UST N-6
Site-Specific Summary Report
Port of Tacoma UST
Remediation Program
Tacoma, Washington

Prepared for
Port of Tacoma

February 3, 2011
17581-00

HARTCROWSER

UST N-6
Site-Specific Summary Report
Port of Tacoma UST Remediation Program
Tacoma, Washington

Prepared for
Port of Tacoma

February 3, 2011
17581-00

Prepared by
Hart Crowser, Inc.

Colleen Rust
Senior Staff
Hydrogeologist

Ross Stainsby, LHG, PMP
Senior Associate

CONTENTS

TABLES

FIGURES

APPENDIX A
GEOPHYSICAL SURVEY REPORT AND ASSOCIATED FIGURE
GLOBAL GEOPHYSICS

APPENDIX B
DIRECT-PUSH PROBE EXPLORATION LOGS AND
BORING LOGS FROM PREVIOUS INVESTIGATIONS

CONTENTS (Continued)

Page

UST N-6 SITE-SPECIFIC SUMMARY REPORT
PORT OF TACOMA UST REMEDIATION PROGRAM
TACOMA, WASHINGTON

1.0 INTRODUCTION

Hart Crowser has prepared this Site-Specific Summary Report as part of the Port of Tacoma's (Port) Underground Storage Tank (UST) Remediation Program. The Port's UST Remediation Program is focused on the northern end of the Blair-Hylebos Peninsula, north of East 11th Street in Tacoma, Washington (Figure 1).

The overall goal of this investigation is to test for the presence of contamination in soil and groundwater related to UST N-6 (Figure 2). A Site-Specific Sampling and Analysis Plan (SSAP) (Hart Crowser 2010b), which supplemented the Area-Wide Sampling and Analysis Plan (AWSAP) (Hart Crowser 2010a), was created for this investigation. The SSAP identified the contaminants of concern related to UST N-6, and provided a detailed sample collection protocol for this investigation.

2.0 PROJECT BACKGROUND

Currently it is unknown whether UST N-6 has been removed or remains in place. As of 2008/2009 the UST was not included in the Port of Tacoma's UST records, but was identified on 1940s-1950s drawings of the former U.S. Naval Station. The UST was identified on a December 1949 drawing (Appendix C) as an oil tank in between the former U.S. Navy buildings 510 and 512 (Figure 3). On another 1949 Navy drawing, building 510 is identified as a restaurant and building 512 is identified as "ship service, office and heating plant no. 4." The size and construction material of UST N-6 is unknown but given its age, it is likely made of steel. A third, undated Navy document reports that a fuel oil tank at building 512 has a capacity of 1,600 gallons.

Hart Crowser performed field investigations in April 2010 with a magnetometer and ground penetrating radar (GPR) to better determine the UST location (Global Geophysics 2010). Results from the geophysical surveys are provided in Appendix A. The magnetometer survey detected four anomalies. One of the magnetometer anomalies located on the southwestern edge of the survey area (Appendix A figure) appears to coincide with the location and orientation of UST N-6 based the Navy drawings. The three remaining anomalies may be due, in part, to interference from surface metal objects such as a street lamp and relatively small buried metal objects, but are unlikely to be UST N-6. The GPR

survey detected no anomalies within the survey area (Appendix A figure). The possible UST location based on the magnetometer data is shown on Figure 3. As seen on Figure 2, N-6 is located within the areal extent of contamination from historical operations at the adjacent Occidental Chemical Corporation (OCC) property.

3.0 PREVIOUS INVESTIGATION

This section summarizes the known prior environmental data available in the vicinity of UST N-6. These data are from environmental investigations completed by Hart Crowser in 2008 and by Conestoga-Rovers & Associates (CRA) in 1996. Boring logs from these investigations are provided in Appendix B.

CRA boring 53 was completed to depths of 25, 50, and 100 feet below ground surface (bgs). Boring 53 is shown on Figure 3. These borings were completed to evaluate soil and groundwater at depths greater than that typically impacted by petroleum hydrocarbons from USTs. Soil and groundwater samples were not collected for analysis during those investigations in the area of concern for this project; therefore, the boring logs are provided for stratigraphic information.

In 2008, Hart Crowser completed two direct push probes (HC08-EP106 and HC08-EP113) in the general vicinity of UST N-6. HC08-EP106 is located approximately 120 feet project east and HC08-EP113 is located approximately 100 feet project west of UST N-6 (Figure 3). These explorations were completed for the Port of Tacoma in association with its planned Blair-Hylebos Peninsula terminal redevelopment project (Hart Crowser 2009a). Previous boring logs in the vicinity of UST N-6 are provided in Appendix B.

Diesel-range petroleum hydrocarbons were measured in soil sample HC08-EP113-S3 at 8,400 mg/kg which exceeds the MTCA Method A soil cleanup levels for industrial properties for diesel-range petroleum hydrocarbons of 2,000 mg/kg. Analytical results of the soil samples are provided in Table 1. Diesel-range petroleum hydrocarbons were reported in soil sample HC08-EP106 and HC08-EP113 at concentration below MTCA Method A cleanup level. Lube oil-range petroleum hydrocarbons were reported in all three soil samples at concentrations below MTCA Method A cleanup level.

4.0 GEOLOGY AND HYDROGEOLOGY

This UST is located on the uplands of the Blair-Hylebos Peninsula (Figure 1). Subsurface conditions on the peninsula generally consist of an industrial fill layer extending from 0 to about 6 feet below ground surface (bgs) over a nonindustrial fill material, hydraulically dredged and placed over local tideflats and intertidal areas in the early 1900s to create the upland peninsula (Hart Crowser 2009b).

Local subsurface conditions observed in direct-push probe explorations in the vicinity of UST N-6 generally consisted of 3 inches of asphalt over 2 to 4 feet of sandy gravel to gravelly sand over fine to medium sand to the completion depth of each exploration. Shallow groundwater was encountered between 9 and 10.5 feet bgs during the previous and current investigations. Since 1996, groundwater flow in this area has been controlled by the OCC groundwater extraction system that surrounds the UST location. Historically, groundwater flow in this area was most likely northerly, towards Commencement Bay. Currently, groundwater flow at this location would most likely be toward the closest extraction well (to the east of UST N-6) and would have a strong downward component.

5.0 SUMMARY OF 2010 INVESTIGATION ACTIVITIES

5.1 Direct-Push Probe Investigation

ESN Northwest, Inc. of Olympia, Washington, completed four direct push probe explorations, HC-N6-1 through HC-N6-4 on September 22, 2010. These probes were completed near all four sides of the inferred UST N-6 location to depths of approximately 12 feet bgs. The exploration locations are shown on Figure 3 and boring logs are provided in Appendix B.

Prior to this subsurface investigation, we contacted One-Call to locate utilities in the public right-of-way and contracted with a private utility locating company to locate potential utilities on private property.

After the samples were collected, the probe locations were backfilled and abandoned in general accordance with the State of Washington Administrative Code on Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 WAC).

Investigation-derived waste associated with this environmental investigation was stored in labeled drums on site, pending receipt of laboratory results, waste designation, and appropriate disposal by the Port.

5.2 Soil Sampling and Analytical Results

Hart Crowser collected and field screened continuous soil samples from direct push probes HC-N6-1 through HC-N6-4 at 4-foot-depth intervals using a Photoionization Detector (PID) and sheen test. Four selected soil samples, one each from HC-N6-1 through HC-N6-4 were submitted to Onsite Environmental Inc. (OnSite) of Redmond, Washington for chemical analysis of diesel- and lube oil-range petroleum hydrocarbons by NWTPH-Dx; gasoline-range petroleum hydrocarbons by NWTPH-Gx; and volatile organic compounds (VOCs) by EPA Method 8260.

The SSAP specified analyzing for benzene, ethylbenzene, toluene, and total xylenes (BETX) by EPA Method 8021. However, based on field observations and the presence of the OCC Groundwater VOC Plume, the more complete list of VOCs was analyzed.

No field evidence of petroleum-related impacts was observed in the four shallow push probe explorations, HC-N6-1 through HC-N6-4, above or below the water table. A sweet solvent-like odor was observed at approximately 10 feet bgs (at the water table) in exploration HC-N6-1. Since no field evidence of petroleum-related soil contamination was observed, four selected soil samples, one each from HC-N6-1 through HC-N6-4 were submitted for analysis from the discrete interval that bridges the observed water table.

Soil Analytical Results

The analytical results for the requested analyses in all four soil samples were reported to be below MTCA Method A (WAC 173-340) soil cleanup levels for industrial properties (Table 2). Gasoline-range petroleum hydrocarbons were detected in samples from HC-N6-2 and HC-N6-3 at concentrations below MTCA Method A cleanup levels However, the laboratory noted that the chromatograms for samples HC-N6-1, HC-N6-2, HC-N6-3, and HC-N6-4 were not similar to a typical gasoline. Diesel- and oil-range petroleum hydrocarbons and BETX were below method detection limits.

Trichloroethene and tetrachloroethene were detected above MTCA Method A cleanup levels for industrial properties. Trichloroethene was reported in the soil sample from HC-N6-2 and tetrachloroethene was reported in all soil samples.

The analytical results for the direct-push probe soil samples are summarized in Table 2. The results of our review of chemical data quality and laboratory reports are provided in Appendix C.

5.3 Groundwater Sampling and Analytical Results

Groundwater samples were collected from temporary 3-foot miniwells installed in each of the four shallow push probe explorations, HC-N6-1 through HC-N6-4. One sample from each location was submitted to Onsite for chemical analysis of diesel-, oil-, gasoline-range petroleum hydrocarbons and VOCs. No evidence of petroleum-related contamination was observed during field screening of the purge water collected from the four shallow push probe explorations. Details of the Hart Crowser grab groundwater sampling procedures can be found in the SSAP (Hart Crowser 2010b) and AWSAP (Hart Crowser 2010a).

Groundwater Analytical Results

Gasoline-range petroleum hydrocarbon concentrations were detected in groundwater samples collected from all four borings (HC-N6-1through HC-N6-4) that exceed the MTCA Method A cleanup level of 1.0 mg/l. Reported concentrations in samples collected from HC-N6-1 through HC-N6-4 were 8.7, 5.5, 6.7, and 8.6 mg/l, respectively. However, the laboratory noted that the chromatograms for samples HC-N6-1, HC-N6-2, HC-N6-3, and HC-N6-4 were not similar to a typical gasoline.

Diesel- and oil -range petroleum hydrocarbons and BETX were not detected above applicable reporting limits. However, laboratory detection limits for diesel-range petroleum hydrocarbons, and in some instances BETX, were above MTCA Method A cleanup levels. The elevated detection levels were due to interferences in the samples and required dilutions.

Trichloroethene and tetrachloroethene were detected in the groundwater samples collected from all four soil borings at concentrations that exceed the MTCA Method A cleanup levels. Cis-1,2-dichloroethene was detected in 3 of the 4 groundwater samples; there is no MTCA Method A cleanup level for cis-1,2-dichloroethene.

The analytical results for the direct push probe grab groundwater samples are summarized in Table 3. The results of our review of chemical data quality and laboratory reports are provided in Appendix C.

6.0 CONCLUSIONS AND RECOMMENDATIONS

A 2008 Hart Crowser investigation identified elevated levels of diesel-range petroleum hydrocarbons in soil approximately 100 feet project west of UST N-6; however, diesel-range petroleum hydrocarbons were not detected in the soil and groundwater samples collected for this investigation. Therefore, we do not believe that it is likely that this UST was the source of the diesel contamination.

Gasoline-range petroleum hydrocarbons were reported in soil and groundwater samples from this investigation. The laboratory reported that the gasoline detections were not similar to typical gasoline and the typical volatile components of gasoline (i.e., BETX) were not detected in any of the four soil samples at levels above the method detection limits. Based on the preliminary laboratory reports of gasoline-range petroleum hydrocarbons in soil and groundwater, the Port of Tacoma notified Ecology of discovery of a petroleum hydrocarbon release on November 8, 2010.

However, a further review of the analytical results indicates that these detections are likely false positives; therefore, we believe it is not likely that UST N-6 is the cause of the solvent contamination. These detections are likely due to interferences from the OCC plume that is documented in this area.

Currently, it is unknown if UST N-6 remains in place; there are no records that indicate the tank has been removed. However, the geophysical survey identified one anomaly that may represent the UST. There also are no records that indicate that the UST has been used since the Washington State Underground Storage Tank Regulations Chapter 173-360 were developed in 1989. It is not likely that the UST was closed to today's standards. Therefore, we recommend that subsurface explorations be completed to determine if the tank still remains and if so, we recommend removing it. As part of the UST removal process, a UST site assessment in accordance with Ecology guidance and Tacoma Pierce County Health Department requirements must be conducted.

7.0 REFERENCES

Conestoga-Rovers & Associates (CRA), 2008. Preliminary Draft Site Characterization Report. Prepared for Occidental Chemical Corporation, March 2008.

Ecology, 2007a. Model Toxics Control Act (MTCA) cleanup regulation, Chapter 173-340 WAC.

Ecology, 2007b. Underground Storage Tank Statute & Regulations, Chapter 173-360 WAC.

Ecology, 2008. State of Washington Administrative Code on Minimum Standards for Construction and Maintenance of Wells, Chapter 173-160 WAC.

Global Geophysics, 2010. Report for a Geophysical Survey to Locate Buried Underground Storage Tanks. Prepared for Hart Crowser, Inc. April 18, 2010.

Hart Crowser, 2008. Revised Geotechnical Work Plan for East Blair Three, Port of Tacoma, Washington. Prepared for Port of Tacoma. August 8, 2008, with addendum dated September 22, 2008.

Hart Crowser, 2009a. Environmental Site Characterization Data Report, Proposed Terminal Development, Port of Tacoma, Washington. Prepared for Port of Tacoma. February 27, 2009.

