficient ice (approximately 20 lbs or possibly more) in the cooler for sample preservation. Ice may be double-bagged in large, leak-resistant ziploc baggies, or it may be double-bagged in white, 30-gallon leakproof garbage bags that are twisted and sealed with tape to prevent leakage.

5.2.5 Secure the Chain-of-Custody as described in Section 5.2.11 when shipping the samples by a public carrier.

5.2.6 Secure the cooler lid with packing tape Wrap a few layers of reinforced strapping tape around the cooler lid as added protection against inadvertent opening of the cooler lid. Place same duct tape over the cooler drain plug, if equipped, to prevent the drain plug from inadvertantly opening during shipment.

5.2.7 Place completed custody seal on two opposite sides of the lid and cover with clear packaging tape.

5.2.8 Place upward pointing arrow label on all four sides of the cooler (see Attachment 7.2).

5.2.9 Ship samples to the attention of:

"Environmental Samples"

Name of Laboratory
Address of Laboratory
Contact: Name of Person

IMPORTANT: Before samples are relinquished, record date and time on Chain-of-Custody and obtain the signature of the person to whom samples will be relinquished (See Procedure No. TP-8-001, Project Custody Documentation, Reference 3.0).

5.2.10 Shipping by Public Carrier

If the cooler is being shipped by a public carrier such as Federal Express or UPS, seal the Chain-of-Custody inside a Ziploc bag and tape it to the inside of the cooler lid.

IMPORTANT: Record date, time and name of carrier that samples will be relinquished to on the completed Chain-of-Custody before sealing it in the cooler (See Procedure No. TP-8-001, Project Custody Documentation, Reference 3.0)

5.2.11 Document activities related to shipping in a field logbook. This includes:

- Method of transportation such as Federal Express or UPS.
- Include the freight bill number and a copy of the invoice.
- Number of coolers and associated Chain-of-Custody forms.

5.3 Hazardous Material Samples

Hazardous material samples need to be shipped as "Other Regulated Substances", UN#8027, Class #9.

Hazardous material samples should be prepared for shipment in the following manner:

5.3.1 Collect sample in specified container and provide complete sample identification information required on the label. Seal container with custody tape.

** NOTE: BE SURE YOU HAVE RECORDED THE BOTTLE LOT NUMBERS IN THE FIELD LOGBOOK.

5.3.2 Place labeled sample container in Ziploc bag and seal. Use one bag per sample container.

5.3.3 Place sealed Ziploc inside metal paint can and cushion it with vermiculite to prevent breakage and absorb leakage. Pack one Ziploc per can. Secure lid-of can with two strips of duct tape across the top.

5.3.4 Place the following labels on each paint can:

- Laboratory address label with sample identification code.
- IATA - Other Regulated Substances UN#8027, Class #9.
- Custody seal on lid.
- "Cargo Aircraft Only" sticker

5.3.5 Place cans in cooler. Surround cans with vermiculite for stability during transport. The total sample volume will not exceed 40 liters per cooler.

5.3.6 Place sufficient ice (approximately 20 lbs or possibly more) in cooler for sample preservation

5.3.7 Secure the Chain-of-Custody as described in Section 5.3.15 when shipping the samples by a public carrier.

5.3.8 Close the lid and secure it with tape.

5.3.9 Place completed custody seal on two sides of the cooler lid.

5.3.10 Place the following labels on the cooler (see Attachment 7.2):

- Upward pointing arrow label on all four sides.

- Place the following labels on the front or top (one side only) of the coolers: "OTHER REGULATED SUBSTANCES, UN#8027, CLASS #9," "CARGO AIRCRAFT ONLY," "INSIDE PACKAGES COMPLY WITH PRESCRIBED SPECIFICATIONS"

- Address, and "THIS END UP" label on top of the cooler.

5.3.11 Complete Shippers Declaration for Dangerous Goods per attached example (see Attachment 7.2). A separate declaration must be completed for each "shipment" totaling 40 liters. Give declaration(s) to driver or shipper.

5.3.12 Ship samples to the attention of:

"Laboratory Samples"
Laboratory Address

5.3.13 Document activities related to shipping in a field logbook. This should include:

- Method of transportation such as Federal Express or UPS.

- Include the freight bill number and a copy of the invoice.

- Number of coolers and associated Chain-of-Custody forms.

IMPORTANT: Before samples are relinquished, record date and time on Chain-of-Custody and obtain the signature if the person to whom samples will be relinquished (see Procedure No. TP-8-001, Project Custody Documentation, Reference 3.0).

5.3.14 Shipping by Public Carrier

Place the Chain-of-Custody inside a Ziploc bag and tape it inside of the cooler lid if the cooler is being shipped by a public carrier such as Federal Express or UPS.

IMPORTANT: Record date, time and name of carrier that samples will be relinquished to public carrier and note the carrier on the completed Chain-of-Custody before sealing it in the cooler (see Procedure No. TP-8-001, Project Custody Documentation, Reference 3.0).

5.4 Shipment of Hazardous Equipment by a Public Carrier

The only hazardous equipment that might be shipped is the HNU and/or OVA and its compressed hydrogen gas fuel (OVA) and calibration gas. If OVAs or OVA hydrogen tanks are to be shipped, use the procedure set out in Attachment 7.3 of Procedure No. TP-12-002, Foxboro Organic Vapor Analyzer (Reference 3.0).

5.4.1 Shipment of HNU with Compressed Calibration Gas

All HNU's should be shipped in their cases, secured with tape to minimize any shipping damage. To provide appropriate identification, certain labeling requirements should be followed by the HDR personnel responsible for shipping the HNU. These labeling requirements are:

- One "Non-Flammable Gas" label (green and white label).
- One "Danger" label (orange and black label).
- A label indicating "Inside Packages Comply with Prescribed Specifications" on the case.
- A label no smaller than one (1) inch in size with "UN1956" written in a bold and clear manner.
- A label no smaller than one (1) inch in size with "Compressed Gas N.O.S." written on it in a bold and clear manner.
- Complete Shippers Declaration for Dangerous Goods per attached example (see Attachment 7.3). Give declaration(s) to driver or shipper.

6.0 QA RECORDS

- Field log books
- Field data sheets and records, if required by Project

7.0 ATTACHMENTS

7.1 Attachment 7.1 - Materials Checklist

7.2 Attachment 7.2 - Shipping Container Label Placement for Shipment of "Environmental Sample" and "Hazardous Material Samples" Class Samples.

7.3 Attachment 7.3 - Example for Hazardous Material Samples "Shipper's Declaration for Dangerous Goods".

ATTACHMENT 7.1

MATERIALS CHECKLIST

_______ Duct Tape

_______ Packing Tapes

_______ Custody Seals

_______ Metal Cans

_______ Coolers

_______ Ice (10 lbs. min.)

_______ Permanent Markers

_______ Mailing Labels

_______ Vermiculite

_______ Ziploc Bags (gallon and pint sizes)

_______ Labels:

Up Arrows
"This End Up"
"Other Regulated Substances, UN#8027, Class #9
"Inside Packages Comply with Prescribed Specifications"
"Cargo Aircraft Only"

_______ Shipping Form (i.e. Federal Express)

_______ Dangerous Goods Form (i.e. Federal Express)

_______ Dangerous Goods Shipping Form (General)

APPENDIX B
QUANTITATIVE LIMITS

APPENDIX B QUANTITATIVE LIMITS

APPENDIX B.1 REPORTING LIMITS

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Table B.1.2 Reporting Limits and NYSDEC Groundwater Standards and Guidance Values

APPENDIX B.1
REPORTING LIMITS

B.1 Laboratory Reporting Limits (RLs)

Laboratory Method Detection Limits (MDLs) for all analyses to be performed under the FSP/QAPP were compared with EPA Region IX Preliminary Remediation Goals (PRGs) (EPA 1999) to ensure adequate method sensitivity. The following decision process was used for soil and water samples:

1. EPA Region IX PRGs for tap water were used for water samples. EPA Region IX PRGs for industrial soils were used for soil samples.
2. The RLs were compared to the PRGSs. If the RL for a chemical did not exceed the PRGS, the RL was considered to meet the PRG. If the RL exceeded either screening level, then the MDL was compared to the PRG. The MDL was used because the laboratory can quantify (qualified as estimated "J") concentrations down to the MDL and data qualified "J" can be used in the risk assessment.
3. The MDL for a chemical was compared with the EPA Region IX PRG. If the MDL for a chemical did not exceed the PRG, the MDL was considered to meet the PRG.
4. If the MDL exceeded the PRG, a decision was made as to whether the chemical was considered a "critical" COPC.

