PHASE III SUBSURFACE INVESTIGATION
FORMER PORTLAND CHEMICAL FACILITY
680 NEWFIELD STREET (REAR)
MIDDLETOWN, CONNECTICUT

HRP #MID6003.P3

June 2, 2006

REPORT, TABLES, & FIGURES

Prepared For:

CITY OF MIDDLETOWN
245 DE KOVEN DRIVE
MIDDLETOWN, CONNECTICUT 06457
c/o MR. WILLIAM WARNER

Prepared By:

HRP *Associates, Inc.*
167 New Britain Ave.
Plainville, CT 06062

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APPENDICES

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LIST OF ACRONYMS

AST	=	Aboveground Storage Tank
c-1,2-DCE	=	cis-1,2-Dichloroethylene
C/B	=	C/B Surface Water Classification
CBYD	=	Call Before You Dig
COC	=	Contaminant of Concern
CT DEP	=	Connecticut Department of Environmental Protection
DCE	=	Dichloroethylene
DEC	=	Direct Exposure Criteria
DI	=	Deionized (Water)
ELUR	=	Environmental Land Use Restriction
ESA	=	Environmental Site Assessment
ETPH	=	Extractable Total Petroleum Hydrocarbons
GB	=	GB Ground Water Classification
GB PMC	=	GB Pollutant Mobility Criteria
GWPC	=	Ground Water Protection Criteria
HASP	=	Health and Safety Plan
HRP	=	HRP Associates, Inc.
I/C VC	=	Industrial/Commercial Volatilization Criteria
I/C DEC	=	Industrial/Commercial Direct Exposure Criteria
ID	=	Inside Diameter
JE	=	Johnson-Ettinger Model
mg/l	=	Milligrams Per Liter
MW	=	Monitoring Well
NAPL	=	Non-Aqueous Phase Liquid
PAH	=	Polynucleic Aromatic Hydrocarbon
PCB	=	Polychlorinated Biphenyls
PCE	=	Perchloroethylene (also Tetrachloroethylene)
PID	=	Photoionization Detector
PMC	=	Pollutant Mobility Criteria
ppb	=	Parts Per Billion
ppm	=	Parts Per Million
ppmv	=	Parts Per Million by Volume
PRA	=	Potential Release Area

PVC	=	Polyvinyl Chloride
QA/QC	=	Quality Assurance/Quality Control
QAPP	=	Quality Assurance Project Plan
RA	=	Release Area
RCRA	=	Resource Conservation and Recovery Act
RDEC	=	Residential Direct Exposure Criteria
RSR	=	Remedial Standard Regulation
RVC	=	Residential Volatilization Criteria
SC/SB	=	SC/SB Surface Water Classification
SPLP	=	Synthetic Precipitation Leaching Procedure
SOPs	=	Standard Operating Procedures
SWPC	=	Surface Water Protection Criteria
t-1,2-DCE	=	trans-1,2-Dichloroethylene
TCE	=	Trichloroethylene
TCLP	=	Toxic Characteristic Leaching Procedure
TPH	=	Total Petroleum Hydrocarbons
TtNUS	=	TetraTech NUS
US EPA	=	United States Environmental Protection Agency
µg	=	Micrograms
VC	=	Volatilization Criteria
VOCs	=	Volatile Organic Compounds
W&C	=	Woodard & Curran, Inc.

1.0 INTRODUCTION

The purpose of this investigation is to evaluate the release areas (RAs) and potential release areas (PRAs) identified in the October 10, 2001 Phase I Environmental Site Assessment (ESA) prepared for the site by HRP Associates, Inc. (HRP). A Quality Assurance Project Plan (QAPP), dated and revised on October 10, 2004, prepared by HRP was submitted to EPA. On October 10, 2004, the EPA approved the QAPP. The results of that investigation are presented herein.

1.1 Site Setting and History

The approximately 3.1 acre subject site consists of the rear lot of the former Portland Chemical Works (Portland Chemical) facility. The site had been developed and maintained by former chemical distribution operations, including the Portland Chemical from 1962 to 1992. Prior to 1962, the site was a vacant, undeveloped lot. The tank farm, loading rack, storage sheds, and drum filling building associated with Portland Chemical were located on-site but have been demolished. Other smaller shed buildings were located on the east side of the site. A railroad spur, railcar loading ramp, and chain link fence are the only remaining developed features on the site. The remainder of the site currently consists of low-lying marshy areas.

The site is bounded on the north by Primary Steel, on the south by Town & Country Toyota, on the east by Jukonski Truck Sales, and on the west by Primary Steel's railroad spur. The site is accessed via Newfield Street through Jukonski Mitsubishi Truck Sales.

1.2 Previous Investigations

The following previous environmental investigations have been identified for the subject site at this time.

Rizzo Associates, Inc. (Rizzo) letter reports dated January - November 1992

These letter reports describe the characterization and disposal of six to nine deteriorated drums that were discarded along the site's northern property line. The primary constituents of the drums were identified as non-hazardous disodium phosphate. The drums were placed in over-pack drums and appropriately disposed off-site.

Rizzo letter report dated June 23, 1992

A letter report prepared by Rizzo discusses the analytical results for three soil samples collected from a stained area next to the railroad loading ramp that was completed in response to Notice of Violation (NOV) No. 426. Up to 2,600 parts per billion (ppb) of xylenes was detected in the samples in addition to trace levels of 1,1-DCA, 1,1,1-TCA, toluene, and ethylbenzene.

Woodard & Curran, Inc. (W&C) Phase I Environmental Site Assessment report dated June 1998

This report identified the following four (4) Areas of Concern (AOCs) on the subject site:

W&C Area of Concern	Issue/Concern
1. Above-Ground Tank Farm	Chemical storage and pipe transfer, soil within dike area, dike breached to wetlands
2. Loading Rack	Chemical pipe transfer, including hand hookups, inadequate spill containment
3. Chemical Manhole	Apparently designed to receive spilled chemicals from drum fill building, possible that releases triggered the installation of nearby monitoring wells
4. Debris Area on North Side of Stream	Presence of petroleum containers, general dump area.

Woodard & Curran *Phase II and III Environmental Site Assessment Report dated August 1998*

W&C's Phase II investigation of the subject site consisted of soil and ground water sampling from the AOCs identified in the W&C Phase I. W&C concluded that ground water did not require remediation at the site and that soil remediation was to be targeted at the chemical manhole and loading rack. The loading rack had several exceedances of Connecticut Department of Environmental Protection (CT DEP) Remediation Standard Regulations (RSR) for TPH. W&C estimated that 185 cubic yards (280 tons) of contaminated soil were associated with the loading rack.

The chemical manhole was also found to have elevated ground water concentrations of chlorinated hydrocarbons. W&C determined that the concentrations detected would exceed applicable volatilization criteria (VC) only if a building was placed over this area. Further investigations in this area also identified the presence of a leach field associated with the chemical manhole. The leach field was, according to W&C, the probable source of VOCs detected in the

adjacent ground water during the Phase II investigation. W&C estimated that 120 cubic yards (180 tons) of contaminated soil was associated with the chemical manhole.

Environmental Condition Assessment Form (ECAF) ***prepared by W&C, September 1999***

The ECAF listed the following four (4) on-site areas of concern: the tank farm, the loading rack, the chemical manhole, and the debris that was on the north side of the stream. No ground water contamination is reported in the ECAF. Site activities were indicated to include the distribution, packaging and warehousing of chemicals. Bulk chemicals were transported to the site via rail car, stored in above ground tanks, and then transferred to smaller containers for distribution. The ECAF indicates that a wide range of chemicals were stored on-site, including chromic acid, sulfuric acid, sulfamic acid, sodium nitrate, copper sulfate, nickel carbonate, and ammonium chloride.

Phase I Environmental Site Assessment, HRP Associates, October 2001.

This site assessment identified the twelve on-site release areas and potential release areas, which are presented in detail in Section 1.3 in the following text. In addition, the Phase I documents the observations, remediation, and sampling conducted in January 2001 as part of the emergency response. Specifically, on January 12, 2001 several buried fiber drums were unearthed during remedial excavation activities to remove contaminated soil from the 10'x10' chemical manhole area. Approximately 120-130 crushed fiber drums were identified 4' below grade in a 50' long trench trending to the north-northeast starting from the chemical manhole area. Excavated soil was dewatered, and then temporarily stored in an on-site roll-off trailers. Recovered ground water, soil, and overpack drums of waste material were appropriately disposed off-site.

Draft Brownfields Targeted Site Assessment, TetraTech NUS, 2002

This report was prepared by Tetra Tech NUS, Inc. (TtNUS) for the United States Environmental Protection Agency (US EPA). The report presents the results of a significant geophysical investigation and subsurface investigation of the rear portion of site. The geophysical investigations included the conduct of a

comprehensive electromagnetic induction (EM) metal detector survey followed by a targeted ground penetrating radar (GPR) survey. The EM survey identified a significant number of geophysical anomalies interpreted to represent buried drums, surface metal or miscellaneous debris. The EM anomalies were further investigated using GPR to refine the interpretations of the target source. The anomaly locations are shown on Figure 2. Possible drum anomalies were clustered in four areas of the site:

1. Along the western perimeter just inside the fence line,
2. Along the northern property boundary,
3. In the rubble pile near the former above ground tank farm, and
4. Near the former storage shed at the west end of the railroad tracks.

A total of three soil borings/monitoring wells were installed: SB-1/MW-1, SB-3/MW-3, and SB-5/MW-5. The subsurface investigation was suspended when the drill rig hit an apparent buried drum at the original drilling location for test boring/monitoring well MW-1 along the western fence and parcel boundary. One soil sample from each boring was submitted for laboratory analysis. These soil samples identified potential exceedances of the GB PMC for metals. Two composite soil samples were collected from the northeastern debris area. These soil samples exhibited potential exceedances of the GB PMC for metals and semi-volatile organic compounds.

Two sediment samples and two surface water samples were collected from the unnamed stream present on-site. Both sediment samples identified the presence of ETPH, metals, SVOCs, and pesticides. The surface water samples detected very low levels of volatile organic compounds, including chlorinated VOCs and MTBE. Various metals and CT ETPH were also detected.

The three ground water monitoring wells installed by TtNUS (MW-1, MW-3 and MW-5) were sampled during this investigation. Chlorinated volatile organic compounds were detected in the site ground water at concentrations ranging from 1 to 80 ug/l. Metals and CT ETPH were also detected in the ground water samples. Ground water flowed towards the southeast, according to TtNUS.

The report notes that soils at the site are very clayey, and therefore have a low potential to transmit contaminated ground water any significant distance.

1.3 Summary of Release Areas (RAs) and Potential Release Areas (PRAs)

Based upon the findings of the previous environmental reports, focusing mostly on the recent Phase I Environmental Site Assessment (ESA) of the property by HRP (dated October 2001) and Brownfields Targeted Site Assessment completed by TtNUS (dated September 2002), the following table composites into one list the potential release areas (PRAs) and release areas (RAs).

PRA # or RA#	Name	Description
RA-1	Drum and Debris Burial	Buried debris and fiber drums containing various chemical wastes were identified during the excavation activities in January 2001. The drums and debris were located in an area approximately 5-feet wide by 50-feet long extending to the north-northeast of the former drum filling building.
RA-2	Former Drum Filling Building	The former drum-filling building constructed in circa 1960 was used to fill 55-gallon drums with the materials from the tank farm. Drum storage was reported to have been located in and adjacent to this building. A floor drain in this building was also indicated to have been connected to the adjacent chemical manhole.
RA- 3	Former Chemical Manhole	The chemical manhole received waste chemicals and spills from the floor drain in the drum-filling building.
RA-4	Leaching Field	The chemical manhole discharged to a nearby leaching field.
RA-5	Former Loading Rack & Piping	The former loading rack was used to unload bulk-chemicals from railroad tank-cars to the tank farm. Surficial staining identified in Hazardous Waste Notice of Violation filed in 1991.
PRA-6	Drum Storage Area	Exterior drum storage is identified from circa 1965 to circa 1980 on the northeast portion of the Site.
PRA- 7	Former Drum Storage Sheds	Drums were stored in and around the small shed formerly located at the western terminus of the railroad spur.
PRA-8	Former Tank Farm	The above ground tank farm consisted of ten (10) 10,000-gallon tanks.
PRA-9	Loading Ramp	The loading ramp was presumably used to load materials onto railroad cars.
PRA-10	Railroad Spur	The railroad spur was formerly used by tank-cars containing various bulk-chemicals. Also, railroad ties were typically treated with chlorinated-organic creosotes. Railroad right-of-ways were typically treated with herbicides.
PRA-11	Unnamed Stream and Outfall Culvert	The culvert outfall discharges run-off from Newfield Street and drainage features on the adjacent property to the east.
PRA-12	Artificial Fill Area	The northwest portion of the Site consists of fill material deposited under an Army Corps of Engineers permit. Also, six to nine fiber and steel drums containing non-hazardous substances (disodium phosphate) were removed from this area.

In addition to the twelve RA/PRAs listed above, this site investigation identified shallow soil contamination over the western portion of the site suspected to be associated with a thirteenth release mechanism: contaminated soil distribution that occurred during the 2001 emergency response excavations. Much of the contaminated soil in direct contact with the buried waste was excavated and contained in roll-offs prior to being appropriately disposed off-site. However, the degree of excavation performed during a wet and muddy period while searching for and removing the buried waste is presumed to have resulted in the limited distribution of some contaminated soil. Note that in several instances machines became so stuck that they had to "dig" their way back out of contaminated excavation areas. The contamination from these activities is presumed to shallow, but may be deeper if the exploratory trenches dug during the emergency response were backfilled with material mixed with contaminated soil. This release area is designated as PRA-13, and the investigation and sampling results pertaining to this release mechanism is described in Section 7.13. Note the area suspected to have been contaminated during the emergency response also coincides with PRA-6, the area of historic drum storage.

1.4 Conceptual Site Model

The CSM was developed based on with the finding of the previous environmental reports, focusing particularly the October 10, 2001 Phase I ESA and September 2002 Draft Brownfields Targeted Site Assessment. Twelve known release areas (RAs) and potential release areas (PRAs) are the subject of the investigation results presented herein.

In accordance with the CT DEP Draft June 12, 2000 Site Characterization Guidance Document ("Site Characterization Guidance Document") and the standards of best industry practice, the RAs/PRAs defined in the Phase I ESA have been actively investigated using the CSM process. The specific details of the CSM are presented in Table 1 including a presentation of: RA/PRA location, RA/PRA specific constituents of concern (COCs), release mechanisms, potential migration pathways, investigation methods, sample types and locations, detected releases, and affected media.

Most of the site consists of low-lying areas with either standing water or saturated soils covered in thick vegetation. The investigation focused on the portions of the site that were formerly developed – the higher ground on the

western and southern portions of the site and the raised area in the center of the site where the tank farm used to be. Shallow groundwater flows toward the east (see Section 5.3). Potential ground water receptors east of the historically developed portions of the site include small, on-site watercourses and, off-site 1500' to the east, the Mattabasset River. The on-site watercourses converge and ultimately discharge to the Mattabasset River. The surface water classification of the Mattabasset River is "C/B", defined by CT DEP as surface water that does not meet Class "B" criteria due to point or non-point sources of pollution. The on-site watercourses are not classified on published CT DEP mapping, and as such, is presumed to be of Class "A" quality.

The only developed land use between the subject site and the Mattabasset River currently consists of a storage yard for large crane equipment.

1.5 Phase III Investigation Objectives

This project was designed 1) to determine the degree and extent contamination at the known release areas based upon the findings of the October 2001 HRP Phase I ESA and September 2002 TtNUS Brownfields Targeted Site Assessment, and 2) to determine the degree and extent of a release of any substance that has occurred to the site soils and, at limited locations, site ground water.

2.0 PRE-FIELD WORK

2.1 Health and Safety Plan (HASP) Preparation

HRP developed a site-specific HASP for the investigation conducted at the subject site. The HASP addresses the health and safety practices employed by all HRP staff and our subcontractors participating in the installation of test pits and Geoprobe® borings. The HASP was developed in accordance with HRP's Corporate Safety and Health Program as required under OSHA's Hazardous Waste Operations Standard (29 CFR 1910.120). The Plan was developed to establish minimum standards for project oversight and environmental sampling activities to protect the health and safety of HRP personnel and HRP's subcontractors. All HRP site personnel have received the required level of training and field experience as required under subpart (e) of the Standard, and have received medical examinations in accordance with HRP's medical surveillance program as required under subpart (f) of the Standard.

2.2 Sample Location Marking, Utility Clearance & Survey

HRP marked all proposed drilling/sampling locations in the field using wooden stakes and white marking paint. The mark out of proposed drilling/test pit locations is required by the Connecticut Call Before You Dig Services (CBYD), who subsequently arranged for the mark out of utility company-owned lines in the field. CBYD did not mark privately owned lines.

3.0 DATA EVALUATION AND APPLICABLE CRITERIA

3.1 Applicable Criteria

Analytical results for soils and ground water obtained during this investigation were compared to the Connecticut Remediation Standard Regulations (RSRs) (January 1996) developed by the Connecticut Department of Environmental Protection (CT DEP). The CT DEP's intent in developing these regulations is to define: minimum remediation performance standards, specific numeric cleanup criteria, and a process for establishing an alternative site-specific standard. The RSRs apply to any action taken to remediate polluted soil, surface water, or a ground water plume at or emanating from a release area, provided that the remedial action is: (1) required pursuant to Chapter 445 (Hazardous Waste) or 446K (Water Pollution Control) of the Connecticut General Statutes; or (2) undertaken pursuant to the voluntary cleanup provisions of Public Act 95-183 or 95-190; including, but not limited to, any such action required to be taken or verified by a licensed environmental professional, except as otherwise provided in the regulations. Specifically, the regulations provide that the standards do not apply to: (1) the soil and water within the zone of influence of a ground water discharge permitted under Section 22a-430 CGS; or (2) for a release which has been remediated and which remediation has been approved in writing by the CT DEP.

3.2 Data Analysis

All soil and ground water data obtained from the site was collected to ultimately facilitate comparison to the CT RSR, which in turn informs site environmental quality. Based upon our current understanding of the study area setting, the following RSR criteria have been used for evaluation of environmental data:

<u>Soil</u>

- I/C DEC
- RDEC
- GB PMC

<u>Ground water</u>

- GWPC
- SWPC
- Current Residential VC
- Current I/C VC
- Proposed I/C VC
- Proposed Residential VC

Note, the approved QAPP indicated that all environmental media sampling, including sediment and surface water, would be compared to the RSRs. While not technically regulated under the RSRs, the results of sediment sampling are also compared to the soil criteria listed above as a means of assessing relative contamination as an unconsolidated environmental solid.

Lastly, the RSR also does not provide numerical criteria for comparison to the surface water sampling results. The Connecticut Water Quality Standards (effective December 17, 2002) include the following applicable numerical surficial water quality standards applications:

- Aquatic Life Criteria, Freshwater, Acute
- Aquatic Life Criteria, Freshwater, Chronic
- Human Health Criteria, Consumption of Organisms Only
- Human Health Criteria, Consumption of Water & Organisms

For comparison purposes, exceedances of the lowest compound-specific numerical value of the four (4) criteria listed above are reported in Section 7.11.

4.0 SOIL INVESTIGATION

4.1 Site-Wide Overview

During the investigation, HRP collected approximately 116 soil samples in total from the RA/PRAs at the site. During collection of soil samples, borings and test pits penetrated to depths up to 12 feet below grade. Surficial soils encountered at the site consisted primarily of sand and gravel mixed with evidence of fill material (typically brick or wood fragments). Beneath the sand and/or fill, brown or brown-grey was uniformly observed throughout the site. Note that a thick sequence of clay underlies the site and the project area in general. During the installation of test pits TP-38 and TP-39 buried fragments of fiberboard drums were identified. When the initial waste was encountered, Connecticut Tank Removal under supervision of HRP initiated a remediation response in preparation of encountering additional waste. No additional waste was encountered at TP-39, other than the initial fragment of fiberboard drum that was placed on plastic sheeting as a temporary stockpile area. Wastes encountered at TP-38 included fiberboard drum fragments, bung covers, drum covers, and other evidence of fill material such as brick fragments and timbers. This material was also temporary stockpiled on and beneath plastic sheeting until loaded into a lined roll-off container on July 25, 2005.

Elevated PID readings, staining or odors were observed during installation of test borings and test pits are noted in the Section 7.0. Soil samples were selected for laboratory analysis based on physical evidence of contamination identified during sample collection, if any. Where no physical evidence of contamination was observed, soil samples were selected for analysis from locations and/or depths where contamination was most likely to be present based on the suspected release mechanism. If the QAPP indicated that two samples were planned to be collected from a given test pit, one sample was collected from the mostly likely impacted depth based on the release mechanism, and the second sample was typically collected from the deeper native clay soil in an effort to determine the vertical limit of contamination.

In total, the noted 116 soil samples were collected from 13 RA/PRAs identified on site and were submitted for laboratory analysis. Of these samples, 28

contained exceedances of RSR criteria for various contaminants of concern, including the following breakdown:

- 13 DEC exceedances for metals,
- 3 DEC and PMC exceedances for SVOCs,
- 10 exceedances of the DEC and PMC for ETPH,
- 1 exceedance of the DEC and PMC for pesticides,
- 1 interpretive exceedance of the PMC for PCBs, and
- 8 DEC and PMC exceedances for VOCs.

4.2 Field Screening

All samples collected from this investigation were field screened for VOCs with a photoionization detector (PID) using the headspace method described in HRP SOPs. A small portion of the sample was placed into a sealable plastic bag and allowed to equilibrate with the surrounding temperature. The samples were then screened by opening the bag to allow the tip of the PID to enter the bag and then resealed. The PID was tipped into the bag until the reading leveled out and then the results were recorded onto the sample log.

All samples collected as part of this investigation were visually inspected for evidence of contamination (i.e., color, odor, etc.). Any staining or unusual odors observed from the samples were recorded on the appropriate sample log.

4.3 Test Pits

Connecticut Tank Removal of Bridgeport, CT provided the excavation services for the installation of the test pits. The test pits were installed on July 18-22 & 25, 2005. Sixty-six (66) test pits were installed with an excavator to depths ranging from 2.7' to 9.7' below grade. Typical depths ranged from 6' to 8' below grade. In certain instances, subsurface utility were encountered at shallow depths and excavation was terminated.

An HRP scientist recovered soil samples from each test pit, and field screened them for VOCs with a PID and visually inspected for evidence of discoloration or staining. With the exception of test pit TP-43, at least one soil sample was collected from a discreet depth within the test pit. If the sample was $\leq$4' deep, then the soil was collected from the sidewall or pit bottom. In order to collect samples deeper than 4' below grade without requiring the sampler to enter a confined space, the excavator operator at the direction of HRP personnel collected

soil from the desired interval with the excavator bucket. The discreet sample was collected into appropriate containers from the soil in the bucket. Note the sampled material was collected from the center of the bucket such that there was no contact with the bucket itself so as to prevent cross-contamination. Sampling priority was given to discrete layers of fill, evidence of buried waste, or other anthropogenic materials. In addition, the supervising scientist recorded all details and observations associated with installation of the test pits on a standard HRP test pit log (Appendix A). Ground water grab samples were also collected from select test pits (see Section 5.0). All test pit locations were repaired to existing surface grade at the termination of sample collection.

4.4 Geoprobe

Eleven (11) borings were installed using a Geoprobe® 6600 backhoe-mounted direct push drill rig by advancing four-foot long stainless steel Macrocore® sampling tubes with disposable acetate liners into the subsurface. Soil samples were collected from each depth interval, visually inspected for evidence of contamination, and field screened with a photoionization detector (PID) by an HRP scientist. Soil and sample descriptions were logged on a standard HRP boring log where PID readings, depth to ground water (if encountered), and any other relevant observations were recorded (Appendix A). All sampling apparatus was decontaminated between sampling locations in accordance with HRP SOPs.

4.5 Site Geology

According to the 1979 Soil Survey of Middlesex County, site soils are mapped as Berlin silt loam 0 to 5 percent slopes (BcA). This soil type is described as a nearly level to gently sloping, moderately well drained soil and is indicated to form in silt and clay deposits. According to the Surficial Material Map of Connecticut, the surficial material at the subject parcels is mapped as fines (f). This deposit is described as well sorted thin layers of alternating silt and clay or thicker layers of very fine sand and silt. Subsurface conditions observed during the investigation were consistent with the published mapping. Typically, 1-4' of surficial sand and gravel (presumed to be artificially deposited, at least on the western portion of the site) overlies a brown or grey clay layer. Occasionally, thinner layers of silt or sand were observed within the clay. Any ground water observed during the test pit installation was either perched above the clay or trickled into the excavation via the coarser-grained layers within the clay.

According to a map compiled by the Connecticut Geological and Natural History Survey, bedrock at the subject parcels is classified as the Portland Arkose (Jp), which is described as a reddish-brown arkose of Jurassic age. Bedrock was not encountered during this investigation.

5.0 GROUND WATER INVESTIGATION

5.1 Test Pit Ground water Grab Samples

Based on the previous investigations, the deepest ground water elevation was reported at 10.34' below grade. As such, ground water was expected to be encountered during the excavation of test pits (see Task 2.0). Ground water grab samples were collected from four (4) of the sixty-six (66) test pits (TP-16, TP-28, TP-59, and TP-70. Dedicated disposable tubing was lowered into the test pit until the tube end was submerged in the ground water that accumulated at the bottom of the test pit. A peristaltic pump was used to pump ground water sample via the tubing. Unfiltered ground water was collected in appropriate sampling containers in accordance with HRP SOPs until submitted to the laboratory for analysis. For ground water samples TP-59W and TP-70W, the laboratory was instructed to filter the samples prior to metal analyses to support dissolved metal analyses. This was done because the grab sampling methodology described above increases the amount of sediment in ground water samples, and filtering, as specified in the QAPP, was not feasible due to field conditions.

5.2 Test Boring Temporary Ground Water Sampling Points

Logical Environmental Solutions of Tolland, CT provided the drilling services for the installation of the temporary well points. The wells were installed on October 28, 2006. Five (5) of the eleven (11) test borings (TB-1, TB-2, TB-3, TB-7 and TB-8) were completed as temporary ground water sampling points constructed of 1-inch diameter PVC using 10 foot screened (0.010 slot) sections coupled to solid riser to the surface. The screens were set such that 7 - 8' penetrated the water table, thus allowing for detection or accumulation of any free-phased petroleum product. No free-phased product was observed in the monitoring wells or temporary sampling points

Each temporary well point was allowed to sit for greater than ten days after installation to allow the well time to equilibrate with the surrounding environment. Prior to sampling, depth to ground water and depth to bottom were measured in each of the five (5) existing, functional monitoring wells and the five (5) new temporary well points using an electronic water level indicator (Table 4). The ground water samples were collected in accordance with HRP's SOP developed in general conformance with the U.S. Environmental Protection Agency (Region 1) "Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of

Ground water Samples from Monitoring Wells", Revision 2, dated July 1996 and the Connecticut Department of Environmental Protection "Draft Site Characterization Guidance Document", dated June 12, 2000.

Prior to sampling, each well was measured for depth to water below the top of the PVC well casing using a decontaminated electronic water level indicator. Given the shallow ground water table, a variable speed peristaltic pump was used to purge and sample each well or sampling point. The depth to water measurements were used along with available well construction details to determine the middle of the water column within each well. The small diameter tubing of the peristaltic pump was slowly lowered into the well to the approximate middle of the water column. Ground water was pumped at such a rate as to minimize the stress on the well and limit mixing of the water column. Depth to water measurements were recorded in 3-minute intervals to determine the ideal pumping rate to maintain drawdown at or less than 0.3 feet.

Ground water was pumped through a YSI flow-cell, which was used to measure the pH, temperature, specific conductivity, oxidation/reduction potential (ORP), and dissolved oxygen (D.O.) of the ground water. It has been HRP's experience that the turbidity results indicated by the YSI flow-cell are not reliably consistent, and thus, Turbidity was monitored using HF Scientific DRT-15CE. A small grab sample of ground water is diverted from the flow cell at the given timed interval. The grab sample is analyzed in the DRT-15CE field meter, and the turbidity is recorded on the sampling data sheet along with the other readings provided by the YSI flow-cell.

While purging the well, the water level and pumping rate were monitored and recorded every 3 minutes to ensure little or no drawdown (<0.3 ft.) was induced in the well. Purging was considered to be complete once field parameters stabilized in the flow-cell over three consecutive readings taken at 3-minute intervals within the following limits:

- Turbidity (10% at >1 NTU)
- D.O. (10%)
- Specific Conductance (5%)
- Temperature (5%)
- pH (±0.1 units)
- ORP (±10 millivolts)

During ground water sampling, it was imperative that appropriate aquifer parameter stabilization was achieved using the low flow method. All sampling, aquifer parameters and any other relevant observational data was recorded on Monitoring Well Field Data Sheets at the time of sampling (Appendix B). Appropriate stable drawdown relative to the guidance requirements (i.e., <0.3-feet) was met in all wells. All ground water samples were preserved as necessary and stored on ice until delivery to a state certified laboratory for analysis. Each ground water sample was analyzed for the following.

- VOCs plus methyl-tert-butyl-ether (MTBE) by U.S. EPA Method 8260B
- PAHs by U.S. EPA Method 8270C-modified
- 9 of the 10 Site-Specific Constituent of Concern Metals (barium, thallium, chromium [total], copper, lead, mercury, nickel, vanadium, and zinc) by mass analysis (U.S. EPA Method 6010B, 7196A and 7470).

  The laboratory was unable to analyze the samples for hexavalent chromium within the methodology holding time. However, the total chromium results were compared to the SWPC for hexavalent chromium, which assumes that in a worst case all detected chromium is in the hexavalent state.
- TPH by EPA Method 418.1

QAQC Note: All Ground water analyzed via EPA method 8260B had MDLs for EDB (1 ug/L) and vinyl chloride (2 ug/L) that exceeded the Proposed Residential VCGW, which are 0.3 and 1.6 ug/L, respectively.

5.3 Ground Water Flow

The relative elevations of the each well and temporary sampling point were surveyed relative to an arbitrary 100' benchmark. The ground water elevations measured in the overburden aquifer indicate a localized ground water flow direction to the east to northeast, as shown by the contours developed from the survey data (Figure 2).

Ground Water Survey Results

Well/Sampling Point	PVC Elevation* (feet)	Depth to Water(feet)	Ground water Elevation (feet)	Well/Sampling Point	PVC Elevation* (feet)	Depth to Water(feet)	Ground water Elevation (feet)
MW-1	101.77	3.28	98.49	TB-2W	101.34	5.48	95.86
MW-3	99.45	2.52	96.93	TB-3W	99.17	2.81	96.36
MW-5	101.52	3.28	98.24	TB-7W	99.37	1.79	97.58
MW-203	97.89	2.57	95.32	TB-8W	102.39	2.90	99.49
TB-1W	100.90	5.10	95.80	RIZ-4	102.34	4.37	97.97

6.0 SURFACE WATER & SEDIMENT SAMPLING

Four sediment and four surface water samples were collected from the unnamed, on-site stream and two of the identified on-site tributaries to the stream. The purposes of sediment sampling and analyses are to confirm previous testing results and determine the effects of nearby contamination sources, if any.

Four sediment samples (SS-1 through SS-4) were collected from the locations shown on Figure 4 and were submitted for laboratory analysis by the following methods.

- Volatile Organic Compounds (VOCs) by collection method U.S. EPA Method 5035A and 8260B,
- Polynucleic Aromatic Hydrocarbons (PAHs) by U.S. EPA Method 8270C – modified,
- pH by U.S. EPA Method 9045C
- 10 Site-Specific Constituent of Concern Metals (barium, thallium, chromium [total], chromium [hexavalent], copper, lead, mercury, nickel, vanadium, and zinc) by mass analysis U.S. EPA Method 3050B, 6010B, 7196A and 7471) (4samples),
- Total Petroleum Hydrocarbons (TPH) by Connecticut Extractable Total Petroleum Hydrocarbons (ETPH),
- Polychlorinated Biphenyls (PCBs) by U.S. EPA Method 8082, and
- Pesticides by U.S. EPA Method 8081.