Hart Crowser, 2009b. Upland Environmental Characterization Report Earley Business Center (EBC), Port of Tacoma, WA. Prepared for Anchor Environmental, LLC and Port of Tacoma. December 1, 2009.

Hart Crowser, 2010a. Area-Wide Sampling and Analysis Plan. Port of Tacoma UST Remediation Program Sampling, Tacoma, Washington. Prepared for the Port of Tacoma. April 27, 2010.

Hart Crowser, 2010b. UST N-6 Site-Specific Sampling and Analysis Plan. Port of Tacoma UST Remediation Program Sampling, Tacoma, Washington. Prepared for the Port of Tacoma. September 3, 2010.

J:\Jobs\1758100\Phase 23 N-6\Summary Report\UST N-6 Summary Report.doc

Table 1 - Prior Analytical Results for Nearby Soil Samples (Hart Crowser, 2009)

Exploration No./Sample ID	HC08-EP106	HC08-EP113	HC08-EP113-S3	MTCA Screening Criteria
Sampling Date	10/03/08	10/03/08	10/03/08	Method A
Depth in Feet	2.75 to 4	2 to 4	9.5 to 11.5	Industrial
Metals in mg/kg				
Arsenic	5 U	9	5 U	20
Cadmium	0.2 U	0.4	0.2 U	2
Chromium	16.1	20.1	14.5	
Copper	16.9	49.8	9.6	
Lead	58	380	2 U	1,000
Mercury	0.04 U	0.05	0.04 U	2
Nickel	10	19	10	
Zinc	64	140	21	
TCLP Metals in mg/L				
Lead		0.8		5
TPH in mg/kg				
Diesel-Range Hydrocarbons	310	61	**8,400**	2,000
Motor Oil-Range Hydrocarbons	1600	180	630	2,000

Notes:
U: Not detected at reporting limit indicated.
J: Estimated value.
Bold, boxed entry indicates concentration exceeds MTCA screening criteria.
Constituents not listed were undetected or were detected at concentrations below applicable regulatory criteria.
Blank entry indicates no applicable MTCA criteria established or sample not analyzed for specific analyte.

Table 2 - Analytical Results for Soil Samples, UST N-6 (Hart Crowser, 2010)

Sample ID	HC-N6-1-S3	HC-N6-2-S3	HC-N6-3-S3	HC-N6-4-S3	MTCA
Sampling Date	9/22/2010	9/22/2010	9/22/2010	9/22/2010	Cleanup Level
Sample Depth in Feet	9.5 to 12	9 to 12	10 to 12	9 to 12	Method A
TPH in mg/kg					
Diesel Range Organics	31 U	30 U	29 U	30 U	2000
Lube Oil	62 U	60 U	59 U	59 U	2000
Gasoline Range Organics	7.6 U	14	6.6	6.2 U	100/30 [a]
Volatiles in mg/kg					
1,1,1,2-Tetrachloroethane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,1,1-Trichloroethane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	2
1,1,2,2-Tetrachloroethane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,1,2-Trichloroethane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,1-Dichloroethane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,1-Dichloroethene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,1-Dichloropropene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,2,3-Trichlorobenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,2,3-Trichloropropane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,2,4-Trichlorobenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,2,4-Trimethylbenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,2-Dibromo-3-chloropropane	0.0063 U	0.0065 U	0.0058 U	0.0063 U	
1,2-Dichlorobenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,2-Dichloroethane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,2-Dichloropropane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,3,5-Trimethylbenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,3-Dichlorobenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,3-Dichloropropane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
1,4-Dichlorobenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
2,2-Dichloropropane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
2-Butanone	0.0063 U	0.0065 U	0.0058 U	0.0063 U	
2-Chloroethylvinylether	0.0063 U	0.0065 U	0.0058 U	0.0063 U	
2-Chlorotoluene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
2-Hexanone	0.0063 U	0.0065 U	0.0058 U	0.0063 U	
4-Chlorotoluene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Acetone	0.013 U	0.013 U	0.012 U	0.013 U	
Benzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	0.03
Bromobenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Bromochloromethane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Bromoform	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Bromomethane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Carbon Disulfide	0.0013 U	0.041	0.0012 U	0.0013 U	
Carbon Tetrachloride	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
CFC-11	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
CFC-12	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Chlorobenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Chloroethane	0.0063 U	0.0065 U	0.0058 U	0.0063 U	
Chloroform	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Chloromethane	0.0063 U	0.0065 U	0.0058 U	0.0063 U	
Cis-1,2-Dichloroethene	0.0043	0.038	0.0012 U	0.0013 U	
Cis-1,3-Dichloropropene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Dibromochloromethane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Dibromomethane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Dichlorobromomethane	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Ethylbenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	6
Ethylene dibromide	0.0013 U	0.0013 U	0.0012 U	0.0013 U	0.005
Hexachlorobutadiene	0.0063 U	0.0065 U	0.0058 U	0.0063 U	
Isopropylbenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
m, p-Xylene	0.0025 U	0.0026 U	0.0023 U	0.0025 U	9
Methyl Iodide	0.0063 U	0.0065 U	0.0058 U	0.0063 U	
Methyl Isobutyl Ketone	0.0063 U	0.0065 U	0.0058 U	0.0063 U	
Methyl t-Butyl Ether	0.0013 U	0.0013 U	0.0012 U	0.0013 U	0.1
Methylene Chloride	0.0063 U	0.0065 U	0.0058 U	0.0063 U	0.02
Naphthalene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	5
n-Butylbenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
n-Propylbenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
o-Xylene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	9
p-Isopropyltoluene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
sec-Butylbenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Styrene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
tert-Butylbenzene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Tetrachloroethene	**0.18**	**1.5**	**0.14**	**0.074**	0.05

Table 2 - Analytical Results for Soil Samples, UST N-6 (Hart Crowser, 2010)

Sample ID	HC-N6-1-S3	HC-N6-2-S3	HC-N6-3-S3	HC-N6-4-S3	MTCA
Sampling Date	9/22/2010	9/22/2010	9/22/2010	9/22/2010	Cleanup Level
Sample Depth in Feet	9.5 to 12	9 to 12	10 to 12	9 to 12	Method A
Toluene	0.0063 U	0.0065 U	0.0058 U	0.0063 U	7
Trans-1,2-Dichloroethene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Trans-1,3-Dichloropropene	0.0013 U	0.0013 U	0.0012 U	0.0013 U	
Trichloroethene	0.011	**0.19**	0.011	0.0085	0.03
Vinyl Acetate	0.0063 U	0.0065 U	0.0058 U	0.0063 U	
Vinyl Chloride	0.0013 U	0.0013 U	0.0012 U	0.0013 U	

Notes:
U = Not detected at the reporting limit indicated.
[a] 100 mg/kg when no benzene present, 30 mg/kg when benzene present.
Bold boxed entry indicates concentration exceeds MTCA cleanup level.
Reporting limits that exceed the MTCA cleanup level are italicized.
Blank entry indicates no applicable MTCA criteria established or sample not analyzed for specific analyte

Table 3 - Analytical Results for Groundwater Samples, UST N-6 (Hart Crowser, 2010)

Sample ID	HC-N6-1 GW	HC-N6-2 GW	HC-N6-3 GW	HC-N6-4 GW	MTCA
Sampling Date	9/22/2010	9/22/2010	9/22/2010	9/22/2010	Cleanup Level
Screen Interval in Feet	10 to 12	10 to 12	10 to 12	10 to 12	Method A
TPH in mg/L					
Diesel Range Organics	*1.7 U*	*0.75 U*	*1.2 U*	*2.1 U*	0.5
Lube Oil	0.42 U	0.42 U	0.43 U	0.42 U	0.5
Gasoline Range Organics	**8.7**	**5.5**	**6.7**	**8.6**	0.8/1 [a]
Volatiles in ug/L					
1,1,1,2-Tetrachloroethane	500 U	50 U	60 U	100 U	
1,1,1-Trichloroethane	500 U	50 U	60 U	100 U	200
1,1,2,2-Tetrachloroethane	500 U	50 U	60 U	100 U	
1,1,2-Trichloroethane	500 U	50 U	60 U	100 U	
1,1-Dichloroethane	500 U	50 U	60 U	100 U	
1,1-Dichloroethene	500 U	50 U	60 U	100 U	
1,1-Dichloropropene	500 U	50 U	60 U	100 U	
1,2,3-Trichlorobenzene	500 U	50 U	60 U	100 U	
1,2,3-Trichloropropane	500 U	50 U	60 U	100 U	
1,2,4-Trichlorobenzene	500 U	50 U	60 U	100 U	
1,2,4-Trimethylbenzene	500 U	50 U	60 U	100 U	
1,2-Dibromo-3-chloropropane	2500 U	250 U	300 U	500 U	
1,2-Dichlorobenzene	500 U	50 U	60 U	100 U	
1,2-Dichloroethane	500 U	50 U	60 U	100 U	5
1,2-Dichloropropane	500 U	50 U	60 U	100 U	
1,3,5-Trimethylbenzene	500 U	50 U	60 U	100 U	
1,3-Dichlorobenzene	500 U	50 U	60 U	100 U	
1,3-Dichloropropane	500 U	50 U	60 U	100 U	
1,4-Dichlorobenzene	500 U	50 U	60 U	100 U	
2,2-Dichloropropane	500 U	50 U	60 U	100 U	
2-Butanone	13000 U	1300 U	1500 U	2500 U	
2-Chloroethylvinylether	2500 U	250 U	300 U	500 U	
2-Chlorotoluene	500 U	50 U	60 U	100 U	
2-Hexanone	5000 U	500 U	600 U	1000 U	
4-Chlorotoluene	500 U	50 U	60 U	100 U	
Acetone	13000 U	1300 U	1500 U	2500 U	
Benzene	*500 U*	*50 U*	*60 U*	*100 U*	5
Bromobenzene	500 U	50 U	60 U	100 U	
Bromochloromethane	500 U	50 U	60 U	100 U	
Bromoform	2500 U	250 U	300 U	500 U	
Bromomethane	500 U	50 U	60 U	100 U	
Carbon Disulfide	500 U	50 U	60 U	100 U	
Carbon Tetrachloride	500 U	50 U	60 U	100 U	
CFC-11	500 U	50 U	60 U	100 U	
CFC-12	500 U	50 U	60 U	100 U	
Chlorobenzene	500 U	50 U	60 U	100 U	
Chloroethane	2500 U	250 U	300 U	500 U	
Chloroform	500 U	50 U	60 U	100 U	
Chloromethane	2500 U	250 U	300 U	500 U	
Cis-1,2-Dichloroethene	500	180	60 U	280	
Cis-1,3-Dichloropropene	500 U	50 U	60 U	100 U	
Dibromochloromethane	500 U	50 U	60 U	100 U	
Dibromomethane	500 U	50 U	60 U	100 U	
Dichlorobromomethane	500 U	50 U	60 U	100 U	
Ethylbenzene	500 U	50 U	60 U	100 U	700
Ethylene dibromide	500 U	50 U	60 U	100 U	
Hexachlorobutadiene	500 U	50 U	60 U	100 U	

Table 3 - Analytical Results for Groundwater Samples, UST N-6 (Hart Crowser, 2010)

Sample ID	HC-N6-1 GW	HC-N6-2 GW	HC-N6-3 GW	HC-N6-4 GW	MTCA
Sampling Date	9/22/2010	9/22/2010	9/22/2010	9/22/2010	Cleanup Level
Screen Interval in Feet	10 to 12	10 to 12	10 to 12	10 to 12	Method A
Isopropylbenzene	500 U	50 U	60 U	100 U	
m, p-Xylene	1000 U	100 U	120 U	200 U	1000
Methyl Iodide	2500 U	250 U	300 U	500 U	
Methyl Isobutyl Ketone	5000 U	500 U	600 U	1000 U	
Methyl t-Butyl Ether	500 U	50 U	60 U	100 U	20
Methylene Chloride	5000 U	500 U	600 U	1000 U	5
Naphthalene	2500 U	250 U	300 U	500 U	160
n-Butylbenzene	500 U	50 U	60 U	100 U	
n-Propylbenzene	500 U	50 U	60 U	100 U	
o-Xylene	500 U	50 U	60 U	100 U	1000
p-Isopropyltoluene	500 U	50 U	60 U	100 U	
sec-Butylbenzene	500 U	50 U	60 U	100 U	
Styrene	500 U	50 U	60 U	100 U	
tert-Butylbenzene	500 U	50 U	60 U	100 U	
Tetrachloroethene	**47000**	**8200**	**11000**	**17000**	5
Toluene	*2500 U*	250 U	300 U	500 U	1000
Trans-1,2-Dichloroethene	500 U	50 U	60 U	100 U	
Trans-1,3-Dichloropropene	500 U	50 U	60 U	100 U	
Trichloroethene	**1600**	**1100**	**1100**	**1800**	5
Vinyl Acetate	5000 U	500 U	600 U	1000 U	
Vinyl Chloride	500 U	50 U	60 U	100 U	0.2

Notes:
U = Not detected at the reporting limit indicated.
[a] 0.8 mg/L when no benzene present, 1 mg/L when benzene present.
Bold boxed entry indicates concentration exceeds MTCA cleanup level.
Reporting limits that exceed the MTCA cleanup level are italicized.
Blank entry indicates no applicable MTCA criteria established or sample not analyzed for specific analyte.

Source: Base map prepared from Microsoft Streets and Trips, 2005.