Table B.1.1 shows the RLs and MDLs for VOCs in soil and water analyzed for by SW-846 Method 8260B. The MDLs and RLs for all chemicals in soil meet the PRGSs. For water samples, the MDLs for eight chemicals (chloroform, 1,2-dibromomethane, dibromochloromethane, 1,2-dichloroethane, 1,1-dichloroethene, trans-1,3-dichloropropene, 1,1,2,2-tetrachloroethane, and vinyl chloride) exceeded the PRGSs.

Table B.1.2 shows the RLs and MDLs for SVOCs in soil and water analyzed for by SW-846 Method 8270C. The MDLs for all chemicals in soil meet the PRGSs. For water samples, the MDLs for several chemicals (e.g., carcinogenic PAHs, 2-chlorophenol, 3,3-dichlorobenzidine, hexachlorobenzene, and hexachlorobutadiene) exceed the PRGSs.

The selected analytical methods (e.g. 8270 for SVOCs) are the most commonly used methods due to the range of compounds that can be identified and the superior qualitative identification capabilities of the selected methods. While other analytical methods with lower MDLs and RLs are available, they have limitations that could detract from data usability. For VOCs, method 504 for drinking water may be able to achieve lower MDLs for chemicals such as vinyl chloride (i.e., those chemicals on the drinking water list). However, the shallow groundwater at the site is not used for domestic purposes (i.e., drinking, bathing).

- Therefore, the proposed methods will be considered appropriate for this phase of the investigation. The contract laboratory will make every effort to reach the lowest detection limits possible.

TABLE B.1.1
Reporting Limits and NYSDEC Recommended Soil Cleanup Objectives

Compound	MDL, ppb	TAGM #4046 Rec. Soil Cleanup Objective, ppm
Volatiles		
1,1,1-Trichloroethene	1.032	0.80
1,1,1,2-Tetrachloroethane	1.119	N/A
1,1,2,2-Tetrachloroethane	1.009	0.60
1,1,2-Trichloro-1,2,2-trifluoroethane	1.162	6.00
1,1,2-Trichloroethane	1.144	N/A
1,1-Dichloroethane	0.949	0.20
1,1-Dichloroethene	1.123	0.40
1,1-Dichloropropene	1.276	N/A
1,2,3-Trichloropropane	1.48	0.40
1,2,3-Trichlorobenzene	1.856	N/A
1,2,4-Trichlorobenzene	1.45	3.40
1,2,4-Trimethylbenzene	1.432	N/A
1,2-Dibromo-3-chloropropane	1.003	N/A
1,2-Dibromoethane	1.007	N/A
1,2-Dichlorobenzene	0.893	7.90
1,2-Dichloroethane	1.11	0.10
1,2-Dichloropropane	0.781	N/A
1,3,5-Trimethylbenzene	1.333	N/A
1,3-Dichlorobenzene	1.037	1.60
1,3-Dichloropropane	1.002	0.30
1,4-Dichlorobenzene	0.838	8.50
2-Butanone	5.384	0.30
2-Chloroethyl vinyl ether	1.376	N/A
2-Chlorotoluene	1.678	N/A
2-Hexanone	5.984	N/A
2,2-Dichloropropane	0.844	N/A
4-Chlorotoluene	1.381	N/A
4-Methyl-2-pentanone	4.009	1.00
Acetone	3.547	0.20
Acrolein	6.709	N/A
Acrylonitrile	7.554	N/A
Benzene	1.021	0.06
Bromobenzene	0.876	N/A
Bromochloromethane	1.128	N/A
Bromodichloromethane	0.813	N/A
Bromoform	1.066	N/A
Bromomethane	1.026	N/A
Carbon Disulfide	1.261	2.70
Carbon tetrachloride	2.057	0.60
Chlorobenzene	1.057	1.70
Chloroethane	1.263	1.90

TABLE B.1.1 (continued)
Reporting Limits and NYSDEC Recommended Soil Cleanup Objectives

Compound	MDL, ppb	TAGM #4046 Rec. Soil Cleanup Objective, ppm
Volatiles (continued)		
Chloroform	0.95	0.30
Chloromethane	1.737	N/A
cis-1,3-Dichloropropene	0.878	N/A
cis-1,2-Dichloroethene	0.883	N/A
Cyclohexane	1.337	N/A
Dibromochloromethane	0.862	N/A
Dibromofluoromethane	2.703	N/A
Dibromomethane	1.018	N/A
Dichlorodifluoromethane	0.85	N/A
Diethyl Ether	0.744	N/A
Ethyl Benzene	1.045	5.50
Hexachlorobutadiene	2.533	N/A
Isopropylbenzene	1.12	N/A
Isopropyl Alcohol	1.006	N/A
Methylene Chloride	1.282	0.10
Methyl Acetate	1.083	N/A
Methyl tert-Butyl Ether	0.916	N/A
Methylcyclohexane	0.955	N/A
m/p-Xylenes	2.76	1.20
Naphthalene	1.195	N/A
n-propylbenzene	1.315	N/A
n-butylbenzene	1.225	N/A
o-Xylene	1.059	1.20
p-Isopropyltoluene	2.435	N/A
sec-Butylbenzene	1.833	N/A
Styrene	1.415	N/A
Tetrachloroethene	1.186	1.40
Toluene	1.108	1.50
trans-1,2-Dichloroethene	1.059	N/A
trans1,3-dichloropropene	1.015	0.30
Trichloroethene	0.985	0.70
Trichlorofluromethane	1.277	N/A
tert-Butylbenzene	1.667	N/A
Tert butyl alcohol	4.218	N/A
Vinyl Acetate	4.553	N/A
Vinyl choloride	0.956	0.20
Semivolatiles		
1,2,4-Trichlorobenzene	39.6	N/A
1,2-Dichlorobenzene	33	N/A
1,3-Dichlorobenzene	39.6	N/A

TABLE B.1.1 (continued)
Reporting Limits and NYSDEC Recommended Soil Cleanup Objectives

Compound	MDL, ppb	TAGM #4046 Rec. Soil Cleanup Objective, ppm
Semivolatiles (continued)		
1,4-Dichlorobenzene	33	N/A
2,2'-oxybis(1-chloropropane)	33	N/A
2,4,5-Trichlorophenol	33	0.10
2,4,6-Trichlorophenol	33	N/A
2,4-Dichlorophenol	42.9	0.40
2,4-Dimethylphenol	75.9	N/A
2,4-Dinitrophenol	66	0.20
2,4-Dinitrotoluene	36.3	N/A
2,6-Dinitrotoluene	33	1.00
2-Chloronaphthalene	39.6	N/A
2-Chlorophenol	36.3	0.80
2-Methylnaphthalene	39.6	36.40
2-Methylphenol	33	0.10
2-Nitroaniline	33	0.43
2-Nitrophenol	36.3	0.33
3,3'-Dichlorobenzidine	33	N/A
3-Nitroanoline	39.6	0.50
3+4-Methylphenols	59.4	N/A
4,6-Dinitro-2-methylphenol	39.6	N/A
4-Bromophenyl-phenylether	42.9	N/A
4-Chloro-3-methylphenol	36.3	0.24
4-Chloroaniline	39.6	0.22
4-Chlorophenyl phenyl ether	39.6	N/A
4-Nitroaniline	79.2	N/A
4-Nitrophenol	36.3	0.10
Acenaphthene	39.6	50.00
Acenaphthylene	39.6	41.00
Anthracene	42.9	50.00
Azobenzene	46.2	N/A
Benz[a]anthracene	33	0.224
Benzo[a]pyrene	49.5	0.061
Benzo[b]fluoranthene	33	1.10
Benzo[g,h,i]perylene	42.9	50.00
Benzo[k]flouranthene	85.8	1.10
Benzoic acid	33.5	N/A
Benzyl Alcohol	33	N/A
bis(2-Chloroethoxy)methane	33	N/A
bis(2-Chloroethyl)ether	39.6	N/A
Bis(2-Ethylhexyl)phthalate	33	50.00