Four surface water samples (SW-1 through SW-4) were collected from the locations shown on Figure 4 and were submitted for laboratory analysis by the following methods.

- Volatile Organic Compounds (VOCs) by collection method U.S. EPA Method 8260B,
- Polynucleic Aromatic Hydrocarbons (PAHs) by U.S. EPA Method 8270C – modified,
- pH by U.S. EPA Method 9045C

- 10 Site-Specific Constituent of Concern Metals (barium, thallium, chromium [total], chromium [hexavalent], copper, lead, mercury, nickel, vanadium, and zinc) by mass analysis U.S. EPA Method 3050B, 6010B, 7196A and 7471) (4samples),
- Total Petroleum Hydrocarbons (TPH) by Connecticut Extractable Total Petroleum Hydrocarbons (ETPH),
- Polychlorinated Biphenyls (PCBs) by U.S. EPA Method 8082, and
- Pesticides by U.S. EPA Method 8081.

7.0 SAMPLING RESULTS

7.1 RA-1 – Drums & Debris Burial

7.1.1 Background Information

Buried debris and fiber drums containing various chemical wastes were identified during the excavation activities in January 2001. The drums and debris were located in a trench approximately 5-feet wide by 50-feet long extending to the north-northeast of the chemical manhole.

7.1.2 Release Information

Potential release mechanisms for this PRA include spills and container failures with discharge directly to concrete and shallow soils. Analytical results of the waste material indicate high levels of heavy metal contamination, consisting of chromium, nickel, and copper, in particular.

7.1.3 Phase III Investigation

With the exception of those test borings and test pits intended to investigate the loading ramp, railroad spur, and tank farm, all investigation locations were selected to investigate the potential for buried waste and/or to evaluate impacts to soil and ground water associated with buried waste (Figure 2). A total of 61 test pits were installed within the general area where historic waste burial activities could have potentially occurred, based on the TtNUS geophysical anomalies and known areas of site development. Note, during the installation of test pits TP-38 and TP-39 buried fragments of fiberboard drums were identified. When the initial waste was encountered, Connecticut Tank Removal under supervision of HRP initiated a remediation response in preparation of encountering additional waste. No additional waste was encountered at TP-39, other than the initial fragment of fiberboard drum that was placed on plastic sheeting as a temporary stockpile area. Wastes encountered at TP-38 included fiberboard drum fragments, bung covers, drum covers, and other evidence of fill material such as brick fragments and timbers. This material was also temporary stockpiled on and beneath plastic sheeting until loaded into a lined roll-off container on July 25, 2005.

Thirty-one of the test pit locations were intended to specifically investigate the areas of geophysical anomalies identified in the TtNUS Brownfields Targeted Site Assessment. Specifically the following test pits targeted the noted anomalies.

• TP-11	• TP-15	• TP-19	• TP-25	• TP-31	• TP-57	• TP-61
• TP-12	• TP-16	• TP-20	• TP-26	• TP-35	• TP-58	
• TP-13	• TP-17	• TP-23	• TP-27	• TP-47	• TP-59	
• TP-14	• TP-18	• TP-24	• TP-29	• TP-50	• TP-60	

The TtNUS report indicates that a buried drum was identified during the installation of MW-1. Test pits TP-15 and TB-16 were installed near MW-1. No buried waste was identified during the installation of TP-15 and TP-16. However, grey process stone saturated with oily water was encountered at these test pits as well as several other test pits in the surrounding area. Sand mixed within and located directly below the stone at TP-15 and TP-16 exhibited slight PID readings (a maximum of 4.5 ppmv was detected). The process stone is believed to be part of the drainage for the on-site leaching field (RA-4) or was a structural layer beneath a layer of pavement that has since been removed. The buried waste identified at MW-1 was likely the process stone.

Three test borings (TB-1W, TB-2W, and TB-8W) were installed within the area of potential waste burial. Borings TB-1W and TB-2W could not be installed at their intended location east of the tank farm (PRA-8) due to the presence of saturated wetlands that prevented equipment access. TB-1W and TB-2W were relocated to down-gradient and within the area where limited wastes were encountered during the installation of test pit TP-38 in July 2005. These borings were installed for the purposes of converting the borings to temporary ground water sampling points and no soil samples were collected. TB-8W, which was also relocated from its proposed location southwest of the tank farm also because of saturated wetlands, was installed on the western portion of the property to further evaluate the isolated, elevated VOC detections at test pit TP-20 and TP-68.

One hundred eleven soil samples were collected from within the general area of RA-1. All samples, with the exception of TB-8A and TB-8B,

were analyzed for the COC metals, VOCs, and PAHs. TB-8A and TB-8B were analyzed for VOCs only. Seventy of the 111 samples were submitted for ETPH analysis. Typically, when two samples were collected from a single test pit, only the presumed worst-case sample of the two was analyzed for ETPH. Worst-case samples were based on field observations for odors, staining, and PID readings. If no indication of contamination was observed, the sample collected from a subsurface layer believed to be artificial fill (typically shallow sand mixed with brick, plastic or timbers) was submitted for ETPH analysis. Lastly, fifty-six samples were submitted for pesticides analysis. Pesticide samples were collected from test pits as planned in the QAPP, with preference for shallow samples closer to the ground surface where pesticides could have been applied.

Ground water grab samples were collected from three of the test pits (TP-16, TP-28, TP-59 and TP-70) installed to evaluate RA-1. Ground water samples were collected via modified low-flow methodology from existing 2"-diameter monitoring wells MW-1, MW-3, MW-5, and RIZ-4 and from newly installed (October 2005) 1"-diameter temporary sampling points (TB-1W, TB-2W, and TB-8W). Groundwater samples were analyzed for the COCs listed in Section 5.2, with the exception the grab samples from test pits, which were analyzed by CT ETPH instead of EPA Method 418.1.

7.1.4 Results of Soil Analysis

A complete summary of the laboratory data for the soil samples collected from RA-1 is included in Table 3.

Note the samples collected above 2' below grade (TP-14B [0.6'], TP-18A [1.0'], TP-20A (1.5'), TP-25A [1.5'], TP-28 [1.5'], TP-36 [1.5'], and TP-64A [1.5']) were above any reported buried waste. The contamination in these samples is believed to be associated with either RA-6 or RA-13, described in Sections 7.4, 7.6 and 7.13, respectively. PAHs, naphthalene, and ETPH, were also detected in TP-28 (1.5') above RSR criteria, as discussed below.

Contamination was also detected above RSR criteria samples TP-4, TP-5, TP-64A. Note these samples were collected from directly beneath the subsurface gravel layer interpreted to be part of the leaching system (RA-4)

for wastewater from the chemical manhole. The contamination in these samples is believed to be associated with either RA-3 or RA-4, described in Sections 7.3 and 7.4, respectively.

RA-1 Drum & Debris Burial
Detected Soil RSR Exceedances

			Sample ID	TP-1	TP-20B	TP-21	TP-26B	TP-31A	TP-32	TP-38	TP-38A	TP-38B	TP-38C	TP-38E	TP-39	TB-08A	TB-08B
			Sample depth (ft.)	7.0'	7.0'	5.0'	5.0'	5.5'	3.5'	3.0'	3.0'	4.0'	2.0'	8.0'	3.0	6-7.5'	8-10'
			Date Collected	7/18/05	7/18/05	7//05	7//05	7//05	7//05	7/21/05	7/25/05	7/25/05	7/25/05	7/25/05	7/21/05	10/28/05	10/28/05
	RDEC	ICDEC	GB PMC														
CT ETPH (mg/kg)	500	2,500	2,500	610			600	6,600	1,100								
Metals (mg/kg)	RDEC	ICDEC	20X GB PMC														
Chromium, Hexavalent	100	100	NE							349							
Chromium, Total	100	100	10							11,800	2,210	606	663	1,500	583		
Copper	2,500	76,000	260							8,240							
VOCs 8260B (µg/kg)	RDEC	ICDEC	GB PMC														
Tetrachloroethylene	12,000	110,000	1,000														23,400
cis-1,2-Dichloroethylene	500,000	1,000,000	14,000													14,200	17,500
Vinyl chloride	320	3,000	400		1,610	496											
Xylene-Total	500,000	1,000,000	19,500													1,830	

KEY

BOLD	Exceeds RDEC	BOLD & ITALIC	Exceeds GB PMC	BOLD	Exceeds GB PMC and RDEC	BOLD & ITALIC	Exceeds GB PMC, RDEC and I/C DEC
Blank	Not Analyzed, Below Detection Limits, or Detected Below RSR Criteria (refer to appended Tables 2A & 2B)						

Metals

The summary table RA-1 indicates which parameters were detected in exceedance of any of the applicable standards. All total chromium exceedances indicated in the table below were detected above the RDEC and Industrial Commercial DEC, which is 100 mg/kg for both criteria. All subsequent SPLP analysis confirmed compliance with the GB PMC for chromium. Chromium above RSR criteria was detected in 5 of the 10 samples collected from the expanded excavation of test pit TP-38, where fiber drum fragments were encountered in the subsurface. The depths of the chromium exceedances ranged from 2.0' to 8.0'. Soil sample TP-38 (3'), collected from the vicinity of the bulk of buried waste removed in 2001, also exceeded the DEC for copper and hexavalent chromium. Chromium above RSR criteria was also detected in the sample collected from the expanded excavation of test pit TP-39.

ETPH

ETPH was detected above one or more of the applicable standards in 8 of the 70 samples analyzed for ETPH. Exceedances of ETPH were detected in three of the test pits (TP-1, TP-4 and TP-5) installed along the western property boundary (Figure 3). ETPH in TP-1 was detected at 7.0' below grade. Note, no debris waste or evidence of fill was observed at this depth in TP-1.

[The exceedances at TP-4 and TP-5 are believed to be associated with oily wastewater perched in the gravel substrate approximately 2-3' below grade. Soil samples TP-4 (3') and TP-5 (2.7') were collected from the soil beneath the gravel layer, potentially constructed as part of the drainage system for the chemical manhole leach field (see Section 7.4).]

Three of the ETPH exceedances were detected in soil samples collected from intermediate depths beneath the northwest central portion of the site (Figure 3). These samples consist of TP-26B (5.5'), TP-31A (5.5'), and TP-32 (3.5'). An isolated area of ETPH soil contamination, presumably associated with buried wastes or contaminated fill, appears to be present on the northwest-central portion of the site.

ETPH was detected above the GB PMC and I/C DEC in sample TP-20A (1.5'). VOC contamination likely associated with the ETPH exceedance at this location is discussed below.

VOCs

VOCs were detected above one or more of the applicable criteria in eight of the 109 samples from RA-1 analyzed for via EPA Method 8260B (Figure 3). Vinyl chloride was detected above the RDEC and GBPMC in sample TP-21 (5'). Other VOCs, including chlorinated and aromatic VOCs, were detected below applicable standards in this sample. The vinyl chloride is presumed to be a breakdown product of one of the chlorinated VOCs that were also detected in the sample.

Vinyl chloride was also detected exceedance of the RDEC and GB PMC in soil sample TB-8W (6-7.5'). PCE was detected in exceedance of the RDEC and GB PMC in soil sample TB-8W (8-10'). Other chlorinated breakdown components of PCE were detected in both samples, however only c-1,2-DCE exceeded any applicable standards.

PAHs

No PAHs were detected in soil samples collective from RA-1 at depths that could have potentially impacted by buried waste.

[PAHs were detected above RSR criteria in samples TP-24A (2') and TP-28 (1.5') and are discussed in Section 7.6 regarding the former storage of drums on-site, RA-6.]

[PAHs were detected above RSR criteria in sample TP-62A (2') and are discussed in Section 7.12 regarding the fill material used on-site, RA-12.]

Pesticides & PCBs

No pesticides or PCBs were detected in soil samples collective from RA-1 that could have potentially impacted by buried waste.

7.1.5 Results of Ground Water Analysis

Ground water sampling results exceeding applicable RSR criteria are summarized in the table below.

RA-1 Drum and Debris Burial
Detected Ground Water RSR Exceedances

					Sample ID	MW-1	TB-1W	TB-2W	TB-8W	TP-16W	TP-28W
					Date Collected	11/16/05	11/16/05	11/16/05	11/16/05	7/19/05	7/19/05
	Current RVC GW	Current ICVC GW	Proposed RVC GW	Proposed ICVC GW	SWPC						
Dissolved Metals (mg/L)											
Chromium, Total	NE	NE	NE	NE	0.11*			**0.129**			**1.09**
Copper	NE	NE	NE	NE	0.048			**0.213**		**0.0904**	**4.66**
Lead	NE	NE	NE	NE	0.013			**0.032**		**0.016**	**0.103**
Zinc	NE	NE	NE	NE	0.123						**0.439**
Water-8270C µg/l											
Acenaphthylene	NE	NE	NE	NE	0.3					**5.9**	
Benzo(b)fluoranthene	NE	NE	NE	NE	0.3		**0.4**				
Phenanthrene	NE	NE	NE	NE	0.3					**65.0**	
Water-8260B µg/l											
Vinyl chloride	2	2	1.6	52	15750	**19.0**		**28.0**	**8.3**	**9.2**	

KEY			
BOLD	Exceeds SWPC	**BOLD**	Exceeds Current RVC GW, Current ICVC GW, and Proposed RVC GW
Blank	Not Analyzed, Below Detection Limits, or Detected Below RSR Criteria (refer to appended Table 3)		

* This SWPC value is that assigned to hexavalent chromium. Total chromium results are compared to this value assuming the worst case that all chromium present is in the hexavalent state.

Four of the nine COC metals that were analyzed in ground water exceeded the SWPC. Ground water sample TB-2W was collected from within the area in which limited drum fragments were identified during the excavation of test pit TP-38; this sample exceeded the SWPC for total chromium, copper and lead (Figure 4). Ground water sample TB-1W is indicative of the ground water quality immediately down-gradient of this area. None of the metals were detected above RSR criteria in sample TB-1W, however, benzo(b)fluoranthene, a PAH constituent, was detected slightly above the SWPC.

SWPC exceedances for metals were also detected in ground water grab samples TP-16W and TP-28W (Figure 4). PAHs were also detected in exceedance of the SWPC at TP-16W. Note, these test pit ground water grab samples were unfiltered, and analysis consisted of total metals only. Any metal and PAHs contamination adhered to soil particles suspended in samples TP-16W and TP-28W would be reported in the total metal

concentrations. Therefore, the metals and/or PAHs in samples TP-16W and TP-28W may not be indicative of the actual ground water quality at those locations. All other ground water samples collected from the site were filtered by the lab and were reported as dissolved metals.

Vinyl chloride was detected above the current RVC GW, the current ICVC GW, and the proposed RVC GW in four of the ground water samples. No other VOCs were detected above the applicable RSR criteria.

7.1.6 Discussion

Proposed site redevelopment plans include regrading and paving the western portion of the site such that it can be used as a parking area for commercial trucks. As such, there is no proposed residential use of the site. Therefore, an Environmental Land Use Restriction (ELUR) limiting the site use to that of industrial or commercial will eliminate the need to physically remediate soil that exceeds only the RDEC, as follows:

- TP-1 (7') – ETPH
- TP-26B (5') – ETPH
- TP-32 (3.5') – ETPH
- TP-38 (3') – Copper and Hexavalent Chromium

The ELUR will not eliminate the need to remediate exceedances of the IC DEC. However, given the proposed installation of pavement and the site's GB-area ground water designation, physical remediation can be limited to the upper two feet provided clean fill replaces what was excavated and the area is paved. Then an ELUR restricting the disturbance of the subsurface would be required. The soil sample exceedance locations that would require physical removal are as follows:

Sample ID (depth below grade)	PMC Exceeding Parameter
TP-14B (0.6')	Total Chromium
TP-18A (1')	Total Chromium
TP-25A (1.5')	Total Chromium
TP-36 (1.8')	Total Chromium
TP-38C (2')	Total Chromium
TP-64A (1.5')	Total Chromium

GB PMC exceedances detected above the ground water table are indicative of contamination in soil that may be contributing to ground water contamination. GB PMC exceedances identified in soil that is presumed to be above the seasonal high ground water table are presented in the following. These exceedances may not necessarily be associated with contamination from buried wastes, but are located within the overall area of where buried wastes were suspected. Four isolated, distinct areas of GB PMC exceedances are identified on the western portion of the site (Figure 3).

Sample ID (depth below grade)	PMC Exceeding Parameter
TP-4 (3')	Dieldrin (pesticide)
TP-5 (2.7)	VOCs and ETPH
TP-28 (1.5')	VOCs and PAHs
TP-21 (5')	PAHs
TP-24A (2.0')	PAHs
TP-31A (5')	ETPH
TP-20A (1.5')	VOCs
TP-68 (1')	VOCs

Much of the areas with soil exceedances of the GB PMC coincide with areas with IC DEC exceedances. Additional excavation to a slightly deeper depth (seasonal high ground water table, estimated to be at most 4' below grade beneath the western portion of the site) will be required at these locations. Limited additional excavation beyond that proposed for IC DEC will be needed to address the GB PMC exceedances.

7.2 RA-2 Former Drum Filling Building

7.2.1 Background Information

The former drum-filling building constructed in circa 1960 was used to fill 55-gallon drums with the materials from the tank farm. Drums were also stored in and adjacent to this building. A floor drain in this building was connected to the adjacent chemical manhole (RA-3)

7.2.2 Release Information

Potential release mechanisms for this PRA include spills and container failures that would discharge directly to concrete and shallow soils. Analytical results of the waste material indicate high levels of heavy metal contamination consisting of chromium, nickel, and copper, in particular. Contaminants of Concern for RA-1 include metals, VOCs, ETPH, PAHs and pesticides.

7.2.3 Phase III Investigation

To evaluate the potential for shallow releases, three test pits (TP-66, TP-67 and TP-68) were installed to depths up to 8.5 feet below grade within the footprint of the former building (Figure 3). The walls and concrete slab of the building were previously demolished. However, the concrete footing walls are still present. TP-66 and TP-67 were installed as one trench that transected the width of the building. The interior walls of the concrete footings were exposed. A 4"-diameter hole was observed in the footing wall along the northern wall, in line with the chemical manhole. Presumably, a drainpipe from the drum filling building to the chemical manhole ran through this hole. Sample TP-66 (2') was collected from beneath the hole; sample TP-67 (2.5') was collected near the middle of the building in line with the hole at the presumed location of a reported floor drain. Test pit TP-68 was installed on the west end of the former drum filling building and soil sample TP-68 (1') was collected to evaluate the potential for a shallow release. No staining, odors or elevated PID readings indicating a release were observed during collection of the soil samples.

Ground water was not encountered in the three test pits. TP-66 and TP-67 remained open over-night in order to determine if ground water would accumulate in the pit over a longer period of time such that a sample could be collected as proposed. Since no ground water accumulated in the pit, data from existing wells RIZ-4 and MW-3 that were inferred to be down-gradient of the building are expected to be representative of ground water emanating from beneath the drum filling building. The data from these wells is presented in the following sections.

7.2.4 Results of Soil Analysis

Soil sampling results for parameters that exceeded RSR criteria are summarized in the table below.

RA-2 Former Drum Filling Building
Detected Soil RSR Exceedances

			Sample ID	TP-66	TP-67	TP-68
			Sample depth (ft.)	2.0'	2.5'	1.0'
			Date Collected	7/20/2005	7/20/2005	7/18/2005
VOCs - 8260B (µg/kg)	RDEC	ICDEC	GB PMC			
4-Isopropyltoluene / p-Isopropyltoluene	500,000	1,000,000	14,000			***239,000***
cis-1,2-Dichloroethylene	500,000	1,000,000	14,000			***22,400***
Tetrachloroethylene	12,000	110,000	1,000			***8,030***
Trichloroethylene	56,000	520,000	1,000			***1,020***

###	Exceeds GB PMC
Blank	Below detection limits for listed compounds

Metals

All COC metals, with the exception of hexavalent chromium and thallium, were detected by mass analysis in one or more of the three samples. None of the mass analysis results exceeded DEC standards. To verify PMC compliance, the three soil samples were also analyzed by the SPLP method for total chromium, lead, nickel, vanadium, and thallium. No leachable metals were detected. The concentrations of all total and leachable metals detected in soil from RA-2 were below the applicable RSR criteria.

VOCs

No VOCs were detected in soil samples from TP-66 and TP-67. Four VOC compounds were detected in sample TP-68 above the GB PMC. In addition to the VOCs listed in the exceedance summary table, t-1,2-DCE was also detected below all applicable standards.

ETPH

ETPH was detected in all three samples at concentrations below the applicable criteria.

PAHs, PCBs & Pesticides

No PAHs, PCBs or pesticides were detected in the two soil samples collected from PRA-2 analyzed for these parameters (see Table 2B).

7.2.5 Results of Ground Water Analysis

Ground water samples MW-3 and RIZ-4 did not exceed the applicable RSR criteria, as summarized in the appended Table 4. Of the 9 analyzed COC metals, only barium, copper, lead, and vanadium were detected above the laboratory MDLs. There were no detectable concentrations of TPH (418.1), VOCs, or PAHs.

7.2.6 Discussion

Soils beneath the former drum filling building do not appear to have been impacted by historical activities. VOC contamination at TP-68 is likely associated with the elevated VOCs detected to the west of the drum filling building at TP-20 and TB-8W; these detections are attributed to a surficial release at or near the drum filling building. To demonstrate compliance with the GB PMC, the area including TP-68, TP-20, and TB-8W will have to be excavated to the seasonal high ground water table depth, presume to be at a maximum depth of 4' below grade. In addition, it is recommended that the concrete footing walls of the former drum filling building be removed, characterized and appropriately disposed.

Contamination was not identified in down-gradient ground water samples. However, the ground water elevation survey data is interpreted such that these wells may be more cross-gradient than down-gradient to the drum filling building. Therefore, the ground water data may not be representative of ground water flowing from beneath the drum filling building.

7.3 RA-3 Former Chemical Manhole

7.3.1 Background Information

The chemical manhole was part of an underground disposal system that received waste chemicals and spills from the floor drain in the drum-filling building (RA-2), located adjacent to the south of the chemical manhole. It is believed that the chemical manhole served as a septic tank that discharged to a leaching field (RA-3) to the north.

The chemical manhole itself was excavated during the remedial action that preceded the January 2001 emergency response. At the time of the Phase III investigation, the manhole consisted of an open excavation filled with water. The terrain surrounding the chemical manhole prevented installation of most of the proposed test pits, as described in Section 7.3.3.

7.3.2 Release Information

Analytical results of soil and ground water samples collected from the chemical manhole area in 1998 indicate the presence of chlorinated solvents, TPH, and heavy metals. Potential release mechanisms for RA-3 include leachate discharge to the soil surrounding and underlying the chemical manhole.

7.3.3 Phase III Investigation

To the south, the excavation abuts the concrete footing of the drum filling building (RA-2), the sampling results from which are discussed in Section 7.2. To the east, the topography drops and the area is saturated with surface water, rendering the area inaccessible to the excavation and Geoprobe equipment. Test pit TP-64 was installed directly to the north of the chemical manhole excavation. Soil samples TP-64A and TP-64B were collected at depths of 1.5' and 3.5' below grade, respectively.

7.3.4 Results of Soil Analysis

Soil sampling results for parameters that exceeded RSR criteria are summarized in the table below.

RA-3 Chemical Manhole
Detected Soil RSR Exceedances

			Sample ID	TP-64A	TP-64B
			Sample depth (ft.)	1.5'	3.5'
			Date Collected	7/25/2005	7/25/2005
Metals (mg/kg)	RDEC	ICDEC	GB PMC		
Chromium, Total	100	100	Not applicable	**899**	**1,310**

BOLD Exceeds RDEC and IC DEC

Metals

All COC metals, with the exception of thallium, were detected by mass analysis in at least one of the samples. Mass analysis results for only total chromium in samples TP-64A (1.5') and TP-64B (3.5') exceeded the RDEC and I/C DEC. Based on the mass analysis results, both soil samples were also analyzed by the SPLP method for total chromium, lead, nickel, thallium and vanadium. No leachable metals were detected, except for total chromium in sample TP-64A (1.5') and copper in sample TP-64B. Neither of the detected leachable metals exceeded the GB PMC.

ETPH

ETPH was detected in, TP-64A (1.5') (TP-64B was not analyzed for hydrocarbons). However the detected ETPH concentrations do not exceed applicable criteria.

VOCs

VOCs detected in RA-3 soil include MTBE at 5 µg/mg in sample TP-64A and DCA at 5 µg/mg in sample TP-64B. Neither detection exceeds the applicable RSR criteria.

PAHs, Pesticides, & PCBs

No PAHs, pesticides or PCBs were detected in the soil samples collected from RA-3.

7.3.5 Discussion

A release of leachate either directly via the chemical manhole or the associated leach field (RA-4, see Section 7.4) is evident in the soil sampled directly north of manhole. Given the elevated chromium and copper concentrations and low pH, the release is presumed to have consisted predominantly of chromic and/or cupric acid.

7.4 RA-4 Leaching Field

7.4.1 Background Information

The leaching field on the east-central portion of the site received discharge from the chemical manhole. The chemical manhole collected floor spills that were discharged from the floor drain in the former drum-filling building. The former drum-filling building was used to fill 55-gallon drums with the raw materials stored in the tank farm.

7.4.2 Release Information

Potential release mechanisms for this release area include leachate discharged to soils underlying the underground disposal system. Contaminants of Concern for RA-4 include the COC metals, VOCs, ETPH and PAHs.

7.4.3 Phase III Investigation

Observations of the leaching field consisted of a blue-grey layer of coarse gravel or process stone 0.5-1.0' thick. The layer of process stone was typically saturated with water that exhibited an oily sheen and/or odor. The leaching field was observed in the following fifteen (15) test pits (Figure 3).

- TP-3
- TP-4
- TP-5
- TP-6
- TP-13
- TP-14
- TP-15
- TP-16
- TP-17
- TP-21
- TP-25
- TP-26
- TP-27

Where the process stone was identified, a soil sample was typically collected from the sand, silt or clay mixed with the process stone or from the unconsolidated material directly beneath the process stone. The delineation of the leach field based on these observations is shown on Figure 3.

Twenty-one soil samples were collected from the test pits installed in the leach field area. All samples were analyzed for the COC metals, VOCs, and PAHs. Twelve samples were analyzed for ETPH; typically a minimum of one sample per test pit (typically collected from just beneath the saturated process stone) was selected for ETPH analysis.

A ground water grab samples was collected from test pit TP-16, located within the area of the leach field. Saturated process stone was

observed during the installation of TP-16. Unfiltered ground water was collected in appropriate sampling containers in accordance with HRP SOPs until submitted to the laboratory for analysis. A sufficient sampling volume was not available to also analyze groundwater from test pit TP-16 for pesticides, as proposed.

In addition, a ground water sample was collected from monitoring well MW-1 during the November 16, 2005 monitoring event. This previously installed, permanent monitoring well is located within the area of the suspected leach field. Note this is the well that TtNUS suspected penetrated a buried waste deposit during installation. A sufficient sampling volume was not available to also analyze groundwater from test pit MW-1 for pesticides, as proposed.

7.4.4 Results of Soil Analysis

Soil sample analytical detections that exceeded one or more of the applicable criteria are summarized in the table below.

RA-4 Leaching Field
Detected Soil RSR Exceedances

			Sample ID	TP-4	TP-5	TP-14B
			Sample depth (ft.)	3.0'	2.7'	0.6'
			Date Collected	7/18/2005	7/18/2005	7/19/2005
	RDEC	ICDEC	GB PMC			
CT ETPH (mg/kg)	500	2,500	2,500	2,100	***13,000***	
Metals (mg/kg)	**RDEC**	**ICDEC**	**GB PMC**			
Chromium, Total	100	100	not applicable			**979**
VOCs 8260B (µg/kg)	**RDEC**	**ICDEC**	**GB PMC**			
Dibromochloromethane	7,300	68,000	100		***1,540***	
Tetrachloroethylene	12,000	110,000	1000		***1,440***	
Toluene	500,000	1000,000	67,000		***184,000***	
Vinyl chloride	320	3,000	400			
Xylene-Total	500,000	1,000,000	19,500		***99,900***	
Pesticides/PCBs 8081A (mg/kg)	**RDEC**	**ICDEC**	**GB PMC**			
Dieldrin	0.038	0.36	0.007	***0.065***		
Aroclor 1268 (PCB)	1	10	0.005	***0.118***		

KEY

BOLD	Exceeds RDEC	***BOLD & ITALIC***	Exceeds GB PMC	**BOLD**	Exceeds GB PMC and RDEC	***BOLD & ITALIC***	Exceeds GB PMC, RDEC and I/C DEC
Blank	Not Analyzed, Below Detection Limits, or Detected Below RSR Criteria (refer to appended Tables 2A & 2B)						

No contamination above RSR criteria was detected in samples TP-25B (2.5'), TP-26A (2.0'), and TP-27 (4.0'), which were collected from the soil beneath the leach field observed at these locations.

Metals

All COC metals, with the exception of thallium, were detected by mass analysis in at least one of the twenty-one samples. Total chromium in samples TP-14B (0.6') exceeded the RDEC and I/C DEC. Sample TP-14B consisted of clay collected from within the layer of process stone indicative of the leach field. Total chromium that was detected in the deeper samples collected from this test pit (TP-14A [2.0']) did not exceed the DEC.

Based on the concentrations of total metals, all soil samples from RA-4 were also analyzed by the SPLP method for at least one of the COC metals. None of the limited number of leachable metals that were detected exceeded the GB PMC.

ETPH

The ETPH RDEC was exceeded in TP-4 (3') (Figure 3). The RDEC, the Industrial Commercial DEC and the GB PMC for ETPH were exceeded at TP-5 (2.7') (Figure 3). [ETPH contamination in TP-26B (5') was discussed in Section 7.1 pertaining to buried waste, RA-1. However, the potential affects of the leach field at this depth cannot be ruled out as contributing source.]

VOCs

VOCs were detected in 15 of the 21 samples collected from the leach field area. None of the detected VOCs exceeded the DEC. Exceedances of GB PMC were detected in two samples. Dibromochloromethane, PCE, toluene, and xylenes were detected in soil sample TP-5 (2.7') above the respective GB PMC. [Vinyl chloride was detected above the GB PMC in sample TP-21 (5'). This contamination was discussed in Section 7.1 with regards to buried waste, RA-1. However, the potential affects of the leach field at this depth cannot be ruled out as contributing source.]

PAHs

No PAHs were detected above applicable criteria.

Pesticides & PCBs

One pesticide, dieldrin (0.065 mg/kg) and one PCB, aroclor 1268 (0.118 mg/kg), were detected in sample TP-4 (3'). The dieldrin detection exceeds the RDEC and GB PMC. The aroclor detection exceeds the GB PMC for PCB's.

7.4.5 Results of Ground Water Analysis

Ground water results with RSR exceedences are summarized below.

RA-4
Detected Ground Water RSR Exceedances

					Sample ID	TP-16W	MW-001
					Date Collected	7/19/2005	11/16/2005
	Current RVC GW	Current ICVC GW	Proposed RVC GW	Proposed ICVC GW	SWPC		
Dissolved Metals (mg/L)							
Copper	NE	NE	NE	NE	0.048	**0.0904**	
Lead	NE	NE	NE	NE	0.013	**0.016**	
PAHs - 8270C modified (µg/L)							
Acenaphthylene	NE	NE	NE	NE	0.3	**5.9**	
Phenanthrene	NE	NE	NE	NE	0.3	**65.0**	
VOCs - 8260B (µg/l)							
Vinyl chloride	2	2	1.6	52	15,750	**9.2**	**19.0**

BOLD	Exceeds SWPC
BOLD	Exceeds Current RVC GW & ICVC GW, and Proposed RVC GW
Blank	Not analyzed, below detection limits, or detected below RSR criteria (refer to appended Table 3)
NE	Not Established (no published DEP criteria)

Metals

Copper and lead were detected above the SWPC in sample TP-16W. Note that this was an unfiltered sample analyzed for total metals. Therefore the sampling results include any metals adhered onto sediment particles collected with the sample.