UST Remediation Program
Tacoma, Washington

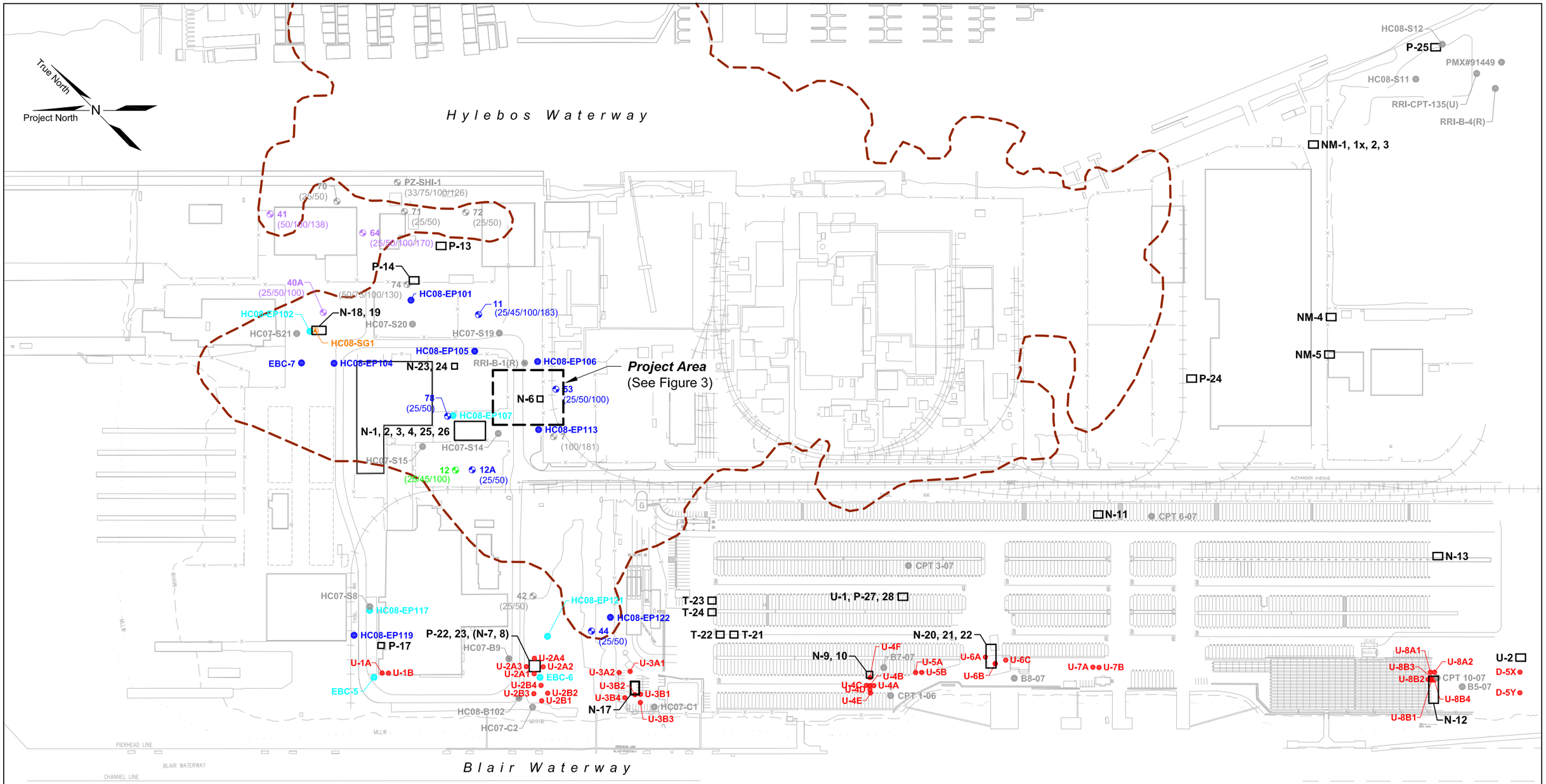
Vicinity Map

17581-00 2/11

HARTCROWSER

Figure
1

JAB 02/3/11 1758100-003.dwg



Well Location and Number

- 78 (25/50) — Hydraulic Monitoring Well, Installed Screen Depth in Feet (CRA 2008)
- 12 (25/45/100) — Hydraulic and Groundwater Monitoring Well, Installed Screen Depth in Feet (CRA 2008)
- 41 (25/50/100) — Groundwater Monitoring Well, Installed Screen Depth in Feet (CRA 2008)
- 71 (25/50) — Monitoring Well/Piezometer Cluster, Installed Screen Depth in Feet (CRA 2008)

Exploration Location and Number

- HC08-EP101 — Environmental Probe, Soil Samples Only (Hart Crowser 2009 a,b)
- HC08-EP117 — Environmental Probe with Groundwater and Soil Samples (Hart Crowser 2009 a,b)
- HC08-SG1 — Soil Gas Probe (Hart Crowser 2009 a,b)
- U-1A — Environmental Probe, Soil Samples Only (GeoEngineers 2008)
- B8-07 — Historical Exploration

N-6 — Estimated Former UST Location and Designation (See SSAP for data summary)

Estimated Maximum Extent of the Occidental Chemical Corporation (OCC) Groundwater VOC Plume (Port of Tacoma Provided)

0 300 600
Scale in Feet

Port of Tacoma
UST Remediation Program

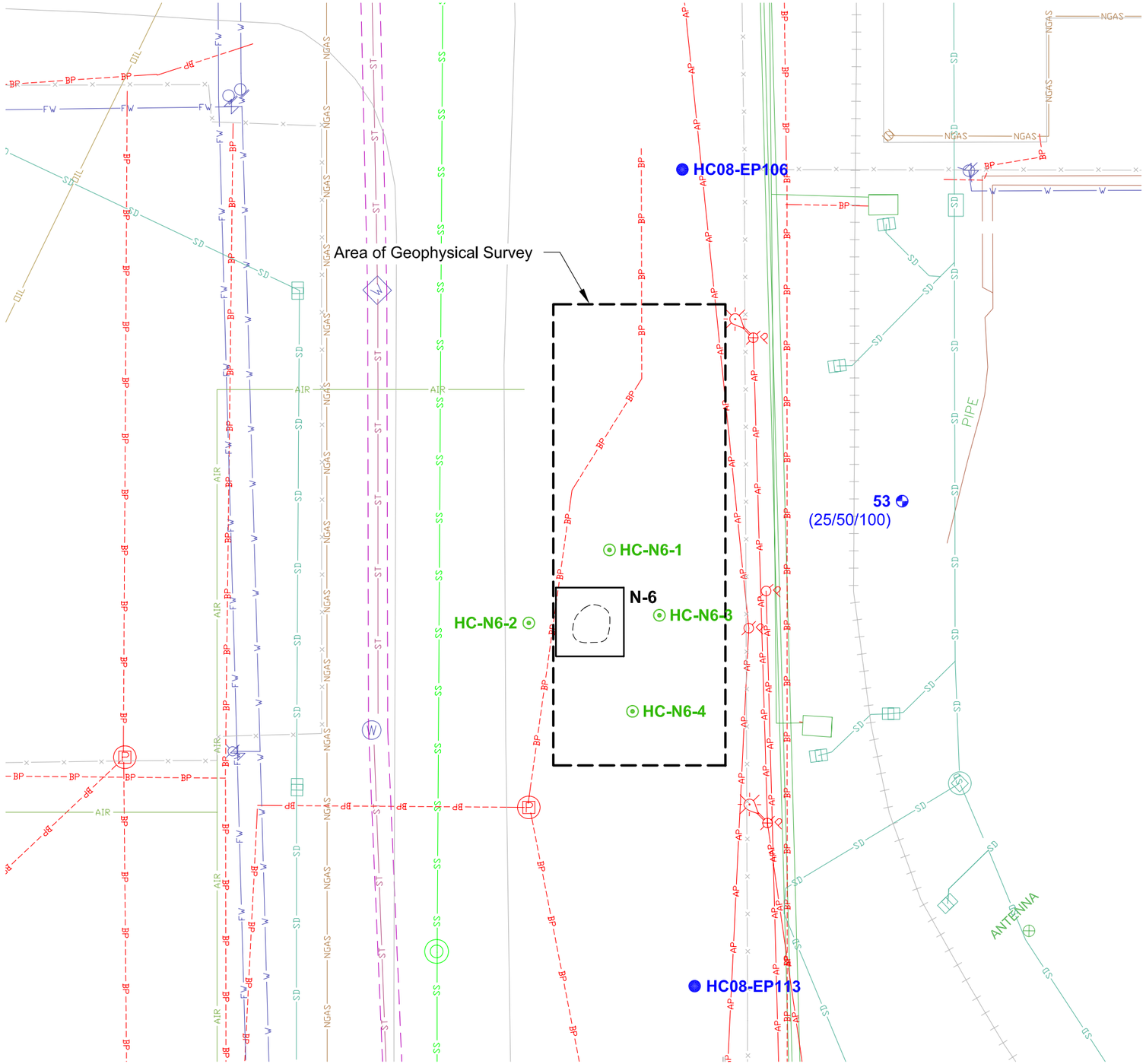
Area Map

17581-00 Phase 23 2/11

HARTCROWSER

Figure 2

JAB 02/3/11 1758100P23-001.dwg



Exploration Location and Number

HC-N6-1 — Exploration

53 (25/50/100) — Hydraulic Monitoring Well, Installed Screen Depth in Feet (CRA 2008)

HC08-EP113 — Environmental Probe, Soil Samples Only (Hart Crowser 2009 a,b)

N-6 — Possible UST Location and Designation based on Port of Tacoma provided information

Possible UST Location based on Geophysical Investigation

Utility Information

- Storm Drain
- Sanitary Sewer
- Main Water Line
- Fire Water Line
- Below Ground Power and Electrical Line
- Above Ground Power and Electrical Line
- Air Line
- Natural Gas Line
- Steam Line
- Utilidor

True North / Project North

0 30 60

Scale in Feet

Note: EBC CAD drawings provide by the Port of Tacoma.

Port of Tacoma
UST Remediation Program

Site Plan UST N-6

17581-00 Phase 23 2/11

HARTCROWSER

Figure 3

JAB 02/3/11 1758100P23-002.dwg

APPENDIX A
GEOPHYSICAL SURVEY REPORT AND ASSOCIATED FIGURE
GLOBAL GEOPHYSICS

Global Geophysics

16651 White Mountain Road SE
Monroe, WA 98272

Tel: 425-890-4321
Fax: 360-805-0259

April 18, 2010 Our ref: 100-0401.000

Hart Crowser, Inc.
1700 Westlake Avenue North, Suite 200
Seattle, WA 98109-3056

ATTENTION: Ms. Colleen Rust

RE: REPORT FOR A GEOPHYSICAL SURVEY TO LOCATE BURIED UNDERGROUND STORAGE TANK

Dear Ms. Rust:

Global Geophysics conducted magnetic and ground penetrating radar (GPR) surveys at the Port of Tacoma, WA. The proposed objectives of the geophysical investigation was to locate underground storage tanks (USTs).

GEOPHYSICAL METHODS, INSTRUMENTATION AND FIELD PROCEDURES

Magnetometry and ground penetrating radar (GPR) were used to locate underground storage tanks (USTs) for this survey. The following paragraphs describe the methods and field procedures.

Magnetometry

The magnetometer measures variations in the magnetic field of the Earth, including local distortions or anomalies of the field caused by ferrous objects or minerals. In general, the magnitude of the magnetometer response is proportional to the mass of the ferrous object and the distance from the magnetometer. A single drum can be detected to a depth of approximately 15 to 20 feet. Non-ferrous metals, such as copper and aluminum, cannot be located with a magnetometer.

A Geometric Model 858 Cesium magnetometer was used for this investigation. A grid of 3 ft by 10 ft was set up in different areas. The magnetic data were collected along the lines every 3 ft apart except location N-11 where 5 ft spacing was used. The magnetic data was downloaded everyday for QA/QC on site.

Ground Penetrating Radar

The GPR method uses electromagnetic pulses, emitted at regular intervals by an antenna to map subsurface features. The electromagnetic pulses are reflected where changes in electrical properties of materials occur such as changes in lithology or where underground utilities are present. The reflected electromagnetic energy is received by an antenna, converted into an electrical signal, and

recorded on the GPR unit. The data is recorded and viewed in real time on a graphical display that depicts a continuous profile or cross-section image of the subsurface directly beneath the path of the antenna.

The depth of penetration of the GPR signal varies according to antenna frequency and the conductivity of the subsurface material. The depth of subsurface penetration with GPR decreases with an increase in the frequency of the antenna and an increase in soil conductivity. Low frequency antennas (50 to 500 MHz) provide the best compromise between obtaining good subsurface penetration and resolution.

The data at selected locations were collected using Geophysical Survey Systems, Inc. (GSSI) SIR 2000 GPR system with an antenna having a center frequency of 200 MHz. The data were digitally recorded for post processing.

RESULTS

The magnetic data was not collected at Area N-23, 24, because there were a lot of surface metal objects present at the site, and the access restrictions due to temporary buildings at the site. Only GPR data was collected at this location.

Both magnetic and GPR data were collected in the following areas: N-9, 10; N-11; N-12; N-17; N-1,2,3,4,25,26; N-23, 24; N-6; N-18, 19; P-24; N-13; and N-20, 21, 22. The magnetic data contour plans with interpretation are shown in figures in the Appendix A. Magnetic anomalies (areas in red and blue colors) are interpreted as buried metal objects or underground storgae tanks (USTs).