TABLE B.1.1 (continued)
Reporting Limits and NYSDEC Recommended Soil Cleanup Objectives

Compound	MDL, ppb	TAGM #4046 Rec. Soil Cleanup Objective, ppm
Semivolatiles (continued)		
Butylbenzylphthalate	33	50.00
Chrysene	52.8	0.40
Dibenzofuran	33	6.20
Dibenzo[a,h]anthracene	49.5	0.014
Diethylphthalate	33	7.10
Dimethylphthalate	33	2.00
Di-n-butyl phthalate	39.6	8.10
Di-n-octyl phthalate	49.5	50.00
Fluorene	36.3	50.00
Fluoranthene	33	50.00
Hexachlorobenzene	36.3	0.41
Hexachlorobutadiene	49.5	N/A
Hexachlorocyclopentadiene	125.4	N/A
Hexachloroethane	36.3	N/A
Indeno[1,2,3-cd]pyrene	52.8	3.20
Isophorone	33	4.40
Naphthalene	39.6	13.00
Nitrobenzene	33	0.20
n-Nitroso-di-n-propylamine	33	N/A
n-nitrosodiphenylamine	66	N/A
Pentachlorophenol	62.7	1.00
Phenanthrene	33	50.00
Phenol	33	0.03
Pyrene	33	50.00

Note:
MDL - Method Detection Limit
N/A – Not Available

TABLE B.1.2
Reporting Limits and NYSDEC Groundwater Standards and Guidance Values

Compound	MDL, ppb	NYS Ambient water quality standards and guidance values	
		Standard, µg/L	Guidance Value, µg/L
Volatiles			
1,1,1-Trichloroethane	0.752	5	N/A
1,1,1,2-Tetrachloroethane	0.638	5	
1,1,2,2-Tetrachloroethane	0.704	5	N/A
1,1,2-Trichloro-1,2,2-trifluoroethane	0.869	5	N/A
1,1,2-Trichloroethane	0.624	1	N/A
1,1-Dichloroethane	0.658	5	N/A
1,1-Dichloroethene	0.69	5	N/A
1,1-Dichloropropene	2.988	5	N/A
1,2,3-Trichloropropane	1.027	0.04	N/A
1,2,3-Trichlorobenzene	1.054	5	N/A
1,2,4-Trichlorobenzene	1.289	N/A	10
1,2,4-Trimethylbenzene	0.825	5	N/A
1,2-Dibromo-3-chloropropane	0.914	0.04	N/A
1,2-Dibromoethane	0.629	N/A	N/A
1,2-Dichlorobenzene	0.88	3	N/A
1,2-Dichloroethane	0.564	0.6	N/A
1,2-Dichloropropane	0.727	1	N/A
1,3,5-Trimethylbenzene	0.968	5	N/A
1,3-Dichlorobenzene	0.738	3	N/A
1,3-Dichloropropane	0.567	5	N/A
1,4-Dichlorobenzene	0.928	3	N/A
2,2-Dichloropropane	0.627	5	N/A
2-Butanone	2.313	N/A	N/A
2-Chloroethyl vinyl ether	2.148	N/A	N/A
2-Chlorotoluene	0.845	5	N/A
2-Hexanone	0.597	N/A	50
4-Chlorotoluene	1.02	5	N/A
4-Methyl-2-pentanone	0.807	N/A	N/A
Acetone	3.521	N/A	50
Acrolein	4.865	5	N/A
Acrylonitrile	3.518	5	N/A
Benzene	0.705	1	N/A
Bromobenzene	0.603	5	N/A
Bromochloromethane	0.913	5	N/A
Bromodichloromethane	0.732	N/A	50
Bromoform	0.492	N/A	50
Bromomethane	0.383	5	N/A
Carbon Disulfide	0.72	N/A	N/A
Carbon tetrachloride	0.468	5	N/A
Chlorobenzene	0.784	5	N/A
Chloroethane	2.422	5	N/A

TABLE B.1.2 (continued)
Reporting Limits and NYSDEC Groundwater Standards and Guidance Values

Compound	MDL, ppb	NYS Ambient water quality standards and guidance values	
		Standard, µg/L	Guidance Value, µg/L
Volatiles (continued)			
Chloroform	0.613	7	N/A
Chloromethane	0.54	N/A	N/A
cis-1,3-Dichloropropene	0.664	0.4	N/A
cis-1,2-Dichloroethene	0.616	5	N/A
Cyclohexane	0.981	N/A	N/A
Dibromochloromethane	0.656	N/A	50
Dibromofluoromethane	3.541	N/A	N/A
Dibromomethane	0.606	5	N/A
Dichlorodifluoromethane	0.705	5	N/A
Diethyl Ether	0.569	N/A	N/A
Ethyl Benzene	0.756	5	N/A
Hexachlorobutadiene	0.938	0.50	N/A
Isopropyl Alcohol	0.676	N/A	N/A
Isopropylbenzene	0.748	5	N/A
Methyl Acetate	0.748	N/A	N/A
Methylene Chloride	1.755	5	N/A
Methyl tert-Butyl Ether	1.047	N/A	N/A
Methylcyclohexane	0.669	N/A	N/A
Naphthalene	0.906	N/A	N/A
n-Butylbenzene	1.225	5	N/A
n-propylbenzene	0.795	5	N/A
o-Xylene	0.72	N/A	N/A
p-Isopropyltoluene	1.089	N/A	N/A
sec-Butylbenzene	0.963	5	N/A
Styrene	0.921	5	N/A
tert-Butylbenzene	0.937	5	N/A
Tetrachloroethene	0.702	5	N/A
Toluene	0.71	5	N/A
trans-1,2-Dichloroethene	0.81	5	N/A
trans1,3-dichloropropene	0.659	0.4	N/A
Trichloroethane	0.716	5	N/A
Trichlorofluromethane	0.728	5	N/A
Tert butyl alcohol	4.017	N/A	N/A
Vinyl Acetate	2.619	N/A	N/A
Vinyl choloride	0.789	2	N/A
Semivolatiles			
1,2,4-Trichlorobenzene	1.2	5	N/A
1,2-Dichlorobenzene	1	3	N/A
1,3-Dichlorobenzene	1.2	3	N/A
1,4-Dichlorobenzene	1	3	N/A

TABLE B.1.2 (continued)
Reporting Limits and NYSDEC Groundwater Standards and Guidance Values