ETPH

ETPH was detected in both TP-16W and MW-1 at 1.8 mg/L and 4.36 mg/L, respectively. There are no hydrocarbon criteria that apply to site groundwater.

VOCs

Vinyl chloride was detected above the current RVC GW, the current ICVC GW, and the proposed RVC GW in the two of the ground water samples. No other VOCs were detected above the applicable RSR criteria.

PAHs

Two PAH compounds, acenaphthylene and phenathrene, were also detected in TP-16W above the SWPC. Note that this was an unfiltered sample analyzed for total metals. Therefore the sampling results include any metals adhered onto sediment particles collected with the sample.

7.4.6 Discussion

The following detections of COCs that exceeded applicable criteria are believed to be directly associated with contaminated wastewater discharged to the leach field via the chemical manhole.

- ETPH, pesticide and PCB contamination at TP-4
- VOC and ETPH contamination detected at TP-5
- ETPH contamination detected at TP-26
- Vinyl chloride contamination was detected at TP-21

The contamination at TP-5 appears isolated as none of these compounds were detected any of the nearest sampling locations. Since the sample was collected from the western edge of the site, contamination may extend off-site to the west (Figure 3).

Note TP-21 transected the edge of the process stone indicative of the leach field. The contamination is presumed to be sourced from contaminated water perched in the process stone presumed to be part of the leach field construction.

Since shallow chromium contamination detected at TP-25 was above the leach field, it is more likely that the shallow contamination is due to a surficial release from historic drum storage in this area (RA-6) or due to the redistribution of contaminated soil disturbed by excavation equipment during the 2001 emergency response.

Arochlor 1268 (a PCB), and dieldrin (a pesticide), and ETPH were detected above applicable criteria in the soil sample TP-4 (3'). While the contamination may be associated with wastewater from the leach field, the fact that pesticides were not detected in any of the other samples collected from within or below the leach field indicates that at least the detected pesticides may be the result of a surficial release.

Groundwater exceedances of the SWPC detected in sample TP-16W are attributed to sediment particles suspended in the unfiltered sample. This is supported by the compliant results for metals and PAHs from monitoring well MW-1, located less than 10' away from the location of test pit TP-16.

Exceedances of the RVC GW for vinyl chlorinated detected in both samples TP-16W and MW-1 indicate low levels of VOC contamination in this area. The detected concentrations are only prohibitive to the construction of residential building within thirty feet of the detections. Since the proposed site use is as a paved commercial parking area, the vinyl chloride does not affect the proposed site use.

7.5 RA-5 Former Loading Rack and Associated Piping

7.5.1 Background Information

The former loading rack was used to unload bulk-chemicals from railroad tanker cars to the tank farm. Surficial staining along the loading rack was identified in the Notice of Violation issued to the Site by the CT DEP in 1991.

7.5.2 Release Information

Potential release mechanisms for this PRA include spills during transfers from railroad tanker cars to the above ground tank farm. Contaminants of Concern for RA-4 include the COC metals, VOCs, ETPH and PAHs.

7.5.3 Phase III Investigation

Two soil borings (TB-7 and TB-9) were installed in the vicinity of the former loading rack (Figure 2). One shallow sample was collected from each boring. No staining, odors or elevated PID readings indicating a release were observed during collection of the soil samples.

Two ground water samples were collected from the vicinity of the former loading rack (Figure 2). Test boring TB-7W was installed and converted to a temporary well point installed at the location of the former rack. Monitoring well MW-203 was an existing 2"-daimater monitoring well installed between the tank farm and railroad spur, to the east and down-gradient of the railroad spur.

7.5.4 Results of Soil Analysis

Soil sample analytical detections are summarized in the text below. None of the detections exceeded RSR criteria. All sampling results are included in the appended Tables 2A and 2B.

Metals

All COC metals, with the exception of thallium, were detected by mass analysis in at least one of the two samples. None of the mass analysis results exceeded the DEC. Both soil samples were also analyzed by the SPLP method for chromium, lead, vanadium, and thallium. The SPLP extract for sample TB-9 was also analyzed for nickel. None of the leachable

metals were detected exceeded the laboratory MDLs, all of which were below the GB PMC. The concentrations of all total and leachable metals detected in soil from RA-5 were below the applicable RSR criteria.

ETPH

ETPH was detected in sample TB-9 (0-2') at a concentration of 94 µg/kg, which is below the applicable RSR criteria. No PAHs were detected in the two soil samples collected from PRA-5.

VOCs

Xylene, the only detected VOC, was detected in sample TB-9 (0-2') at a concentration of 3 µg/kg, which is below the applicable RSR criteria. No other VOCs were detected in the soil.

PAHs

No PAH compounds were detected above the applicable standards.

7.5.5 Results of Ground Water Analysis

Of the analyzed COCs, only barium, total chromium, lead, vanadium and zinc were detected in the ground water samples collected from MW-203 and TB-7W (see appended Table 3). No exceedances of RSR criteria were detected.

7.5.6 Discussion

None of the COCs were detected above the applicable RSR criteria. The only detections of COCs, including ETPH, metals, and xylenes in soil and metals in ground water were significantly below the respective criteria.

7.6 PRA-6 Drum Storage Area

7.6.1 Background Information

Exterior drum storage was identified from circa 1965 to circa 1980 on the northeast portion of the Site. Drum storage was also reported to have been located in and adjacent to the drum filling building (RA-2).

7.6.2 Release Information

Potential release mechanisms for this PRA include spills and container failures with discharge directly to concrete and shallow soils. Contaminants of Concern for PRA-6 include metals, VOCs, PAHs, ETPH and pesticides.

7.6.3 Phase III Investigation

For the purposes of evaluating surficial releases associated with drum storage, twenty-one shallow soil samples (samples from within 2' of the ground surface) were collected from the following fourteen test-pits installed with the area of drum storage.

• TP-06 2.0'	• TP-07 1.5'	• TP-08 1.5'	• TP-09 2.0'	• TP-11A 1.0'	• TP-12B 2.0'	• TP-13A 2.0'	• TP-14B 0.6'
• TP-14A 2.0'	• TP-15A 2.0'	• TP-16A 2.0'	• TP-17A 1.0'	• TP-18A 1.0'	• TP-19A 1.5'	• TP-20A 1.5'	• TP-24A 2.0'
• TP-25A 1.5'	• TP-25B 2.5'	• TP-26A 2.0'	• TP-28 1.5'				

Several shallow soil samples are not included in the drum storage evaluation because the samples were collected to directly evaluate a separate distinct release mechanism, such as the buried waste or chemical manhole leachate.

All samples were analyzed for the ten COC metals, VOCs, and PAHs. Select samples were analyzed for ETPH, pesticide, and PCBs. At least one sample per test pit was selected for ETPH analysis based on field observations (e.g., PID readings, odors, or evidence of fill). No staining was observed in the shallow samples collected from this portion of the site. However, elevated PID readings and a solvent odor were observed during the installation of TP-20.

7.6.4 Results of Soil Analysis

Soil sample analytical detections that exceeded one or more of the applicable criteria are summarized in the table below. All soil sampling results are included in the appended Tables 2A and 2B.

RA-6 Former Drum Storage
Detected Soil RSR Exceedances

			Sample ID	TP-14B	TP-18A	TP-20A	TP-24A	TP-25A	TP-28
			Sample depth (ft.)	0.6'	1.0'	1.5'	2.0'	1.5'	1.5'
			Date Collected	7/19/2005	7/19/2005	7/18/2005	7/20/2005	7/20/2005	7/19/2005
	RDEC	ICDEC	GB PMC						
CT ETPH (mg/kg)	500	2,500	2,500			***4,300***			860
Metals (mg/kg)	**RDEC**	**ICDEC**	**20X GB PMC**						
Chromium, Total	100	100	10	***979***	***2,390***			***104***	***161***
PAHs 8270C-modified (µg/kg)	**RDEC**	**ICDEC**	**GB PMC**						
2-Methylnaphthalene	474,000	2,500,000	9,800						57,900
Benzo(a)anthracene	1,000	7,800	1,000						***19,300***
Benzo(a)pyrene	1,000	1,000	1,000						***12,400***
Benzo(b)fluoranthene	1,000	7,800	1,000				***1,170***		***15,100***
Benzo(k)fluoranthene	8,400	78,000	1,000						6,350
Chrysene	84,000	780,000	1,000						18,400
Fluoranthene	1,000,000	2,500,000	56,000						74,100
Indeno(1,2,3-cd)pyrene	1,000	7,800	1,000						4,130
Naphthalene	1,000,000	2,500,000	56,000						83,900
Phenanthrene	1,000,000	2,500,000	40,000						111,000
Pyrene	1,000,000	2,500,000	40,000						48,900
VOCs 8260B (µg/kg)	**RDEC**	**ICDEC**	**GB PMC**						
4-Isopropyltoluene / p-Isopropyltoluene	500,000	1,000,000	14,000			***2,150,000***			
Naphthalene	1,000,000	2,500,000	56,000						***456,000***

BOLD	Exceeds RDEC
BOLD	Exceeds GB PMC
BOLD	Exceeds RDEC and GBPMC
BOLD & ITALIC	Exceed RDCE, IC DEC and GBPMC
Blank	Not analyzed, below detection limits, or detected below RSR criteria (refer to appended Tables 2A and 2B)

Metals

Chromium was detected above the RDEC and IC DEC in TP-14A (0.6'), TP-18A (1.0'), TP-25A (1.5'), and TP-28 (1.5'). No other mass analysis results for metals exceeded the DEC. No exceedances of the GB PMC were detected in the SPLP analysis, including the SPLP chromium analysis. Note, deeper samples TP-18B (4.5') and TP-25B (2.5') are

compliant with the RSR criteria for chromium, indicating that the chromium contamination is limited to only the shallow soil at these locations.

ETPH

ETPH was detected above standards in two samples, TP-20A (1.5') and TP-28 (1.5'). ETPH in TP-20A (1.5') exceeds the RDEC, ICDEC and GBPMC. Since the deeper sample TP-20B (7') was not analyzed for ETPH, the depth of the contamination is not known at this location. The concentration in TP-28 (1.5') exceeds only the RDEC. However the ETPH is presumed to be associated with the detections of VOCs and PAHs at this location.

VOCs

The compound 4-isopropyltoluene was detected in exceedance of the GB PMC at TP-20A (1.5'). The elevated concentrations of 4-isopropyltoluene in TP-20A (1.5') is indicative of a shallow release having occurred at this location and does not appear related to waste burial. The compound 4-Isopropyltoluene was not detected above standard in deeper sample TP-20B (7') however vinyl chloride was detected above the RDEC and GBPMC in the deeper sample. The source of the deeper vinyl chloride contamination has not been identified, however the data does not rule out a surficial release that may have migrated into the deeper soil.

[The shallow 4-isopropyltoluene release appears to have impacted nearby sampling location TP-68, where 4-isopropyltoluene was also detected above standards. TP-68, located within the footprint of the former drum filling building, had several other VOCs detected above RSR criteria, as described in Section 7.2.]

In addition, 456,000 µg/kg of naphthalene was detected as a VOC above the GB PMC in TP-28 (1.5'). A surficial release of naphthalene may have occurred near this location. Note naphthalene is a compound that is reported on both the 8260B VOC analysis and the 8270C-modified PAH analysis. The PAH analysis of sample TP-28 (1.5') detected 83,900 µg/kg of naphthalene. Both detections exceed the GB PMC.

PAHs

In addition to the naphthalene detected in TP-28 (1.5'), several other PAHs exceeding one or more of the applicable standards were detected at TP-28 (1.5').

Benzo(b)fluroanthane was detected in sample TP-24A above the RDEC and GBPMC. No other exceedances were detected at TP-24A. No exceedances were detected in the deeper sample from TP-24 (TP-24B [4']), including the result for benzo(b)fluroanthane.

Pesticides & PCBs

No pesticides were detected above RSR criteria in shallow samples collected from the former drum storage area.

7.6.5 Discussion

Shallow soil data indicate that surficial releases likely occurred in the vicinity of TP-14, TP-18, TP-20, TP-24, TP-25, and TP-28. Chromium contamination above the RDEC and IC DEC was detected in 4 shallow samples from RA-6. Based on previous sample results from waste samples obtained during the 2001 remedial response, the varied waste had elevated concentrations of chromium. Surficial releases of chromium from improper drum storage cannot be ruled out. It is also suspected that the detected chromium is associated with contaminated soil that was excavated redistributed over the surface during the emergency response. This release mechanism is further addressed as RA-13 in Section 7.13.

The VOC contamination detected in TP-20A is indicative of a shallow release of 4-isobutyltoluene that has also affected soil at TP-68, installed within the footprint of the former drum filling building (see Section 7.2).

7.7 PRA-7 Former Drum Storage Sheds

7.7.1 Background Information

Drums were stored in and around the small shed formerly located at the western terminus of the railroad spur.

7.7.2 Release Information

Potential release mechanisms for this PRA include spills and container failures with discharge directly to concrete and shallow soils.

7.7.3 Phase III Investigation

To evaluate the potential for releases associated with the storage sheds, two test pits (TP-69 and TP-70) were installed to depths up to 8' below grade (Figure 2). Soil samples TP-69 and TP-70 were analyzed for pH, COC metals, VOCs, PAHs, ETPH and pesticides.

Test-pit TP-69 was installed directly beneath the northwest corner of the concrete slab of a former shed located near the eastern terminus of the railroad spur. The slab is approximately 10' x 15' and was 0.8' thick. A second shed is suspected to have been located along the southern property boundary, however no slab was apparent during the investigation. Test-pit TP-70 was installed to the north of the suspected location of the southern shed.

The bottom of the concrete slab removed during the installation of TP-69 was coated in a black, viscous petroleum-based substance. Approximately six-inches of process stone underlying the slab was also coated with the same material. Elevated PID readings were recorded for the layer of process stone and for the soil under the process stone and slab (77 and 54 ppmv, respectively), although the soil was not observed to be stained or odorous. One soil sample was collected from approximately 2' below grade, which, in this case, is measured from the top of the concrete slab.

No staining, odors or elevated PID readings indicating a release were observed during the installation of TP-70. However, two 3' steel pipes were identified at 0.6' and 1.2' below grade (see test pit logs). Although it is not known if the suspected shed to the south of TP-70 was connected to

unities, these pipes may be conduits for water, septic, or electrical lines. One soil sample was collected approximately one foot below grade.

A ground water grab sample was also collected from TP-70. Groundwater sample TP-70W was analyzed for pH, COC metals, ETPH, VOCs, PAHs, and pesticides.

7.7.4 Results of Soil Analysis

Soil sample analytical detections are summarized in the text below. Only metals and ETPH were detected in the samples. VOCs, PAHs, PCBs, and pesticides were not detected above the laboratory detection limits. All sampling results are included in the appended Tables 2A and 2B.

Metals

None of the mass analysis results exceeded the DEC. Both soil samples TP-69 and TP-70 were analyzed by the SPLP method for chromium, lead, vanadium, and thallium. The SPLP extract for sample TP-70 was also analyzed for nickel. None of the SPLP metals were detected above the laboratory MDLs, all of which were below the GB PMC. The concentrations of all total and leachable metals detected in soil from PRA-7 were below the applicable RSR criteria.

ETPH

Of the analytes detected in soil samples TP-69 (2.0') and TP-70 (1.0'), only ETPH was detected above RSR criteria. ETPH was detected at 540 mg/kg at TP-69, which exceeds the RDEC. The ETPH detected at this location is presumed to be associated with the viscous oil coating observed on the process stone beneath the slab of the former shed at TP-69.

7.7.5 Results of Ground Water Analysis

Of the 9 analyzed COC metals, barium, total chromium, copper, vanadium and zinc were detected in the ground water grab sample TP-70W. However none of the detections were above the applicable criteria. ETPH was also detected, however no criteria for hydrocarbons is applicable to the subject site. VOCs, PAHs and pesticides were not detected above the laboratory detection limits.

7.7.6 Discussion

Of the COCs, only ETPH was detected above the applicable criteria. A concentration of 540 mg/kg of ETPH was detected in TP-69, which slightly exceeds the RDEC.

If an environmental land use restriction (ELUR) is imposed on the site limiting site use to that of only commercial or industrial, then no further remediation would be required to address the soil contamination detected at TP-69. Nevertheless, the viscous petroleum material that coats the base of the slab and underlying process stone should be removed and appropriately disposed.

7.8 PRA-8 Former Tank Farm

7.8.1 Background Information

The above ground tank farm (shown on Figures 2, 4 and 5) which consisted of ten (10) 10,000-gallon tanks was located on the central portion of the parcel. The following materials were reported to have been stored in the tank farm ASTs: isopropanol, methanol, methyl ethyl ketone, acetone, xylol, dioctyl phthalate, anti-freeze, and toluol.

7.8.2 Release Information

Any release from the former above ground tanks is presumed to have been initially contained by the former concrete containment structure. Currently, the only the western portion of the concrete base remains intact. Concrete rubble piles are located on the western portions of the former tank farm. The structural integrity of the concrete containment while the site was active is unknown, and a release from a tank may have been able to permeate to the subsurface through any cracks, gaps or other drainage outlet.

7.8.3 Phase III Investigation

To evaluate the potential for releases, six test pits (TP-43, TP-54, TP-55, TP-73, TP-74 and TP-75) were installed to depths up to 7' below grade (Figure 2). A solvent odor and elevated PID readings were observed during the installation of test pits TP-55 and TP-73, located on the eastern and northeastern portions of the tank farm. The highest PID readings were detected in soil from a layer of saturated sand observed 3.5-5.5' below grade at both test pits. This sand interval, which consisted of well-sorted medium-grained sand, was layered between layers. A similar stratigraphy was observed at test pit TP-54, however there was no odor, staining or PID readings indicating a release.

One soil sample each was collected from test pits TP-73, TP-74 and TP-75. Two samples were collected from both TB-54 and TP-55. No indication of contamination was observed at test pit TP-43 and no sample was collected from this test pit. The primary purpose of TP-43 was to

identify the northern extent of the remaining concrete tank farm base, which was partially buried beneath a layer of sand and silt.

One soil sample was collected from TP-73 at 6.0' below grade. Samples were collected at 3' and 6' below grade (TP-54A and TP-54B, respectively) to confirm that the observed contamination did not extent to the northwest of TP-55 and TP-73.

It was the intent to collect ground water samples down-gradient of the tank farm from the one existing monitoring well and two proposed temporary well points. However, upon inspection the existing monitoring well (MW-203) was damaged, preventing the collection of a ground water sample. Also, the backhoe mounted Geoprobe unit was unable to access the eastern portion of the site due to wetlands that were significantly saturated. Temporary well points TB-1W and TB-2W were relocated to evaluate ground water quality at the waste burial area (RA-1). A groundwater grab sample was collected from test pit TP-59, installed in the presumed down-gradient direction of the former tank farm. Note, there was insufficient volume of groundwater available from TP-59 to run all COC analytes; PCBs and pesticides were not analyzed in preference to the other analytes (metals, ETPH, VOCs and PAHs).

7.8.4 Results of Soil Analysis

Soil sample analytical detections are summarized in the text below. None of the detections exceeded RSR criteria. Detections of Metals, ETPH and VOCs are described below. No PAHs, pesticides or PCBs were detected in the soil samples collected from the tank farm area. All sampling results are included in the appended Tables 2A and 2B.

Metals

None of the mass analysis results exceeded the DEC. Seven soil samples were also analyzed by the SPLP method for at least six of the COC metals. With of the exception of barium, none of the SPLP metals were identified above the laboratory detection limits. The barium detection was significantly below the GB PMC. The concentrations of all total and leachable metals detected in soil from PRA-8 were below the applicable RSR criteria.

ETPH

Low concentrations of ETPH were detected in the three analyzed samples, TP-54A (3'), TP-55A (3.5'), and TP-73 (6'). The highest ETPH concentration of these samples was 33 mg/kg, which is well below the applicable criteria.

VOCs

A significant VOC odor and limited PID readings higher than that observed in most other areas of the site indicated that VOC contamination was present in the wet sandy layer beneath the former tank farm. Ethyl benzene and xylenes were detected in samples TP-55A and TP-73. Xylenes were detected in TP-55B. However, the concentrations of VOCs detected in these were below all applicable RSR criteria. No other VOCs were detected.

Note all VOC analyses for soil samples submitted from RA-7 with the exception of TP-54A and TP-54B were subcontracted by the primary contract laboratory to an alternative laboratory (see LIMS 90542). The subcontracted laboratory completed the requested analysis by EPA Method 8260B.

7.8.5 Results of Ground Water Analysis

The nearest down-gradient ground water sample was collected as a grab sample from TP-59W. Trace concentrations of barium, total chromium, copper, vanadium, and zinc were detected in groundwater sample TP-59W. All metal detections were below the SWPC, the only applicable criteria for metals in groundwater. ETPH was detected at 0.161 mg/L, however no ETPH criterion applies to the groundwater at the subject site. A trace concentration of toluene (0.6 μg/L) was detected in groundwater sample TP-59W; this concentration is well below the applicable criteria. No PAHs were detected in groundwater sample TP-59W.

7.8.6 Discussion

No soil contamination above applicable RSR criteria was identified in soil samples collected from test pits installed within and around the former tank farm.

No ground water contamination above applicable RSR criteria was identified in the nearest down gradient ground water sample.

Approximately 95 cubic yards of concrete debris presumably originating from the eastern portion of the tank farm remain on-site and should be appropriately characterized and disposed. The portion of concrete base of the tank farm that remains in place (approximately 135 cubic yards) should also be appropriately characterized, removed and disposed.

7.9 RA-9 Loading Ramp

7.9.1 Background Information

The loading ramp located on the southcentral portion of the site adjacent to the south of the railroad spur was presumably used to transfer materials in containers on and off railroad cars. A report by Rizzo Associates dated June 23, 1992 indicated that VOCs had been detected in shallow soil samples from this area.

7.9.2 Release Information

Potential release mechanisms for this RA include spills from containers being transferred between railroad cars and the loading ramp. A potential release is expected to have discharged directly to the concrete ramp and shallow soils surrounding the ramp.

7.9.3 Phase III Investigation

To evaluate the potential for shallow releases, four soil borings (TB-3, TB-4, TB-5, and TB-6) were installed via Geoprobe to depths up to 8' feet below grade (boring logs attached). No staining, odors or elevated PID readings indicating a release were observed during collection of the soil samples. Therefore, one shallow soil sample was collected from TB-4, TB-5, and TB-6. Soil samples were analyzed for the 10 COC metals, VOCs, PAHs, and ETPH. Sample TB-5 was also analyzed for pesticides.

Test boring TB-3 was converted to a temporary well point for the purpose of collected a ground water sample. Ground water was analyzed for the 10 COC metals, ETPH, PAHs, and VOCs.

7.9.4 Results of Soil Analysis

Soil sample results from RA-9 are summarized in the table below. No VOCs or PAHs were detected above the laboratory detection limits for all three samples collected from this RA. No pesticides or PCBs were detected in the only sample analyzed for these parameters from this area, TB-5 (0-3').

Metals

None of the mass analysis results exceeded the DEC. The three soil samples were each analyzed by the SPLP method for four of the COC metals. With of the exception of chromium and vanadium, none of the SPLP metals were identified above the laboratory detection limits. The only chromium and vanadium detections (0.03 and 0.05 µg/L SPLP-leachate, respectively) were both detected in sample TB-5 and are significantly below the GB PMC. The concentrations of all total and leachable metals detected in soil from PRA-8 were below the applicable RSR criteria.

ETPH

ETPH was detected only in TB-6 (0-2') at 60 mg/kg, which is well below the applicable criteria. ETPH was not detected above the laboratory MDLs in samples TB-4 (0-3') and TB-5 (0-3').

7.9.5 Results of Ground Water Analysis

One ground water sample (TB-3W) was collected from temporary sampling point installed between the ramp and railroad spur. Sampling results are included in the appended Table 3. No ETPH, VOCs, or PAHs were detected above the laboratory detection limits. Seven of the 9 analyzed COC metals were detected in the sample. However, only zinc, detected at 0.773 mg/L, exceeded the SWPC.

7.9.6 Discussion

None of the COCs were detected in soil above the applicable RSR criteria. Only zinc was detected above one of the applicable ground water criteria, the SWPC. The zinc exceedance was detected in sample TB-3W. Note no soil sampling results are available from boring TB-3. However, it is reasonable to assume that a release of a zinc-related material occurred during the transfer of containers to or from a railway car. Additional soil testing may be required to confirm compliance. The zinc exceedance of the SWPC detected at TB-3W is expected to be isolated to the immediate vicinity of TB-3.

7.10 PRA-10 Railroad Spur

7.10.1 Background Information

The railroad spur was formerly used by tank-cars containing various bulk-chemicals. Also, railroad ties were typically treated with chlorinated-organic creosotes. Railroad right-of-ways were typically treated with herbicides.

7.10.2 Release Information

Potential release mechanisms for this PRA include spills and container failures with discharge directly to concrete and shallow soils. Also direct application of herbicides to the railroad area had not been ruled out.

7.10.3 Phase III Investigation

To evaluate the potential for shallow releases, four soil borings (TB-3, TB-7, TB-10, and TB-11) were installed via Geoprobe to depths up to 8 feet below grade (boring logs attached). No staining, odors or elevated PID readings indicating a release were observed during collection of the soil samples. Therefore, one soil sample each was collected from TB-7, TB-10, and TB-11. Shallow samples were collected from TB-7 and TB-11 (0-2' and 0-3', respectively) to determine if any surface releases had occurred. A sample was collected from the 4-6' interval at TB-10 to determine if potential contamination extended deeper in the subsurface.

Test boring TB-3 was converted to a temporary well point for the purpose of collected a ground water sample. Ground water was analyzed for the 10 COC metals, ETPH, PAHs, and VOCs. Note that TB-3 is also used to evaluate RA-9, the loading ramp next to the railroad spur.

7.10.4 Results of Soil Analysis

No ETPH, VOCs, PAHs, or herbicides were detected in the three soil samples collected from PRA-10. Soil sample results from RA-10 are summarized in the attached Tables 2A and 2B. The following text summarizes the metals that were detected in the soil samples.

Metals

None of the mass analysis results exceeded the DEC. The three soil samples were each analyzed by the SPLP method for four of the COC metals: total chromium, lead, vanadium and thallium. None of the SPLP metals were identified above the laboratory detection limits. The concentrations of all total and leachable metals detected in soil from PRA-8 were below the applicable RSR criteria.

7.10.5 Results of Ground Water Analysis

Refer to the ground water results summarized for TB-3 in Section 6.9.4. As indicated, only zinc was detected above any of the applicable RSR criteria.

7.10.6 Discussion

None of the COCs were detected in soil above the applicable RSR criteria. Only zinc was detected above one of the applicable ground water criteria, the SWPC. The zinc exceedance is presumed to be associated with a release that would have occurred during transfer of containers between railroad cars and the loading ramp and is expected to be localized to the immediate area of the loading ramp.

7.11 PRA-11 Unnamed Stream and Outfall

7.11.1 Background Information

A 24" concrete storm sewer is located beneath the northwest portion of the site. The outfall discharges run-off from Newfield Street and drainage features on the adjacent property to the east. The outfall is located on the north central portion of the site. Unnamed seasonal watercourses converge with the storm drainage discharge and form one main, unnamed east-flowing stream. The stream flows beneath the off-site railroad spur to the east of the site, and ultimately converges with the Mattabasset River.

7.11.2 Release Information

Any unidentified off-site releases that reached the storm sewer system via the catch basins installed along Newfield Street or on the adjacent property to the east could have potentially adversely impacted the subject site at the outfall location or along the on-site steam. In addition, stormwater drainage typically contains low concentrations of contaminants as a result of contact with these contaminants deposited on the run-off surfaces.

7.11.3 Phase III Investigation

To evaluate the potential for impacts associated with drainage from the stormwater discharging on-site, four sediment samples (SED-1 through SED-4) and four surface water samples (SW-1 through SW-4) were collected. Samples SED-1 and SW-1 were collected at the outlet of the 24" concrete storm drain pipe. Samples SED-2 and SW-2 were collected near the point that the on-site stream discharges from the site via a culvert beneath the off-site railroad spur east of the site. Samples SED-3 and SW-3 were collected from an intermittent tributary identified on the eastern portion of the site. Samples SED-4 and SW-4 were collected from an intermittent tributary immediately up-stream of the stormwater outfall.

7.11.4 Results of Sediment Analysis

Sediment sample results from RA-11 are summarized in the attached Tables 4. Exceedances are summarized in the table below.

RA-11 Unnamed Stream and Outfall Culvert
Sediment Sampling Analytical Result Summary

			Sample ID	SED-001	SED-002	SED-003	SED-004
			Date Collected	11/16/2005	11/16/2005	11/16/2005	11/16/2005
Metals (mg/kg)	RDEC	ICDEC	20X GB PMC				
Barium	4700	140000	200				295
Chromium, Total	100	100	10	21.5	37.3	80.3	177
Lead	400	1000	3	18	20.7	17.1	23
Nickel	1400	7500	20	21.8			23.3
Vanadium	470	14000	10	35.1	17.6	53.1	26.9
Pesticides & PCBs - 8081A (mg/kg)	RDEC	ICDEC	GB PMC				
4,4'-DDE	1.8	17	0.02			0.03	
PCB-1254	1	10	NE			1.07	

BOLD	Exceeds 20xGB PMC (Interpretively exceeds GB PMC without further SPLP analysis)
BOLD	Exceeds GB PMC
BOLD	Exceeds GB PMC, RDEC and IC DEC
Blank	Not analyzed, below detection limits, or detected below RSR *soil* criteria (refer to appended Table 4)

Metals

All COC metals, with the exception of thallium and hexavalent chromium, were detected by mass analysis in at least one of the four sediment samples. The mass analysis result for SED-4 exceeded the RDEC and I/C DEC for total chromium. The mass analysis results for total chromium, lead, and vanadium in all four sediment samples did not indicate compliance with the GB PMC. The mass analysis results for nickel in sediment samples SED-1 and SED-4 also did not indicate compliance with the GB PMC. Barium was also detected in SED-4 at a concentration that exceeded the 20 x GB PMC.

ETPH

ETPH was detected in each of the four samples. The concentrations of ETPH detected in sediment were below all RSR soil criteria.

VOCs

Methylene chloride was detected in the two of the sediment samples collected at concentrations of 47 and 41 µg/kg. No other VOCs were

detected in the soil. The concentrations of methylene chloride detected in sediment were below all RSR soil criteria.

PAHs

No PAHs were detected in sediment samples.

Pesticides & PCBs

The pesticide 4-4'-DDE and PCB-1254 were detected in sample SED-3. The pesticide result exceeds the GB PMC established for soil. The PCB result exceeds the RDEC for soil.

7.11.5 Results of Surface Water Analysis

Connecticut Water Quality Standards (CT WQS) include numerical criteria for select substances. The results of the surface water sample analyses were compared to the CT WQS numerical standards; exceedances are summarized in the table below.