LIMITATIONS OF THE GEOPHYSICAL METHOD

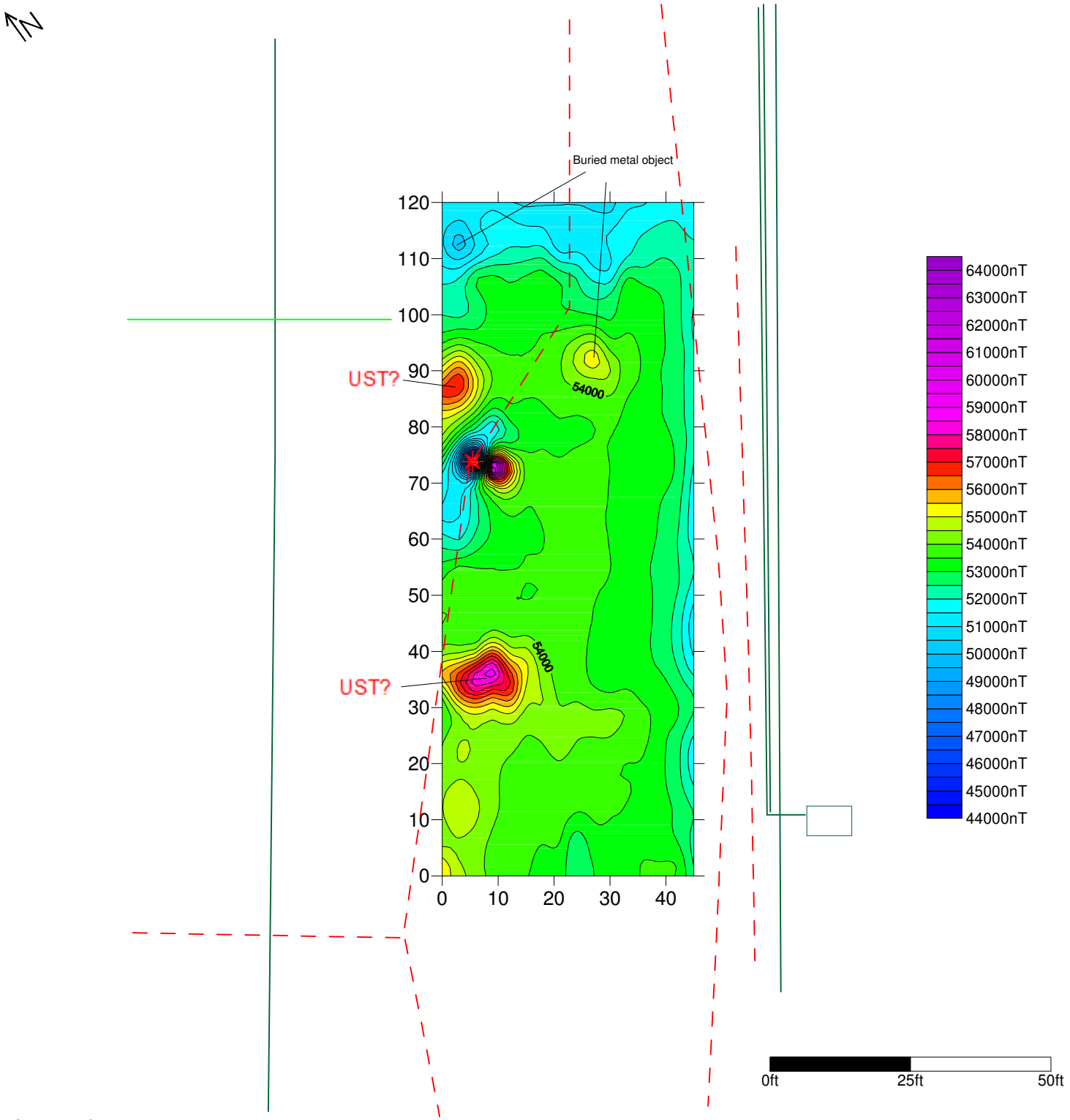
Global geophysics services are conducted in a manner consistent with the level of care and skill ordinarily exercised by other members of the geophysical community currently practicing under similar conditions subject to the time limits and financial and physical constraints applicable to the services. Magnetic and GPR are remote sensing geophysical methods that may not detect all subsurface conditions due to the limitations of the methods, soil conditions, size of the features and their depths.

Sincerely,

Global Geophysics

John Liu, Ph.D., R.G.
Principal Geophysicist

Attachment: Appendix A – Site Figures



Legend:

- Storm Drain
- Power Line
- Water
- Sewer
- Air
- Communication
- 3 feet spacing
- Interpreted metal pipe based on magnetic data

PROJECT
PORT OF TACOMA
UST LOCATE

TITLE
Magnetic Data Contour Plan For Area N-6

Global Geophysics
16651 White Mountain Road SE
Monroe, WA, 98272
Tel: 425-890-4321

PROJECT No. 100-0401			FILE No.
DESIGN	--		SCALE AS SHOWN REV.
CADD	JL		
CHECK	--		**FIGURE X**
REVIEW	--		

APPENDIX B
DIRECT-PUSH PROBE EXPLROATION LOGS AND BORING LOGS FROM PREVIOUS INVESTIGATIONS

DIRECT-PUSH PROBE EXPLORATION LOGS (HART CROWSER)

Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and probes is estimated based on visual observation and is presented parenthetically on the logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 to 4	Very soft	0 to 2	<0.125
Loose	4 to 10	Soft	2 to 4	0.125 to 0.25
Medium dense	10 to 30	Medium stiff	4 to 8	0.25 to 0.5
Dense	30 to 50	Stiff	8 to 15	0.5 to 1.0
Very dense	>50	Very stiff	15 to 30	1.0 to 2.0
		Hard	>30	>2.0

Sampling Test Symbols

- 1.5" I.D. Split Spoon
- Grab (Jar)
- 3.0" I.D. Split Spoon
- Shelby Tube (Pushed)
- Bag
- Cuttings
- Core Run

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE			GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE			SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, likely below optimum
Moist	Likely near optimum moisture content
Wet	Much perceptible moisture, likely above optimum

Minor Constituents	Estimated Percentage
Trace	<5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

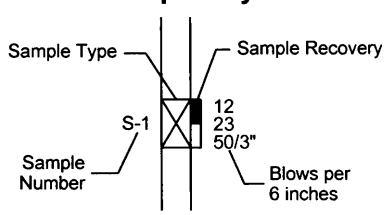
Laboratory Test Symbols

GS	Grain Size Classification
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits Water Content in Percent Liquid Limit Natural Plastic Limit
PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	In Situ Density in PCF
OT	Tests by Others

Groundwater Indicators

- Groundwater Level on Date or (ATD) At Time of Drilling
- Groundwater Seepage (Test Pits)

Sample Key



HARTCROWSER

17581-00 *9/10*

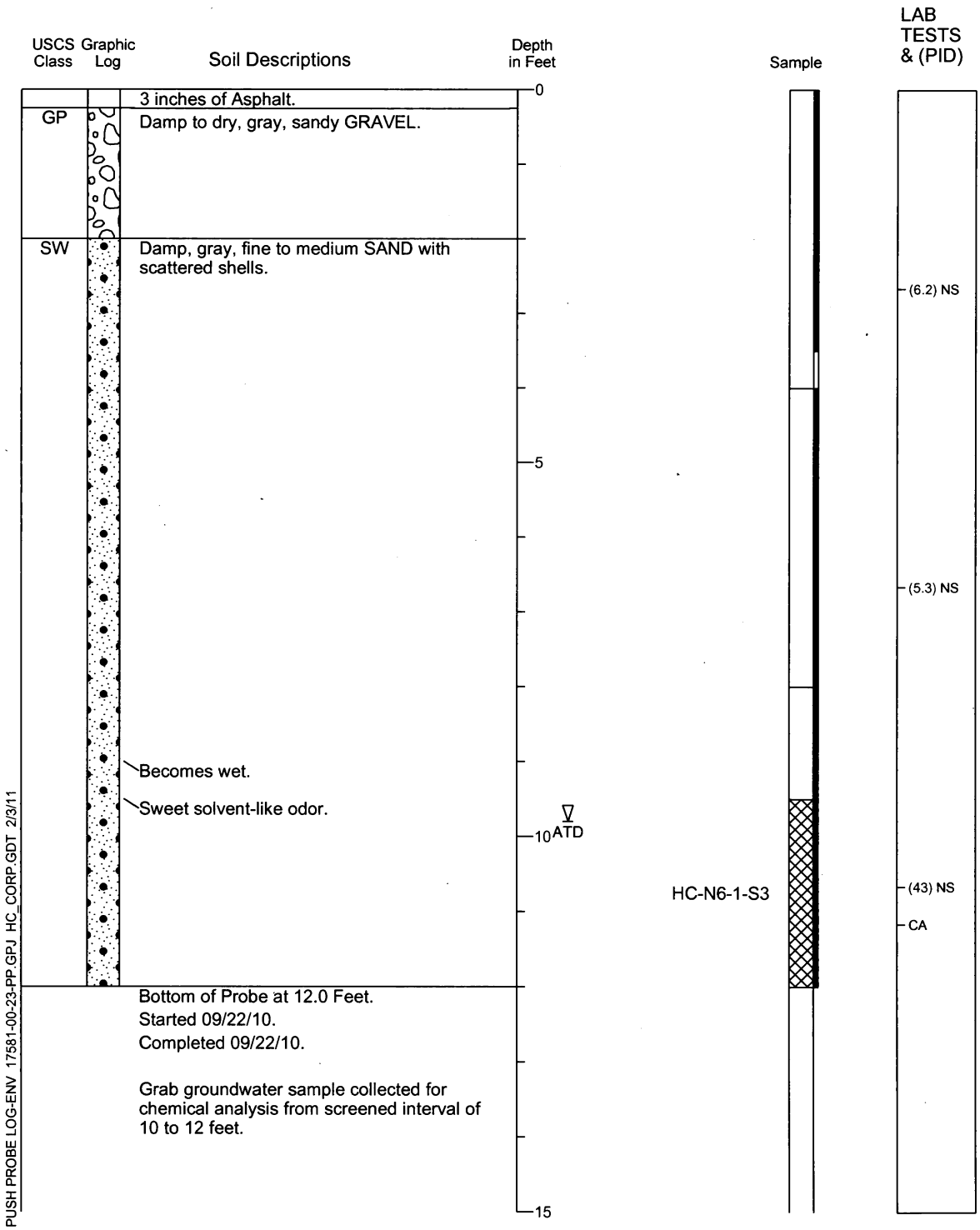
Figure B-1

KEY SHEET 17581-00-23-PP.GPJ HC_CORP.GDT 2/3/11

Push Probe Log HC-N6-1

Location: See Figure 3.
Approximate Ground Surface Elevation: 17 Feet
Horizontal Datum: NA
Vertical Datum: MLLW

Drill Equipment: Push Probe
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: C. Rust



PUSH PROBE LOG-ENV 17581-00-23-PP.GPJ HC_CORP.GDT 2/3/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen

HARTCROWSER

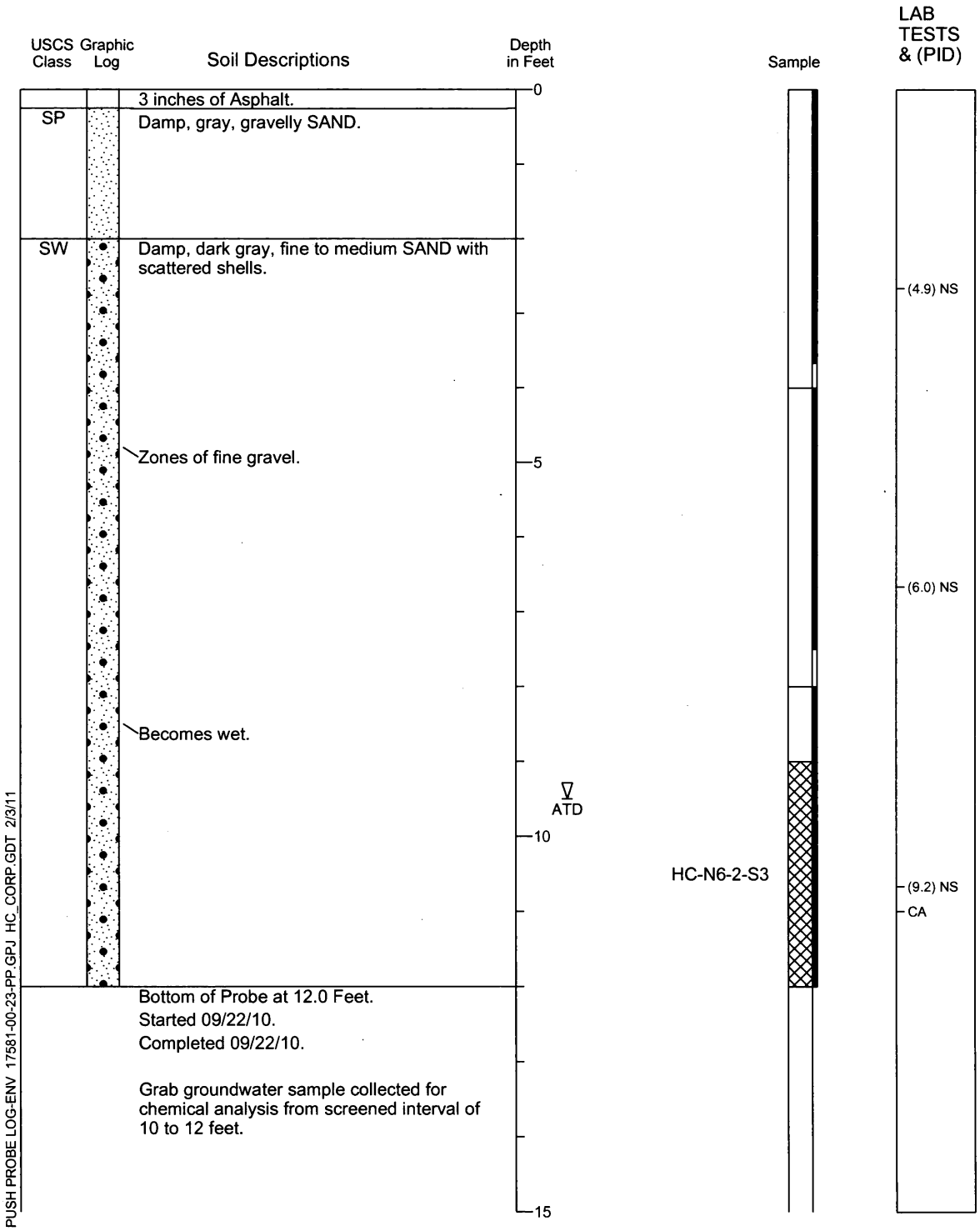
17581-00 *9/10*

Figure B-2

Push Probe Log HC-N6-2

Location: See Figure 3.
Approximate Ground Surface Elevation: 17 Feet
Horizontal Datum: NA
Vertical Datum: MLLW