Compound	MDL, ppb	NYS Ambient water quality standards and guidance values	
		Standard, µg/L	Guidance Value, µg/L
Semivolatiles (continued)			
2,2'-oxybis(1-chloropropane)	1	N/A	N/A
2,4,5-Trichlorophenol	1	N/A	N/A
2,4,6-Trichlorophenol	1	N/A	N/A
2,4-Dichlorophenol	1.3	(1)	N/A
2,4-Dimethylphenol	2.3	N/A	50
2,4-Dinitrophenol	2	N/A	10
2,4-Dinitrotoluene	1.1	5	N/A
2,6-Dinitrotoluene	1	5	N/A
2-Chloronaphthalene	1.2	N/A	10
2-Chlorophenol	1.1	N/A	N/A
2-Methylnaphthalene	1.2	N/A	N/A
2-Methylphenol	1	N/A	N/A
2-Nitroaniline	1	5	N/A
2-Nitrophenol	1.1	N/A	N/A
3,3'-Dichlorobenzidine	1	5	N/A
3+4-Methylphenols	1.8	N/A	N/A
3-Nitroanoline	1.2	5	N/A
4,6-Dinitro-2-methylphenol	1.2	N/A	N/A
4-Bromophenyl phenyl ether	1.3	N/A	N/A
4-Chloro-3-methylphenol	1.1	N/A	N/A
4-Chloroaniline	1.2	5	N/A
4-Chlorophenyl phenyl ether	1.2	N/A	N/A
4-Nitroaniline	2.4	5	N/A
4-Nitrophenol	1.1	N/A	N/A
Acenaphthene	1.2	N/A	20
Acenaphthylene	1.2	N/A	N/A
Anthracene	1	N/A	50
Azobenzene	1.4	5	N/A
Benzoic acid	1	N/A	N/A
Benzo[a]anthracene	1	N/A	0.002
Benzo[a]pyrene	1.5	ND	N/A
Benzo[b]flouranthene	1	N/A	0.002
Benzo(g,h,I)perylene	1.3	N/A	N/A
Benzo[k]flouranthene	2.6	N/A	0.002
Benzyl Alcohol	1	N/A	N/A
bis(2-Chloroethoxy) methane	1	N/A	N/A
bis(2-Chloroethyl) ether	1.2	N/A	N/A
Bis(2-Ethylhexyl)phthalate	1	5	N/A
Butylbenzylphthalate	1	N/A	50
Chrysene	1.6	N/A	0.002

TABLE B.1.2 (continued)
Reporting Limits and NYSDEC Groundwater Standards and Guidance Values

Compound	MDL, ppb	NYS Ambient water quality standards and guidance values	
		Standard, µg/L	Guidance Value, µg/L
Semivolatiles (continued)			
Dibenz[a,h]anthracene	1.5	N/A	N/A
Dibenzofuran	1	N/A	N/A
Diethylphthalate	1	N/A	50
Dimethylphthalate	1	N/A	50
Di-n-butylphthalate	1.2	50	N/A
Di-n-octyl phthalate	1.5	N/A	50
Fluoranthene	1	N/A	50
Fluorene	1.1	N/A	50
Hexachlorobenzene	1.1	N/A	0.04
Hexachlorobutadiene	1.5	0.5	N/A
Hexachlorocyclopentadiene	3.8	5	N/A
Hexachloroethane	1.1	5	N/A
Indeno[1,2,3-cd]pyrene	1.6	N/A	0.002
Isophorone	1	N/A	50
Naphthalene	1.2	N/A	10
Nitrobenzene	1	0.4	N/A
n-Nitroso-di-n-propylamine	1	N/A	N/A
n-Nitrosodiphenylamine	2	N/A	50
Pentchlorophenol	1.9	(1)	N/A
Phenanthrene	1	N/A	50
Phenol	1	(1)	N/A
Pyrene	1	N/A	50

Note:
(1) NYS Water Quality Standard for total of all phenolic compounds is 1 mg/L
MDL - Method Detection Limit
N/A – Not Available
ND – Non-Detect

PART C

FINAL

PROJECT SPECIFIC HEALTH AND SAFETY PLAN

FOR

REMEDIAL INVESTIGATION WORK PLAN

HALSTEAD QUINN OIL STORAGE TERMINAL FACILITY

79–91 ALEXANDER STREET

YONKERS, NEW YORK

Site # B00193-3

Dates in Effect
October 2003 to July 2004

Henningson, Durham & Richardson
Architecture and Engineering, P.C.
711 Westchester Avenue
White Plains, New York 10604

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SITE SPECIFIC HEALTH & SAFETY PLAN:
TITLE PAGE
Henningson, Durham & Richardson Architecture and Engineering, P.C.

PROJECT NAME: Remedial Investigation Work Plan	PROJECT CLIENT: Yonkers Alexander Street Redevelopment, Inc. (YASR)
JOB SITE ADDRESS: 79 – 91 Alexander Street, Yonkers, NY	JOB NUMBER: 11841-002-147
PROJECT MANAGER: Joyce Mariani, HDR	PHONE NO.: (914) 993-2016
SITE CONTACT: Noemi Castillo, HDR	PHONE NO.: (914) 993-2034

( ) AMENDMENT NO. 0

OBJECTIVES OF FIELD WORK.

Perform a remedial investigation at the site.
Field Activities Include:

1. Collect supplemental subsurface soil samples to investigate potential environmental contamination.
2. Install a monitoring well and collect a supplemental groundwater sample.
3. Install temporary monitoring wells and collect groundwater samples.
4. Collect groundwater samples from Geoprobe locations.
5. Collect water sample from oil/water separator
6. Measure the groundwater level at all groundwater sampling locations.
7. Measure the thickness of free product, if any, at the permanent and temporary groundwater monitoring well locations.
8. UST Removal.
9. Drum sampling to determine the contents for proper disposal.
10. Conduct a demolition asbestos and lead and lead based paint inspection of site structures.

SITE TYPE: *Check as many as applicable*

( ) Active	( ) Landfill	( ) Natural
(X) Inactive	( ) Uncontrolled	( ) Military
(X) Secure	**(X) Industrial**	( ) Other specify:
( ) Unsecured	( ) Residential	
(X) Enclosed space	( ) Well Field	

DESCRIPTION AND FEATURES: *Summarize below. Include principal operations and unusual features (containers, buildings, dikes, power lines, hills, slopes, rivers)*

The site is an urban location in the City of Yonkers, NY. A brief description of the site is provided:

Site Description

The site is located on the east bank of the Hudson River in Yonkers, New York. The site is listed on Tax Section 2 as Block 2610, Lots 18, 22, 30 and 35. According to the Phase I Report, the site is approximately 2.8 acres. The site is bordered by the Hudson River on the west, Ashburton Avenue on the north, Alexander Street on the east and an industrial property on the south.

The site was formally used as a Major Oil Storage Facility (MOSF) containing 16 registered aboveground storage tanks (ASTs) that were used to store a total capacity of 5,093,000 gallons of diesel and fuel oil. Fifteen (15) of the ASTs, AST Tank #1 through #16 (AST Tank #3 does not exist), were located in a secondary containment area consisting of a concrete wall and Claymax lined bottom under at least six of the ASTs. The 15 ASTs, along with piping within the containment area, were surveyed for lead-based paint. Five of the ASTs tested positive for lead-based paint. In addition, all green piping located within the AST containment area and attached to the fuel fill racks also tested positive for lead. These 15 ASTs were drained and cleaned in August 2003 and demolished in September 2003 for the purpose of this investigation. One 275-gallon AST, registered and believed to be containing waste oil, is located next to the garage/warehouse building. One AST assumed to be 1,000 gallons and one AST assumed to be 550 gallons are located in the boiler house along the northern perimeter of the property. Neither of these tanks are registered and their contents are unknown. An additional AST assumed to be 550 gallons is located in the foam house along the eastern border of the property, has unknown contents and is unregistered.

The site is occupied by four buildings totaling approximately 5,000 square feet. The buildings include a warehouse/maintenance garage, a dispatch office, a fire suppression foam pumphouse, and an inactive boiler building. The buildings are single story, except for a section of the warehouse/maintenance garage that has a second floor office space (not in use). The buildings are brick and concrete block structures with no basements.