RA-11 Unnamed Stream and Outfall Culvert
Surface Water Sampling Analytical Result Summary

	Sample ID	SW-001	SW-002	SW-003	SW-004
	Date Collected	11/16/2005	11/16/2005	11/16/2005	11/16/2005
Metals (mg/L)	WQS				
Copper	0.0048				0.0074
Lead	0.0012	0.006	0.008	0.006	0.011
VOCs - 8260B (µg/l)					
Tetrachloroethylene	0.8	2.6			
Vinyl chloride	2	12.5			

BOLD	Exceeds Freshwater Aquatic Life and/or Human Consumption WQS criteria
Blank	Not analyzed, below detection limits, or detected below RSR criteria (refer to appended Table 5)

Metals

Barium, total chromium, copper, lead, nickel, vanadium, and zinc were detected in the surface water samples. The lead detected in the four surface water samples exceeded the chronic freshwater aquatic life criteria, the most conservative of the applicable CT WQS. The copper result for SW-4 also exceeds the chronic, freshwater aquatic life criteria.

ETPH

ETPH was detected only in sample SW-4. The CT WQS does not include a numerical criterion for petroleum hydrocarbons.

VOCs

Several VOCs were detected in surface water sample SW-1 and SW-2. Vinyl chloride and PCE were detected in SW-1 at concentrations that exceed the CT WQS. No other exceedances were detected.

PAHs

No PAHs were detected above the laboratory detection limit. It should be noted that the laboratory detection limit for most of the PAHs exceeds the extremely low numerical standards for PAHs in the CT WQS.

7.11.6 Discussion

Total chromium detected in sediment sample SED-4 exceeds the RDEC and I/C DEC. Sample SED-4 was collected from the base of an intermittent watercourse immediately upstream of the stormwater discharge outlet. This intermittent stream included surface water drainage from the southeastern and northwestern portions of the site. This surface water was conceivably in contact with chromium-contaminated soil identified on the western portion of the site. The chromium concentration decreases downstream as the surface water is diluted with drainage discharge from the culvert.

The mass analysis results for barium, total chromium, lead, and vanadium in all four sediment samples did not indicate compliance with the GB PMC. The mass analysis results for nickel in sediment samples SED-1 and SED-4 also did not indicate compliance with the GB PMC. If compliance with the GB PMC soil standards were required to be demonstrated with regards to the sediment samples, then additional samples would need to be analyzed via SPLP.

Surface water sample SW-1 collected near the outlet of the stormwater drainage culvert exceeded the CT WQS for PCE and vinyl chloride. The detected VOCs are likely associated with stormwater drainage from Newfield Street and the adjoining property to the west that is discharged on-site via the culvert. Copper and lead in exceedance of the CT WQS was detected in surface water sample SW-4, collected up-stream of

the culvert discharge. Lead in exceedance of the CT WQS was detected in the three other surface water samples.

7.12 RA-12 Artificial Fill Area

7.12.1 Background Information

The northwest portion of the Site consists of fill material deposited under authorization of an Army Corps of Engineers permit. Also, six to nine fiber and steel drums containing non-hazardous substances (disodium phosphate) were removed from this area.

7.12.2 Release Information

No reported releases of petroleum or hazardous substances were identified for PRA-12. The purpose of investigating PRA-12 was to evaluate the quality of the material used as artificial fill. The source of the fill material is unknown.

7.12.3 Phase III Investigation

One test pit (TP-62) was installed to the southwest of the area designated in previous environmental reports as the permitted fill area. Note, that the previous environmental reports did not include supporting documentation that delineated the actual fill area. Initially, the extent of PRA-12 was based on peripheral visual inspections during which a discreet area of concrete debris was placed raising the surface grade to that of the adjacent site to the north. During the investigation, the area of concrete debris was observed to extend further to the south and west of original delineation of PRA-12.

Test pit TP-62 was installed within the raised area of concrete debris. Much of the area to the north and east of TP-62 was inaccessible to the test pit and Geoprobe equipment due to either dense vegetation or saturated wetlands. The concrete debris was observed to be approximately 1.5' thick, beneath which was brown or brown-grey sand mixed with concrete fragments and gravel. Clay was encountered at approximately 7.5' below grade. Two soil samples were collected from TP-62. Sample TP-62A consisted of sand collected at 2' below grade and was analyzed for the COC metals, ETPH, pH, VOCs, PAHs, and pesticides. Sample TP-62B consisted of clay collected from the base of the test pit (8.5' below grade) and was

analyzed for the COC metals, pH, VOCs, and PAHs. No unusual staining, odors or PID readings were observed during the installation of TP-62.

Groundwater was not encountered during the installation of TP-62.

7.12.4 Results of Soil Analysis

No ETPH, VOCs, PAHs, or herbicides were detected in the three soil samples collected from RA-12. Soil sample results from RA-12 are summarized in the attached Tables 2A and 2B. Exceedances are summarized in the table below.

RA-12 Permitted Fill Area
Detected Soil RSR Exceedances

			Sample ID	TP-62A	TP-62B
			Sample depth (ft.)	2.0'	8.5'
			Date Collected	7/25/2005	7/25/2005
	RDEC	ICDEC	GB PMC		
CT ETPH (mg/kg)	500	2500	2500	750	not analyzed
PAHs 8270C-modified (µg/kg)	RDEC	ICDEC	GB PMC		
Benzo(a)anthracene	1,000	7,800	1,000	**1,800**	below detection limits
Benzo(a)pyrene	1,000	1,000	1,000	***1,830***	
Benzo(b)fluoranthene	1,000	7,800	1,000	**2,440**	
Chrysene	84,000	780,000	1,000	***2,010***	
Indeno(1,2,3-cd)pyrene	1,000	7,800	1,000	**1,090**	
BOLD	Exceeds RDEC and GBPMC				
BOLD & ITALICS	Exceeds RDEC, IC DEC GBPMC				
BOLD & ITALICS	Exceeds GBPMC				

Metals

None of the mass analysis results exceeded the RDEC or I/C DEC. The two soil samples were each analyzed by the SPLP method for total chromium, lead, thallium and vanadium. None of the SPLP metals were identified above the laboratory detection limits. The concentrations of all total and leachable metals detected in soil from RA-12 were below the applicable RSR criteria.

ETPH

ETPH was detected in sample TP-62A at 750 mg/kg, which exceeds the RDEC. Sample TP-62B, was not analyzed for ETPH.

VOCs

No VOCs were detected in either TP-62A or TP-62B.

PAHs

Four PAH compounds were detected in sample TP-62A above the GB PMC, as shown in the summary table. The PAHs, with the exception of chrysene, exceeded the respective RDEC for each compound. Benzo(a)pyrene also exceeds the I/C DEC. PAHs were not detected above the laboratory detection limits in sample TP-62B.

Pesticides & PCBs

A trace concentration (0.04 mg/kg) of 4-4' DDE, a pesticide, was detected in sample TP-62A. This concentration does not exceed applicable criteria. No other pesticides or PCBs were detected in the sample.

7.12.5 Discussion

RA-12 is presumed to consist of sand, gravel, and concrete debris placed along the northern portion of the site. The large geophysical anomaly identified during the TtNUS' GPR survey is believed to be caused by the partially buried concrete debris observed at TP-62.

The ETPH and PAHs detected in soil sample TP-62A may indicate that the fill material used in PRA-12 was contaminated. Due to the GB PMC exceedances, the fill material will require remediation, likely via excavation and appropriate disposal. Without further information regarding the source material, it is presumed that the sand and gravel identified above the clay is contaminated with PAHs. While 4-4' DDE was detected below applicable standards, potential exceedances elsewhere in the fill material cannot be ruled out.

The imported soil and concrete debris used to fill in this area of the site brought the site grade up to meet the elevation of the adjacent site to the north, Primary Steel. Primary Steel presumably imported and emplaced fill since their facility makes use of the raised area for their operations, although their use of this area encroaches onto the subject site. The source location of the contaminated fill material is unknown.

7.13 RA-13 2001 Emergency Response

7.13.1 Background Information

The release area was not identified in the QAPP. However, observations during the investigation field work and trends indicated by the soil data indicate that soil disturbance while excavating the buried waste during the January 2001 emergency response may have resulted in distribution of contaminated soil over the general surface of the western portion of the site.

7.13.2 Release Information

In January 2001, 120-130 buried fiberboard drums were excavated from the western portion of the site. Waste characterization indicated that the material was acidic and had high concentrations of metals, particularly chromium and copper. Much of the contaminated soil in direct contact with the buried waste was excavated and contained in roll-offs prior to being appropriately disposed off-site. However, the degree of excavating done in searching for and removing the buried waste is presumed to have resulted in the limited distribution of some contaminated soil. The contamination from these activities is presumed to be shallow, but may be deeper if the exploratory trenches dug during the emergency response were backfilled with material mixed with contaminated soil.

Note, the area suspected to have been contaminated during the emergency response coincides with RA-1, RA-4 and RA-6, the buried waste, leach field, and drum storage release areas. As such, all sampling results in this section have been addressed in a previous section.

7.13.3 Phase III Investigation

For the purposes of evaluating surficial releases associated with drum storage, the following twenty-seven soil samples were typically collected from samples from the upper 2' of the subsurface within the work area of the 2001 emergency response. Deeper samples collected in close proximity to the previously excavated trenches were also included in this evaluation for comparison to the shallower samples.

• TP-11A 1.0'	• TP-12B 2.0'	• TP-13A 2.0'	• TP-14B 0.6'	• TP-14A 2.0'	• TP-15A 2.0'	• TP-16A 2.0'
• TP-17A 1.0'	• TP-18A 1.0'	• TP-19A 1.5'	• TP-20A 1.5'	• TP-21 5.0'	• TP-24A 2.0'	• TP-25A 1.5'
• TP-25B 2.5'	• TP-26A 2.0'	• TP-27 4.0'	• TP-28 1.5'	• TP-33A 4.0'	• TP-33B 6.0'	• TP-36 1.8'
• TP-64A 1.5'	• TP-38 3.0'	• TP-38b 4.0'	• TB-38c 2.0'	• TB-38d 4.0'	• TB-38f 4.0'	

As noted, the area potentially impacted by contaminated soil distribution also includes test pit TP-38, in which buried debris was observed during installation. Five of the ten samples collected from the expanded excavation were located in close proximity to the exploratory trenches excavated in 2001, so are included in this evaluation.

The impact to ground water as a result of disturbing and redistributing contaminated soil is not expected to be significant. As such, the results of ground water sampling have not been evaluated with respect to this potential release mechanism.

7.13.4 Results of Soil Analysis

Chromium was detected above the RDEC and IC DEC in eight of the samples collected from the emergency response work area. Soil sample TP-38 (3') also exceeded the DEC for copper and hexavalent chromium. No other mass analysis results for metals exceeded the DEC. No exceedances of the GB PMC were detected in the SPLP analysis.

ETPH was detected above standards in five samples, as indicated in the table below. ETPH in TP-20A (1.5') exceeds the RDEC, ICDEC and GBPMC. The concentration in TP-28 (1.5') exceeds only the RDEC. However the ETPH is presumed to be associated with the detections of VOCs and PAHs at this location.

As shown on the table below, the PAHs detected in TP-28 (1.5') exceed one or more of the applicable RSR criteria. Only one other shallow sample from the former drum storage area had a detection of a PAH-compound that exceeded the applicable criteria. Benzo(b)fluroanthane was detected in sample TP-24A (2.0') above the RDEC and GBPMC. No

exceedances were detected in the deeper sample from TP-24 (TP-24B [4']), including the result for benzo(b)fluroanthane.

Naphthalene was detected as a VOC above the GBPMC in sample TP-28 (1.5'). Only two other shallow samples from this area had a detection of a VOC compound that exceeded the applicable criteria. 4-Isopropyltoluene in TP-20A (1.5') exceeds the RDEC, ICDEC and GBPMC and vinyl chloride in TP-21 (5') exceeds the RDEC and GBPMC.

No pesticides were detected above RSR criteria in shallow samples collected from the former this area.

RA-13 Contaminated Soil Disturbed During 2001 Emergency Response
Detected Soil RSR Exceedances

				Sample ID	TP-14B	TP-18A	TP-20A	TP-21	TP-24A	TP-25A	TP-28	TP-36	TP-38	TP-38B	TP-38C
				Sample depth (ft.)	0.6'	1.0'	1.5'	5.0'	2.0'	1.5'	1.5'	1.8'	3.0'	4.0'	2.0'
				Date Collected	7/19/05	7/19/05	7/18/05	7/20/05	7/20/05	7/20/05	7/19/05	7/22/05	7/21/05	7/25/2005	7/25/2005
	RDEC	ICDEC	GB PMC												
CT ETPH (mg/kg)	500	2500	2500				***4,300***				860				
Metals (mg/kg)	**RDEC**	**ICDEC**	**GB PMC**												
Chromium, Hexavalent	100	100	not applicable										349		
Chromium, Total	100	100		***979***	***2,390***					***104***	***161***	***642***	***11,800***	***606***	***663***
Copper	2,500	76000											8,240		
PAHs 8270C-modified (ug/kg)	**RDEC**	**ICDEC**	**GB PMC**												
2-Methylnaphthalene	474,000	2,500,000	9,800								57,900				
Benzo(a)anthracene	1,000	7,800	1,000								***19,300***				
Benzo(a)pyrene	1,000	1,000	1,000								***12,400***				
Benzo(b)fluoranthene	1,000	7,800	1,000						***1170***		***15,100***				
Benzo(k)fluoranthene	8,400	78,000	1,000								6,350				
Chrysene	84,000	780,000	1,000								18,400				
Fluoranthene	1,000,000	2,500000	56,000								74,100				
Indeno(1,2,3-cd)pyrene	1,000	7,800	1,000								4,130				
Naphthalene	1,000,000	2,500,000	56,000								83,900				
Phenanthrene	1,000,000	2,500,000	40,000								111,000				
Pyrene	1,000,000	2,500,000	40,000								48,900				
VOCs 8260B (ug/kg)															
4-Isopropyltoluene / p-Isopropyltoluene	500,000	1,000,000	14,000				***2,150,000***								
Naphthalene	1000,000	2,500,000	56,000								456,000				
Vinyl chloride	320	3,000	400					***496***							

BOLD	Exceeds RDEC
BOLD	Exceeds RDEC and GB PMC
BOLD & ITALIC	Exceeds RDEC, IC DEC and GB PMC
BOLD	Exceeds GBPMC
Blank	Not analyzed, below detection limits, or detected below RSR criteria (refer to appended Tables 2A and 2B)

7.13.5 Discussion

Contamination detected in shallow soil on the western portion of the site has likely been impacted by a variety of mechanisms, including the redistribution of contaminated soil originally impaired as a result of historical waste burial. Much of the soil in contact with the waste was removed during the emergency response of 2001. However, the chromium detections in shallow soil throughout the emergency response work area is believed to be contaminated soil that was excavated and inadvertently dispersed by the remediation equipment and personnel. Note, this release mechanism coincides with the contamination suspected to be associated with historical drum storage in this same area. Regardless, soil contamination will require remediation such that soil is complainant with RSR criteria.

8.0 PROJECT QA/QC

8.1 Data Verification and Validation

HRP performed a Tier II-type validation of laboratory deliverables/reports (Laboratory Information Management System- LIMS) received from Con-Test Analytical Laboratory. The purpose was to access the usability and validity of the data generated to determine the areas that potentially require remediation and the volume of material requiring remediation.

8.2 Validation Results

8.2.1 Completeness, Documentation, and Records

The laboratory, laboratory project number, number of samples, sample field identifications, laboratory sample IDs and the list of analyzed parameters were identified and documented. A comparison of the chain-of-custody and laboratory reports to parameter lists in the QAPP identified two laboratory reports with inconsistencies in documentation. In LIMS 93351, the laboratory's sample receipt detailed that samples for TB-2W were missing and subsequently not analyzed for PAHs and TPH. Laboratory sample receipt for LIMS 90599 documented that the original laboratory sample pick-up was missing soils samples for TP-50a and TP-50b. Soil samples were eventually found based on the results included in LIMS 90599. No additional discrepancies were noted in the remaining documentation.

8.2.2 Field issues affecting data quality

Equipment Blanks

Four equipment blanks were collected from the primary pieces of field equipment that were utilized during the course of the investigation. Minor detections of several analytes were reported in three of the equipment blanks. These results are included in the following table. Please note that all detections are below RSR criteria.

LIMS	Sample ID	Date Collected	Sample media affected	Detections			RAs/PRAs Affected
				Type	Contaminant	Level[1]	
90380	EQ-719A	7/19/2005	Soil	Metals	Barium	0.106 mg/l	RA-1, RA-4, PRA-6
					Chromium (total)	0.036 mg/l	
					Copper	0.0362 mg/l	
					Lead	0.01 mg/l	
					Nickel	0.018 mg/l	
					Vanadium	0.023 mg/l	
					Zinc	0.123 mg/l	
				VOCs	2-Butanone (MEK)	19.1 ug/l	
					4-Isopropyltoluene/ p-Isopropyltoluene	1.3 ug/l	
					Acetone	62.2 ug/l	
90543	EQ-725W	7/25/2005	Ground water	Metals	Chromium (total)*	0.004 mg/l	RA-1, PRA-7
					Copper*	0.0022 mg/l	
					Nickel*	0.003 mg/l	
					Zinc*	0.066 mg/l	
				VOCs	2-Butanone (MEK)	30.6 ug/l	
					Acetone	93.9 ug/l	
					Tetrahydrofuran	11.9 ug/l	
				-	ETPH	0.237 mg/l	
	EQ-725	7/25/2005	Soil	Metals	Chromium (total)*	0.005 mg/l	RA-1, PRA-7
					Copper*	0.0025 mg/l	
					Zinc*	0.039 mg/l	
				VOCs	Acetone	92.6 ug/l	
					Tetrahydrofuran	12.6 ug/l	
				-	ETPH	0.208 mg/l	
93351	EQ-1116	11/16/2005	Ground water & Surface water	-	No Detections	-	RA-1, RA-2, RA-4

Notes:
* = Dissolved Metals
(1) = All detection levels below RSR criterion

Trip Blanks

Eight trip blanks were prepared by the laboratory, placed in the sampling coolers and tested for VOCs in order to assess sampling handling effects. One technical issue was reported for selected VOCs in TB-1028, however the data quality was unaffected since all affected compounds were "not detected." No additional issues or detections were noted in the other trip blanks. The table below summarizes trip blank information.

LIMS	Sample ID	Date Collected	Sample Media affected	Issues	Detections
90371	TB-718	7/18/2005	Soil	-	No Detections
90380	TB-719	7/19/2005	Soil, Ground water	-	No Detections
90462	TB-720	7/20/2005	Soil	-	No Detections
90478	TB-721	7/21/2005	Soil	-	No Detections
90543	TB-722	7/22/2005	Soil, Ground water	-	No Detections
90600	TB-725	7/25/2005	Soil	-	No Detections
92910	TB-1028	10/28/2005	Soil	Reported result is estimated, initial or continuing calibration did not meet criteria for VOCs-Bromomethane, tert-butyl alcohol, chloroethane	No Detections
93351	TB-1116	11/16/2005	Ground water, Surface water, Sediment	-	No Detections

Notes:
1. TB-722 also applies for samples in LIMS 90452 since collection date was also 7/22/06
2. TB-725 also applies for samples in LIMS 90599 since collection date was also 7/25/06

Duplicate Samples

Four duplicate soil samples where collected for analysis to determine the reproducibility of the laboratory's analytical data. The results of this sampling are summarized in Tables 2A and 2B. Testing revealed reasonable correlation between three of the four sample test results. Differences were noted between samples TP-56a and DUP-56a. When TP-56a was analyzed for metals by mass exceedances of the 20X GB PMC rule were noted for chromium (total), lead, and vanadium; the results by mass for DUP-56a matched those exceedances and reported additional exceedances for barium and nickel. As a result of these 20X GB PMC exceedances samples were run by SPLP. No exceedances were reported when metals were analyzed by SPLP, however a minor detection of barium was reported in DUP-56a. This can be explained by the method blanks recovery outside of control limits due to process contamination, resulting in values biased on the high side. The table below summarizes information about duplicate soil samples.

LIMS[1]	Sample ID	LIMS[2]	Date Collected	Issues/Detections*
90543	Dup-29	91171	7/22/2005	No Detections
	Dup-47			No Detections
90600	Dup-57B	91308	7/25/2005	No Detections
90599	Dup-56A	91011	7/25/2005	No Detections

Notes:
* = Detections based on SPLP results
(1) LIMS #'s for metals results analyzed by mass
(2) LIMS #'s for metals results analyzed by SPLP

8.2.3 Laboratory Quality Control

In order to assess laboratory influences on the quality of the investigation data, HRP reviewed sample holding times, detection limits, and the test results of laboratory control samples, including laboratory fortified blanks, matrix spikes, surrogate recoveries, and method blanks. The results of this review revealed the following information.

Holding Times

Review of laboratory documentation indicates that of all the samples tested during this phase of the project, only six were extracted and analyzed outside of acceptable sample holding times. LIMS noted with samples received after acceptable holding times are presented in the following table.

LIMS	Sample ID	Sample Description	Date Collected	Issues/Detections
90380	TP-16W	GW sample	7/19/2005	pH analyzed after holding time
	TP-28W	GW sample	7/19/2005	pH analyzed after holding time
90543	TP-59W	GW sample	7/25/2005	pH analyzed after holding time
	TP-70W	GW sample		pH analyzed after holding time
	EQ-725	Blank		pH analyzed after holding time
	EQ-725W	Water/Blank		pH analyzed after holding time

Method Detections

Review of detection limits revealed that elevated limits were reported in TP-04 from LIMS 90371, for PCBs and Pesticides (EPA method 8081A). The elevated levels are attributed to matrix interferences. Two compounds (one PCB, one pesticide) had detections with minute exceedances of RSR criteria. The PCB, Aroclor 1268, was detected at 0.116 mg/kg that exceeds

20X GB PMC (0.1 mg/kg). The pesticide dieldrin was reported at 0.065 mg/kg that exceeds the RDEC (0.038 mg/kg). Based on matrix interferences resulting in elevated detection limits and the minor differences between detections and established criteria, the exceedances noted are believed to be absolved.

Elevated minimum detection limits (MDLs) for several specific analytes where noted which exceed applicable RSR criteria. As a result the data for samples reported in the following table is not suitable for comparison to RSR criteria or future evaluation of compliance with applicable criteria.

LIMS	Sample ID	Sample Media[1]	Date Collected	Issues/Detections		Exceeded RSR criterion[2]	RAs/PRAs Affected
90543	Dup-29	S	7/22/2005	Pesticides	Dieldrin	GB PMC	RA-1
	Dup-47	S	7/22/2005	Pesticides	Dieldrin	GB PMC	RA-1
93351	MW-1	GW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	RA-1, RA-4
	MW-3	GW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	RA-1, RA-2
					Vinyl Chloride	RVC	
	MW-5	GW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	RA-1
					Vinyl Chloride	RVC	
	MW-203	GW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	RA-5
					Vinyl Chloride	RVC	
	RIZ-4	GW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	RA-2
					Vinyl Chloride	RVC	
	SW-1	SW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	PRA-11
	SW-2	SW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	PRA-11
					Vinyl Chloride	RVC	
	SW-3	SW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	PRA-11
					Vinyl Chloride	RVC	
	SW-4	SW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	PRA-11
					Vinyl Chloride	RVC	
	TB-001W	GW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	RA-1
					Vinyl Chloride	RVC	
	TB-002W	GW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	RA-1
	TB-003W	GW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	RA-1
					Vinyl Chloride	RVC	
	TB-007W	GW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	RA-5
					Vinyl Chloride	RVC	
	TB-008W	GW	11/16/2005	VOCs	1,2-Dibromoethane (EDB)	RVC	RA-1
	SED-1	SED	11/16/2005	Metals	Thallium	20X GB PMC	PRA-11
				Pesticides	Dieldrin	GB PMC	
	SED-2	SED	11/16/2005	Metals	Thallium	20X GB PMC	PRA-11
				Pesticides	Dieldrin	GB PMC	

LIMS	Sample ID	Sample Media[1]	Date Collected	Issues/Detections		Exceeded RSR criterion[2]	RAs/PRAs Affected
93351 (cont'd)	SED-3	SED	11/16/2005	Metals	Thallium	20X GB PMC	PRA-11
				Pesticides	Dieldrin	GB PMC	
	SED-4	SED	11/16/2005	Metals	Thallium	20X GB PMC	PRA-11
				Pesticides	Dieldrin	GB PMC	
	EQ-1116	-	11/16/2005	VOCs	Vinyl Chloride	RVC	RA-1, RA-2, RA-4
					1,2-Dibromoethane (EDB)	RVC	
	TB-1116	-	11/16/2005	VOCs	Vinyl Chloride	RVC	RA-1, RA-2, RA-4
					1,2-Dibromoethane (EDB)	RVC	

Notes:
(1) = Sample media: Soil=S, ground water=GW, surface water= SW, sediment= SED
(2) = RVC exceedances are compared to proposed levels

Laboratory Fortified Blanks

Based on the data verification and validation performed, a QA/QC issue regarding the laboratory-fortified blanks (LFB) was noted in several laboratory reports (Laboratory Information Management System-LIMS number). A LFB is an aliquot of reagent water or other blank matrix to which known quantities of method analytes and all preservation compounds are added and analyzed as a sample. Generally these are utilized when there is an insufficient sample amount to run duplicates and/or matrix spikes. The purpose of this practice is to determine whether the sample batch is within accepted control limits and if the laboratory is capable of producing accurate and precise results. Specifically the issue noted in the LIMS was in regards to the recovery outside control limits for VOCs. Sample rounds outside of control limits had results bias both high and low. Additionally it should be noted that several results had LFB recoveries outside of control limits however results were "not detected" and bias on the high side therefore data validation was unaffected. Laboratory reports with LFB recovery issues that affected results are found in the following table.

LIMS	LFBLANK ID	Compounds	Bias		Samples with detections*	RAs/PRAs Affected
			High	Low		
90478	43691	1,2,4-Trichlorobenzene		X	-	RA-1, PRA-7
		cis-1,3-Dichloropropene		X	-	
		trans-1,3-Dichloropropene		X	-	
90543	43715	1,2,3 Trichlorobenzene		X	-	RA-1
		1,2.4-Trichlorobenzene		X	-	
		1,2-Dibromo-3-Chloropropane		X	-	
		Bromoform		X	-	
		cis-1,2-Dichloropropane		X	-	

LIMS	LFBLANK ID	Compounds	Bias		Samples with detections*	RAs/PRAs Affected
			High	Low		
90543 (cont'd)	43715 (cont'd)	Naphthalene		X	-	RA-1
		trans-1,3-Dichloropropene		X	-	
90599	43734	1,2,3 Trichlorobenzene		X	-	RA-1
		1,2.4-Trichlorobenzene		X	-	
		1,2-Dibromo-3-Chloropropane		X	-	
		Bromoform		X	-	
90599 cont.	43734	cis-1,2-Dichloropropane		X	-	RA-1
		Naphthalene		X	-	
		trans-1,3-Dichloropropene		X	-	
93351	46578	Naphthalene		X	-	RA-1, RA-2, RA-4
90371	43598	Bromochloroethane		X	-	RA-1, RA-2, RA-4, PRA-6
90462	43640	1,3,5-Trimethylbenzene	X		TP-13a, TP-25b, TP-26b	RA-1, RA-2, RA-3, RA-4, PRA-6, PRA-13
		m + p Xylene	X		TP-13a, TP-13b, TP-21, TP-25a, TP-26b, TP-31a	
		Tert-Butylethyl Ether		X	TP-12a	
		Tert-Amylmethyl Ether		X	TP-13a	

Notes:
* Of the effected samples with detections of noted compounds, none had RSR exceedances. Samples without detections or below MDL are not listed in table
(1) Both reports for LIMS 90543 and 90599 dated 8/8/2005, same fortified blank issues for same compound list noted in both QC summary reports

For all samples identified with detections of the noted select VOCs, data usability is unaffected by LFB recoveries outside of control limits and bias on the high side since no RSR criterion is exceeded. Please note that there is no established criteria for m+p Xylenes, however notable detections were reported in TP-13a (286 ug/kg), TP-21 (183 ug/kg), and TP-26b (185 ug/mg) and are bias on the low side. All other samples with detections of the affected VOCs are orders of magnitude below RSR criteria and as such have no affect on data quality.

Method Blanks Samples

Two LIMS were identified with barium contaminated method blanks. A method blank is an analyte free matrix sample carried through the entire sample preparation and analysis procedure used for samples. The purpose of a method blank is to determine if any laboratory contamination has occurred. The reported issue for the method blanks in LIMS 91014 and 91011 was a recovery outside of control limits resulting from process contamination, resulting in value biased on the high side. Laboratory reports with method blank recovery issues are as follows.

LIMS	BLANK ID	Issues	Contaminant	Bias		Samples effected	RAs/PRAs Affected
				High	Low		
91011	44137	Recovery outside control limits due to process contamination in method blank	Barium	X		TP-21	RA-1, PRA-8
91014	44059	Recovery outside control limits due to process contamination in method blank	Barium	X		TP-38C, TP-38G, TP-47, TP-49a, TP-74, DUP-56a	RA-1, RA-2, RA-3, RA-4, PRA-6, PRA-13

Notes:
(1) Both reports for LIMS 91011 and 91014 report the same issue for barium, 91011 report is dated 8/18/2005 and 91014 report is dated 8/19/2005.

Data usability is unaffected based on the fact that all barium results for the affected samples are orders of magnitude lower than RSR criteria and are bias high.

Sample Matrix Spike and Surrogate Recovery

Several LIMS were noted with issues associated with surrogate and matrix spike recoveries that produced data that is estimated or biased. Specifically the issues regarding recoveries include matrix interferences, recoveries outside of control limits, and surrogate dilutions. A matrix spike is an aliquot of sample spiked with a known concentration of target analytes for the purpose of characterizing matrix interference effects and estimating overall sample matrix-dependent analytical method accuracy. Duplicates of matrix spikes are run to indicate the precision of the results. Surrogates are organic compounds similar to the target analyte in chemical composition and behavior but not normally found in environmental samples. Sample aliquots are spiked with surrogates, the recoveries of which are used to determine the methods efficiency and overall accuracy. The presence of clay in a sample matrix is a common occurrence known to contribute to poor surrogate recoveries. Deviations from the acceptable recovery control limits established for each method results in a decrease in precision or accuracy or estimated values. The following issues were noted during the LIMS review.

LIMS	Sample ID	Date collected	Analysis	Issues	Effects				RAs/PRAs Affected
					Bias		Reduced Accuracy	Reduced Precision	
					High	Low			
90462	TP-25A	7/20/2005	2-Methylaphthalene	Duplicate RPD outside contro limits				X	RA-1, PRA-6, PRA-13
			Acenaphthene					X	
			Acenaphthylene					X	
			Anthracene					X	
			Benzo(a)anthracene					X	
			Benzo(k)fluoroanthene					X	
			Naphthalene					X	
			Pyrene					X	
			Benzo(g,h,i)perylene	Matrix spike recovery outside of control limits		X			
90600	TP-55B	7/25/2005	Acenaphthene	Matrix Spike recovery outside control limits but within control for LFB. Possibility of matrix effects leading to low bias results can not be eliminated and is likely		X			RA-1, PRA-8
			Acenaphthylene			X			
			Anthracene			X			
			Benzo(a)anthracene			X			
			Benzo(a)pyrene			X			
			Benzo(b) fluoranthene			X			
			Benzo(g,h,i)perylene			X			
			Chrysene			X			
			Dibenz(a,h)anthracene			X			
			Fluoranthene			X			
			Fluorene			X			
			Indeno(1,2,3-cd)pyrene			X			
			Naphthalene			X			
			Phenanthrene			X			
			Pyrene			X			
92910	TB-05	10/28/2005	Terphenyl	Clay in sample matrix, historically contributes to poor surrogate recoveries			X		PRA-9
	TB-09	10/28/2005	Terphenyl	CT ETPH, surrogate diluted below lowest calibration point			X		RA-5
	TB-10	10/28/2005	1,2-Dichloroethane-d4	Surrogate recovery outside of control limits due to matrix interference	X				RA-1, PRA-10
92910 (cont'd)	TB-11	10/28/2005	Mercury	RPD outside of control limits, possibly due to non-homogenous sample or "hot spot" encountered during sample prep.				X	PRA-10

Notes:
(1) = Terphenyl is the surrogate used by the laboratory in ETPH analysis

Please note that of the samples affected by recovery issues, only TB-5, TB-9, and TB-11 had actual detections of influenced analytes; however, all influenced sample results were "not detected" and therefore data was unaffected. The ETPH detection for TB-9 had reduced accuracy as a result the dilution of the surrogate Terphenyl below the lowest calibration point. The mercury result for TB-11 had reduced precision as a result of the RPD outside of control limits. All matrix and surrogate recovery issues addressed in the above table were for samples where

analytes were "not detected," and thus the data unaffected, except for TB-9 and TB-11.