Drill Equipment: Push Probe
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: C. Rust



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen

HARTCROWSER

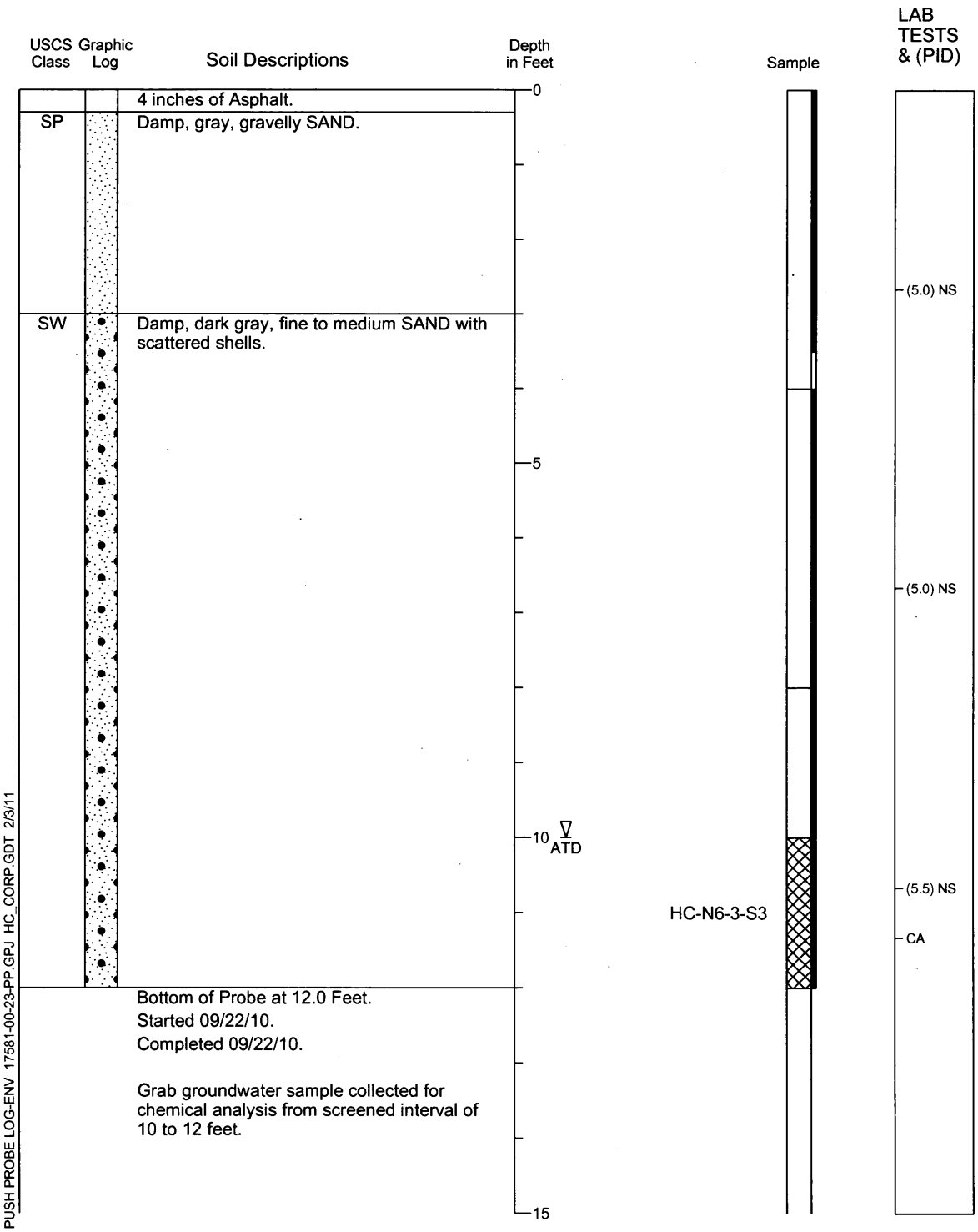
17581-00 9/10

Figure B-3

Push Probe Log HC-N6-3

Location: See Figure 3.
Approximate Ground Surface Elevation: 17 Feet
Horizontal Datum: NA
Vertical Datum: MLLW

Drill Equipment: Push Probe
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: C. Rust



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen

HARTCROWSER

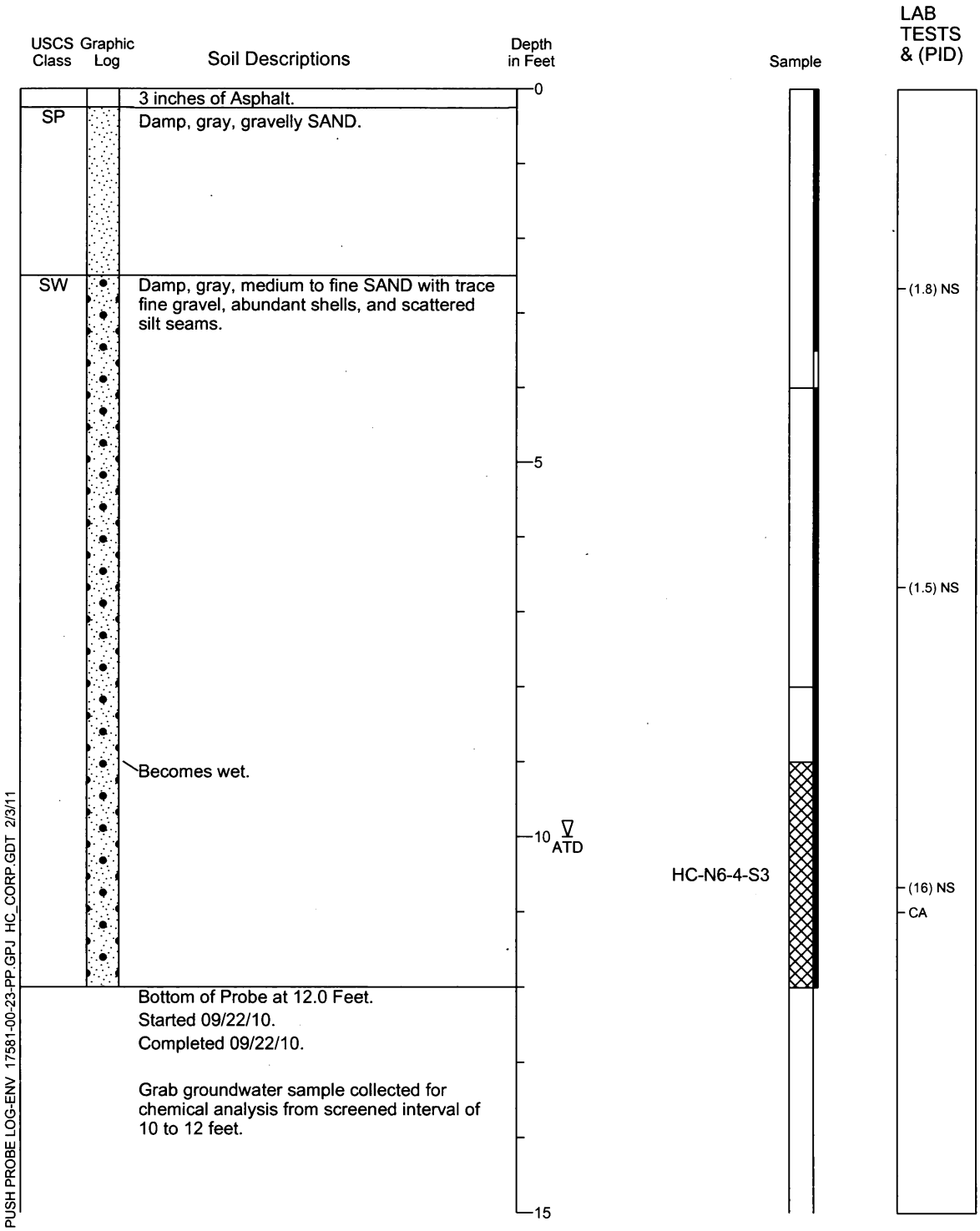
17581-00 ***9/10***

Figure B-4

Push Probe Log HC-N6-4

Location: See Figure 3.
Approximate Ground Surface Elevation: 17 Feet
Horizontal Datum: NA
Vertical Datum: MLLW

Drill Equipment: Push Probe
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: C. Rust



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen

HARTCROWSER

17581-00 *9/10*

Figure B-5

BORING LOGS FROM PREVIOUS INVESTIGATIONS (CRA AND HART CROWSER)

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-02)
Page 1 of 1

PROJECT NAME: OXYCHEM - TACOMA
PROJECT NUMBER: 7843
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: MIDWAY BETWEEN EXTRACTION WELLS D-2 AND D-3

HOLE DESIGNATION: 53-25
DATE COMPLETED: SEPTEMBER 18, 1996
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: J. WILLIAMS

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*12.4* *12.36*					
-2.5 -5.0 -7.5 -10.0 -12.5 -15.0 -17.5 -20.0 -22.5 -25.0	For overburden stratigraphy refer to stratigraphic and instrumentation log for 53-100.		CONCRETE SEAL 8" Ø BOREHOLE BENTONITE GROUT 2" Ø BLACK IRON PIPE BENTONITE CHIPS SAND PACK WELL SCREEN TAILPIPE				
-27.5 -30.0 -32.5	END OF HOLE @ 26.5ft BGS	*-14.1*					

SCREEN DETAILS
Screened Interval:
20.0 to 25.0ft BGS
Length: 5.0ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
17.0 to 26.5ft BGS
Material: 20-40 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

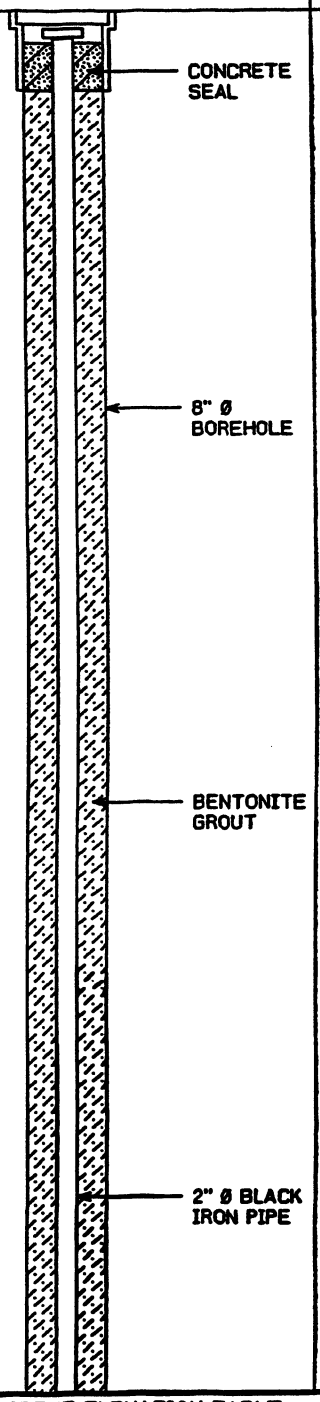
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-03)

PROJECT NAME: OXYCHEM - TACOMA
PROJECT NUMBER: 7843
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: MIDWAY BETWEEN EXTRACTION WELLS D-2 AND D-3

HOLE DESIGNATION: 53-50
DATE COMPLETED: SEPTEMBER 16, 1996
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: J. WILLIAMS

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	*12.62* *12.4*					
	For overburden stratigraphy refer to stratigraphic and instrumentation log for 53-100.						
2.5							
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OXYCHEM - TACOMA
PROJECT NUMBER: 7843
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: MIDWAY BETWEEN EXTRACTION WELLS D-2 AND D-3

HOLE DESIGNATION: 53-50
DATE COMPLETED: SEPTEMBER 16, 1996
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: J. WILLIAMS

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
-37.5			BENTONITE GROUT; 8" Ø BOREHOLE				
-40.0			BENTONITE CHIPS				
-42.5			2" Ø BLACK IRON PIPE				
-45.0			WELL SCREEN				
-47.5			SAND PACK				
-50.0			TAILPIPE				
	END OF HOLE @ 51.5ft BGS	-39.1					
-52.5							
-55.0							
-57.5							
-60.0							
-62.5							
-65.0							
-67.5							

SCREEN DETAILS
Screened Interval:
45.0 to 50.0ft BGS
Length: 5.0ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
42.0 to 51.5ft BGS
Material: 20-40 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OXYCHEM - TACOMA
PROJECT NUMBER: 7843
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: MIDWAY BETWEEN EXTRACTION WELLS D-2 AND D-3