The site contained four truck drive-through fuel-fill racks and vehicle fuel dispensers. The rack areas were covered with corrugated metal roofs and are fully bermed with asphalt. The fuel-fill racks and vehicle fuel dispensers were demolished in September 2003. Catch basins located inside the bermed areas discharge to an oil-water separator that was permitted for discharge to the Hudson River. Since the closing of the site as a MOSF, the valves to discharge to the Hudson River were closed at the request of the NYSDEC.

A barge loading dock with four 8-inch diameter pipelines extends approximately 100 feet out into the Hudson River. The four 8-inch diameter pipelines were drained in August 2003 and were removed from the site in September 2003. An approximate 50-gallon capacity catch basin is located under the pipe header to contain minor spills. A guard/monitoring house is at the end of the dock from where vessel to tank farm fueling operations were formerly monitored.

There are six groundwater monitoring wells, three 3-foot diameter recovery wells, and two stormwater sumps/containment sumps on site (see Figure 2). One monitoring well was installed upgradient of the tank farm. Several monitoring wells and one recovery well were installed as a result of a 1989 #6 fuel oil spill (spill #8912251). Two additional recovery wells and four monitoring wells were installed in 1998 as a result of a pipe leak in which approximately 10,375 gallons of #2 fuel oil was released (spill #9801901). These recovery wells are not currently in use. A Scavenger Recovery System was previously used to recover product from the groundwater table at these recovery wells. Recovered product was pumped into a tank truck. The two stormwater sumps/containment sumps are located inside the containment area.

SURROUNDING POPULATION: ( ) Residential **(X) Industrial** ( ) Rural **(X) Urban** **(X) Commercial** ( ) Other:

SITE SPECIFIC HEALTH & SAFETY PLAN
SITE LOCATION PLAN/SITE SKETCH
Hennngson, Durham & Richardson Architecture and Engineering, P.C.

Site location map follows as Figure 1.

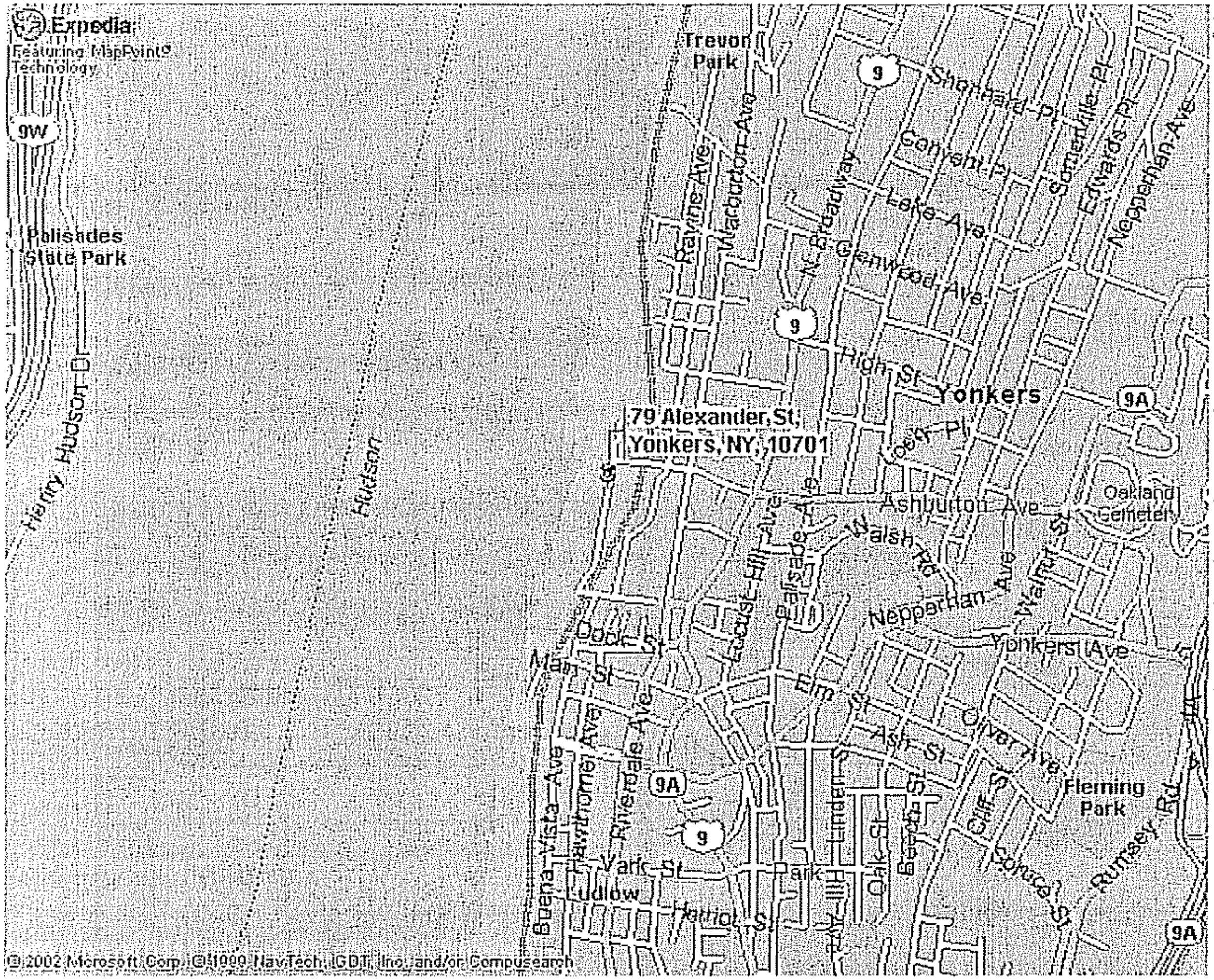


Figure 1

SITE SPECIFIC HEALTH & SAFETY PLAN
EMERGENCY CONTACTS AND APPROVAL PAGE
Henningson, Durham & Richardson Architecture and Engineering, P.C.

EMERGENCY CONTACTS		
EPA Region II		(800) 227-8917
State DEC Office		(518) 402-8559
Site Telephone		None
Poison Control Center		(800) 522-6337
Continuum Health Care (Occupational Health Management)		1-800-229-3674 (ext. 440)

EMERGENCY CONTACTS	NAME	PHONE
Project Manager	Joyce Mariani	(914) 993-2016
Health and Safety Officer (HSO)	Noemi Castillo	(914) 993-2034
Other (specify)		
National Response Center		1-800-424-8802
State Spill		845-256-3000
Fire Department		911
Police Department		911
Nearest Hospital Emergency Room Number:	Yonkers General Hospital	914-964-7300
Number of 24-Hour Ambulance:		911

1. Evacuation Routes will be specified by the HSO and communicated to all personnel on site.
2. Personnel will evacuate under conditions specified by air monitoring or as directed by the HSO.
3. An INCIDENT REPORT form will be completed for all accidents (see Appendix A).

QA REVIEW: ______________________ Date:
HDR Office Safety Coordinator

The route to hospital is described on the following page and includes a map.