Calibration Issues

All analytical instruments are calibrated using standard solutions of known concentrations. Initial calibration is normally accomplished by utilizing several levels of reference standards to generate a calibration curve that determine an instrument's accuracy. Continuing calibration is done to maintain and track the accuracy of the equipment overtime. Common calibration issues noted in the laboratory reports included initial or continuing calibration outside of control limits, reported values below lowest calibration standard, and one occurrence where the reported value was over the calibrated linear range. All these issues resulted in estimated values for the compounds noted in the following table.

LIMS	Sample ID	Analyte	Issue	Effects			RAs/PRAs affected
				Bias		Estimated value	
				High	Low		
92910	TB-4, TB-5, TB-6, TB-7, TB-8A, TB-8B, TB-9, TB-10, TB-11, TB-1028	Bromomethane	I or C*			X	RA-1, RA-5, PRA-9, PRA-10
		tert-Butyl Alcohol					
		Chloroethane					
		1,4 Dioxane					
	TB-5	Dieldrin	Value reported under lowest standard			X	PRA-9
	TB-9	Benzo(a)pyrene	Internal standard area did not meet specs.			X	RA-5
		Benzo(b)fluoranthene					
		Benzo(g,h,I)perylene					
		Benzo(k)fluoranthene					
		Dibenz(a,h)anthracene					
		Indeno(1,2,3-cd)pyrene					
		Terphenyl[1]	CT ETPH, surrogate diluted below lowest calibration point			X	
	Blank-80587	Dieldrin	Value reported under lowest standard			X	-
93351[2]	SED-1, SED-2, SED-3, SED-4	Dieldrin	Value reported under lowest standard			X	PRA-11
	EQ-1116	Indeno(1,2,3-cd)pyrene	I or C*			X	PRA-11
	Blank-81484	Dieldrin	Value reported under lowest standard			X	-
90380	TP-17B	1,4- Dioxane	Value reported over calibrated linear range			X	RA-1, RA-4
90462	TP-25A	Benzo(a)pyrene	Internal standard associated with compound is outside method requirements	X			RA-1, RA-4, PRA-6, PRA-13
		Benzo(b)fluoranthene		X			

Notes:
* I or C= Initial or continuing calibration did not meet required criteria
(1)= Terphenyl is the surrogate used by the laboratory for ETPH analysis
(2)= LIMS 93351 had initial or continuing calibration that did not meet criteria which resulted in estimated values for 8260 both water and solids, however the select VOCs were all "not detected"

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

All PRAs/RAs identified in the October 2001 Phase I Environmental Site Assessment have been actively investigated during performance of the Phase II Investigation presented herein. The investigations have been performed in accordance with the HRP prepared QAPP, dated September 7, 2004 and revised October 13, 2004. EPA approved the QAPP on October 13, 2004. Any exceptions or modifications related to the approved scope have been documented in this text including supporting rationale for the changes. The results of this investigation include the following:

1. Shallow soil on the western portion of the site has been impacted by a variety of mechanisms, including the distribution of contaminated soil originally impaired due to contact with buried chemical wastes. When 120-130 buried fiberboard drums were excavated from the western portion of the site in January 2001 much of the contaminated soil was contained in roll-offs. However, some of the excavated contaminated soil is believed to have been inadvertently distributed over the unpaved work area by emergency response equipment and personnel. The widespread distribution of shallow chromium contamination detected during this investigation is supportive of this release mechanism (RA-13), which was not identified in previous reports or in the site QAPP.

2. During the Phase III investigation, 116 soil samples were submitted for laboratory analysis from 5 Release Areas and 7 Potential Release Areas previously identified at the site. Of these samples 26 contained exceedances of RSR criteria for various contaminants of concern. Of the 26 exceedances, 13 were related to total chromium. Characterization samples of the buried wastes removed in January 2001 indicated elevated concentrations of chromium and copper in addition to an acidic pH.

3. The investigation results indicate that no releases requiring additional investigation or remediation have been detected in the following areas:

    - RA-5 - Former Loading Rack

      Although CT DEP cited a previous site occupant in 1991 for surficial staining near the loading rack, this Phase III investigation did not identify any of the site-specific COCs exceeding soil or groundwater RSR criteria.

    - PRA-8 - Former Tank Farm

      Field observations indicated that soil underlying and to the northeast of the tank farm had been impacted by a VOC release. However, the detected VOCs were below all applicable standards. Although no soil contamination requiring remediation was identified at the former tank

farm, approximately 230 cubic yards of uncharacterized concrete associated with the tank farm remains on site.

- RA-9 - Loading Ramp

  In 1992, soil samples from a stained area next to the railroad loading ramp had detectable concentrations of VOCs. However, this Phase III investigation did not identify any detectable VOCs in soil or groundwater collected from the vicinity of the ramp.

- PRA-10 - Railroad Spur

  This Phase III investigation did not identify any of the site-specific COCs exceeding soil or groundwater RSR criteria.

4. RSR criteria exceedances for hexavalent chromium, total chromium, copper, lead, ETPH, VOCs or PAHs were detected in soil or ground water samples from the eastern portion of the site. The eastern portion of the site includes of seven of the release mechanisms, all of which overlap the areas of either waste burial (RA-1), drum storage (RA-5) or the 2001 emergency response (RA-13). These seven areas and the volumetric extent of soil contamination requiring remediation are listed below.

RA#	Name	Description	Arial Extent	Volume Requiring Remediation
RA-1	Drum and Debris Burial	Buried debris and fiber drums containing various chemical wastes were identified during the excavation activities in January 2001. The drums and debris were located in an area approximately 5-feet wide by 50-feet long extending to the north-northeast of the former drum filling building.	53,600 Square feet	1,990 Cubic yards
RA-2	Former Drum Filling Building	The former drum-filling building constructed in circa 1960 was used to fill 55-gallon drums with the materials from the tank farm. Drum storage located in and adjacent to this building. A floor drain in this building was connected to the adjacent chemical manhole.		
RA- 3	Former Chemical Manhole	The chemical manhole received waste chemicals and spills from the floor drain in the drum-filling building.		
RA-4	Leaching Field	The chemical manhole discharged to a nearby leaching field.		
RA-6	Drum Storage Area	Exterior drum storage is identified from circa 1965 to circa 1980 on the northeast portion of the Site.		
RA-13	2001 Emergency Response	Excavated contaminated soil inadvertly redistributed by equipment and personnel during 2001 remediation.		
RA- 7	Former Drum Storage Sheds	Drums were stored in and around the small shed formerly located at the western terminus of the railroad spur.	Soil	
			440 square feet	35 cubic yards
			Concrete	
			440 square feet	16 cubic yards

5. Contamination was identified in RA-11, the sediment and surface water of the unnamed stream that flows eastward on the eastern portion of the site. The stream includes stormwater discharge from Newfield Street and the adjacent property to the west. A portion of the contamination is most likely associated with the stormwater discharge. However, pesticide, lead, and copper contamination were detected in surface water from on-site tributaries, indicating contamination is also associated with on-site run-off over contaminated surfaces.
6. One of two soil samples collected from RA-12 indicated that the area of artificial fill along the site's northern boundary is contaminated above RSR criteria for PAHs. The fill material constitutes an area presumably created and currently utilized by the adjacent, off-site Primary Steel facility. As such, the on-site PAH contamination is characterized as emanating from an off-site source.
7. The project QA/QC and data usability analysis performed in support of this project and presented in Section 8.0 demonstrates that collected data is generally sufficient to support the conclusions presented herein. Any deviations are noted in the appropriate sections of the text.

9.2 Recommendations/Conceptual Remedial Action Plan

Site redevelopment and reuse will require a combination of physical and institutional remedial measures described below, such that soil and ground water is rendered compliant with the RSR.

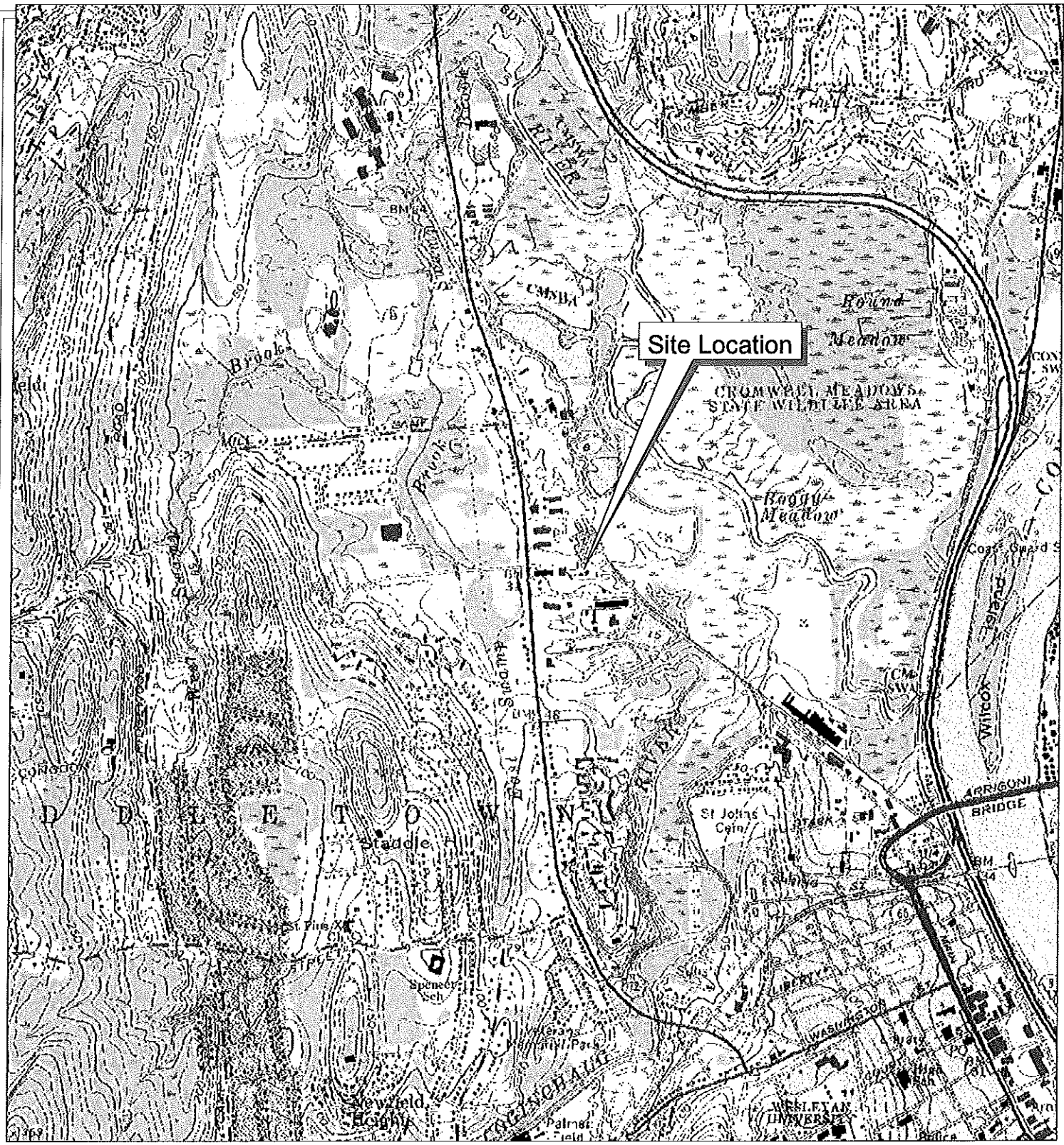
1. Isolated locations of petroleum contaminated soil which exceeds only the RDEC will comply with the RSR without physical remediation provided that an institutional Environmental Land Use Restriction (ELUR) allowing only industrial or commercial activities to occupy the site is in place with CT DEP approval.

2. Nearly all of contaminated area requiring remediation coincides with detections of chromium that exceed the RDEC and I/C DEC. Physical remediation of these exceedances can be limited to 2' below grade provided that the impacted area is backfilled with clean material, paved, and an ELUR preventing disturbance of the subsurface is in place with CT DEP approval.

3. Isolated areas of VOC, PAH, and pesticide concentrations that exceed the GB PMC will require additional physical remediation beyond that excavated to comply with the I/C DEC. Of the 19,000 square feet of aerial extent requiring remediation, 11,300 square feet will require physical remediation to extend to the mean high ground water table. Based on the limited amount of ground water elevation data available to date, the mean high ground water table is no deeper than four feet beneath the impacted areas.

4. Physical remediation of the areas referenced above is envisioned to consist of excavation, characterization, and off-site disposal. Confirmatory sampling of the excavation is required to verify that the extent of contamination is completely addressed.

5. Shallow ground water contamination was identified during this investigation. The hydrogeologic unit impacted from historical site use is dense clay that hinders the migration of ground water. Therefore, the contamination is expected to be contained on-site. Once the soil that exceeds the GB PMC and the on-site remnants of the chemical manhole septic system has been remediated, the effective source of the ground water contamination will be removed, and ground water is expected to attenuate naturally. On-going monitoring will be needed to verify decreasing trends in ground water contamination.



MIDDLETOWN, CONN
41072-E6-TF-024
1965
PHOTOREVISED 1992
DMA 6467 II SW-SERIES V816

Figure 1
Site location
680 Newfield Street
Middletown, CT 06457
HRP# MID6003.P3

PHASE III SUBSURFACE INVESTIGATION

FORMER PORTLAND CHEMICAL FACILITY
680 NEWFIELD STREET (REAR)
MIDDLETOWN, CONNECTICUT

July 12, 2006

REPORT, TABLES, FIGURES

PHASE III SUBSURFACE INVESTIGATION

FORMER PORTLAND CHEMICAL FACILITY
680 NEWFIELD STREET (REAR)
MIDDLETOWN, CONNECTICUT

July 12, 2006

APPENDICES

LIST OF APPENDICES

APPENDIX A

TEST PIT AND BORING LOGS

TEST PIT # TP-1

TEST PIT LOG

HRP Associates, Inc.

167 NEW BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: 7/18/05

Photos Taken: NA

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level: 8'

No. Samples Taken: 1

PID: 0.0

Sample Storage: cooler, iced chilled, methanol, DI

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Northwest of chain link fence.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0.0	0.3			Dry	Brown silt and f-vf sand w/ roots and vegetation (topsoil/loam); PID = 0.0
TP-1	0.3	8.0	7.0 BG, south wall	Bucket	Moist @ 7.0 Wet @ 8.0	Brown f-vf sand and silt. Trace black organic sand. Roots. PID = 0.0
						End of test pit at 8.0 BG.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT LOG

HRP Associates, Inc.

167 NEW BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: 7/18/05

Photos Taken: #1

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level: NA

No. Samples Taken: 1

PID: 0.0

Sample Storage: cooler, iced chilled, methanol, DI

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

West of chain link fence.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0.0	0.5			Dry	Black-brown c-f sand, some gravel, trace scrap metal (2" metallic band @ 0.5' BG). Fill. PID = 0.0.
TP-2	0.5	5.0	2.5', south wall	G	Moist	Brown clay, some brown silt, some brown m-vf sand. PID = 0.0.
						Orangeburg pipe at 5.0' BG. ?Abandoned sewer drain?
						End of Test Pit at 5.0' BG.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-3

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: 7/18/05

Photos Taken: #2

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level: 5.5'

No. Samples Taken: 1

PID: 0.0

Sample Storage: cooler, iced chilled, methanol, DI

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

West of chain link fence.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0.0	0.5			Dry	Black-brown-grey gravel and c-m sand (packed gravel pavement). PID = 0.0.
	0.5	0.6			Dry	Asphalt.
	0.6	1.0			Moist	Brown-black c-m sand and gravel. PID = 0.0.
	1.0	2.4			Moist	Brown clay. PID = 0.0.
	2.4	3.5			Moist	Brown-grey clay. PID = 0.0.
TP-3	3.5	4.0	3.5' BG. South wall	G	Moist	Black clay. Petroleum and septic odor. PID = 0.0.
	4.0	9.0			Wet at 5.5'	Brown clay. PID = 0.0.
						End of Test Pit at 9' BG.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-4

TEST PIT LOG

HRP Associates, Inc.

167 NEW BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: 7/18/05

Photos Taken: #3

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level: 1.5'

No. Samples Taken: 1

PID: 3.2

Sample Storage: cooler, iced chilled, methanol, DI

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

West of chain link fence.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	1.0			Dry	Black-brown-grey gravel and c-m sand (packed gravel pavement). PID = 0.0.
	1.0	1.3			Dry	Brown-black c-m sand and gravel. PID = 0.0.
	1.3	1.8			Moist	Grey-green med. processed gravel.
	1.8	2.5			Wet	Black large processed gravel. Significant groundwater infiltration with strong petroleum and septic odor. Oily sheen on groundwater. ?Leachfield?
TP-4	2.5	3.0	3.0' BG, bottom.	G	Wet	Brown-grey c-vf sand and gravel. PID = 3.2.
						EOTP at 3.0' BG.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-5

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/18/05
Photos Taken: NA
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level: 2.5'
No. Samples Taken: 1
PID: 1.0
Sample Storage: cooler, iced chilled, methanol, DI
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:
West of chain link fence.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0.0	1.0			Dry	Black-brown-grey gravel and c-m sand (packed gravel pavement). Trace debris (plywood, 2 bung caps). PID = 0.0.
	1.0	1.5			Dry	Brown-black c-m sand and gravel. PID = 0.0.
	1.5	2.0			Moist	Grey-green med. processed gravel.
	2.0	2.7			Wet @ 2.5'	Black large processed gravel. Significant groundwater infiltration with strong petroleum and septic odor. Oily sheen on groundwater. ?Leachfield?
TP-5	2.7	2.7+	2.7' BG, bottom.	G	Wet	Brown-grey c-vf sand and gravel. PID = 1.0.
						Excavation expanded laterally ~3' to the east and south. Same as above
						End of Test Pit at 2.7' BG.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-6

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: 7/18/05

Photos Taken: #4

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level: 6.0'

No. Samples Taken: 1

PID: 0.0

Sample Storage: cooler, iced chilled, methanol, DI

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

West of chain link fence.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0.0	0.2			Dry	Black-brown-grey gravel and c-m sand (packed gravel pavement). PID = 0.0.
	0.2	1.3			Dry	Brown-black c-m sand and gravel. PID = 0.0.
	1.3	1.6			Dry	Grey c-m sand and gravel. PID = 0.0.
	1.6	1.9			Moist	Black large processed gravel. PID = 0.0.
TP-6	1.9	3.2	2.0' BG, south wall.	Bucket	Moist	Brown f-vf sand and silt, some gravel. PID = 0.0.
	3.2	7.5			Wet @ 6.0'	Brown clay. PID = 0.0.
						End of Test Pit at 7.5' BG.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-7

TEST PIT LOG

HRP Associates, Inc.

167 NEW BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: 7/18/05

Photos Taken: #5

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level: 4.5'

No. Samples Taken: 1

PID: 0.0

Sample Storage: cooler, iced chilled, methanol, DI

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

West of chain link fence.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0.0	0.6			Dry	Black-brown-grey gravel and c-m sand (packed gravel pavement). PID = 0.0.
	0.6	0.8			Dry	Brown-grey c-vf sand and gravel, some silt. PID = 0.0.
	0.8	1.0			Dry	Brown c-vf sand and gravel, some silt. PID = 0.0.
	1.0	1.1			Dry	Green c-vf sand and gravel, some silt. PID = 0.0.
TP-7	1.1	2.5	1.5' BG, south wall.	G	Dry	Brown c-m sand and m-l gravel (cobble). PID = 0.0.
	2.5	6.3			Wet @ 4.5'	Brown clay. PID = 0.0.
						End of Test Pit at 6.3' BG.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-8

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: 7/18/05

Photos Taken: NA

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level: 5.0'

No. Samples Taken: 1

PID: 0.0

Sample Storage: cooler, iced chilled, methanol, DI

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

West of chain link fence.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0.0	0.2			Dry	Black-brown-grey gravel and c-m sand (packed gravel pavement). PID = 0.0.
	0.2	0.9			Dry	Brown-black c-m sand and gravel. PID = 0.0.
TP-8	0.9	2.0	1.5' BG, north wall	G	Dry	Brown c-m sand and cobble. PID = 0.0.
	2.0	2.1			Dry	Brown m. sand. PID = 0.0.
	2.1	6.4			Moist Wet at 5.0'	Brown clay. PID = 0.0.
						End of Test Pit at 6.4' BG.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-9

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: 7/18/05

Photos Taken: NA

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level: NA

No. Samples Taken: 1

PID: 0.0

Sample Storage: cooler, iced chilled, methanol, DI

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

West of chain link fence.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0.0	0.2			Dry	Black-brown-grey gravel and c-m sand, some weathered asphalt. PID = 0.0.
	0.2	1.0			Dry	Brown-black c-m sand and gravel. PID = 0.0.
	1.0	1.2			Dry	Grey med. Process stone.
TP-9	1.2	2.4	2.0' BG, north wall.	G	Dry	Brown c-vf sand and gravel, cobble.
	2.4	6.0			Moist	Brown clay.
						End of Test Pit at 6.0' BG.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-10

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20/05
Photos Taken: NA
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level: 9.0'
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced chilled, methanol, DI
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.1			Dry	Brown silt and c-vf sand, trace gravel, trace vegetation (top bucket/loam).
TP-10A	0.1	3.2	2.0 BG, south wall.	G	Dry	Brown sand. Large cobble, roots, tree stumps. Fill.
	3.2	9.0			Dry	Brown silt, some c-vf sand. Trace gravel.
	9.0	9.7			Wet	Brown clay.
						end of test pit at 9.7' bg

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-11

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20/05
Photos Taken: NA
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level: na
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced chilled, methanol, DI
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.1				brown loam
TP-11A	0.1	1.2	1.0 south wall	G	dry	brown grey sand and silt, trace gravel
TP-11B	1.2	6.0	6.0 bottom	bucket	moist	brown clay and sand, little brick. Metallic bands <1" thick, plastic fragments, glass beverage bottles, pieces of fabric tarp.
						Orangeburg sewer pipe @ 5' below grade.
						end of test pit at 6.0' bg

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-12

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/ /05
Photos Taken: NA
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level
No. Samples Taken: 2
PID: 5.4
Sample Storage: cooler, iced chilled, methanol, DI
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.5			Dry	brown loam, clay
	0.5	0.6			Dry	asphalt, process stone
TB-12A (805a)	0.6	3.5	2.0 south wall	G	Dry	grey sand
TB-12A (755a)	3.5	4.0	3.7 south wall	G	Dry	grey clay and brown sand, odor, PID=5.4
						end of test pit at 4.0' bg

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-13

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20 /05
Photos Taken: NA
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level
No. Samples Taken: 2
PID: 5.4
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.5			Dry	brown loam, gravel
	0.5	0.7			Dry	grey brown sand and process stone
	0.7	1.2			Wet	process stone – perched water with oily sheen and petro odor – septic leaching field
TP-13A	1.2	3.4			Moist	brown sand and gravel, clay PID=5.4
TP-13B	3.4	6.0	Bottom (6')	Bucket	Moist	brown clay, roots
						End of test pit at 6'

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-14

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/19/05
Photos Taken: NA
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 1.5' BG PERCHED
No. Samples Taken: 2
PID: 2.6
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.3			dry	brown loam
	0.3	0.5			dry	brown sand and gravel
TB-14B (1015a)	0.5	0.8	side wall, 0.5-0.8'	G	dry	grey process and clay
	0.8	1.3			wet	process stone – perched water with oily sheen, oil and septic odor, PID-= 2.6
TP-14A (1025a)	1.3	2.5	side wall, 1.3-2.5'	G	moist	brown clay and sand, trace brick
	2.5	7.0			moist	brown clay
						End of Test Pit at 7.0' BG

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

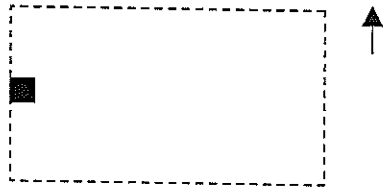
TEST PIT # TP-15

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/19/05
Photos Taken: NA
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 1.3 - PERCHED
No. Samples Taken: 2
PID: 4.5
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.3			dry	brown loam
	0.3	0.5			dry	brown sand and gravel
	0.5	0.8			dry	grey process and clay
	0.8	1.3			wet	process stone – perched water with oily sheen, oil and septic odor, PID-= 4.5
TB-15A	1.3	2.5	1.3-2.5, side wall	G	dry	brown sand and gravel
TP-15B	2.5	5.0	5.0', bottom	bucket	moist	brown clay
						End of Test Pit at 5.0' BG

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-16

TEST PIT LOG

HRP Associates, Inc.

167 NEW BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: 7/19/05

Photos Taken: NA

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level 1.3

No. Samples Taken: 2

PID: 1.4

Sample Storage: cooler, iced

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.2			dry	sandy loam, some silt, some gravel
	0.2	0.7			dry	grey brown sand, some process stone
	0.7	1.3		GW	wet	process stone – septic leaching field (PID = 1.4) – groundwater grab sample
TP-16A	1.3	2.2	2.0, south sidewall	G	moist	brown sand, some gravel, treace brick (fill)
TP-16B	2.2	6.2	2.5, south sidewall	G	moist	brown clay
						end of test pit 6.2' bg

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

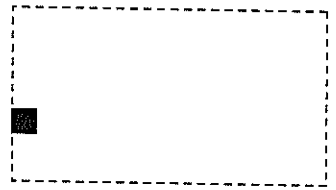
TEST PIT # TP-17

TEST PIT LOG

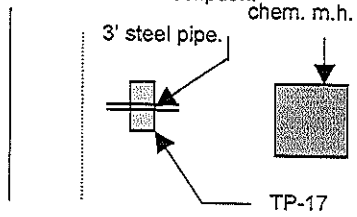
HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/18/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:



Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.5			dry	brown loamy c-vf sand and silt some gravel
	0.5	2			dry	brown c-vf sand, some orange brown sand, copper pipe fragment, log, rotting wood.
TP-17A TB-17B	2	3	2.5' (trench fill) 2-3'	G G	moist moist	grey-brown clay. 3" steel pipe @ 3' BG running E-W between off-site building to W and chemical manhole to E. Sandy fill surrounding pipe (TB-17A). Pin hole puncture leaking water
	3	6			moist	brown clay
						End of Test Pit 6' BG

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-18

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/ /05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 4.6
No. Samples Taken:
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.4			dry	brown, loamy slit and f-c sand, some med gravel
	0.4	0.8			dry	poly sheeting (left from 2001 emergency response)
TP-18A	0.8	1.9	1.0, south sidewall	G	dry	brown c-f sand and gravel
TB-18B	1.9	5.5	4.5', south sidewall	bucket	dry	brown-grey sand, water at 4.6' bg
						End of Test Pit at 4.6' BG

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-19

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/18/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0.75	1.9			dry	brown sand and clay, med gravel
	1.9	3.1			dry	brown clay
TP-19B	3.1	4.5		BUCKET	dry	grey clay
	4.5	6.0			moist	brown clay
						End of test pit at 6.0' BG.

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-20

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/18/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 1'
No. Samples Taken: 2
PID: 44.5
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	1			dry	black brown sand and gravel
TP-20A	1	2.5	1-2.5', south side wall	G	wet	brown grey sand and cobble, perched groundwater at 1.5', strong solvent odor PID = 44.5
TP-20B	2.5	7	bottom	bucket	moist	brown clay PID = 0.0
						end of test pit at 7.0' bg

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-21

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20 /05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 4.5
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)	
	see remarks				dry	NORTHEAST END	SOUTHWEST END
					dry	0-0.8: brown loam	0.-0.5 brown loam
					dry	0.8-3.5: brown sand and gravel, metal pipe fragment, timbers process stone	0.5-07: gray clay
					moist	3.5-4.5: brown clay	0.7-1.2: process stone, perched groundwater-NORTHERN EXTENT OF SEPTIC LEACHING FIELD
TP-21			4.5-6.5' northeast sidewall	bucket	wet	4.5-6.5: grey brown clay (TP-21)	1.2-8.0: brown sand and clay
					wet	6.5-8.0 brown clay	
						END OF TEST PIT AT 8.0' BG	

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-22

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 8.3
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	3.0			dry	brown sand, roots, trace asphalt fragments, trace scrap metal - artificial fill
TP-22 (925)	3.0	9.3	3' south side wall	G	moist	grey brown sand, wet at 8.3, no infiltration
						end of test pit 9.3' bg.