HOLE DESIGNATION: 53-100
DATE COMPLETED: SEPTEMBER 20, 1996
DRILLING METHOD: 6" CT
CRA SUPERVISOR: J. WILLIAMS

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*12.4* *12.34*					
-2.5	SP-SAND (FILL), medium grained, trace fine sand and silt, black with red grains, moist		CONCRETE SEAL				
-5.0							
-7.5	- little fine sand and silt			1SS			
				2SS			
-10.0	SP-SAND, fine grained, some silt, dark brown to black, wet	*2.4*	6" Ø BOREHOLE	3SS			
-12.5							
-15.0							
-17.5							
-20.0	SP-SAND, coarse grained, black with red grains, wet	*-7.6*	BENTONITE GROUT	4SS			
-22.5							
-25.0	- trace brick fragments, slight chemical odor			5SS			
-27.5							
-30.0	SP-SAND, medium grained, little silt and fine sand, black with red grains, slight chemical odor, wet	*-17.6*	2" Ø BLACK IRON PIPE	6SS			
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊽ STATIC WATER LEVEL ⊻

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OXYCHEM - TACOMA
PROJECT NUMBER: 7843
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: MIDWAY BETWEEN EXTRACTION WELLS D-2 AND D-3

HOLE DESIGNATION: 53-100
DATE COMPLETED: SEPTEMBER 20, 1996
DRILLING METHOD: 6" CT
CRA SUPERVISOR: J. WILLIAMS

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SW-SAND (NATIVE), fine to medium grained, little silt and decayed wood, black with red grains, slight chemical odor, wet	-22.6		7SS			
37.5							
40.0			6" Ø BOREHOLE	8SS			
42.5							
45.0	- no decayed wood			9SS			
47.5							
50.0		-37.6	BENTONITE GROUT	10SS			
	SP-SAND, fine grained, some silt, dark olive to black, wet						
52.5							
55.0				11SS			
57.5							
60.0	- trace wood		2" Ø BLACK IRON PIPE	12SS			
62.5							
65.0	- no wood			13SS			
67.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊽ STATIC WATER LEVEL ⊽

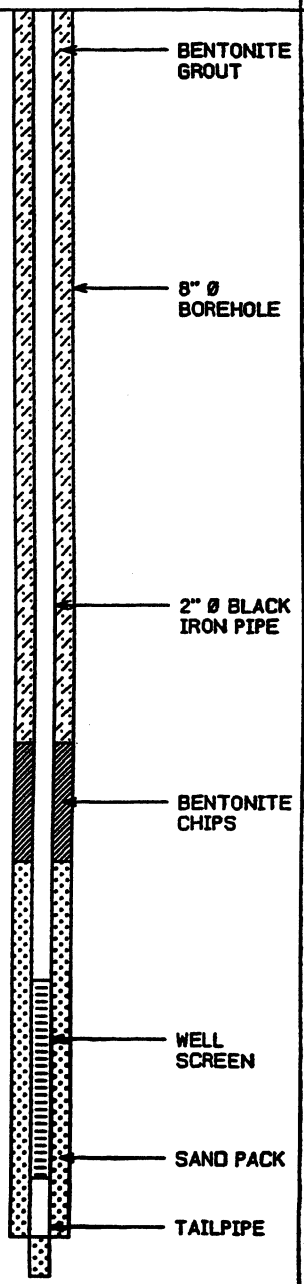
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OXYCHEM - TACOMA
PROJECT NUMBER: 7843
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: MIDWAY BETWEEN EXTRACTION WELLS D-2 AND D-3

HOLE DESIGNATION: 53-100
DATE COMPLETED: SEPTEMBER 20, 1996
DRILLING METHOD: 6" CT
CRA SUPERVISOR: J. WILLIAMS

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
	SW-SAND, fine to medium grained, some silt, dark olive to black, no odor	-57.6
72.5		
75.0	ML-SILT, some fine sand, dense, medium plasticity, dark gray, wet	-62.6
77.5		
80.0	SP-SAND, fine grained, some silt, dense, dark gray, wet	-67.6
82.5		
85.0		
87.5		
90.0		
92.5		
95.0		
97.5		
100.0	SW-SAND, fine to medium grained, some silt, dark olive to black, wet, strong ammonia odor	-87.6
102.5	END OF HOLE @ 102.0ft BGS	-89.6

MONITOR INSTALLATION



SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
14SS			
15SS			
16SS			
17SS			
18SS			
19SS			
20SS			

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OXYCHEM - TACOMA
PROJECT NUMBER: 7843
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: MIDWAY BETWEEN EXTRACTION WELLS D-2 AND D-3

HOLE DESIGNATION: 53-100
DATE COMPLETED: SEPTEMBER 20, 1996
DRILLING METHOD: 6" CT
CRA SUPERVISOR: J. WILLIAMS

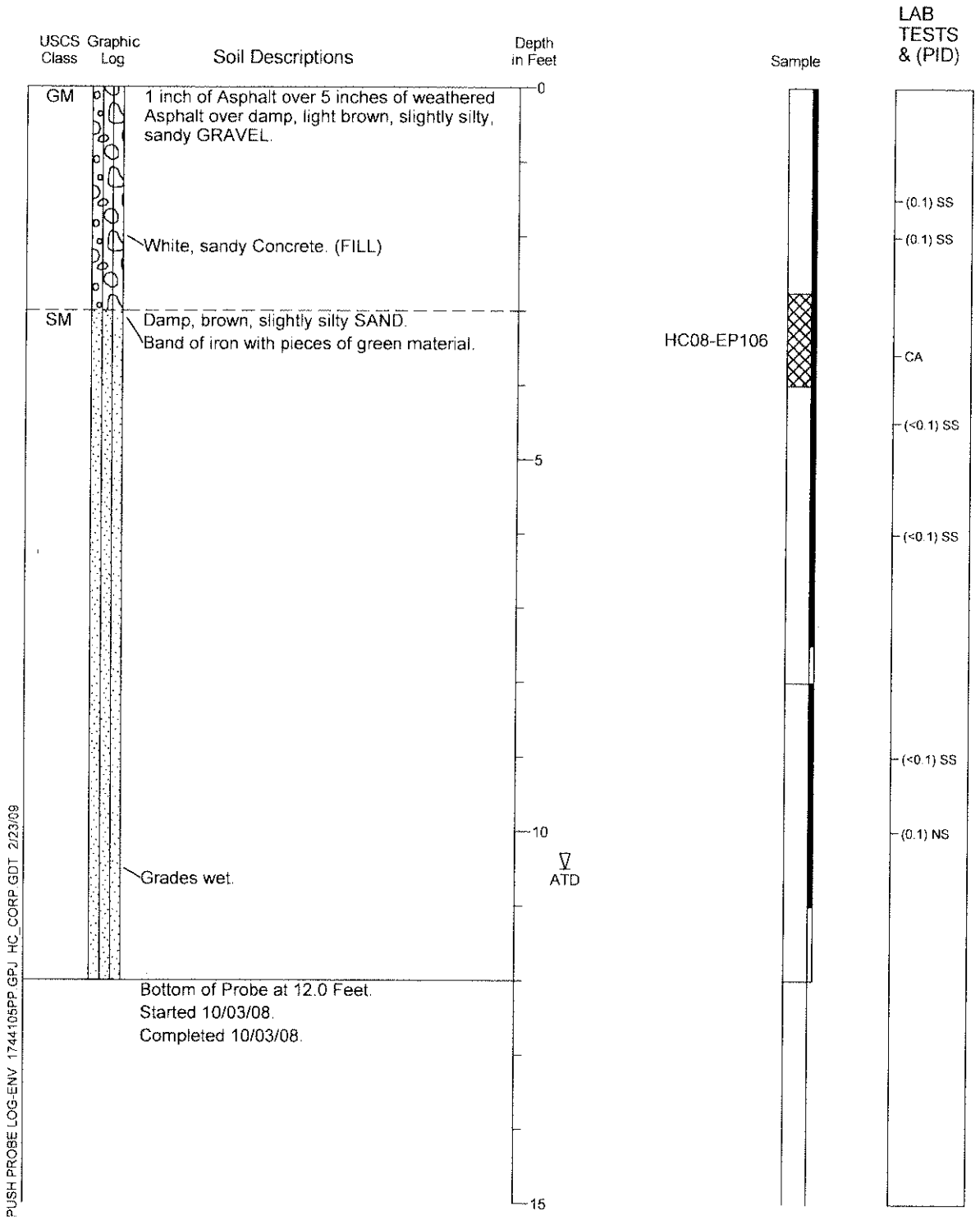
DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
-107.5			**SCREEN DETAILS** Screened Interval: 94.5 to 99.5ft BGS Length: 5.0ft Diameter: 2" Slot Size: #10 Material: Stainless Steel Sand Pack: 91.5 to 102.0ft BGS Material: 20-40 Silica Sand				
-110.0							
-112.5							
-115.0							
-117.5							
-120.0							
-122.5							
-125.0							
-127.5							
-130.0							
-132.5							
-135.0							
-137.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

Push Probe Log HC08-EP106

Location: N 715739.08 E 1167036.86
Approximate Ground Surface Elevation: 19.17 Feet
Horizontal Datum: NAD 83/07
Vertical Datum: MLLW

Drill Equipment: Push Probe
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: A. Goodwin/K. Reinauer Reviewed By: G. Both



PUSH PROBE LOG-ENV 174410SPP.GPJ HC_CORP.GDT 2/23/09

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. HS = High Sheen; MS = Moderate Sheen; SS = Slight Sheen; NS = No Sheen

HARTCROWSER

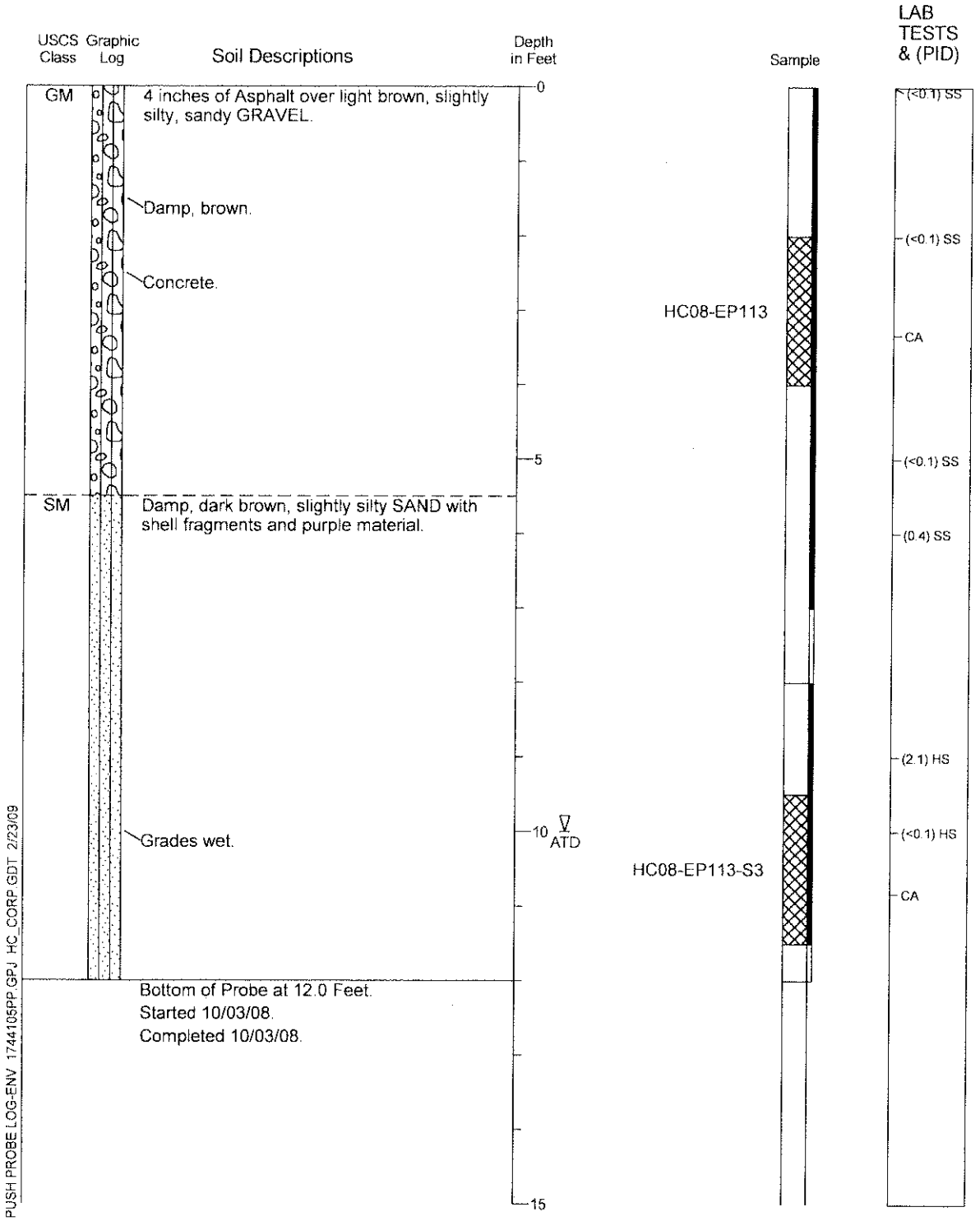
17441-05 *10/08*

Figure A-7

Push Probe Log HC08-EP113

Location: N 715584.28 E 1166891.2
Approximate Ground Surface Elevation: 19.63 Feet
Horizontal Datum: NAD 83/07
Vertical Datum: MLLW

Drill Equipment: Push Probe
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: A. Goodwin/K. Reinauer Reviewed By: G. Both