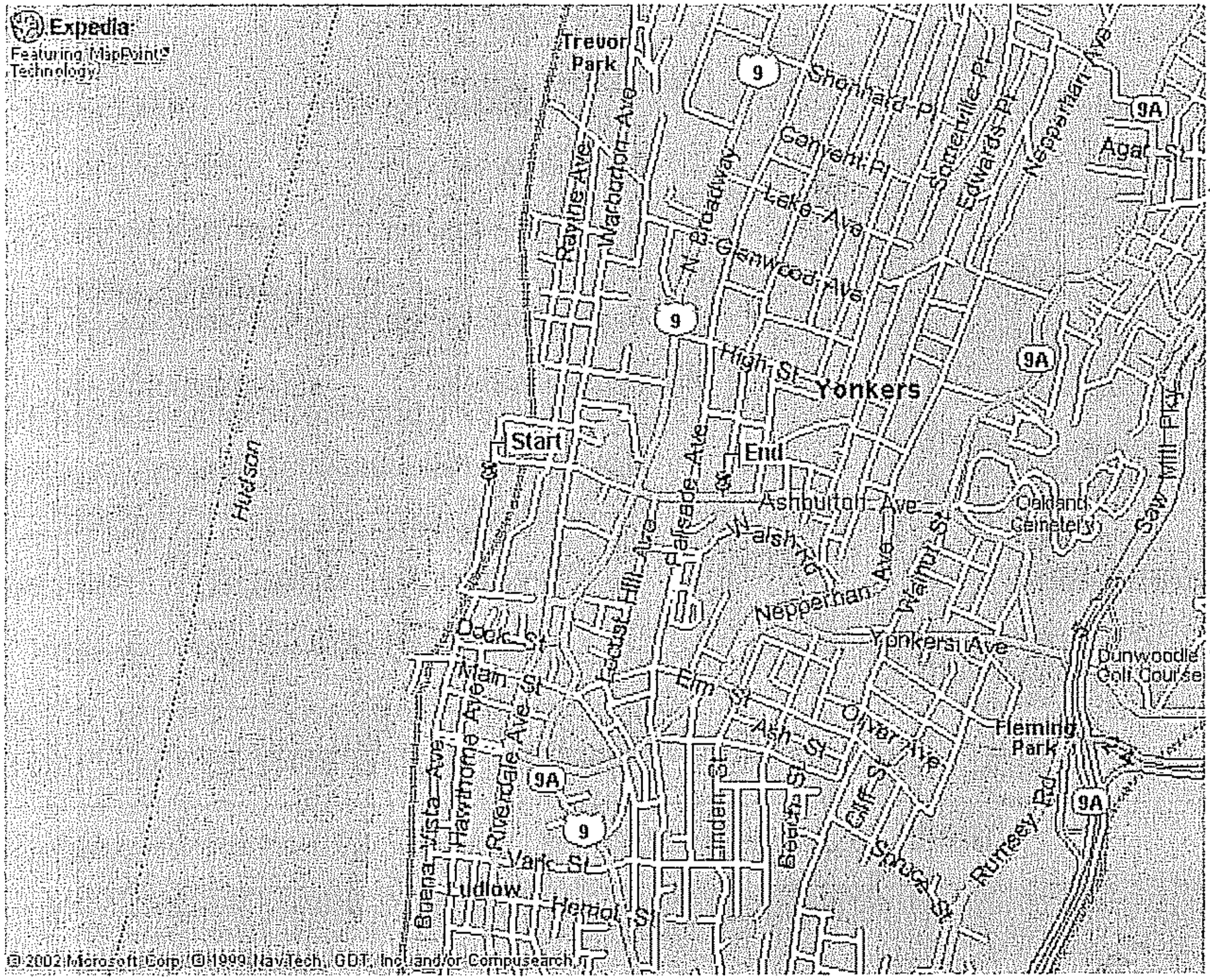
HEALTH AND SAFETY PLAN APPROVALS

Project Manager: ______________________ Date

Site Health and Safety Officer ______________________ Date:

SITE SPECIFIC HEALTH & SAFETY PLAN
HOSPITAL MAP ROUTE
Henningson, Durham & Richardson Architecture and Engineering, P.C.

Directions to Yonkers General Hospital from the site: From 79 Alexander Street, go north on Alexander Street to Ashburton Avenue, make a right and go east on Ashburton Avenue. Proceed to the second light. Turn left and go north on Park Avenue. Hospital is on right on Park Avenue near the intersection of Ashburton and Park Avenues. Hospital Address: 2 Park Avenue Yonkers, NY 10703.



SITE SPECIFIC HEALTH & SAFETY PLAN
HISTORY AND WASTE CHARACTERIZATION PAGE
Henningson, Durham & Richardson Architecture and Engineering, P.C.

HISTORY: Summarize site specific information below or attach information behind this page.

WASTE TYPES: **(X) Liquid (X) Solid (X) Sludge** ( ) Gas ( ) Unknown ( ) Other specify:

WASTE CHARACTERISTICS: Check as many as applicable.

( ) Corrosive **(X) Flammable** ( ) Radioactive

(X) Toxic (X) Volatile ( ) Reactive

( ) Inert Gas ( ) Unknown ( ) Other specify:

WORK ZONES: Describe how the Exclusion, Contamination Reduction, and Support Zones will be delineated in terms that on-site personnel will recognize. Work zones will be shown on "WORK ZONE MAP PAGE."

1. Exclusion zone will be considered to be within 20 feet of the sampling location.

HAZARDS OF CONCERN: Check as many as applicable.

(X) Heat Stress attach guidelines See HDR H&S Pro #28

(X) Noise See HDR H&S Pro #26

(X) Cold Stress attach guidelines See HDR H&S Pro #29

(X) Inorganic Chemicals

(X) Explosive/Flammable

(X) Organic Chemicals

( ) Oxygen Deficient

(X) Motorized Traffic

( ) Radiological

(X) Drill Rigs See HDR H&S Pro #37

( ) Biological See HDR H&S Pro #34

(X) Slips, Trips & Falls See HDR H&S Pro #3

(X) Other specify:
First Aid/CPR See HDR H&S Pro #30
Asbestos See HDR H&S Pro #10
Air Monitoring See HDR H&S Pro #25
Personal Protective Equipment See HDR H&S Pro #21
CONFINED SPACES WILL NOT BE ENTERED.
(If confined spaces are to be entered a specific confined space entry plan will be developed)

PRINCIPAL DISPOSAL METHODS AND PRACTICES: Summarize Site Specific Conditions Procedures Below:

Investigative Derived Wastes (IDW) generated during field sampling activities will be containerized pending waste characterization and proper disposal. Types of IDW that may be generated include:

Aqueous

- Decontamination fluids from small tool and large equipment decontamination activities.
- Groundwater purged during development and sampling of groundwater monitoring wells.

All decontamination fluids and purged groundwater will be containerized in 55-gallon drums

Solid

- Soil cuttings at monitoring well installations.
- Leftover soil sample material from direct-push soil sampling activities.

Soil IDW will be containerized in 55-gallon drums.

All drums will be labeled as presented in technical procedure TP-8-002, Drum Labeling, in Appendix A of the FSP/QAPP.

All field refuse including gloves, used personal protective equipment, paper towels, plastic bags, and other general refuse will be disposed. A subjective determination will be made in the field as to the condition of the refuse. Most refuse will have little potential for contamination and will be double-bagged and disposed of in a solid waste receptacle. If gross contamination of any refuse is suspected, it will be containerized in a 55-gallon drum until the completion of field work, at which time it will be disposed of at a proper treatment, storage, or disposal facility. It is not anticipated that any refuse will require containerization based on the type of sampling planned for the site, the type and quantity of refuse likely to be generated, and the general decontamination and housekeeping practices to be used during field sampling.

IDW Characterization

At the completion of all fieldwork at the site, the aqueous and solid IDW will be sampled for waste characterization to determine proper disposal actions. The analyses that will be completed on the soil for waste characterization are shown in the table on the following page. Based on the results of the waste characterization sampling of stockpiled soils, the soils will be disposed of in a manner consistent with all applicable federal, state, and local regulations.
If the aqueous IDW is found to be non-characteristic, a suitable location for the disposal of the water will be determined at the direction of the YASR. This location may include an active oil/water separator, a sanitary sewer, or another location to allow discharge and evaporation of the water. If a suitable location is not available for the water disposal, or if the water is found to be characteristic, arrangements will be made at that time to dispose of the water at a suitable off-site location.