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-23

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-23A	0	3.5	3' west sidewall	G	dry	brown sand, some grey sand, some gravel, trace scrap metal – artificial fill
TB-23B	3.5	8.0	4' west sidewall	G	dry	brown sand. some gravel
	8.0	8.5			moist	brown clay
						end of test pit at 8.5' bg

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

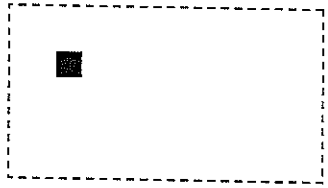
TEST PIT # TP-24

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 5.8
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.1			dry	brown loam, some gravel
TP-24A (1015 a)	0.1	2.5	2.0	G	dry	brown sand. some gravel
TP-24B (1025a)	2.5	6.0	4.0, directly above pipe	G	moist	brown silt and sand and gravel, plastic pipe running southeast-northwest at 4.5' bg, wet at 5.8' bg.
						end of test pit at 6' bg

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-25

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/21/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-25A (100 p)	0	1.5		G	dry	brown sand and gravel, two drum lids at 1.5' bg. Expanded test pit width around lids – no further evidence of buried waste
	1.5	2.0			dry	process stone – perched groundwater with sheen
TP-25B (105 p)	2.0	2.7		G	wet	grey brown sand and silt, trace gravel
	2.7	4.5			wet	grey brown silt and clay
	4.5	5			wet	brown clay
						end of test pit at 5' bg

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
SM = Slightly Moist
VM = Very Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

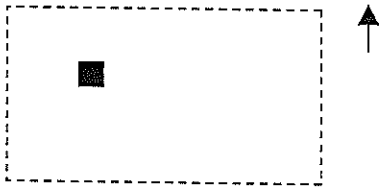
TEST PIT # TP-26

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.1			dry	brown loam
TP-26A	0.1	2.5	2.0	G	dry	brown sand and gravel
	2.5	3			dry	process stone – no water
	3	4.2			dry	brown gray sand, silt and gravel
TP-26B	4.2	8.5	5.0	bucket	dry	brown clay
						end of test pit @ 5.0' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

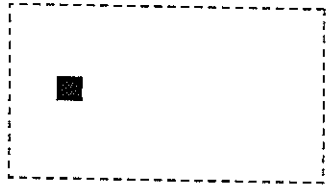
TEST PIT # TP-27

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 1' (leach field)
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	2.5			dry	brown sand, gravel
	2.5	3.0			wet	process stone on east side of pit.
TP-27 (130 p)	3.0	4.3	4.0', west sidewall	G	moist	brown sand, gravel
	4.3	7.8			moist	brown clay, roots, decomposing vegetation
						End of test pit at 7.8' bg

SOAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-28

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/19/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 1' (leachfield)
No. Samples Taken: 1
PID: 10.7
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.5			dry	grey brown sandy loam
	0.5	1.0			wet	process stone – water at 1' bg.
TP-28	1.0	2.0	1.5' west wall	G	moist	brown clay, black creosol stained bucket on west side of TP. PID = 10.7 ppm
	2.0	4.5			moist	brown clay. Timber (railroad tie?) at 3.5' bg.
	4.5	6.5			moist	brown-grey clay. tree stump.
	6.5	8.5		GW	wet	brown clay – groundwater grab sample
						end of test pit at 8.5'

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

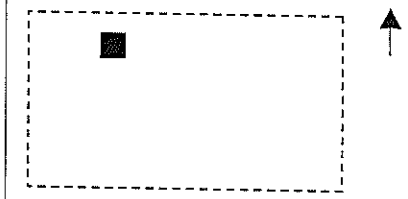
TEST PIT # TP-29

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken: NA
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level NA
No. Samples Taken: 1 (plus dup.)
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-29, DUP-29	0	3.0	2.0	G	dry	brown sand and gravel, rubber tire, stone block Storm sewer pipe 3' bg.
						end of test pit at 3'. Did not want to disturb sewer line.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

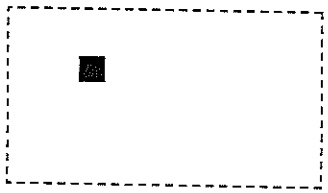
TEST PIT # TP-30

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	7.5			dry	Lg. gravel and cobble, some sand.
TP-30 (1135 a)	7.5	8.0	bottom, 8'	bucket	moist	grey organic clay, some silt, some sand
						end of test pit at 8' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

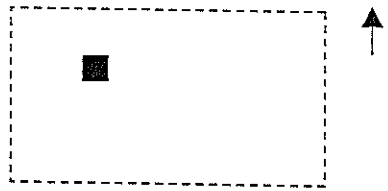
TEST PIT # TP-31

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 7.9'
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-31B (1145a)	0	5	3.0	G	dry	brown sand and gravel
TP=31A (1150a)	5	7.9	5.5	BUCKET	moist	grey silt and sand, some gravel. Swamp (H2S) odor.
	7.9	8.0			wet	brown clay
						end of test pit 8.0' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

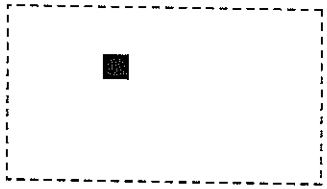
TEST PIT # TP-32

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	3			dry	brown sand, some wood fragments, little concrete fragments, little brick – fill
TP-32 (1205 p)	3	4	3.5', south sidewall	G	moist	grey black organic sand and silt
	4	5.5			dry	brown grey sand and silt
	5.5	7.0			dry	brown clay
						end of test pit at 7' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

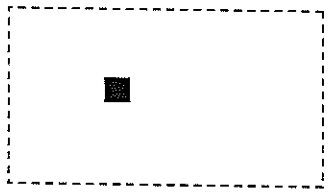
TEST PIT # TP-33

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20/05
Photos Taken: ma
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 3.0'
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	1.3			dry	brown sand and gravel. Poly sheeting at 0-1 bg. ?left over from 2001 emergency response?
TP-33A (145 p) TP-33B (155 p)	1.3	7.0	4.0 NE sidewall 6.0 NE sidewall	bucket bucket	moist wet at 3'	brown clay, trace sand, trace gravel, trace brick, trace roots/vegetation. No process stone or leach field characteristics. Back filled trench from emergency response.
	7	8			wet	brown clay (native)
						end of test pit 8.0' bg

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

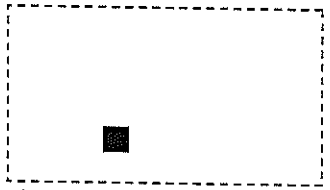
TEST PIT # TP-34

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/21/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 0.0 (surface)
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:
in wetland

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.8			wet	dark brown silt and sand, some roots/vegetation
TP-34	0.8	6.0	1.0	G	wet	brown clay, trace vegetation
						end of test pit at 6.0 bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-35

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/18/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.3			dry	weathered asphalt
	0.3	0.9			dry	process stone and brown-black c-m sand
TP-35A	0.9	2.0			dry	brown c-m sand and med. gravel
TP-35B	2.0	6.0	Bottom 6.0'	bucket	moist	brown clay
						end of test pit at 6.0' bg

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

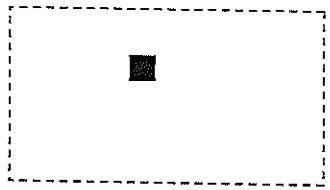
TEST PIT # TP-36

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken:
Excavator Type: case 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-36	0	2.1	1.8' west sidewall	G	dry	brown sand, some gravel, trace asphalt fragments along west sidewall
	2.1	6.0			moist	brown clay
						end of test pit at 6.0' bg.

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

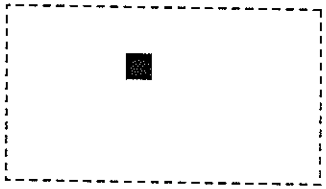
TEST PIT # TP-37

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/25/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-37	0	2.5	1.9' east side wall	G	dry	brown sand and gravel, trace brick along south sidewall. Water pipe at 2' bg east-west thru TP. Pinholes in pipe leaking water
	2.5	3.0				brown clay
						end of test pit at 3'.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

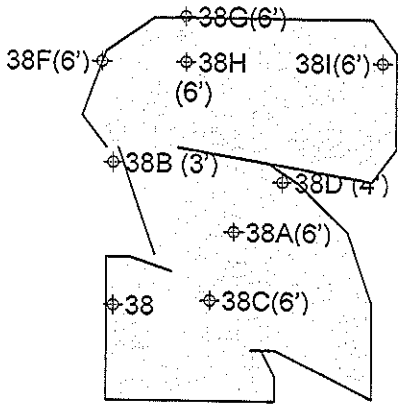
TEST PIT # TP-38

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/21-22/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level NA
No. Samples Taken: 10
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT SKETCH MAP



Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-38	0	3	3'east side wall	G	dry	Brown sand and gravel. Some black organic silt. Little vegetation.
	3	9				Buried fragments and covers to fiberboard drums and bung rims. Small fiberboard fragments mixed with bucket. No sludge or wastes.
7-22-05						EXPANDED EXCAVATION
38A			bottom	BUCKET	moist	black organic silt near drum fragments
38B			sidewall	G	moist	black organic silt, some brown sand. Sidewall abuts backfilled trench from 2001 emergency response
38C			sidewall	G	moist	brown sand, some clay, backfill from 7/21/05
38D			sidewall	G	moist	black organic silt and some brown sand. Side wall next to area to be excavated
38E			bottom	BUCKET	moist	grey brown clay
						END OF TEST PIT 9' BG

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

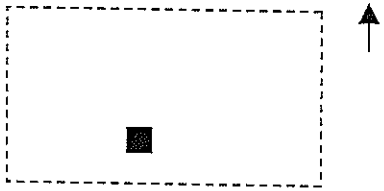
TEST PIT # TP-39

TEST PIT LOG

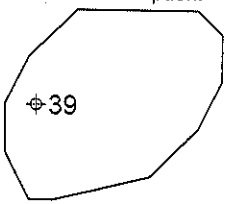
HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/21/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 4.0
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:



Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	3.5			dry	brown sand, vegetation, black silt , trace brick/hose/tire/wire (fill)
TP-39			3' discolored bucket	G	moist	black organic silt and brown sand, vegetation. Fiberboard drum fragment at 3; bg. Crushed plastic drum 0-3'. Isolated discolored bucket. No free liquids. Instructed excavation team to go to Level C for remedial activity. Expanded test pit. No further evidence of waste deposits. Concluded remediation response at TP-39.
	3.5	7.0			wet	brown clay, trace brick
	7.0	8.0			wet	brown clay
						end of test pit at 8.0 bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
SM = Slightly Moist
VM = Very Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

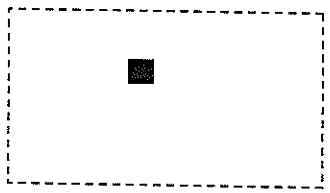
TEST PIT # TP-40

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-40	0	3	2.5', west sidewall	G	dry	Brown sand and gravel, trace silt/clay/brick/roots
	3	7			moist	Brown clay
						end of test pit at 7' BG

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

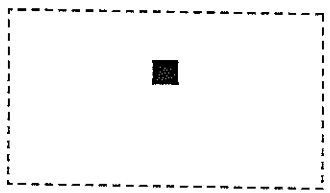
TEST PIT # TP-41

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken: NA
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level NA
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-41	0	1.7	1.6', south sidewall	G	dry	brown sand, trace gravel/roots
	1.7	7.0			moist	brown clay
						end of test pit at 7'

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-42

TEST PIT LOG

HRP Associates, Inc.

167 NEW BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: NA

Photos Taken: NA

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level 0.0

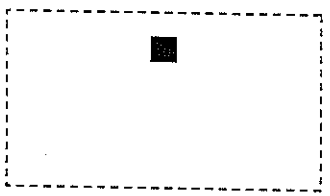
No. Samples Taken: 0

PID: N/A

Sample Storage: N/A

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						NA – Wetlands with standing water

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

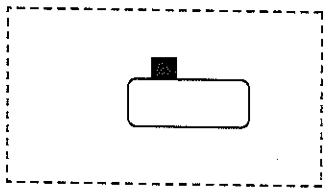
TEST PIT # TP-43

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 722/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 0.0
No. Samples Taken: 0
PID: 0.0
Sample Storage: N/A
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks, (color, structure, grain size, staining, odor, PID)
	0	4			dry	brown sand and gravel. Concrete slab 0-1.5' along south side wall
	4	6			moist	grey-black organic sand and silt
	6	6.5			wet	brown clay
						end of test pit at 6.5' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

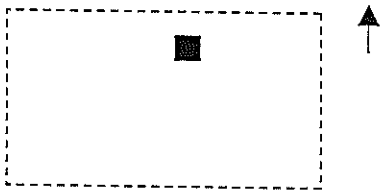
TEST PIT # TP-44

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 722/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 0.0
No. Samples Taken: 0
PID: N/A
Sample Storage: N/A
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						NA – Wetlands with standing water

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

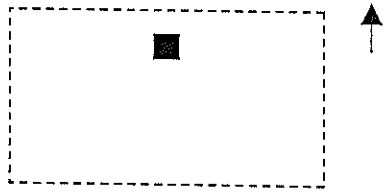
TEST PIT # TP-45

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 722/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 0.0
No. Samples Taken: 0
PID: N/A
Sample Storage: N/A
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						NA – Wetlands with standing water

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-46

TEST PIT LOG

HRP Associates, Inc.

167 NEW BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: 722/05

Photos Taken:

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level 0.0

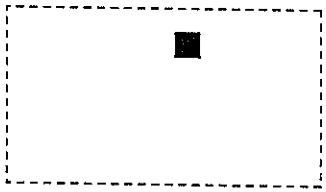
No. Samples Taken: 0

PID: N/A

Sample Storage: N/A

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						NA – Wetlands with standing water

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-47

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken:
Excavator Type:
Contractor: CTR
Ground Water Level na
No. Samples Taken: 1 (plus duplicate)
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.5			dry	brown sand and gravel, some clay, concrete blocks
TP-47 DUP-47	0.5	2.8	2.0, west side wall	G	moist	brown clay, concrete sewer pipe 2.0'
						end of test pit at 2.8' bg. (did not want to risk damage to pipe)

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

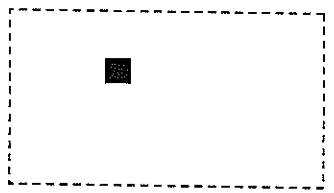
TEST PIT # TP-48

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-48A	0	2	1.8' bg,	G	dry	brown sand and gravel, trace brick/roots
TP-48B	2	6	2.5' bg	G	moist	brown clay
						End of test pit at 6' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

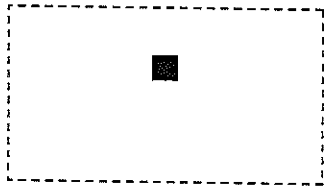
TEST PIT # TP-49

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 0.0
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-49A	0	2.5	2.0' west side wall	G	wet	brown black silt and sand and vegetation
TP-49B	2.5	5.0	3.0' west side wall	G	wet	brown clay
						end of test pit 5.0' bg.

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

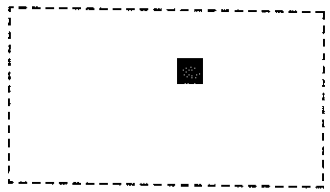
TEST PIT # TP-50

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/25/05
Photos Taken: NA
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 0.0
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-50B	0	2.5	1' west sidewall	G	wet	brown black silt and sand and vegetation
TP-50A	2.5	8.0	8' bottom	bucket	wet	brown clay
						end of test pit 8.0' bg.

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

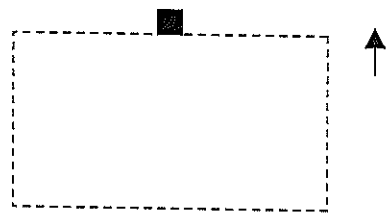
TEST PIT # TP-51

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date:
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level N/A
No. Samples Taken: 0
PID: N/A
Sample Storage: N/A
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						NA – accessible only via off-site Primary Steel

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

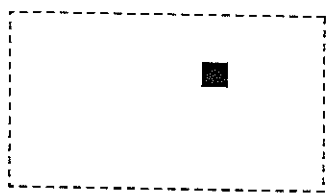
TEST PIT # TP-52

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/25/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 5.5'
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:
northeast of storm sewer outfall

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	1.5			dry	brown sand and gravel, some concrete, some vegetation/roots
TP-52A	1.5	3.5	3', center	G	moist	brown silt and clay, some brown sand and gravel
TP-52B	3.5	6'	5', center	bucket	wet	brown sand and gravel, some brown silt and clay
						end of test pit at 6' bg

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

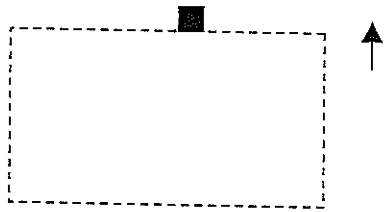
TEST PIT # TP-53

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: na
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 0
PID: na
Sample Storage: na
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						NA – accessible only via off-site Primary Steel

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

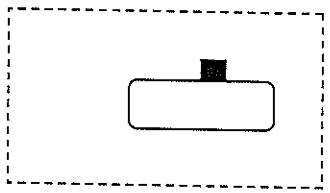
TEST PIT # TP-54

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						surface covered with scrap metal, scrap vehicle, scrap appliance. TP relocated from proposed wetland N of tank farm to topographic high debris pile NE of tank farm. Also, need to evaluate extent of solvent smell ID'd to the east at TP-73.
	0	2.5			dry	brown c-f sand, some gravel, some silt
TP-54A	2.5	4.5	3.0' southwest side wall	G	wet	brown-grey med sand. Saturated w/ perched groundwater.
TP-54B	4.5	6.0	6.0' bottom	bucket	moist	brown clay
						end of test pit 6.0' bg.

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

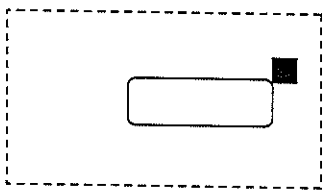
TEST PIT # TP-55

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/25/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 5.5 (perched in sand lens)
No. Samples Taken: 2
PID: 2.0, 23.7
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						TP relocated from proposed wetland N of tank farm to topographic high NE of tank farm. Also, need to evaluate extent of solvent smell ID'd to the west at TP-73.
	0	3.5			dry	brown c-f sand, some gravel, some silt, some vegetation/roots.
TP-55A	3.5	5.5	4.0' west side wall	G	wet	brown-grey med sand. Saturated w/ perched groundwater. Strong solvent odor. PID = 23.7 ppm.
TP-55B	5.5	7.0	7.0' bottom	bucket	moist	brown clay PID = 2.0 ppm
						end of test pit 7.0' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

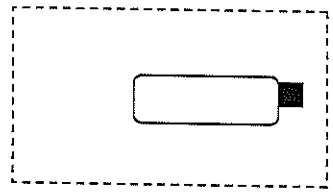
TEST PIT # TP-56

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/25/05
Photos Taken: NA
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 0.5 (wetland)
No. Samples Taken: 2 (plus dup.)
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:
west of tank farm

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-56A DUP-56	0	3	3' southwest corner	G	wet	Brown-black silt and sand, some vegetation
	3	4.5			wet	brown black clay and silt
	4.5	5.0			wet	light brown-grey med sand (PID = 0.0)
TP-56B	5.0	6	6' bottom	bucket	wet	brown clay
						end of test pit at 6' bg

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-57

TEST PIT LOG

HRP Associates, Inc.

167 NEW BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: 7/2505

Photos Taken: NA

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level 0.5 (wetland)

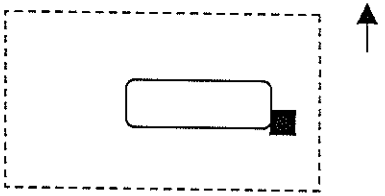
No. Samples Taken: 2

PID: 0.0

Sample Storage: cooler, iced

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-57A	0	3	3' north sidewall	G	wet	Brown-black silt and sand, some vegetation
	3	4.5			wet	brown black clay and silt
TP-57B DUP-57B	4.5	6	6' bottom	bucket	wet	brown clay
						end of test pit at 6' bg

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

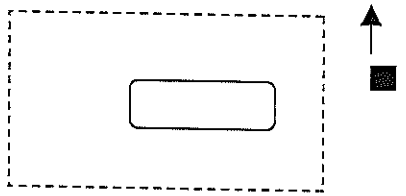
TEST PIT # TP-58

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/25/05
Photos Taken: yes -debris
Excavator Type:
Contractor: CTR
Ground Water Level 6.0'
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Near Ttnus GPR anomaly, scrap metal, empty drums (including ID'd oil drum), scrap washing machine located above pit location.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-58A	0	2	2' southwest sidewall	bucket	dry	brown sand and gravel, some silt/roots/vegetation
	2	6			dry	brown silt and clay, some brown-grey sand
	6	6.5			moist	brown clay
						end of test pit 6.5' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

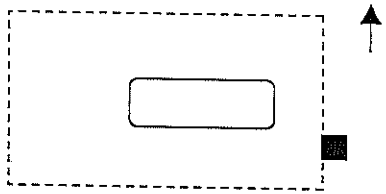
TEST PIT # TP-59

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/ 25/05
Photos Taken: yes
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 0.1 (wetland)
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						scrap metal on surface
TP-59A	0	4.5	1' west sidewall	G	wet	Brown-black silt and sand, some vegetation
TP-59B	4.5	7.5	7.5' bottom	bucket	wet	brown clay
						end of test pit at 7.5' bg

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

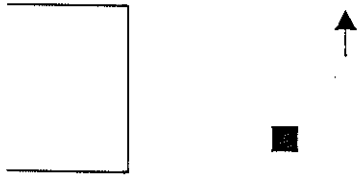
TEST PIT # TP-60

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/25/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-60A	0	2.5	2' west side wall	G	dry	Brown-silt and sand, some vegetation, trace gravel, trace brick, trace scrap metal
TP-60B	2.5	6	3' west side wall	G	moist	brown clay
						end of test pit at 6' bg

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

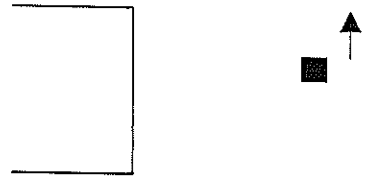
TEST PIT # TP-61

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/25/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 4'
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-61B	0	3.5	3' west side wall	G	dry	Brown-sand and gravel, some silt
TP-61A	3.5	6.5	6' west side wall	bucket	wet	brown silt and clay
						end of test pit at 6.5' bg

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

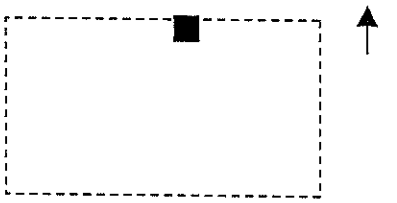
TEST PIT # TP-62

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/25/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

TP relocated ~120' west from proposed location. Proposed location inaccessible on-site due to thick vegetation and stream bed. Installed in same concrete rubble embankment along north side of site

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	1.5			dry	concrete rubble, some rebar (fill material – embankment comes down from adjoining Primary Steel)
TP-62A	1.5	5.5	3.0', south sidewall	G	dry	brown-grey sand, some gravel, some concrete
	5.5	7.5			dry	brown sand, some gravel, trace roots
TP-62b	7.5	8.5	8.5 bottom	bucket	moist	brown clay
						end of test pit at 8.5' bg

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

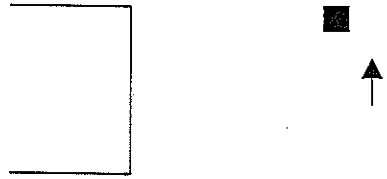
TEST PIT # TP-63

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: na
Photos Taken: na
Excavator Type: na
Contractor: CTR
Ground Water Level na
No. Samples Taken: 0
PID: na
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Proposed location inaccessible on-site due to thick vegetation and streambed.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						NA – No access to location.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

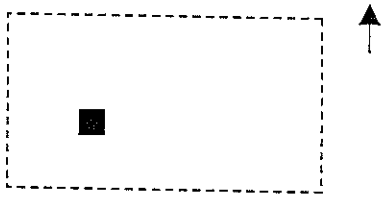
TEST PIT # TP-64

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/25/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 1'
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:
north of chemical manhole.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.2			dry	sandy loam, some silt, some gravel
	0.2	0.7			dry	grey brown sand, some process stone
	0.7	1.3		gw	wet	process stone – septic leaching field – leaching groundwater bright yellow (PID = 0.0)
TP-64A	1.3	2.2	1.5, north sidewall	g	moist	brown sand, some gravel, trace brick (fill)
TP-64B	2.2	6.0	3.5, north sidewall	g	moist	brown clay
						end of test pit 6.0' bg.

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

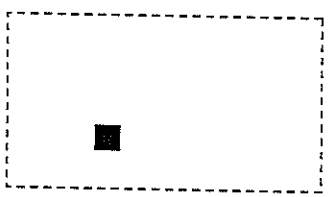
TEST PIT # TP-65

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: na
Photos Taken: na
Excavator Type: na
Contractor: CTR
Ground Water Level ~0 (wetland surface water)
No. Samples Taken: 0
PID: 0.0
Sample Storage: na
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						No feasible area to dig pit between chemical manhole and saturated wetlands.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

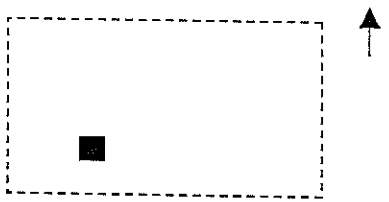
TEST PIT # TP-66

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level NA
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Had to off-set proposed location – no area between chemical manhole excavation and north side of drum filling building. Installed within foundation remains of former drum filling building. Directly south of chemical man hole.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.5			dry	brown sand, gravel, concrete, some vegetation, roots
TP-66 (215 p)	0.5	5.5	1-2', north side wall	g	moist	brown clay, some silt, some sand, trace gravel. Drain hole in foundation to chemical manhole at 0.7' below grade, 1.5' below what remains of the top of the foundation. Footing 4' below top of foundation. Sample TP-66 collected from directly beneath hole in foundation..
						end of test pit at 5.5' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

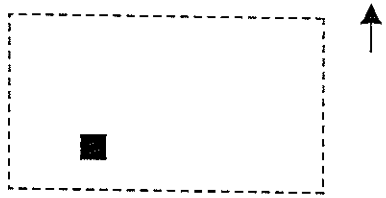
TEST PIT # TP-67

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/20-21/05
Photos Taken:
Excavator Type:
Contractor: CTR
Ground Water Level
No. Samples Taken:
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Expanded TP-66 to the south. Installed as a trench with former drum filling building.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-67 (225 P)	0	5.5	2.5', center*	g	dry	see TP-66. *sampled from beneath presumed location of the reported floor drain in drum filling building.
	5.5	8.5			moist	brown clay, some silt, some sand, trace gravel
						end of TP at 8.5' bg.
						Test pit left open over night to determine if groundwater will infiltrate. No gw observed on 7/21. Backfilled on 7/21.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

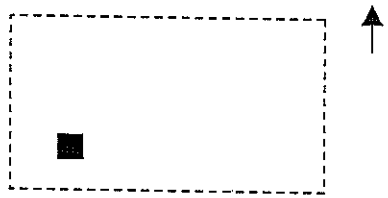
TEST PIT # TP-68

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/18 /05
Photos Taken:
Excavator Type:
Contractor: CTR
Ground Water Level na
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
TP-68	0	2	1' west sidewall	g	dry	brown grey sand and gravel, some vegetation/roots
	2	7			dry	brown clay and silt
						end of test pit at 7' bg.

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

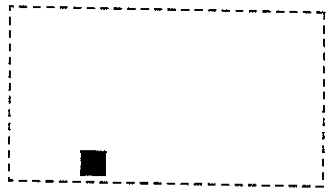
TEST PIT # TP-69

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/21/05
Photos Taken:
Excavator Type:
Contractor: CTR
Ground Water Level 1 (perched in process stone beneath slab)
No. Samples Taken: 1
PID: 12.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:
NE corner of slab of former storage shed

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.8			dry	Concrete slab
	0.8	2.5			wet	Process stone coated in oily tar. Footing to 2.5'. Strong petro odor. Perched water beneath slab has sheen. (PID = 77)
TP-69 (630 a)	2.5	3.0	2.5 – 3.0, center	G	moist	brown-black sand and gravel, trace brick. (PID = 54)
	3.0	5.5			moist	brown clay
						end of TP at 5.5' bg.

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-70

TEST PIT LOG

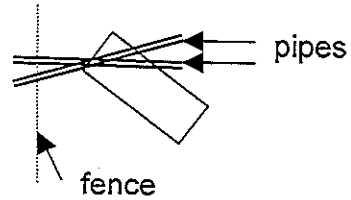
HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/21/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 7'
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

Test Pit Location Description:

Unable to locate slab to former shed. Installed TP on north side of fence where shed was believed to have been.



Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.5			dry	dark brown loam, some vegetation
	0.5	1.0			dry	grey process stone. 3" steel pipe at 0.6' bg.
TP-70 (655 A)	1.0	2.8	1.0, above pipe	G	moist	brown sand and gravel, some clay. 3" steel pipe at 1.2' bg.
TP-70W	2.8	8.0		GW	wet at 7'	brown clay
						end of test pit at 8.0' bg

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

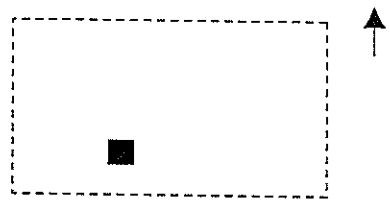
TEST PIT # TP-71

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/21/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level 3.0 (perched)
No. Samples Taken: 2
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.5			dry	brown loamy sand, some roots/vegetation
TP-71B (720 a)	0.5	2.5	1.0	G	dry	brown clay
TP-71A (715 a)	2.5	3.0	2.7	G	wet	brown med. sand
	3.0	7.5			moist	brown-grey clay
						end of test pit at 7.5' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-72

TEST PIT LOG

HRP Associates, Inc.

167 NEW BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown

Location: 680 Newfield St. (rear), Middletown, CT

Job No.: MID6003.P3

Date: na

Photos Taken: na

Excavator Type: CASE 9010

Contractor: CTR

Ground Water Level 0 (surface water

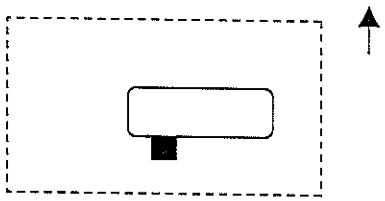
No. Samples Taken: na

PID: na

Sample Storage: cooler, iced

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:

2' standing water at location of former loading rack. TP location not accessible.

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
						2' standing water at location of former loading rack. TP location not accessible.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

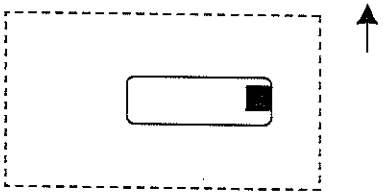
TEST PIT # TP-73

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken: na
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:
west end of tank farm

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	2.5			dry	brown sand and gravel. Concrete slab 0-1.5' along west side wall
TP-73	2.5	4	3.0' west sidewall	G	moist	med sand
	4	4.5			moist	grey-black organic sand and silt
	4.5	6.5			moist	brown-black-grey clay
						end of test pit at 6.5' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

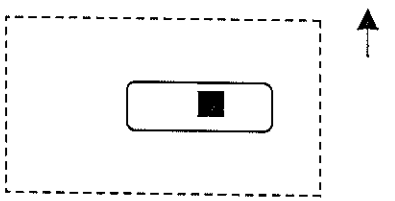
TEST PIT # TP-74

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level na
No. Samples Taken: 1
PID: 0.0
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:
center of tank farm pad (weathered area of concrete slab)

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.4				weathered concrete – 8" concrete slab along west side wall
	0.4	2.5			dry	med light brown sand, some gravel and concrete
TP-74	2.5	4	3.0' north sidewall	G	moist	grey-brown clay
	4	5			moist	med. light-brown-grey sand, some black silt
	6	6.5			moist	brown clay
						end of test pit at 6.5' bg.