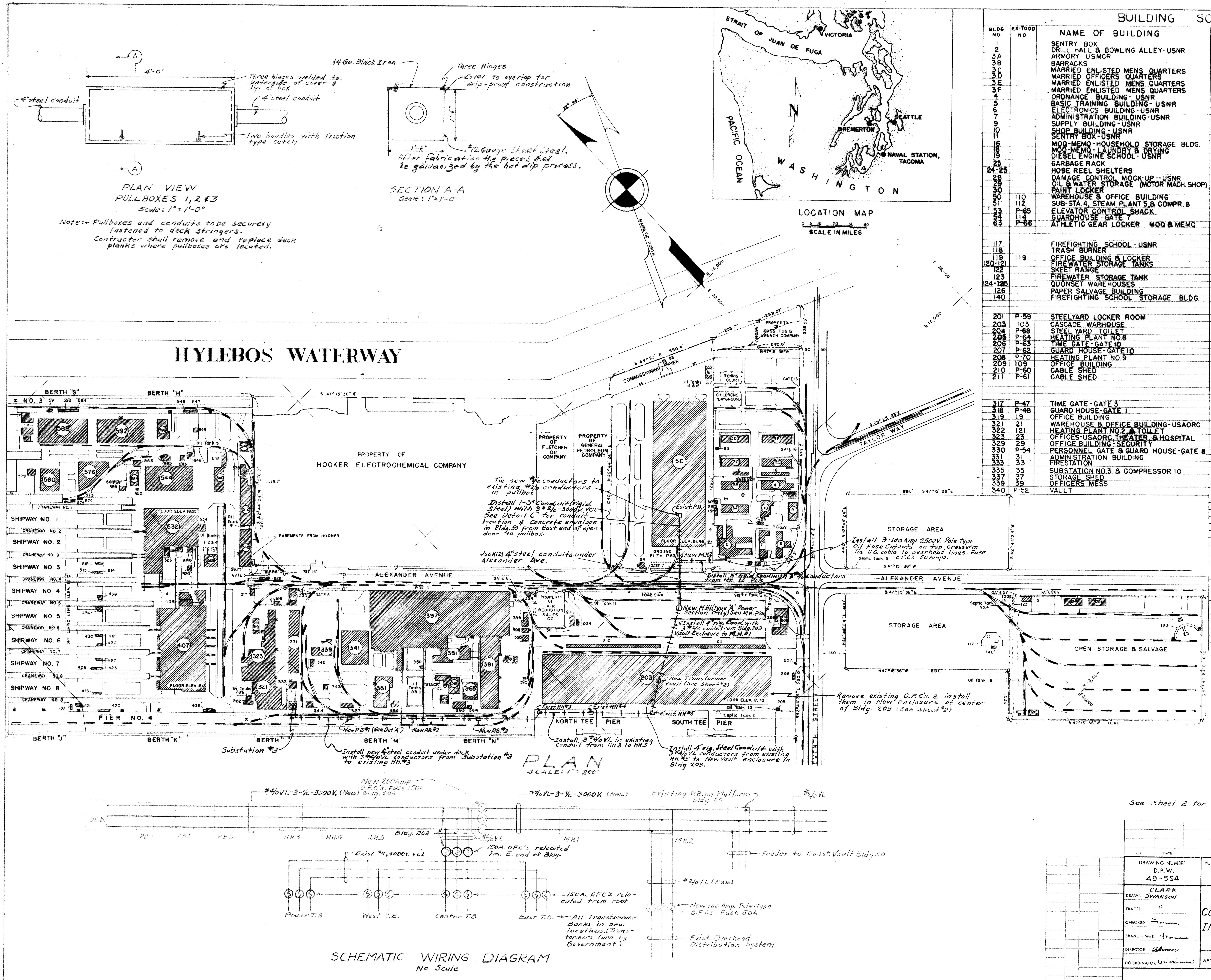
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. HS = High Sheen; MS = Moderate Sheen; SS = Slight Sheen; NS = No Sheen

HARTCROWSER

17441-05 10/08

Figure A-15

APPENDIX C
NAVY DRAWING



BUILDING SCHEDULE

BLDG NO.	EX-TODD NO.	NAME OF BUILDING
1		SENTRY BOX
2		DRILL HALL & BOWLING ALLEY-USNR
3A		ARMORY-USMCR
3B		BARRACKS
3C		MARRIED ENLISTED MENS QUARTERS
3D		MARRIED OFFICERS QUARTERS
3E		MARRIED ENLISTED MENS QUARTERS
3F		MARRIED ENLISTED MENS QUARTERS
4		ORDNANCE BUILDING-USNR
5		BASIC TRAINING BUILDING-USNR
6		ELECTRONICS BUILDING-USNR
7		ADMINISTRATION BUILDING-USNR
9		SUPPLY BUILDING-USNR
10		SHOP BUILDING-USNR
11		SENTRY BOX-USNR
16		MOQ-MEMQ-HOUSEHOLD STORAGE BLDG.
18		MOQ-MEMQ-LAUNDRY & DRYING
19		DIESEL ENGINE SCHOOL-USNR
23		GARBAGE RACK
24-25		HOSE REEL SHELTERS
28		DAMAGE CONTROL MOCK-UP--USNR
29		OIL & WATER STORAGE (MOTOR MACH. SHOP)
30		PAINT LOCKER
50	110	WAREHOUSE & OFFICE BUILDING
51	112	SUB-STA.4, STEAM PLANT 5,8, COMPR. 8
53	P-65	ELEVATOR CONTROL SHACK
54	114	GUARDHOUSE-GATE 7
63	P-66	ATHLETIC GEAR LOCKER MOQ & MEMQ
117		FIREFIGHTING SCHOOL-USNR
118		TRASH BURNER
119	119	OFFICE BUILDING & LOCKER
120-121		FIREWATER STORAGE TANKS
122		SKEET RANGE
123		FIREWATER STORAGE TANK
124+125		QUONSET WAREHOUSES
126		PAPER SALVAGE BUILDING
140		FIREFIGHTING SCHOOL STORAGE BLDG.
201	P-59	STEELYARD LOCKER ROOM
203	103	CASCADE WARHOUSE
204	P-68	STEEL YARD TOILET
205	P-64	HEATING PLANT NO.8
206	P-63	TIME GATE-GATE 10
207	P-62	GUARD HOUSE-GATE 10
208	P-70	HEATING PLANT NO.9
209	109	OFFICE BUILDING
210	P-60	CABLE SHED
211	P-61	CABLE SHED
317	P-47	TIME GATE-GATE 3
318	P-48	GUARD HOUSE-GATE 1
319	19	OFFICE BUILDING
321	21	WAREHOUSE & OFFICE BUILDING-USAORC
322	121	HEATING PLANT NO.2 & TOILET
323	23	OFFICES-USAORC, THEATER, & HOSPITAL
329	29	OFFICE BUILDING-SECURITY
330	P-54	PERSONNEL GATE & GUARD HOUSE-GATE 8
331	31	ADMINISTRATION BUILDING
333	33	FIRESTATION
335	35	SUBSTATION NO.3 & COMPRESSOR 10
337	37	STORAGE SHED
339	39	OFFICERS MESS
340	P-52	VAULT

BLDG NO.	EX-TODD NO.	NAME OF BUILDING
341	41	MACHINE SHOP
343	43	ACETYLENE GENERATOR HOUSE
344	P-69	SUBSTATION 3-A
350	P-50	COMPRESSOR SHED NO.12
351	51	RECREATION BUILDING
356	P-49	TRANSFORMER & SWITCH SHED
361	61	HEATING PLANT NO.3 & PAINT LOCKER
362		ELEVATED WATER TANK
363	63	STORAGE SHED
364	P-55	MOTOR GENERATOR HOUSE
365	65	VAULT & PAINT STORAGE
381	81	SHOP BUILDING-RIGGERS LOFT
390		INFLAMMABLE STORAGE BUILDING
391	91	PUBLIC WORKS SHOP BUILDING
392	P-57	GUARD HOUSE-GATE 6
393	93	SERVICE STATION & GREASE RACKS
394	P-58	TIME GATE-GATE 6
395	95	OFFICE BUILDING
397	97	WAREHOUSE
398	P-56	OFFICE BUILDING
399	99	OFFICE BUILDING
406	P-45	TOILET BUILDING
407	7	STEEL SHED "B"
409	9	WASH ROOM
411	11	SUB STATION NO.2
420	P-37	TRANSFORMER SHED & COMPR. NO.9
421	P-35	TOILET BUILDING
422	P-36	TOILET BUILDING
423	P-34	TOOL ROOM
425	P-32	SWITCH & TRANSFORMER SHED
426		COMPRESSOR SHED
427	P-31	TOOL ROOM
430	P-28	TOOL ROOM
431	P-27	LOCKER ROOM
436	P-24	TOOL ROOM
439	P-21	TOOL ROOM
510	10	RESTAURANT
512	12	SHIP SERVICE, OFFICES & HEATING PLT. 4
513	P-19	COMPRESSOR SHED NO.6
514	P-19	TRANSFORMER & SWITCH SHED
515	P-18	TOOL ROOM & OFFICE
520	20	ASSEMBLY BUILDING
523	P-53	OFFICE BUILDING
524	24	OFFICE BUILDING
525	25	GUARD HOUSE-GATE 5
526	26	BENDING FURNACE
529		CENTRAL HEATING PLANT
532	32	STEEL SHED "A"
534	34	ACETYLENE SHOP
538	38	OFFICE BUILDING
540	40	OFFICE BUILDING & HOSPITAL-USAORC
541		ELEVATED WATER TANK
542	42	SHED GARAGE
544	44	MOLD LOFT-USAORC
545	P-42	TOILET BUILDING
546	46	HEATING PLANT NO.1
547	98	SWITCH & TRANSFORMER SHED
548	48	ACETYLENE GENERATOR BUILDING
549	98	COMPRESSOR SHED NO.5
550	50	FIRE CART SHED
552	52	PIPE SHOP
554	54	TOOL ROOM
556	56	SUBSTATION NO.1
558	58	OIL STORAGE SHED
568	68	GRINDING SHED
573	P-12	TOILET BUILDING
574	P-9	TRANSFORMER SHED
575	P-13	TOILET BUILDING
576	76	RIGGERS & SAILMAKERS LOFT-USAORC
579	P-7	STORAGE SHED
580	80	WAREHOUSE & OFFICES
582	P-10	TRANSFORMER SHELTER
583	P-11	COMPRESSOR SHED NO.1
584	P-8	COMPRESSOR SHED NO.2
585	P-8	TRANSFORMER & SWITCH SHED
586	86	SUBSTATION NO.5
587	P-5	TRANSFORMER & SWITCH SHED
588	88	SHOP BUILDING
589	P-5	COMPRESSOR SHED NO.3
590	P-6	OFFICE & COMPRESSOR SHED
591	P-4	TOILET BUILDING
592	92	OFFICE & WAREHOUSE-USAORC
593	P-3	TRANSFORMER & COMPRESSOR NO.4 SHED
594	P-2	TOILET BUILDING
596	96	PAINT SHOP
597		BOAT POOL

See Sheet 2 for CONSTRUCTION NOTES

REV.	DATE	DESCRIPTION	BY

ISSUE	NO.	TO	DATE

DRAWING NUMBER D.P.W. 49-594

PUBLIC WORKS DEPT. — DISTRICT HEADQUARTERS
THIRTEENTH NAVAL DISTRICT
SEATTLE, WASHINGTON

DRAWN: CLARK SWANSON
TRACED: "
CHECKED: Fromme.
BRANCH MGR.: Fromme.
DIRECTOR: Falconer
COORDINATOR: Williams

U.S. NAVAL STATION
TACOMA, WASHINGTON
CONSOLIDATION OF ELECTRICAL METERS
INSTALLATION OF 2400 VOLT FEEDERS
LOCATION PLAN & DIAGRAM

APPROVED: A C Richards, PUBLIC WORKS OFFICER — DATE 27 Dec 1949

SCALE: AS NOTED — SPEC. NO. 23188
Y. & D. DRAWING NO. 471,399
SHEET 1 OF 2

CONT. NOY 19502

FP-6152-12_000E1 14-21-450

AS BUILT PRINT RICL

APPENDIX D
CHEMICAL DATA QUALITY REVIEW AND LABORATORY REPORTS

APPENDIX D
CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS

Chemical Data Quality Review for UST N-6

Four soil samples and four water samples were collected on September 22, 2010. The samples were submitted to OnSite Environmental Inc., of Redmond, Washington, for chemical analysis. The sample results were reported as Laboratory Reference No. 1009-249.

The water and soil samples were analyzed for the following:

- Gasoline range organics by Washington State Department of Ecology (Ecology) method NWTPH-Gx;
- Volatile organic compounds (VOCs) by EPA Method 8260; and
- Diesel- and lube oil-range organics by Ecology method NWTPH-Dx with Acid/Silica Gel Cleanup.

Quality assurance/quality control (QA/QC) reviews of laboratory procedures were performed on an ongoing basis by the laboratories. Hart Crowser performed the data review, using laboratory quality control results summary sheets, to ensure they met data quality objectives for the project. The following criteria were evaluated in the standard data quality review process:

- Holding times;
- Method blanks;
- Surrogate recoveries;
- Laboratory control sample (LCS) recoveries;
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries;
- Laboratory duplicate relative percent differences (RPDs); and
- Reporting limits (RL).

The data were determined to be acceptable for use without qualification. Full laboratory results are presented at the end of this memo. Results of the data reviews follow.

Soil Samples

Gasoline by NWTPH-Gx

The required holding times were met. Reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. Laboratory duplicate RPDs were not applicable as the sample and duplicate were non-detect.

The laboratory noted that the chromatograms for samples HC-N6-2-S3 and HC-N6-3-S3 were not similar to a typical gasoline. No results were qualified.

VOCs by EPA 8260

The required holding times were met. Reporting limits were acceptable. No method blank contamination was detected. Surrogate and LCS recoveries were within laboratory control limits.

Diesel and Lube Oil by NWTPH-Dx

The required holding times were met. Reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within method control limits. Laboratory duplicate RPDs were not applicable as the sample and duplicate were non-detect.

Water Samples

Gasoline by NWTPH-Gx

The required holding times were met. Reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. Laboratory duplicate RPDs were not applicable as the sample and duplicate were non-detect.