SITE SPECIFIC HEALTH & SAFETY PLAN
HAZARDOUS MATERIAL SUMMARY PAGE
Henningson, Durham & Richardson Architecture and Engineering, P.C.

HAZARDOUS MATERIAL SUMMARY: **Underline and bold waste type** and estimate amounts by category (if possible)

CHEMICALS Amounts/Units:	SOLIDS Amounts/Units:	SLUDGES Amounts/Units:	SOLVENTS Amounts/Units:	OILS Amounts/Units:	OTHER Amounts/Units:
Acids	Flyash	**Paint (Potential)**	Halogenated (chloro, bromo) Solvents	**Oily Wastes (Potential)**	Laboratory
Pickling Liquors	**Asbestos**	Pigments	**Hydrocarbons**	**Gasoline (Potential)**	Pharmaceutical
Caustics	Milling/Mine Tailings	Metal Sludges	Alcohols	**Diesel Oil (Potential)**	Hospital
Pesticides	Ferrous Smelter	POTW Sludge	Ketones	**Lubricants**	Radiological
Dyes/Inks	Non-ferrous Smelter	Aluminum	Esters	PCBs	Municipal
Cyanides	**Metals (Potential)**	Distillation Bottoms	Ethers	Polynuclear Aromatics	Construction
Phenols	Other	Other	Other:	Other	Munitions
Halogens	**Specify: Potential lead based paint and asbestos present in structures. Potential metals contamination in soils**	**Specify: Potential lead based paint present in structures.**	**Specify: VOCs and SVOCs found in groundwater and soil samples.**	**Specify: Site is a former MOSF with ASTs and USTs for diesel, gasoline and fuel oil. Existing maintenance garage on-site**	Other
Dioxins					Specify:

OVERALL HAZARD EVALUATION TASKS 1 & 2: ( ) High ( ) Medium **(X) Low** ( ) Unknown (Where tasks have different hazards, evaluate each. Attach additional sheets if necessary)
JUSTIFICATION: Sampling will be conducted using a drill rig. All cuttings and fluids will be contained in 55-gallon drums. There is little potential for dermal exposure under this scenario.
OVERALL HAZARD EVALUATION TASK 3: ( ) High **(X) Medium** ( ) Low ( )
JUSTIFICATION: Potential for exposure to Lead/ Lead based paint during the remedial observation.

FIRE/EXPLOSION POTENTIAL: ( ) High ( ) Medium **(X) Low** ( ) Unknown

BACKGROUND REVIEW: **(X) COMPLETE** ( ) INCOMPLETE

SITE SPECIFIC HEALTH & SAFETY PLAN
CHEMICAL HAZARD TABLE PAGE
Henningson, Durham & Richardson Architecture and Engineering, P.C.

CONTAMINANTS OF CONCERN	HIGHEST OBSERVED CONCENTRATION (specify units and media)	PEL/TLV ppm or mg/m^3 (specify)	IDLH ppm or mg/m^3 (specify)	SYMPTOMS/EFFECTS OF ACUTE EXPOSURE	PHOTOIONIZATION POTENTIAL
Benzene	11 ppb	1 ppm PEL	500 ppm	Irritant, Carcinogen, CNS depressant	
Ethylbenzene	31 ppb	100 ppm PEL	800 ppm LEL	Irritant, CNS depressant	
Toulene	10 ppb	200 ppm PEL	500 ppm	Irritant, Aspiration hazard, CNS depressant	
m-Xylene & p-Xylene	120 ppb	100 ppm PEL	900 ppm	Irritant, Aspiration hazard, CNS depressant	
o-Xylene	30 ppb	100 ppm PEL	900 ppm	Irritant, Aspiration hazard, CNS depressant	
Acenaphthene	720 ppb – soil	NA	NA	Irritant	
Phenanthrene	1900 ppb – soil	NA	NA	Irritant	

NA = Not Available
S = Soil
A = Air
NE = None Established
SW = Surface Water
GW = Groundwater
U = Unknown
T = Tailings
SL = Sludge
W = Waste
D = Drums
SD = Sediment
OFF = Offsite

HAZARD COMMUNICATIONS STANDARD

A notebook containing this Site Specific Health and Safety Plan will be taken to the field with the crew and kept in the vehicle. A current inventory of chemicals to be brought on-site and appropriate MSDSs will accompany these chemicals in the vehicle.

SITE SPECIFIC HEALTH & SAFETY PLAN
TASK DESCRIPTION PAGE
Henningson, Durham & Richardson Architecture and Engineering, P.C.

FIELD ACTIVITIES COVERED UNDER THIS PLAN - **ATTACH ACTIVITY HAZARD ANALYSIS FOR EACH TASK**				HAZARD		
TASK DESCRIPTION/SPECIFIC TECHNIQUE-STANDARD OPERATING PROCEDURES/SITE LOCATION(Attach additional sheets as necessary)	Type	Primary	Contingency	SCHEDULE		
1 Mobilization/ Site Preparation	Intrusive	A B C D	A B C D	Hi	Med	Low
	Non-intrusive	**Modified D**	**Exit Area**			X
2 Remedial Investigation	**Intrusive**	A B C D	A B C D	Hi	Med	Low
	Non-intrusive	**Modified D**	**Exit Area**			X

PERSONNEL AND RESPONSIBILITIES (Include subcontractors) Responsibilities and the reporting organizational structure are described on the following page.

NAME	PHONE	DATE OF LAST TRAINING	DATE OF HEALTH CLEARANCE	RESPONSIBILITIES	ON-SITE? List task numbers
Joyce Mariani	(914) 993-2016	NA	NA	PROJECT MANAGER	No
Stephanie Nakai	(914) 993-2012	August 2003	June 2002	NA	Yes
Noemi Castillo	(914) 993-2034	August, 2003	June, 2002	SITE MANAGER/SITE SAFETY AND HEALTH OFFICER - Alternate	Yes

1. Site Safety and Health Personnel.

The Site Health and Safety Officer (HSO), in conjunction with the Site Coordinator, ensures that the provisions of this HASP are adequate and implemented in the field. The Project Manager is to take all necessary actions to guarantee site safety. Changing field conditions may require decisions to be made concerning adequate protection programs and may require deviations or additions to this HASP. All deviations and/or additions must be documented and approved by the HSO on the DEVIATIONS AND ADDITIONS form, located in Appendix B. Personnel assigned as HSO must be experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120 and this HASP. The HSO is also responsible for conducting site inspections on a regular basis to ensure the effectiveness of this plan.

2. Organizational Structure and Responsibilities.

Briefly describe the responsibilities of all team members and denote the reporting structure.

1. Project Manager
   - a. Overall responsibility for project schedule.
   - b. Develop cost estimates for work identified.
   - c. Identify scope of work and estimate schedule for work.
   - d. Determine the technical/field team.
   - e. Will not be on site.

2. Site Coordinator (reports to "1" when "1" is on-site, otherwise in charge)
   - a. Enforce disciplinary action when unsafe acts or practices occur.
   - b. Grant permission for site access (including visitors, see Appendix C).
   - c. Designate site security.
   - d. Enforce the buddy system.
   - e. Attend all Site pre-entry safety briefings.
   - f. Serve as the facilitator of communications in emergencies.

3. Site Health and Safety Officer (HSO) (Same as "2")
   - a. Maintain daily field log book and a health and safety file for the project.
   - b. Conduct safety meetings.
   - c. Monitor on-site hazards and conditions.
   - d. Enforce safety procedures.
   - e. Designate facilities, and equipment for health and safety.
   - f. Select, dispense, and ensure availability of Personal Protective Equipment (PPE).
   - g. Maintain copies of instrument operation manuals and maintain records of usage and calibration.
   - h. Periodically inspect PPE and ensure proper storage and maintenance.
   - i. Monitor for heat and cold stress.
   - j. Set up decontamination lines, control decontamination, prepare decontamination solutions, and monitor.
   - k. Train employees on emergency procedures and evacuation routes.
   - l. Control entry and exit at the Access Control Points.
   - m. Confirm an employee's suitability for work based on the physician's recommendation.