SAMPLE TYPE
Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE
D = Dry
SM = Slightly Moist
VM = Very Moist
W = Wet (saturated)

PROPORTIONS USED
0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

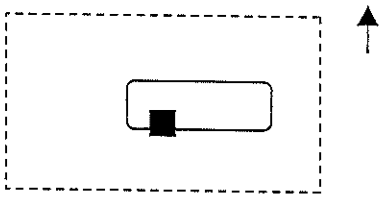
TEST PIT # TP-75

TEST PIT LOG

HRP Associates, Inc.
167 NEW BRITAIN AVENUE
PLAINVILLE, CONNECTICUT 06062

Project/Client: Portland Chem./City of Middletown
Location: 680 Newfield St. (rear), Middletown, CT
Job No.: MID6003.P3
Date: 7/22/05
Photos Taken:
Excavator Type: CASE 9010
Contractor: CTR
Ground Water Level
No. Samples Taken: 1
PID: 33.5
Sample Storage: cooler, iced
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP



Test Pit Location Description:
south of western half of tank farm pad

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	2.5			dry	brown sand and gravel. Concrete slab 0-1.5' along south side wall
	2.5	4			moist	med sand
	4	6			moist	grey-black organic sand and silt
TP-75	6	6.5	6.0' north sidewall	bucket	moist	brown clay, PID = 33.5 ppm
						end of test pit at 6.5' bg.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

Project	Former Portland Chemical	HRP ASSOCIATES, INC. ENGINEERING & GEOLOGY	Test Boring/Monitor Well ID TB-7W
Location	680 Newfield St., Middletown, CT	***DRILLING/SOIL LOG***	Sheet No. / Location 1 of 1
HRP#	MID6003.P3		
Contractor	LES		

	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")	Start 10-28-05 Finish 10-28-05 Driller Wayne HRP Rep. JMC
Type	NA	MC	NA		
O.D. (inch)		2.125		Rig Type Geoprobe GH-40	
I.D. (inch)		1.5			

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
		0-2.8'	2.8	Dry	0.0	Process gravel (railroad base)	0.0
					0.2	Brown coarse-fine sand, trace gravel, some silt	
					2.5	Clay	
					2.7	Brown fine sand	
					2.8		
4'							
		4-8'	4'	Wet	4.0	Brown fine sand	0.0
					5.5	Clay	
8'						EOTB @ 8' BG	
					8.0	5' screen sch. 40 PVC, 0.010" slot, 1/2" diameter, 3-8' BG 5' PVC riser, 1/2" diameter Cut to 5" stick up Sand 0.5-8' BG Bentonite 0.5-0.0' BG PVC cap	

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler

Cohenionless Density		Cohesive Consistence	
# of Hammer Blows		*# of Hammer Blows*	
		0-2	very soft
0-4	very loose	3-4	soft
5-9	loose	5-8	medium stiff
10-29	medium dense	9-15	stiff
30-49	dense	16-30	very stiff
50+	very dense	31+	hard

PROPORTIONS	
trace	0 to 10 %
little	10 to 20 %
some	20 to 35 %
and	30 to 50 %

Ground Elevation:
Reference Elevation:
Bottom Elevation:

Project	Former Portland Chemical	HRP ASSOCIATES, INC. ENGINEERING & GEOLOGY	Test Boring/Monitor Well ID TB-1W
Location	680 Newfield St., Middletown, CT	***DRILLING/SOIL LOG***	Sheet No. / Location 1 of 1
HRP#	MID6003.P3		
Contractor	LES		

	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")	Start 10-28-05
Type	NA	MC	NA		Finish 10-28-05
O.D. (inch)		2.125		Rig Type Geoprobe GH-40	Driller Wayne
I.D. (inch)		1.5			HRP Rep. JMC

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
		0-2.2	2.2	Dry	0.0	Brown sand and silt, little coarse gray gravel	0
				Moist @ 1.8'	1.5	Brown clay, trace sand, trace gravel, trace brick	
					2.2	Brown clay	
4							
		4-8	4.0	Wet @ 7.0	4.0	Brown clay, some vegetation Wood @ 4.1' Gravel @ 5.0'	0
8							
		N/A	0.0	Wet	8.0	No recovery	
12						EOTB @ 12' BG	
						10' screen sch. 40 PVC, 0.010" slot, 1/2" diameter, 2-12' BG 2'-12' BG 5' riser PVC sch. 40 1/2"-diameter w/ 3' stickup Sand 1-12' BG Bentonite 0-1' BG PVC cap	

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler

Cohenionless Density		Cohesive Consistence	
# of Hammer Blows		*# of Hammer Blows*	
		0-2	very soft
0-4	very loose	3-4	soft
5-9	loose	5-8	medium stiff
10-29	medium dense	9-15	stiff
30-49	dense	16-30	very stiff
50+	very dense	31+	hard

PROPORTIONS	
trace	0 to 10 %
little	10 to 20 %
some	20 to 35 %
and	30 to 50 %

Ground Elevation:
Reference Elevation:
Bottom Elevation:

Project Former Portland Chemical	HRP ASSOCIATES, INC. ENGINEERING & GEOLOGY	Test Boring/Monitor Well ID TB-2W
Location 680 Newfield St., Middletown, CT	***DRILLING/SOIL LOG***	Sheet No. / Location 1 of 1
HRP# MID6003.P3		
Contractor LES		

	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")	Start 10-28-05 Finish 10-28-05 Driller Wayne HRP Rep. JMC
Type	NA	MC	NA		
O.D. (inch)		2.125		Rig Type Geoprobe GH-40	
I.D. (inch)		1.5			

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
		0-1.9	1.9	Wet	0.0	Brown coarse fine sand, little brown/gray sand, trace vegetation	0
4					1.9		
		4-6.3	2.3	Wet	4.0	Brown/black silt, some clay, trace fine sand, vegetation	0
8					6.3		
		N/A	0		8.0	Solid probe to 12' BG	
12						EOTB @ 12' BG	
					12.0	10' screen sch. 40 PVC, 0.010" slot, 1/2" diameter, 2-12' BG 5' PVC riser 0-2', plus stickup 3' Sand 1-12' BG Bentonite 0-1' BG PVC cap	

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler

Cohenionless Density		Cohesive Consistence	
# of Hammer Blows		*# of Hammer Blows*	
		0-2	very soft
0-4	very loose	3-4	soft
5-9	loose	5-8	medium stiff
10-29	medium dense	9-15	stiff
30-49	dense	16-30	very stiff
50+	very dense	31+	hard

PROPORTIONS	
trace	0 to 10 %
little	10 to 20 %
some	20 to 35 %
and	30 to 50 %

Ground Elevation:
Reference Elevation:
Bottom Elevation:

Project Former Portland Chemical	HRP ASSOCIATES, INC. ENGINEERING & GEOLOGY	Test Boring/Monitor Well ID TB-3W
Location 680 Newfield St., Middletown, CT	***DRILLING/SOIL LOG***	Sheet No. / Location 1 of 1
HRP# MID6003.P3		
Contractor LES		

	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")	Start 10-28-05
Type	NA	MC	NA		Finish 10-28-05
O.D. (inch)		2.125		Rig Type Geoprobe GH-40	Driller Wayne
I.D. (inch)		1.5			HRP Rep. JMC

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
					0.0	Gray coarse-medium sand and gravel	
		0-1'	1'	Dry	0.1'	Brown coarse-fine sand and gravel	0
4					1'		
		4-8'	4'	Wet	4.0	Brown clay, little sand, little silt	0
8						EOTB @ 8' BG	
					8.0	5' screen sch. 40 PVC, 0.010" slot, 1/2" diameter, 3-8' BG 5' PVC riser, 1/2" diameter Cut to 5" stick up Sand 0.5-8' BG Bentonite 0.5-0.0' BG PVC cap	

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler

Cohenionless Density		Cohesive Consistence		PROPORTIONS	
# of Hammer Blows		*# of Hammer Blows*		trace	0 to 10 %
		0-2	very soft	little	10 to 20 %
0-4	very loose	3-4	soft	some	20 to 35 %
5-9	loose	5-8	medium stiff	and	30 to 50 %
10-29	medium dense	9-15	stiff	Ground Elevation:	
30-49	dense	16-30	very stiff	Reference Elevation:	
50+	very dense	31+	hard	Bottom Elevation:	

Project	Former Portland Chemical			HRP ASSOCIATES, INC. ENGINEERING & GEOLOGY		Test Boring/Monitor Well ID TB-4	
Location	680 Newfield St., Middletown, CT			*DRILLING/SOIL LOG*		Sheet No. / Location 1 of 1	
HRP#	MID6003.P3						
Contractor	LES						
	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")		Start 10-28-05	
Type	NA	MC	NA			Finish 10-28-05	
O.D. (inch)		2.125		Rig Type Geoprobe GH-40		Driller Wayne	
I.D. (inch)		1.5				HRP Rep. JMC	

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
		0-0.3'	0.3	Dry	0.0	Topsoil	0
					0.1'	Gravel	
					0.2'	Gravel, some brown coarse-fine sand	
					0.3'		
4							
		4-4.3'	0.3	Moist Very Loose	4.0	Brown silt and sand	0
					4.3'		
8						EOTB @ 8' BG	
						Since very little recovery - offset 1' NE	
						TB-4A	
		0-3'	3'	Dry		Topsoil	0
					0.1	Gravel	
					0.2	Brown coarse-very fine sand, trace gravel	
					0.3	Gravel	
					0.4	Brown silt, some sand, some clay	
					1	Brown clay	
					3		
4							
						EOTB @ 4' BG	

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler				PROPORTIONS	
Cohenionless Density		Cohesive Consistence			
# of Hammer Blows		*# of Hammer Blows*		trace	0 to 10 %
		0-2	very soft	little	10 to 20 %
0-4	very loose	3-4	soft	some	20 to 35 %
5-9	loose	5-8	medium stiff	and	30 to 50 %
10-29	medium dense	9-15	stiff	Ground Elevation:	
30-49	dense	16-30	very stiff	Reference Elevation:	
50+	very dense	31+	hard	Bottom Elevation:	

Project Former Portland Chemical	HRP ASSOCIATES, INC. ENGINEERING & GEOLOGY	Test Boring/Monitor Well ID TB-5	
Location 680 Newfield St., Middletown, CT	***DRILLING/SOIL LOG***	Sheet No. / Location 1 of 1	
HRP# MID6003.P3			
Contractor LES			

	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")	Start 10-28-05
Type	NA	MC	NA		Finish 10-28-05
O.D. (inch)		2.125		Rig Type Geoprobe GH-40	Driller Wayne
I.D. (inch)		1.5			HRP Rep. JMC

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
		0-2.8'	2.8	Dry	0.0	Gray-black gravel	0
					0.2	Brown sand and brown-gray gravel	
				Moist	0.4	Brown silt and clay	
				Wet @ 2.4'			
					2.3'	Brown clay	
4					2.8'		
		4-8'	4'	Wet	4.0	Brown clay, little fine-very fine sand, little silt	0
8						EOTB @ 8' BG	
					8.0		

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler

Cohesionless Density		Cohesive Consistence	
# of Hammer Blows		*# of Hammer Blows*	
		0-2	very soft
0-4	very loose	3-4	soft
5-9	loose	5-8	medium stiff
10-29	medium dense	9-15	stiff
30-49	dense	16-30	very stiff
50+	very dense	31+	hard

PROPORTIONS	
trace	0 to 10 %
little	10 to 20 %
some	20 to 35 %
and	30 to 50 %

Ground Elevation:
Reference Elevation:
Bottom Elevation:

Project	Former Portland Chemical	HRP ASSOCIATES, INC. ENGINEERING & GEOLOGY	Test Boring/Monitor Well ID TB-6
Location	680 Newfield St., Middletown, CT	***DRILLING/SOIL LOG***	Sheet No. / Location 1 of 1
HRP#	MID6003.P3		
Contractor	LES		

	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")	Start 10-28-05 Finish 10-28-05 Driller Wayne HRP Rep. JMC
Type	NA	MC	NA		
O.D. (inch)		2.125		Rig Type Geoprobe GH-40	
I.D. (inch)		1.5			

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
		0-2.3'	2.3'	Dry	0.0	Gray gravel	0.0
					0.2	Brown coarse-medium sand and gray gravel	
					1.2	Brown clay, trace brick	
4					2.3'		
		4-8	4	Wet	4	Brown clay	0.0
8						EOTB @ 8' BG	
					8		

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler				PROPORTIONS	
Cohenionless Density		Cohesive Consistence			
# of Hammer Blows		*# of Hammer Blows*		trace	0 to 10 %
		0-2	very soft	little	10 to 20 %
0-4	very loose	3-4	soft	some	20 to 35 %
5-9	loose	5-8	medium stiff	and	30 to 50 %
10-29	medium dense	9-15	stiff	Ground Elevation:	
30-49	dense	16-30	very stiff	Reference Elevation:	
50+	very dense	31+	hard	Bottom Elevation:	

Project Former Portland Chemical	HRP ASSOCIATES, INC. ENGINEERING & GEOLOGY	Test Boring/Monitor Well ID TB-7W
Location 680 Newfield St., Middletown, CT	*DRILLING/SOIL LOG*	Sheet No. / Location 1 of 1
HRP# MID6003.P3		
Contractor LES		

	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")	Start 10-28-05
Type	NA	MC	NA		Finish 10-28-05
O.D. (inch)		2.125		Rig Type Geoprobe GH-40	Driller Wayne
I.D. (inch)		1.5			HRP Rep. JMC

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
		0-2.8'	2.8	Dry	0.0	Process gravel (railroad base)	0.0
					0.2	Brown coarse-fine sand, trace gravel, some silt	
					2.5	Clay	
					2.7	Brown fine sand	
4'					2.8		
		4-8'	4'	Wet	4.0	Brown fine sand	0.0
					5.5	Clay	
8'						EOTB @ 8' BG	
					8.0	5' screen sch. 40 PVC, 0.010" slot, 1/2" diameter, 3-8' BG 5' PVC riser, 1/2" diameter Cut to 5" stick up Sand 0.5-8' BG Bentonite 0.5-0.0' BG PVC cap	

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler				PROPORTIONS	
Cohenionless Density		Cohesive Consistence			
# of Hammer Blows		*# of Hammer Blows*		trace	0 to 10 %
		0-2	very soft	little	10 to 20 %
0-4	very loose	3-4	soft	some	20 to 35 %
5-9	loose	5-8	medium stiff	and	30 to 50 %
10-29	medium dense	9-15	stiff	Ground Elevation:	
30-49	dense	16-30	very stiff	Reference Elevation:	
50+	very dense	31+	hard	Bottom Elevation:	

Project Former Portland Chemical	HRP ASSOCIATES, INC.	Test Boring/Monitor Well ID TB-8
Location 680 Newfield St., Middletown, CT	ENGINEERING & GEOLOGY	
HRP# MID6003.P3	*DRILLING/SOIL LOG*	Sheet No. / Location 1 of 1
Contractor LES		

	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")	Start 10-28-05 Finish 10-28-05
Type	NA	MC	NA		
O.D. (inch)		2.125		Rig Type Geoprobe GH-40	Driller Wayne
I.D. (inch)		1.5			HRP Rep. JMC

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
		0-2.7'	2.7'	Dry	0.0	Brown gray sand and gravel	
					1.0	Brown gray clay	0
					2.7		
4							
		4-6'	3.5'	Wet	4.0	Brown clay	0.0
		6-7.5'				Brown clay, solvent odor	33.6 @ 7.0
8					7.5		
		8-10'	2.0	Wet	8.0	Brown Clay, solvent odor	69.7
					10.0		
12						EOTB @ 12' BG	

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler

Cohesionless Density		Cohesive Consistence	
# of Hammer Blows		*# of Hammer Blows*	
0-4	very loose	0-2	very soft
5-9	loose	3-4	soft
10-29	medium dense	5-8	medium stiff
30-49	dense	9-15	stiff
50+	very dense	16-30	very stiff
		31+	hard

PROPORTIONS	
trace	0 to 10 %
little	10 to 20 %
some	20 to 35 %
and	30 to 50 %

Ground Elevation:
Reference Elevation:
Bottom Elevation:

Project	Former Portland Chemical	HRP ASSOCIATES, INC. ENGINEERING & GEOLOGY	Test Boring/Monitor Well ID TB-9
Location	680 Newfield St., Middletown, CT	***DRILLING/SOIL LOG***	Sheet No. / Location 1 of 1
HRP#	MID6003.P3		
Contractor	LES		

	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")	Start 10-28-05 Finish 10-28-05 Driller Wayne HRP Rep. JMC
Type	NA	MC	NA		
O.D. (inch)		2.125		Rig Type Geoprobe GH-40	
I.D. (inch)		1.5			

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
		0-2	2.0'	Dry	0.0	Brown sand and silt, some gravel, trace vegetation	0.0
					0.5	Brown sand and silt, trace gravel	
					1.5	Gray gravel	
					1.9	Black organic silt	
4					2.0		
		4-8	4'	Wet	4.0	Brown sand, trace gravel	0.0
					4.5	Brown clay	
8						EOTB @ 8' BG	
					8.0		

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler

Cohenionless Density		Cohesive Consistence	
# of Hammer Blows		*# of Hammer Blows*	
0-4	very loose	0-2	very soft
5-9	loose	3-4	soft
10-29	medium dense	5-8	medium stiff
30-49	dense	9-15	stiff
50+	very dense	16-30	very stiff
		31+	hard

PROPORTIONS	
trace	0 to 10 %
little	10 to 20 %
some	20 to 35 %
and	30 to 50 %

Ground Elevation:
Reference Elevation:
Bottom Elevation:

Project	Former Portland Chemical	HRP ASSOCIATES, INC. ENGINEERING & GEOLOGY	Test Boring/Monitor Well ID TB-10
Location	680 Newfield St., Middletown, CT	***DRILLING/SOIL LOG***	Sheet No. / Location 1 of 1
HRP#	MID6003.P3		
Contractor	LES		

	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")	Start 10-28-05 Finish 10-28-05
Type	NA	MC	NA		
O.D. (inch)		2.125		Rig Type Geoprobe GH-40	Driller Wayne
I.D. (inch)		1.5			HRP Rep. JMC

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
		0-3	3'	Dry	0.0	Process gravel (railroad base)	0.0
					0.2	Brown medium-fine sand, trace gravel, trace silt	
					2.5	Brown clay	
					2.8	Brown fine sand	
4					3.0		
		4-8	4'	Wet	4.0	Brown fine sand	0.0
					5.0	Brown clay	
8						EOTB @ 8' BG	
					8.0		

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler

Cohenionless Density		Cohesive Consistence	
# of Hammer Blows		*# of Hammer Blows*	
0-4	very loose	0-2	very soft
5-9	loose	3-4	soft
10-29	medium dense	5-8	medium stiff
30-49	dense	9-15	stiff
50+	very dense	16-30	very stiff
		31+	hard

PROPORTIONS	
trace	0 to 10 %
little	10 to 20 %
some	20 to 35 %
and	30 to 50 %

Ground Elevation:
Reference Elevation:
Bottom Elevation:

Project Former Portland Chemical	HRP ASSOCIATES, INC. ENGINEERING & GEOLOGY	Test Boring/Monitor Well ID TB-11	
Location 680 Newfield St., Middletown, CT	*DRILLING/SOIL LOG*	Sheet No. / Location 1 of 1	
HRP# MID6003.P3			
Contractor LES			

	Casing	*Sampler*	*Core Barrel*	Hammer (weight-lb./fall-30")	Start 10-28-05 Finish 10-28-05 Driller Wayne HRP Rep. JMC
Type	NA	MC	NA		
O.D. (inch)		2.125		Rig Type Geoprobe GH-40	
I.D. (inch)		1.5			

Depth (ft.)	Sampler Blows per 6"	Sample Interval	Recovery (ft)	Density or Consistency/Moisture	Profile Change	*Remarks* (color, structure, grain size, staining, odor)	PID (ppm)
					0.0	Process gravel (railroad base)	
					0.2	Brown fine-coarse sand and gravel	0.0
		0-2	2'	Moist			
4					2.0		
		4-8	4'	Wet	4.0	Brown silt and clay, some brown fine sand	0.0
8						EOTB @ 8' BG	
					8.0		

SAMPLE PENETRATION RESISTANCE - 140 lb. wt. falling 30" on 2" O.D. sampler

Cohenionless Density		Cohesive Consistence		PROPORTIONS	
# of Hammer Blows		*# of Hammer Blows*		trace	0 to 10 %
0-4	very loose	0-2	very soft	little	10 to 20 %
5-9	loose	3-4	soft	some	20 to 35 %
10-29	medium dense	5-8	medium stiff	and	30 to 50 %
30-49	dense	9-15	stiff		
50+	very dense	16-30	very stiff		
		31+	hard		

Ground Elevation:
Reference Elevation:
Bottom Elevation:

APPENDIX B

LOW FLOW SAMPLING DATA SHEETS

HRP Associates, Inc.
167 New Britain Avenue
Plainville, Connecticut 06062
(860) 793-6899

Monitor Well Data Sheet

Well ID: MW-1

Site Background Information

Site Location:	Portland Chemical	**Sampling Dates:**	11/16/05
Job Number:	MID6002.P3 T-2	**Field Team Leader:**	JC
Weather:	Overcast 45-50 F	**Team Personnel:**	CJL, KG, BE

Ground Water Elevation Data

Date	Time	Sampler Name	Equipment Model		Depth to Water (ft)		Depth to Bottom (ft)	
11/16/05	10:25	CJL	Solinst-101		uncorrected		uncorrected	
			corr. factor		corrected	3.28	corrected	17.21

Measurement Point: PVC

Well Condition (circle one)

General Condition	Visible Well ID	Well Cap Present	Well Plumbness	Lock
Good	No	Yes	Good	No

Concrete Collar	Ponded Water	Comments:
Good	No	Could not maintain .3' drawdown criteria. Lowered flow rate to minimize draw down.

Well Purging Data

Date	Time						Sampler Initials	Instrument Calibration Date
	Equipment Set-up		Purging		Sample Collection			
	Start	Finish	Start	Finish	Start	Finish		
11/16/05	1:00	1:13	1:13	1:48	1:48	2:30	BE	11/16/05

Instrument Mfg & Model	
pH	YSI 600 XLM w/ 650 MDS S# 01C0134 AC
Temp.	YSI 600 XLM w/ 650 MDS S# 01C0134 AC
Sp. Cond.	YSI 600 XLM w/ 650 MDS S# 01C0134 AC
ORP	YSI 600 XLM w/ 650 MDS S# 01C0134 AC
DO	YSI 600 XLM w/ 650 MDS S# 01C0134 AC
Turbidity	HF Scientific DRT-15CE S# HRP1

Initial Water Depth (ft):			3.28	Time:	1:06			
Time	Water Depth (ft)	Flow Rate (ml/min)	pH (s.u.)	Temp (°C)	Sp Con (uS)	ORP (mV)	DO (mg/l)	Turbidity (ntu)
1:20	3.85	160	Dropped flow rate due to d.d.					
1:23	3.92	80	6.96	16.39	898	0.5	0.49	44.9
1:26	3.95	80	6.95	16.6	897	4	0.5	41.5
1:29	3.99	80	6.95	16.75	897	9.1	0.54	45.5
1:32	4.04	80	6.93	16.88	910	-21.2	0.61	38.6
1:35	4.09	80	6.92	16.7	912	-44.8	0.48	36.2
1:38	4.12	80	6.92	16.63	911	-49.7	0.43	34.8
1:41	4.16	80	6.92	16.48	912	-50.5	0.38	36.5
1:44	4.19	80	6.92	16.5	911	-57.3	0.36	35.7
1:47	4.22	80	6.91	16.49	912	-59.9	0.35	34.3
Req. Limits for Last 3 Readings			0.1	3%	3%	10 mV	10%	10%

Pump Mfg & Model	Color	Odor	Purge Vol (ml)	Sample Depth (ft.)
GEO Tech Peristaltic	clear/sl sheen	none	2700	12.21

Sample Containers

Type & No.	Volume	Preservative
2 Vials	2 x 40 mL	HCL
2 Ambers	2 x 1L	As Is
1 Amber	1 L	H2SO4

Type & No.	Volume	Preservative
1 Plastic	500 mL	HNO3

HRP Associates, Inc.
167 New Britain Avenue
Plainville, Connecticut 06062
(860) 793-6899

Monitor Well Data Sheet

Well ID: MW-3

Site Background Information

Site Location:	Portland Chemical	**Sampling Dates:**	11/16/05
Job Number:	MID6002.P3 T-2	**Field Team Leader:**	JC
Weather:	Overcast 45-50 F	**Team Personnel:**	CJL, KG, BE

Ground Water Elevation Data

Date	Time	Sampler Name	Equipment Model		Depth to Water (ft)		Depth to Bottom (ft)	
11/16/05	10:38	CJL	Solinst-101		uncorrected		uncorrected	
			corr. factor		corrected		corrected	18.01

Measurement Point: PVC

Well Condition (circle one)

General Condition	Visible Well ID	Well Cap Present	Well Plumbness	Lock
Good	No	Yes	Good	No

Concrete Collar	Ponded Water	Comments:
Good	No	could not maintain.3' draw down criteria @ minimum flow of 80 mL

Well Purging Data

Date	Time						Sampler Initials	Instrument Calibration Date
	Equipment Set-up		Purging		Sample Collection			
	Start	Finish	Start	Finish	Start	Finish		
11/16/05	1:10	1:16	1:16	1:42	1:42	2:20	KG	11/16/05

Instrument Mfg & Model	
pH	YSI 600 XLM w/ 650 MDS S# 00DO690 AD
Temp.	YSI 600 XLM w/ 650 MDS S# 00DO690 AD
Sp. Cond.	YSI 600 XLM w/ 650 MDS S# 00DO690 AD
ORP	YSI 600 XLM w/ 650 MDS S# 00DO690 AD
DO	YSI 600 XLM w/ 650 MDS S# 00DO690 AD
Turbidity	HF Scientific DRT-15CE S# HRP 3

Initial Water Depth (ft):			2.44	Time:	1:13			
Time	Water Depth (ft)	Flow Rate (ml/min)	pH (s.u.)	Temp (°C)	Sp Con (uS)	ORP (mV)	DO (mg/l)	Turbidity (ntu)
1:20	3.21	80	7.25	15.98	377	298.1	2.37	10.91
1:23	3.59	80	7.26	15.58	374	329.6	1.89	11.14
1:26	3.97	80	7.23	15.41	372	356.9	1.6	11.21
1:29	4.32	80	7.21	15.31	371	372.8	1.42	10.62
1:32	4.78	80	7.21	15.31	370	384.6	1.33	10.69
1:35	5.19	80	7.22	15.28	370	396.6	1.26	10.99
1:38	5.4	80	7.21	15.34	369	400.3	1.24	10.36
1:41	5.74	80	7.21	15.33	370	406.1	1.23	10.15
Req. Limits for Last 3 Readings			0.1	3%	3%	10 mV	10%	10%

Pump Mfg & Model	Color	Odor	Purge Vol (ml)	Sample Depth (ft.)
GEO Tech Peristaltic	clear	none	2080	13.01

Sample Containers

Type & No.	Volume	Preservative
2 Vials	2 x 40 mL	HCL
2 Ambers	2 x 1L	As Is
1 Amber	1 L	H2SO4

Type & No.	Volume	Preservative
1 Plastic	500 mL	HNO3

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Monitor Well Data Sheet

Well ID: MW-5

Site Background Information

Site Location:	Portland Chemical	**Sampling Dates:**	11/16/05
Job Number:	MID6002.P3 T-2	**Field Team Leader:**	JC
Weather:	Overcast 45-50 F	**Team Personnel:**	CJL, KG, BE

Ground Water Elevation Data

Date	Time	Sampler Name	Equipment Model		Depth to Water (ft)		Depth to Bottom (ft)	
11/16/05	10:30	CJL	Solinst-101		uncorrected		uncorrected	
			corr. factor		corrected	3.28	corrected	17.03

Measurement Point: PVC

Well Condition (circle one)

General Condition	Visible Well ID	Well Cap Present	Well Plumbness	Lock
Good	Yes	Yes	Good	No

Concrete Collar	Ponded Water	Comments:
Good	No	Could not maintain drawdown criteria. Unable to lower flow ratebelow 200 mL/

Well Purging Data

Date	Time						Sampler Initials	Instrument Calibration Date
	Equipment Set-up		Purging		Sample Collection			
	Start	Finish	Start	Finish	Start	Finish		
11/16/05	11:05	11:37	11:37	12:28	12:28	12:48	CJL	11/16/05

	Instrument Mfg & Model
pH	YSI 600 XLM w/ 650 MDS S# 01B1220 AA
Temp.	YSI 600 XLM w/ 650 MDS S# 01B1220 AA
Sp. Cond.	YSI 600 XLM w/ 650 MDS S# 01B1220 AA
ORP	YSI 600 XLM w/ 650 MDS S# 01B1220 AA
DO	YSI 600 XLM w/ 650 MDS S# 01B1220 AA
Turbidity	HF Scientific DRT-15CE S# HRP2

Initial Water Depth (ft):			3.27	Time:	11:20			
Time	Water Depth (ft)	Flow Rate (ml/min)	pH (s.u.)	Temp (°C)	Sp Con (uS)	ORP (mV)	DO (mg/l)	Turbidity (ntu)
11:41	5.81	280	6.26	14.36	1169	90.4	6.68	12.78
11:44	6.15	280	6.14	14.21	1166	-5.4	7.17	11.94
11:47	6.44	280	6.16	14.25	1168	-30.2	7.42	11.22
11:50	6.9	200	6.15	14.28	1169	-34.3	7.46	7.58
11:53	7.27	200	6.16	14.32	1181	-37.1	7.64	6.22
11:56	7.39	200	6.17	14.31	1186	-39.9	7.76	5.96
11:59	7.38	200	6.17	14.42	1217	-50.7	8.31	4.6
12:02	7.35	200	6.18	14.46	1232	-61.4	8.48	2.85
12:05	7.39	200	6.18	14.49	1243	-77	8.66	3.67
12:08	7.53	200	6.14	14.52	1303	-80.5	8.97	3.35
12:11	7.6	200	6.12	14.54	1322	-89	8.89	3.18
12:14	7.69	200	6.13	14.55	13.65	-90.5	8.66	2.38
12:17	7.71	200	6.16	14.57	1388	-90.9	8.34	2.68
12:20	7.9	200	6.18	14.61	1407	-90.3	8.13	2.22
12:23	7.95	200	6.19	14.69	1412	-88.9	8.03	2.02
12:27	8	200	6.19	14.76	1415	-89.7	7.89	2.12
Req. Limits for Last 3 Readings			0.1	3%	3%	10 mV	10%	10%

Pump Mfg & Model	Color	Odor	Purge Vol (ml)	Sample Depth (ft.)
Masterflex Peristaltic	clear	none	11,240	12.03

Sample Containers

Type & No.	Volume	Preservative
2 Vials	2 x 40 mL	HCL
2 Ambers	2 x 1L	As Is
1 Amber	1 L	H2SO4

Type & No.	Volume	Preservative
1 Plastic	500 mL	HNO3

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Monitor Well Data Sheet

Well ID: MW-203

Site Background Information

Site Location:	Portland Chemical	**Sampling Dates:**	11/16/05
Job Number:	MID6002.P3 T-2	**Field Team Leader:**	JC
Weather:	Overcast 45-50 F	**Team Personnel:**	CJL, KG, BE

Ground Water Elevation Data

Date	Time	Sampler Name	Equipment Model		Depth to Water (ft)		Depth to Bottom (ft)	
11/16/05	10:46	CJL	Solinst-101		uncorrected		uncorrected	
			corr. factor		corrected		corrected	14.95

Measurement Point: PVC

Well Condition (circle one)

General Condition	Visible Well ID	Well Cap Present	Well Plumbness	Lock
Good	Yes	Yes	Good	No

Concrete Collar	Ponded Water	Comments:
Good	No	Could not maintain .3' drawdown criteria @ minimum flow of 80 mL/min

Well Purging Data

Date	Time						Sampler Initials	Instrument Calibration Date
	Equipment Set-up		Purging		Sample Collection			
	Start	Finish	Start	Finish	Start	Finish		
11/16/05	2:22	2:25	2:25	2:50	2:50	3:29	KG	11/16/05

Instrument Mfg & Model	
pH	YSI 600 XLM w/ 650 MDS S# 00D0698 AD
Temp.	YSI 600 XLM w/ 650 MDS S# 00D0698 AD
Sp. Cond.	YSI 600 XLM w/ 650 MDS S# 00D0698 AD
ORP	YSI 600 XLM w/ 650 MDS S# 00D0698 AD
DO	YSI 600 XLM w/ 650 MDS S# 00D0698 AD
Turbidity	HF Scientific DRT-15CE S# HRP3

Initial Water Depth (ft):			2.13	Time:	2:23			
Time	Water Depth (ft)	Flow Rate (ml/min)	pH (s.u.)	Temp (°C)	Sp Con (uS)	ORP (mV)	DO (mg/l)	Turbidity (ntu)
2:28	2.89	80	7.32	14.34	471	298.9	2.21	25.5
2:31	3.17	80	7.21	14.37	470	328.9	1.22	26.3
2:34	3.48	80	7.15	14.17	471	350.9	1.02	24.6
2:37	3.81	80	7.11	14.17	470	367.9	0.87	25.9
2:40	4.13	80	7.08	14.11	470	380.2	0.78	25.7
2:43	4.47	80	7.08	14.11	470	388.1	0.7	27.7
2:46	4.74	80	7.08	14.08	470	393.2	0.67	28.4
2:49	5.03	80	7.07	14.05	470	397	0.64	28.9
Req. Limits for Last 3 Readings			0.1	3%	3%	10 mV	10%	10%

Pump Mfg & Model	Color	Odor	Purge Vol (ml)	Sample Depth (ft.)
GEO Tech Peristaltic	clear	none	2000	9.95

Sample Containers

Type & No.	Volume	Preservative
2 Vials	2 x 40 mL	HCL
2 Ambers	2 x 1L	As Is
1 Amber	1 L	H2SO4