4. Other On-Site Personnel (report to "2")

SITE SPECIFIC HEALTH & SAFETY PLAN
PPE BY TASK PAGE
Hemingson, Durham & Richardson Architecture and Engineering, P.C.

PROTECTIVE EQUIPMENT: Specify by task. Indicate type and/or material as necessary. Use copies of this sheet if needed.

TASKS: 1 - 2 - 3 - 4 - 5 – 6 **(X) Primary**
LEVEL: A - B - C - **D - Modified** ( ) Contingency

Respiratory: (X) Not Needed
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not Needed
( ) Safety Glasses:
( ) Face Shield:
( ) Goggles:
(X) Hard Hat:
( ) Other:

Boots: ( ) Not Needed
(X) Boots: <u>Leather steel-toed work boots</u>
( ) Over boots:
( ) Rubber:

Protective Clothing: (X) Not Needed
( ) Encapsulated Suit:
( ) Splash Suit:
( ) Apron
( ) Tyvek Coverall:
( ) Saranex Coverall:
( ) Cloth Coverall:
( ) Other:

Gloves: (X) Not Needed
( ) Under gloves:
( ) Gloves:
( ) Over gloves:

( ) Other - specify below:

TASKS: 1 - 2 - 3 - 4 - 5 – 6 **(X) Primary**
LEVEL: A - B - C - **D - Modified** ( ) Contingency

Respiratory: (X) Not Needed
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not Needed
(X) Safety Glasses:
( ) Face Shield:
( ) Goggles:
(X) Hard Hat:
( ) Other:

Boots: ( ) Not Needed
(X) Boots: <u>Leather, steel-toed work boots</u>
( ) Over boots:
( ) Rubber:

* Tyvek-HDR employees are required to bring Tyvek coveralls to the site. It is not believed that the Tyvek will be needed for dermal protection; however, HDR employees are required to evaluate the need for the Tyvek based on the site conditions and don the Tyvek if appropriate or if preferred.

Protective Clothing: (X) Not Needed
( ) Encapsulated Suit:
( ) Splash Suit:
( ) Apron
(X) Tyvek Coverall: OPTIONAL*
( ) Saranex Coverall:
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not Needed
(X) Under gloves: Latex
( ) Gloves:
(X) Over gloves: Chemical Resistant Nitrile (To be worn if gross contamination is present)

(X) Other - specify below:
Ear plugs

SITE SPECIFIC HEALTH & SAFETY PLAN
AIR MONITORING BY TASK PAGE
Henningson, Durham & Richardson Architecture and Engineering, P.C.

MONITORING EQUIPMENT: Specify by task. Indicate type as necessary. Attach additional sheets as necessary.

INSTRUMENT	TASK	ACTION GUIDELINES	COMMENTS (Includes schedules of use)
Combustible Gas Indicator	1 - 2	0-10% LEL — No explosion hazard 10-25% LEL — Potential explosion hazard; notify HSO. **>25% LEL — Explosion hazard; interrupt task/evacuate** 21.0% 02 — Oxygen normal <20.5% 02 — Oxygen deficient; notify HSO. **<19.5% 02 — Interrupt task/evacuate**	**(X) Not Needed**
Radiation Survey Meter	1 - 2	3X Background — Notify SHSC **>2mR/hr — Interrupt task/evacuate**	**(X) Not Needed**
Photo ionization Detector ( ) 11.7 ev **(X) 10.2 ev** ( ) 9.8 ev ( ) ___ ev	1 - 2	**Specify:** If TOTAL VOC's ≥ 5 PPM above background in the breathing zone, sustained for 5 or more minutes, all personnel shall evacuate the site. Contact Project HSO and the site shall be reevaluated after 30 minutes. The HSO will re-enter the site upwind and monitor with the PID. Once the volatile levels are below 1 PPM, work can continue.	( ) Not Needed
Flame ionization Detector Type	1 - 2	**Specify:**	**(X) Not Needed**
Detector Tubes/Monitox Type Type	1 - 2 -	**Specify:**	**(X) Not Needed**
Respirable Dust Monitor Type Type	1 - 2	**Specify:**	**(X) Not Needed**
Other Specify	1 - 2	**Specify:**	

Notes:

1. Personal air samples and area samples taken during unique project activities must be documented on the INDUSTRIAL HYGIENE SAMPLING SHEET (see Appendix D).
2. When area samples are collected for routine project activities, the following information must be recorded in the field log book: date and time; location; air temperature; wind direction and speed; cloud cover and type of precipitation; sampler; instrumentation used; activity being sampled; result; sample duration time; applicable comments.

SITE SPECIFIC HEALTH & SAFETY PLAN
DECONTAMINATION PAGE
Henningson, Durham & Richardson Architecture and Engineering, P.C.

DECONTAMINATION PROCEDURES

ATTACH SITE MAP INDICATING EXCLUSION, DECONTAMINATION, AND SUPPORT ZONES AS PAGE TWO

Personalized Decontamination	Sampling Equipment Decontamination	Heavy Equipment Decontamination
Summarize below and/or attach diagram; discuss use of work zones. Sampler will wear disposable gloves. No other portion of body should be exposed. Observers will wear disposable PPE. **(X) Not Needed**	Summarize below and/or attach diagram; discuss use of work zones. For equipment such as spoons, knives, bowls, trowels, hand augers, balers, direct-push samplers and surface water sampling devices (dippers), the following procedures will be used: (1) Initial wash with potable water/alconox soap mixture. Scrub brushes will be used to remove all residual dirt or other debris. (2) Potable water wash to remove all soap residue. (3) Rinse with distilled/deionized water. (4) Wrap decontaminated equipment in plastic or aluminum foil to prevent recontamination. For sampling in areas where free-product petroleum (NAPL) is encountered, the following additional steps will be added between steps 2 and 3 above: 2a) Methanol Rinse 2b) Hexane Rinse 2c) Methanol Rinse For sampling in areas where elevated metal concentrations are a concern, the following additional step will be added between steps 2 and 3 above: 2a) Rinse with diluted (10%) nitric acid (HNO_3). ( ) Not Needed	Summarize below and/or attach diagram; discuss use of work zones. For equipment such as drill rigs, augers, drill rods, etc. the following procedures will be used: (1) Spray with a hot water/high pressure sprayer (Hotsy) using on-base potable water supply. (2) Stubborn soil or residue may be washed with a potable water/alconox soap mixture. Scrub brushes will be used to remove all residual dirt or other debris. (3) Place decontaminated equipment in a secure location, or wrap in plastic to prevent recontamination ( ) Not Needed
Containment and Disposal Method Disposable PPE will be placed in sealed plastic bags, and disposed of as municipal waste.	Containment and Disposal Method See principal disposal methods and practices.	Containment and Disposal Method See principal disposal methods and practices.

SITE SPECIFIC HEALTH & SAFETY PLAN WORK ZONE PAGE Henningson, Durham & Richardson Architecture and Engineering, P.C.
THIS PAGE RESERVED FOR MAP (Show Exclusion, Contamination Reduction, and Support Zones. Indicate evacuation and reassembly points.) To be completed on-site.

SITE SPECIFIC HEALTH & SAFETY PLAN
SIGNATURE PAGE
Henningson, Durham & Richarson Architecture and Engineering, P.C.

The following personnel have read and fully understand the contents of this Site Health and Safety Plan and referenced HDR H&S procedures and further agree to all requirements contained herein. Furthermore, the individuals are fully trained and have required clearances in accordance with HDR H&S Procedure #20. Attach copies of current HTRW and first aid training, medical clearance, and respiratory fit test records.

Name	Affiliation	Date	Signature