Type & No.	Volume	Preservative
1 Plastic	500 mL	HNO3

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Monitor Well Data Sheet

Well ID: TB-1W

Site Background Information

Site Location:	Portland Chemical	**Sampling Dates:**	11/16/05
Job Number:	MID6002.P3 T-2	**Field Team Leader:**	JC
Weather:	Overcast 45-50 F	**Team Personnel:**	CJL, KG, BE

Ground Water Elevation Data

Date	Time	Sampler Name	Equipment Model		Depth to Water (ft)		Depth to Bottom (ft)	
11/16/05	9:17	KG	Solinst-101		uncorrected		uncorrected	
			corr. factor		corrected	5.10	corrected	14.82

Measurement Point: PVC

Well Condition (circle one)

General Condition	Visible Well ID	Well Cap Present	Well Plumbness	Lock
Good	No	Yes	Good	No

Concrete Collar	Ponded Water	Comments: See below
Good	No	Unable to take DTW due to diameter of PVC

Well Purging Data

Date	Time						Sampler Initials	Instrument Calibration Date
	Equipment Set-up		Purging		Sample Collection			
	Start	Finish	Start	Finish	Start	Finish		
11/16/05	10:00	10:18	10:18	10:41	2:40	3:12	BE	11/16/05

Instrument Mfg & Model	
pH	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
Temp.	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
Sp. Cond.	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
ORP	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
DO	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
Turbidity	HF Scientific DRT-15CE S# HRP 1

Initial Water Depth (ft):			5.13	Time:	10:05			
Time	Water Depth (ft)	Flow Rate (ml/min)	pH (s.u.)	Temp (°C)	Sp Con (uS)	ORP (mV)	DO (mg/l)	Turbidity (ntu)
10:25		140	6.36	15.51	1302	-88.7	0.53	>1500
10:28		140	6.27	15.13	1302	-97.1	0.42	>1500
10:31		120	6.27	15.01	1299	-105	0.41	>1500
10:34		120	6.27	14.85	1291	-110.3	0.36	>1500
10:37		120	6.28	14.74	1289	-106.9	0.3	>1500
10:40		120	6.31	14.95	1259	-103.5	0.23	>1500
Well running dry(large air bubbles in tubing) stopped purging and will allow well to recharge & grab sample.								
Req. Limits for Last 3 Readings			0.1	3%	3%	10mV	10%	10%

Pump Mfg & Model	Color	Odor	Purge Vol (ml)	Sample Depth (ft.)
GEO Tech Peristaltic	silty brown	none	2600	12.82

Sample Containers

Type & No.	Volume	Preservative
2 Vials	2 x 40 mL	HCL
2 Ambers	2 x 1L	As Is
1 Amber	1 L	H2SO4

Type & No.	Volume	Preservative
1 Plastic	500 mL	HNO3

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Monitor Well Data Sheet

Well ID: TB-2W

Site Background Information

Site Location:	Portland Chemical	**Sampling Dates:**	11/16/05
Job Number:	MID6002.P3 T-2	**Field Team Leader:**	JC
Weather:	Overcast 45-50 F	**Team Personnel:**	CJL, KG, BE

Ground Water Elevation Data

Date	Time	Sampler Name	Equipment Model		Depth to Water (ft)		Depth to Bottom (ft)	
11/16/05	9:15	KG	Solinst-101		uncorrected		uncorrected	
			corr. factor		corrected	5.48	corrected	14.70

Measurement Point: PVC

Well Condition (circle one)

General Condition	Visible Well ID	Well Cap Present	Well Plumbness	Lock
Good	No	Yes	Good	No

Concrete Collar	Ponded Water	Comments:	See Below
Good	No		

Well Purging Data

Date	Time						Sampler Initials	Instrument Calibration Date
	Equipment Set-up		Purging		Sample Collection			
	Start	Finish	Start	Finish	Start	Finish		
11/16/05	11:00	11:10	11:13	11:30	3:10	3:14	BE/CJL	11/16/05

Instrument Mfg & Model	
pH	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
Temp.	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
Sp. Cond.	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
ORP	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
DO	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
Turbidity	HF Scientific DRT-15CE S# HRP1

Initial Water Depth (ft):			5.50	Time:	11:02			
Time	Water Depth (ft)	Flow Rate (ml/min)	pH (s.u.)	Temp (°C)	Sp Con (uS)	ORP (mV)	DO (mg/l)	Turbidity (ntu)
11:20		80	6.43	16.52	4195	-101.6	0.36	>1500
11:23		80	6.51	15.95	3923	-113.4	0.36	411 *
11:26		80	6.54	15.66	3834	-116.5	0.38	>1500
11:29		80	6.5	15.67	3906	-115.1	0.39	>1500
* Turbidity visually looks to be greater than 411.								
Well ran dry stopped purging and will allow recharge then grab sample.								
CJL was able to fill only 2 vials and 1 plastic before well went dry after flow 320 ml/Min								
Req. Limits for Last 3 Readings								

Pump Mfg & Model	Color	Odor	Purge Vol (ml)	Sample Depth (ft.)
GEO Tech Peristaltic	silty brown	none	1360	12.7

Sample Containers

Type & No.	Volume	Preservative
2 Vials	2 x 40 mL	HCL

Type & No.	Volume	Preservative

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Monitor Well Data Sheet

Well ID: TB-3W

Site Background Information

Site Location:	Portland Chemical	**Sampling Dates:**	11/16/05
Job Number:	MID6002.P3 T-2	**Field Team Leader:**	JC
Weather:	Overcast 45-50 F	**Team Personnel:**	CJL, KG, BE

Ground Water Elevation Data

Date	Time	Sampler Name	Equipment Model		Depth to Water (ft)		Depth to Bottom (ft)	
11/16/05	9:29	KG	Solinst-101		uncorrected		uncorrected	
			corr. factor		corrected	2.81	corrected	7.66

Measurement Point: PVC

Well Condition (circle one)

General Condition	Visible Well ID	Well Cap Present	Well Plumbness	Lock
Good	No	Yes	Good	No

Concrete Collar	Ponded Water	Comments:
Good	No	Could not record DTW due to size of PVC. 80 mL/min lowest flow possible

Well Purging Data

Date	Time						Sampler Initials	Instrument Calibration Date
	Equipment Set-up		Purging		Sample Collection			
	Start	Finish	Start	Finish	Start	Finish		
11/16/05	10:00	10:10	10:10	10:48	10:48	11:11	KG	11/16/05

Instrument Mfg & Model	
pH	YSI 600 XLM w/ 650 MDS S# 00D0698 AD
Temp.	YSI 600 XLM w/ 650 MDS S# 00D0698 AD
Sp. Cond.	YSI 600 XLM w/ 650 MDS S# 00D0698 AD
ORP	YSI 600 XLM w/ 650 MDS S# 00D0698 AD
DO	YSI 600 XLM w/ 650 MDS S# 00D0698 AD
Turbidity	HF Scientific DRT-15CE S# HRP 3

Initial Water Depth (ft):			2.81	Time:	9:29			
Time	Water Depth (ft)	Flow Rate (ml/min)	pH (s.u.)	Temp (°C)	Sp Con (uS)	ORP (mV)	DO (mg/l)	Turbidity (ntu)
10:14	N/A	80	7.05	14.64	288	264.8	3.18	>1500
10:17	N/A	80	6.99	14.57	283	288.3	2.83	>1500
10:20	N/A	80	6.95	13.91	276	327	2.4	902
10:23	N/A	80	6.94	13.79	275	334.7	2.33	903
10:26	N/A	80	6.95	13.65	274	348	2.23	933
10:29	N/A	80	6.97	13.58	271	362	2.11	911
10:32	N/A	80	6.96	13.44	271	370	2.16	894
10:35	N/A	80	6.99	13.22	271	378	2.14	934
10:38	N/A	80	6.99	13.1	271	383.8	1.91	906
10:41	N/A	80	6.99	13.06	271	390.2	1.83	941
10:44	N/A	80	7	13.06	270	395.4	1.79	934
10:47	N/A	80	7	12.94	271	398.7	1.89	927
Req. Limits for Last 3 Readings								

Pump Mfg & Model	Color	Odor	Purge Vol (ml)	Sample Depth (ft.)
GEO Tech Peristaltic	br/br silt	none	3040	5.24

Sample Containers

Type & No.	Volume	Preservative
2 Vials	2 x 40 mL	HCL
2 Ambers	2 x 1L	As Is
1 Amber	1 L	H2SO4

Type & No.	Volume	Preservative
1 Plastic	500 mL	HNO3

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Monitor Well Data Sheet

Well ID: TB-7W

Site Background Information

Site Location:	Portland Chemical	**Sampling Dates:**	11/16/05
Job Number:	MID6002.P3 T-2	**Field Team Leader:**	JC
Weather:	Overcast 45-50 F	**Team Personnel:**	CJL, KG, BE

Ground Water Elevation Data

Date	Time	Sampler Name	Equipment Model		Depth to Water (ft)		Depth to Bottom (ft)	
11/16/05	9:31	KG	Solinst-101		uncorrected		uncorrected	
			corr. factor		corrected	1.79	corrected	6.90

Measurement Point: PVC

Well Condition (circle one)

General Condition	Visible Well ID	Well Cap Present	Well Plumbness	Lock
Good	No	Yes	Good	No

Concrete Collar	Ponded Water	Comments:
		* unable to record DTW due to size of pipe. 90 mL/min lowest flow possible
Good	No	** unexpected jump in Turbidity.

Well Purging Data

Date	Time						Sampler Initials	Instrument Calibration Date
	Equipment Set-up		Purging		Sample Collection			
	Start	Finish	Start	Finish	Start	Finish		
11/16/05	11:14	11:18	11:18	12:31	12:31	1:06	KG	11/16/05

	Instrument Mfg & Model
pH	YSI 600 XLM w/ 650 MDS S# 00DO0698AD
Temp.	YSI 600 XLM w/ 650 MDS S# 00DO0698AD
Sp. Cond.	YSI 600 XLM w/ 650 MDS S# 00DO0698AD
ORP	YSI 600 XLM w/ 650 MDS S# 00DO0698AD
DO	YSI 600 XLM w/ 650 MDS S# 00DO0698AD
Turbidity	HF Scientific DRT-15CE S# HRP 3

Initial Water Depth (ft):			1.79	Time:	9:31			
Time	Water Depth (ft)	Flow Rate (ml/min)	pH (s.u.)	Temp (°C)	Sp Con (uS)	ORP (mV)	DO (mg/l)	Turbidity (ntu)
11:25	N/A*	90	6.96	13.2	734	350.9	4.89	220
11:28	N/A	90	6.78	12.8	730	372.2	4.11	142.6
11:31	N/A	90	6.68	12.73	728	338.2	3.34	122.4
11:34	N/A	90	6.63	12.71	724	307.4	3.47	57.1
11:37	N/A	90	6.58	12.77	720	276.5	3.52	29.1
11:40	N/A	90	6.55	12.82	707	231.9	3.2	23.4
11:43	N/A	90	6.53	12.83	699	200.9	2.57	14.63
11:46	N/A	90	6.51	12.79	691	179.4	1.49	11.84
11:49	N/A	90	6.49	12.73	687	170.4	1.18	11.68
11:52	N/A	90	6.48	12.81	677	175.4	1.16	124.3**
11:55	N/A	90	6.47	12.85	661	179.7	0.94	23.3
11:58	N/A	90	6.46	12.87	653	191.3	0.81	16.33
12:01	N/A	90	6.45	12.83	651	211.9	0.71	8.56
12:04	N/A	90	6.43	12.88	651	216.3	0.66	5.5
12:07	N/A	90	6.4	12.94	651	222.3	0.58	4.41
12:10	N/A	90	6.36	12.96	650	216.3	0.55	5.12
12:13	N/A	90	6.32	13.03	649	204.3	0.52	5.94
12:16	N/A	90	6.29	12.93	650	193.1	0.49	4.51
12:19	N/A	90	6.27	12.94	648	163.6	0.47	3.4
12:22	N/A	90	6.27	12.92	650	146.2	0.46	2.74
12:25	N/A	90	6.26	12.94	652	134.6	0.44	2.85
12:28	N/A	90	6.27	13.01	652	128.2	0.44	2.81
12:31	N/A	90	6.27	13.03	655	130.5	0.42	2.56
Req. Limits for Last 3 Readings			0.1	3%	3%	10 mV	10%	10%

Pump Mfg & Model		Color	Odor	Purge Vol (ml)	Sample Depth (ft.)
GEO Tech	Peristaltic	lt. Br/clear	none	6570	4.4

Sample Containers

Type & No.	Volume	Preservative
2 Vials	2 x 40 mL	HCL
2 Ambers	2 x 1L	As Is
1 Amber	1 L	H2SO4

Type & No.	Volume	Preservative
1 Plastic	500 mL	HNO3

HRP Associates, Inc.
167 New Britain Avenue
Plainville, Connecticut 06062
(860) 793-6899

Monitor Well Data Sheet

Well ID: TB-8W

Site Background Information

Site Location:	Portland Chemical	**Sampling Dates:**	11/16/05
Job Number:	MID6002.P3 T-2	**Field Team Leader:**	JC
Weather:	Overcast 45-50 F	**Team Personnel:**	CJL, KG, BE

Ground Water Elevation Data

Date	Time	Sampler Name	Equipment Model		Depth to Water (ft)		Depth to Bottom (ft)	
11/16/05	9:19	KG	Solinst-101		uncorrected		uncorrected	
			corr. factor		corrected	2.90	corrected	13.75

Measurement Point: PVC

Well Condition (circle one)

General Condition	Visible Well ID	Well Cap Present	Well Plumbness	Lock
Good	No	Yes	Good	No

Concrete Collar	Ponded Water	Comments:
Good	No	* Turbidity visually appears to be much higher.

Well Purging Data

Date	Time						Sampler Initials	Instrument Calibration Date
	Equipment Set-up		Purging		Sample Collection			
	Start	Finish	Start	Finish	Start	Finish		
11/16/05	11:38	11:50	11:50	12:30	12:30	12:50	BE	11/16/05

Instrument Mfg & Model	
pH	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
Temp.	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
Sp. Cond.	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
ORP	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
DO	YSI 600 XLM w/ 650 MDS S# 01CO134 AC
Turbidity	HF Scientific DRT-15CE S# HRP1

Initial Water Depth (ft):			2.95	Time:	11:44			
Time	Water Depth (ft)	Flow Rate (ml/min)	pH (s.u.)	Temp (°C)	Sp Con (uS)	ORP (mV)	DO (mg/l)	Turbidity (ntu)
11:56	N/A	80	6.91	15.86	666	-96.6	0.19	>1500
11:59	N/A	80	6.88	15.34	572	-90.4	0.14	>1500
12:02	N/A	80	6.83	14.76	528	-90.9	0.22	491*
12:05	N/A	80	6.81	14.69	507	-79.5	0.49	699
12:08	N/A	80	6.79	14.65	486	-61.8	1.11	463
12:11	N/A	80	6.77	14.6	474	-44.9	1.76	302
12:14	N/A	80	6.75	14.55	467	-28.2	1.78	292
12:17	N/A	80	6.73	14.53	465	-13	2.37	280
12:20	N/A	80	6.72	14.36	464	-11	2.49	236
12:23	N/A	80	6.7	13.91	464	-10.4	2.76	211
12:26	N/A	80	6.69	13.96	462	-11.6	2.69	206
12:29	N/A	80	6.69	14.05	462	-5.8	2.61	193
Req. Limits for Last 3 Readings			.1 su	3%	3%	10 mV	10%	10%

Pump Mfg & Model	Color	Odor	Purge Vol (ml)	Sample Depth (ft.)
GEO Tech Peristaltic	sl tan/ clear	none	3200	11.2

Sample Containers

Type & No.	Volume	Preservative
2 Vials	2 x 40 mL	HCL
2 Ambers	2 x 1L	As Is
1 Amber	1 L	H2SO4

Type & No.	Volume	Preservative
1 Plastic	500 mL	HNO3

HRP Associates, Inc.
167 New Britain Avenue
Plainville, Connecticut 06062
(860) 793-6899

Monitor Well Data Sheet

Well ID: RIZ-4

Site Background Information

Site Location:	Portland Chemical	**Sampling Dates:**	11/16/05
Job Number:	MID6002.P3 T-2	**Field Team Leader:**	JC
Weather:	Overcast 45-50 F	**Team Personnel:**	CJL, KG, BE

Ground Water Elevation Data

Date	Time	Sampler Name	Equipment Model		Depth to Water (ft)		Depth to Bottom (ft)	
11/16/05	10:35	CJL	Solinst-101		uncorrected		uncorrected	
			corr. factor		corrected	4.37	corrected	14.69

Measurement Point: PVC

Well Condition (circle one)

General Condition	Visible Well ID	Well Cap Present	Well Plumbness	Lock
Poor	Yes	Yes	Poor	No

Concrete Collar	Ponded Water	Comments:
Cracked	No	

Well Purging Data

Date	Time						Sampler Initials	Instrument Calibration Date
	Equipment Set-up		Purging		Sample Collection			
	Start	Finish	Start	Finish	Start	Finish		
11/16/05	12:55	1:19	1:19	1:59	1:59	2:18	CJL	11/16/05

Instrument Mfg & Model	
pH	YSI 600 XLM w/ 650 MDS S# 01B1220AA
Temp.	YSI 600 XLM w/ 650 MDS S# 01B1220AA
Sp. Cond.	YSI 600 XLM w/ 650 MDS S# 01B1220AA
ORP	YSI 600 XLM w/ 650 MDS S# 01B1220AA
DO	YSI 600 XLM w/ 650 MDS S# 01B1220AA
Turbidity	HF Scientific DRT-15CE S# HRP2

Initial Water Depth (ft):			4.33	Time:	1:15			
Time	Water Depth (ft)	Flow Rate (ml/min)	pH (s.u.)	Temp (°C)	Sp Con (uS)	ORP (mV)	DO (mg/l)	Turbidity (ntu)
1:23	5.1	200	6.31	14.51	637	92.8	7.12	108.5
1:26	5.8	200	5.94	14.33	630	93.4	5.57	112.1
1:29	5.91	200	5.81	14.15	622	96.8	5.36	131.6
1:32	6.02	200	5.79	14.04	621	98.9	5.34	120.1
1:35	6.15	200	5.77	14.05	620	92.7	5.26	124.7
1:38	6.3	200	5.76	13.91	621	94.1	5.25	89.9
1:41	6.51	200	5.7	13.92	619	97.9	5.33	66.5
1:44	6.69	200	5.68	13.93	618	102.5	5.38	38.7
1:47	6.9	200	5.64	14.03	618	131.4	5.53	34.1
Req. Limits for Last 3 Readings			.1 su	3%	3%	10 mV	10%	10%

Pump Mfg & Model	Color	Odor	Purge Vol (ml)	Sample Depth (ft.)
GEO Tech Peristaltic	clear	none	8000	9.69

Sample Containers

Type & No.	Volume	Preservative
2 Vials	2 x 40 mL	HCL
2 Ambers	2 x 1L	As Is
1 Amber	1 L	H2SO4

Type & No.	Volume	Preservative
1 Plastic	500 mL	HNO3

6.0 GROUND WATER INVESTIGATION METHODS

<<need to discuss conditions issues and how that required us to alter our approach.

6.1 Methods

Monitoring Well Installation

Twelve (12) overburden ground water monitoring wells identified as HRP-1 through HRP-12 were installed at the site from July 26 to August 15, 2006 to investigate ground water conditions at the site including in AOCs 1 to 7 (Figure 3). Installation details for each monitoring well are included on the boring logs in Appendix B and are discussed in detail in Technical Memo #8 provided in Appendix A. A summary of the ground water investigation program is provided below

Aquifer Drilling and Testing (ADT), of Bloomfield, CT provided the drilling services for the installation of shallow overburden ground water monitoring wells HRP-1 through HRP-7 on July 26, 2006. Glacier Drilling, LLC of Durham, CT provided the drilling services for the installation of three (HRP-8 through HRP-10) deep overburden monitoring wells at the site on August 4th and 7th, 2006 and Geosearch of Fitchburg, MA provided drilling services for the installation of shallow overburden monitoring wells HRP-11 and HRP-12 on August 10th and August 15th, 2006, respectively. The wells were all constructed of 1 or 2 inch diameter schedule 40 PVC material and a 10-foot screen (0.01" slot size) which was installed to the bottom of the boring. An HRP scientist supervised the drilling activities and monitoring well installation. HRP-8 through HRP-10 were installed into the deeper portions of the overburden aquifer to approximately 50 feet below grade and just above the bedrock. HRP also visually inspected soil samples for evidence of gross contamination from HRP-1, HRP-8, HRP-9 and HRP-10. In addition, soil samples were screened for the presence of VOCs with a PID in those borings. Each monitoring well was installed in overburden materials using either a Geoprobe 6610 DT Drill Rig (HRP-1 through HRP-7, HRP-10 and HRP-11) or conventional hollow stem auger drilling techniques (HRP-8 through HRP-10). Five-foot long sample sleeves were used to collect soil samples from SB-1/HRP-1 and split spoon sampling techniques were used at SB-40/HRP-8 through SB-42/HRP-10 to collect soil samples at discrete locations for visual and PID screening. For the depths where split spoon sampling was not used in those borings, soil brought to the surface from the augers was inspected and screened. Petroleum odors and staining were observed in the soil samples collected from SB-40/HRP-8 from 7 to 12 feet below grade and a slight odor was observed in connection with the soils encountered in SB-41/HRP-9 from approximately 5 to 15 feet below grade. Soil discolorations and petroleum odors were not observed in connection with the soils encountered in SB-1/HRP-1 or SB-42/HRP-10. Soil samples were submitted to Spectrum Analytical from SB-40/HRP-8 and SB-41/HRP-9 for

analytical analysis. The soil data for SB-40 and SB-41 are discussed in Technical Memos #6 and #5, respectively. It should be noted that TCA was detected in the three soil samples collected from SB-40 and ETPH was detected in SB-40 (9-11') above RSR Criteria. VOCs and ETPH were not detected in the soil samples submitted for analysis from SB-41/HRP-9.

Grab Ground Water Sampling

Grab ground water samples were collected from HRP-1 through HRP-7, as well as from previously existing wells MW-1, MW-6, MW-7B and MW-8 on July 26, 2006.

The purpose of the site wide collection and laboratory analysis of ground water samples was two-fold. The data will be used to determine the optimal locations of permanent ground water monitoring wells for the purposes of evaluating the degree of ground water contamination. This will reduce the number of wells required for this effort, thereby reducing both the short- and long-term cost of the ground water evaluation. Secondly, the initial ground water testing results will be evaluated in conjunction with the soils data to confirm the validity of the conclusions drawn from the soil testing data and to identify critical data gaps

The purpose of collecting the grab ground water samples was to screen the ground water quality across the site to provide an initial evaluation of the locations(s) where samples were collected for ground water screening purposes to determine ground water conditions at the site in the shallow overburden aquifer and to be used to determine the placement of additional monitoring wells at the site. The ground water samples were collected with either a Watera check valve and tubing or a bailer. All ground water samples were submitted to Spectrum Analytical, Inc. of Agawam, MA for various analyses including RCRA-8 Metals, VOCs via EPA Method 8260 and ETPH.

Samples will be collected from areas most likely to be contaminated but also from other areas of the site. Each sample will be submitted for laboratory analysis of ETPH and VOCs.

According to the analytical results several metals including, arsenic, barium, cadmium, chromium, lead, mercury, and silver were detected in the samples at concentrations above the appropriate RSR Criteria. Several concentrations also exceeded one or more than one of the appropriate criteria for the determination of a Significant Environmental Hazard (SEH). Several VOCs including TCA, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, acetone, cis-1,2-dichloroethylene, TCE, chloroethane and PCE were detected in the ground water samples, however only concentrations of VOCs detected in HRP-1, HRP-4, MW-6, MW-7B, MW-8 and MW-8A (duplicate sample) exceed appropriate RSR Criteria. Concentrations of VOCs detected in MW-6, MW-7B, MW-8 and duplicate sample MW-8A also exceeded one or more than one of the appropriate criteria for the determination of a SEH. ETPH was detected in ground water samples HRP-1, MW-7B and MW-8 at concentrations above the GWPC. The concentration of ETPH detected in MW-7B also constitutes a SEH. The Significant Environmental Hazard conditions were reported to the site

representative within the appropriate amount of time following the confirmation of the detected concentrations. Grab ground water analytical results are provided on Table 1, 2 and 3 and ground water analytical reports are included in Appendix E.

It should be understood that the grab ground water samples were collected under less than ideal conditions where a higher silt content may have been included in the samples submitted to the laboratory for analysis. The silt content alone can artificially elevate contaminant concentrations in ground water samples, which are not necessarily indicative of actual ground water conditions and contaminant concentrations.

Final Ground Water Sampling

HRP collected ground water samples from MW-7B on August 23rd, from HRP-1, HRP-3, HRP-4, HRP-8, HRP-10, HRP-11 and MW-8 on August 24th, and from HRP-9, HRP-12, MW-1 and MW-6 on August 28, 2006. Prior to sampling, depth to ground water was measured in each well using an electronic water level indicator. The ground water samples were collected by using low flow sampling techniques, except for HRP-1, HRP-3, HRP-12, MW-6 and MW-1 which were sampled with a bailer. Where possible the wells sampled with a bailer were purged more than 3 well volumes and were allowed to recharge prior to sampling.

As identified where possible ground water samples were collected using low flow sampling methods as presented and required in the *Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples From Monitoring Wells*, U.S. Environmental Protection Agency Region I, July 30, 1996, Revision 2 and ASTM Designation D4750-87, "Test Method For Determining Subsurface Liquid Levels in a Borehole or Monitoring Wells (Observation Well)." HRP-4, HRP-8, HRP-10, HRP-9, HRP-11, MW-7B and MW-8 were either sampled with a peristaltic or submersible pump and associated tubing. Ground water was pumped through a YSI flow-cell, which was used to measure the pH, temperature, specific conductivity, oxidation/reduction potential (ORP), and dissolved oxygen (D.O.). Turbidity measurements were also recorded every three minutes. While purging the well, the water level and pumping rate were monitored and recorded every 3 minutes to ensure little or no draw down (<0.3 ft.) was induced in the well. Purging was considered to be complete once field parameters stabilized in the flow-cell over three consecutive readings taken at 3-minute intervals within the following limits:

- Turbidity (10% at >1 NTU)
- D.O. (10%)
- Specific Conductance (5%)
- Temperature (5%)
- pH (±0.1 units)
- ORP (±10 millivolts)

As possible once those criteria were met, samples were collected prior to the flow cell and were placed into the appropriate sample containers and sealed.

All ground water samples were placed into a cooler on ice until submitted, under strict chain-of-custody, to Spectrum Analytical, Inc., for analysis. Ground water samples were analyzed for various constituents including ETPH, VOCs and metals. Analytical results are tabulated in Table 6.

All samples collected for metals analysis with a bailer where field filtering was not possible were sent to the laboratory for filtering prior to analysis. All water removed from the wells during purging was containerized in 55-gallon drums that were stored on site for later disposal.

It should be noted that based on the screening level ground water sample results monitoring wells HRP-2, HRP-5, HRP-6 and HRP-7 were not resampled during the final sample round. VOCs and ETPH were not detected in those wells during the first sample round, however metals were detected in the samples at concentrations above RSR Criteria. It is however felt that if sampled under ideal conditions the concentrations of metals detected in those samples would not exceed standards.

6.2 Site-Wide Results and Final Ground Water Analytical Results

According to the final ground water analytical results barium and chromium were detected in ground water samples at concentrations below RSR criteria. There were no other metals detected in the ground water samples. As such, it is concluded that metals in excess of the RSR Criteria do not exist at the site in the areas investigated and that the concentrations of metals detected in the screening level ground water samples were significantly affected by the occurrence of silt in the samples submitted for analysis. During the second round of sampling the silt content was carefully observed during sampling or the metals samples were filtered to remove the silt to obtain a representative ground water sample.

Several VOCs including TCA, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, acetone, cis-1,2-dichloroethylene, TCE, chloroethane, toluene and PCE were detected in the ground water samples collected during the second round of sampling, however only concentrations of VOCs detected in HRP-1, HRP-9, HRP-10, HRP-11, MW-6, MW-7B and MW-8 exceed the appropriate RSR Criteria. No other exceedances were detected in the samples. VOC concentrations detected in HRP-1, HRP-8, HRP-9, HRP-10, HRP-11, MW-6, MW-7B and MW-8 also exceed one or more than one of the appropriate criteria for the determination of a SEH. ETPH was detected in ground water samples HRP-8, HRP-11, MW-7B and MW-8 at concentrations above the GWPC. Concentrations of ETPH were not detected in the other samples. It is therefore, concluded that releases of VOCs and ETPH to ground water have occurred at the site. The release to ground water also correlates to the detections of VOCs and ETPH in site soils in the areas investigated. It is also

concluded that ground water in both the shallow and deep overburden aquifer are impacted with VOCs and ETPH above RSR Criteria.

The sources of the ground water contamination can be attributed to releases associated with the settling tank located south of the building connector as well as releases of VOCs and petroleum in the former material storage areas in the courtyard, the tank area and inside the building connector, as well as historic discharges to the former septic system.

The sixteen wells (HRP-1 through HRP-12, MW-1, MW-6, MW-7B and MW-8) located at the site were surveyed and gauged on August 23, 2006 and according to those results the direction of groundwater flow at the site was to the west in the vicinity of Building No. 1 and to the northwest in the vicinity of Building No. 2 as shown on Figure 6. Based on the survey and gauging data the direction of ground water flow in the deep overburden aquifer just above the bedrock on August 23rd was to the west from HRP-8 to HRP-10 as shown on Figure 7. The depth to ground water at the site on August 23rd ranged from 16.7 to 25 feet below grade. A Survey and gauging data table for August 23, 2006 is included in Appendix F.

In the context of a global site picture it should be noted that ground water in the overburden aquifer does not flow to the southeast towards Manchester Water Department Well No. 6 or to the southwest towards Well No. 3, where TCA was detected in the past. However, based on the proximity of Well No. 6 to the subject property it is considered likely that ground water flow in the deeper portions of the overburden aquifer and in the bedrock aquifer may be redirected towards the well when it is pumping. Based on the direction of ground water flow and the distance of the site to Well No. 3 it is also not considered likely that the detection of TCA in Well No. 3 is as a result of releases associated with the subject property. Also, based on the available data it appears that the concentrations of VOCs detected in MW-1 have declined significantly over the years which is most likely attributed to the ceasing of wastewater discharges to the septic system in 1980 and the removal of the leachfield via soil excavation in 1986.

6.3 Delineation of Ground Water Contamination

Based on the analytical data it appears that ground water in the shallow and deep portions of the overburden ground water aquifer are impacted with VOCs and ETPH above RSR Criteria. The distribution of VOCs and ETPH in groundwater above RSR Criteria are identified on a ground water plume map included with the report as Figure 8. The plume map is an estimation of ground water impacts based on the detection of contaminants in the areas investigated. Based on the available data impacts in the shallow overburden aquifer have not been defined south of the building connector beyond MW-7B, HRP-8 and MW-6, but do not exceed HRP-12. Ground water impacts are not defined beneath Building No. 1 west beyond HRP-11, but appear to not exceed west of Building No. 1 in HRP-5. Impacts appear to be limited in the area west of Building No. 1 by HRP-4. Impacts in the shallow overburden aquifer above RSR Criteria to the north of the courtyard also do not appear to exceed MW-1. Ground water

impacts in the shallow overburden aquifer have also not been determined beneath Building No. 2. Impacts in the deeper portion of the overburden aquifer were encountered in all three deep wells (SB-40 to SB-42), as such a determination of the extent of impacts at those depths are not defined. To determine the extent of ground water impacts at the site additional ground water monitoring wells should be installed into the shallow and deep overburden and bedrock aquifers