The laboratory noted that the chromatograms for samples HC-N6-1 GW, HC-N6-2 GW, HC-N6-3 GW, and HC-N6-4 GW were not similar to a typical gasoline. No results were qualified.

VOCs by EPA 8260

The required holding times were met. No method blank contamination was detected. Surrogate and LCS recoveries were within laboratory control limits.

The reporting limits were elevated for samples HC-N6-1 GW, HC-N6-2 GW, HC-N6-3 GW, and HC-N6-4 GW due to sample dilutions as a result of high levels of target analytes.

Diesel and Lube Oil by NWTPH-Dx

The required holding times were met. No method blank contamination was detected. Surrogate recoveries were within method control limits. Laboratory duplicate RPDs were not applicable as the sample and duplicate were non-detect.

The reporting limit for diesel is elevated in samples HC-N6-1 GW, HC-N6-2 GW, HC-N6-3 GW, HC-N6-4 GW, and HC-N6-4 GW duplicate due to interferences in the samples.

J:\Jobs\1758100\Phase 23 N-6\Summary Report\UST N-6 Summary Report.doc

ONSITE ENVIRONMENTAL INC.
LABORATORY REPORTS

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 1, 2010

Colleen Rust
Hart Crowser, Inc.
1700 Westlake Avenue North, Suite 200
Seattle, WA 98109-3056

Re: Analytical Data for Project 17581-00 23
Laboratory Reference No. 1009-249

Dear Colleen:

Enclosed are the analytical results and associated quality control data for samples submitted on September 23, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

Case Narrative

Samples were collected on September 22, 2010 and received by the laboratory on September 23, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

NWTPH Gx (water) Analysis

The chromatograms for samples HC-N6-1 GW, HC-N6-2 GW, HC-N6-3 GW, and HC-N6-4 GW are not similar to a typical gas.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

NWTPH Gx (soil) Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7°C and -20°C until extraction or analysis.

The chromatograms for samples HC-N6-2-S3 and HC-N6-3-S3 are not similar to a typical gas.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Volatiles EPA 8260B (soil) Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7°C and -20°C until extraction or analysis.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N6-1 GW**					
Laboratory ID:	09-249-01					
Gasoline	**8700**	100	NWTPH-Gx	9-27-10	9-27-10	T
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*95*	*74-121*				
Client ID:	**HC-N6-2 GW**					
Laboratory ID:	09-249-02					
Gasoline	**5500**	100	NWTPH-Gx	9-27-10	9-27-10	T
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*74-121*				
Client ID:	**HC-N6-3 GW**					
Laboratory ID:	09-249-03					
Gasoline	**6700**	100	NWTPH-Gx	9-27-10	9-27-10	T
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*74-121*				
Client ID:	**HC-N6-4 GW**					
Laboratory ID:	09-249-04					
Gasoline	**8600**	100	NWTPH-Gx	9-27-10	9-27-10	T
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*94*	*74-121*				

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0927W1					
Gasoline	**ND**	100	NWTPH-Gx	9-27-10	9-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*95*	*74-121*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	09-259-03										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*92*	*92*	*74-121*			

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

NWTPH-Gx

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N6-1-S3**					
Laboratory ID:	09-249-05					
Gasoline	**ND**	7.6	NWTPH-Gx	9-27-10	9-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*98*	*55-127*				
Client ID:	**HC-N6-2-S3**					
Laboratory ID:	09-249-06					
Gasoline	**14**	6.7	NWTPH-Gx	9-27-10	9-27-10	T
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*98*	*55-127*				
Client ID:	**HC-N6-3-S3**					
Laboratory ID:	09-249-07					
Gasoline	**6.6**	6.0	NWTPH-Gx	9-27-10	9-28-10	T
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*92*	*55-127*				
Client ID:	**HC-N6-4-S3**					
Laboratory ID:	09-249-08					
Gasoline	**ND**	6.2	NWTPH-Gx	9-27-10	9-28-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*91*	*55-127*				

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

NWTPH-Gx
QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0927S2					
Gasoline	**ND**	5.0	NWTPH-Gx	9-27-10	9-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*91*	*55-127*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	09-282-03										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*98*	*99*	*55-127*			

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

NWTPH-Dx
(with acid/silica gel clean-up)

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N6-1 GW**					
Laboratory ID:	09-249-01					
Diesel Range Organics	**ND**	1.7	NWTPH-Dx	9-29-10	9-29-10	U1
Lube Oil Range Organics	**ND**	0.42	NWTPH-Dx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*90*	*50-150*				
Client ID:	**HC-N6-2 GW**					
Laboratory ID:	09-249-02					
Diesel Range Organics	**ND**	0.75	NWTPH-Dx	9-29-10	9-29-10	U1
Lube Oil Range Organics	**ND**	0.42	NWTPH-Dx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*83*	*50-150*				
Client ID:	**HC-N6-3 GW**					
Laboratory ID:	09-249-03					
Diesel Range Organics	**ND**	1.2	NWTPH-Dx	9-29-10	9-29-10	U1
Lube Oil Range Organics	**ND**	0.43	NWTPH-Dx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*89*	*50-150*				
Client ID:	**HC-N6-4 GW**					
Laboratory ID:	09-249-04					
Diesel Range Organics	**ND**	2.1	NWTPH-Dx	9-29-10	9-29-10	U1
Lube Oil Range Organics	**ND**	0.42	NWTPH-Dx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*93*	*50-150*				

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

NWTPH-Dx
QUALITY CONTROL
(with acid/silica gel clean-up)

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0929W1					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	9-29-10	9-29-10	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*89*	*50-150*				

Analyte	Result		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-249-04							
	ORIG	DUP						
Diesel Range Organics	**ND**	**ND**				NA	NA	U1
Lube Oil Range Organics	**ND**	**ND**				NA	NA	
Surrogate:								
o-Terphenyl			*93*	*91*	*50-150*			

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

NWTPH-Dx
(with acid/silica gel clean-up)

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N6-1-S3**					
Laboratory ID:	09-249-05					
Diesel Range Organics	**ND**	31	NWTPH-Dx	9-29-10	9-29-10	
Lube Oil Range Organics	**ND**	62	NWTPH-Dx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*77*	*50-150*				
Client ID:	**HC-N6-2-S3**					
Laboratory ID:	09-249-06					
Diesel Range Organics	**ND**	30	NWTPH-Dx	9-29-10	9-29-10	
Lube Oil Range Organics	**ND**	60	NWTPH-Dx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*72*	*50-150*				
Client ID:	**HC-N6-3-S3**					
Laboratory ID:	09-249-07					
Diesel Range Organics	**ND**	29	NWTPH-Dx	9-29-10	9-29-10	
Lube Oil Range Organics	**ND**	59	NWTPH-Dx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*93*	*50-150*				
Client ID:	**HC-N6-4-S3**					
Laboratory ID:	09-249-08					
Diesel Range Organics	**ND**	30	NWTPH-Dx	9-29-10	9-29-10	
Lube Oil Range Organics	**ND**	59	NWTPH-Dx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*87*	*50-150*				

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

NWTPH-Dx
QUALITY CONTROL
(with acid/silica gel clean-up)

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0929S1					
Diesel Range Organics	**ND**	25	NWTPH-Dx	9-29-10	9-29-10	
Lube Oil Range Organics	**ND**	50	NWTPH-Dx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*93*	*50-150*				

Analyte	Result		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-257-01							
	ORIG	DUP						
Diesel Range Organics	**ND**	**ND**				NA	NA	
Lube Oil Range Organics	**ND**	**ND**				NA	NA	
Surrogate:								
o-Terphenyl			*112*	*105*	*50-150*			

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-29-10
Date Analyzed:	9-29-10
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-249-01
Client ID:	**HC-N6-1 GW**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		500
Chloromethane	ND		2500
Vinyl Chloride	ND		500
Bromomethane	ND		500
Chloroethane	ND		2500
Trichlorofluoromethane	ND		500
1,1-Dichloroethene	ND		500
Acetone	ND		13000
Iodomethane	ND		2500
Carbon Disulfide	ND		500
Methylene Chloride	ND		5000
(trans) 1,2-Dichloroethene	ND		500
Methyl t-Butyl Ether	ND		500
1,1-Dichloroethane	ND		500
Vinyl Acetate	ND		5000
2,2-Dichloropropane	ND		500
(cis) 1,2-Dichloroethene	500		500
2-Butanone	ND		13000
Bromochloromethane	ND		500
Chloroform	ND		500
1,1,1-Trichloroethane	ND		500
Carbon Tetrachloride	ND		500
1,1-Dichloropropene	ND		500
Benzene	ND		500
1,2-Dichloroethane	ND		500
Trichloroethene	1600		500
1,2-Dichloropropane	ND		500
Dibromomethane	ND		500
Bromodichloromethane	ND		500
2-Chloroethyl Vinyl Ether	ND		2500
(cis) 1,3-Dichloropropene	ND		500
Methyl Isobutyl Ketone	ND		5000
Toluene	ND		2500
(trans) 1,3-Dichloropropene	ND		500

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-249-01
Client ID: HC-N6-1 GW

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		500
Tetrachloroethene	47000		500
1,3-Dichloropropane	ND		500
2-Hexanone	ND		5000
Dibromochloromethane	ND		500
1,2-Dibromoethane	ND		500
Chlorobenzene	ND		500
1,1,1,2-Tetrachloroethane	ND		500
Ethylbenzene	ND		500
m,p-Xylene	ND		1000
o-Xylene	ND		500
Styrene	ND		500
Bromoform	ND		2500
Isopropylbenzene	ND		500
Bromobenzene	ND		500
1,1,2,2-Tetrachloroethane	ND		500
1,2,3-Trichloropropane	ND		500
n-Propylbenzene	ND		500
2-Chlorotoluene	ND		500
4-Chlorotoluene	ND		500
1,3,5-Trimethylbenzene	ND		500
tert-Butylbenzene	ND		500
1,2,4-Trimethylbenzene	ND		500
sec-Butylbenzene	ND		500
1,3-Dichlorobenzene	ND		500
p-Isopropyltoluene	ND		500
1,4-Dichlorobenzene	ND		500
1,2-Dichlorobenzene	ND		500
n-Butylbenzene	ND		500
1,2-Dibromo-3-chloropropane	ND		2500
1,2,4-Trichlorobenzene	ND		500
Hexachlorobutadiene	ND		500
Naphthalene	ND		2500
1,2,3-Trichlorobenzene	ND		500

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	85	71-126
Toluene-d8	89	76-116
4-Bromofluorobenzene	91	70-123

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-29-10
Date Analyzed:	9-29-10
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-249-02
Client ID:	**HC-N6-2 GW**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		50
Chloromethane	ND		250
Vinyl Chloride	ND		50
Bromomethane	ND		50
Chloroethane	ND		250
Trichlorofluoromethane	ND		50
1,1-Dichloroethene	ND		50
Acetone	ND		1300
Iodomethane	ND		250
Carbon Disulfide	ND		50
Methylene Chloride	ND		500
(trans) 1,2-Dichloroethene	ND		50
Methyl t-Butyl Ether	ND		50
1,1-Dichloroethane	ND		50
Vinyl Acetate	ND		500
2,2-Dichloropropane	ND		50
(cis) 1,2-Dichloroethene	180		50
2-Butanone	ND		1300
Bromochloromethane	ND		50
Chloroform	ND		50
1,1,1-Trichloroethane	ND		50
Carbon Tetrachloride	ND		50
1,1-Dichloropropene	ND		50
Benzene	ND		50
1,2-Dichloroethane	ND		50
Trichloroethene	1100		50
1,2-Dichloropropane	ND		50
Dibromomethane	ND		50
Bromodichloromethane	ND		50
2-Chloroethyl Vinyl Ether	ND		250
(cis) 1,3-Dichloropropene	ND		50
Methyl Isobutyl Ketone	ND		500
Toluene	ND		250
(trans) 1,3-Dichloropropene	ND		50

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-249-02
Client ID: HC-N6-2 GW

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		50
Tetrachloroethene	8200		50
1,3-Dichloropropane	ND		50
2-Hexanone	ND		500
Dibromochloromethane	ND		50
1,2-Dibromoethane	ND		50
Chlorobenzene	ND		50
1,1,1,2-Tetrachloroethane	ND		50
Ethylbenzene	ND		50
m,p-Xylene	ND		100
o-Xylene	ND		50
Styrene	ND		50
Bromoform	ND		250
Isopropylbenzene	ND		50
Bromobenzene	ND		50
1,1,2,2-Tetrachloroethane	ND		50
1,2,3-Trichloropropane	ND		50
n-Propylbenzene	ND		50
2-Chlorotoluene	ND		50
4-Chlorotoluene	ND		50
1,3,5-Trimethylbenzene	ND		50
tert-Butylbenzene	ND		50
1,2,4-Trimethylbenzene	ND		50
sec-Butylbenzene	ND		50
1,3-Dichlorobenzene	ND		50
p-Isopropyltoluene	ND		50
1,4-Dichlorobenzene	ND		50
1,2-Dichlorobenzene	ND		50
n-Butylbenzene	ND		50
1,2-Dibromo-3-chloropropane	ND		250
1,2,4-Trichlorobenzene	ND		50
Hexachlorobutadiene	ND		50
Naphthalene	ND		250
1,2,3-Trichlorobenzene	ND		50

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	87	71-126
Toluene-d8	90	76-116
4-Bromofluorobenzene	89	70-123

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-29-10
Date Analyzed:	9-29-10
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-249-03
Client ID:	**HC-N6-3 GW**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		60
Chloromethane	ND		300
Vinyl Chloride	ND		60
Bromomethane	ND		60
Chloroethane	ND		300
Trichlorofluoromethane	ND		60
1,1-Dichloroethene	ND		60
Acetone	ND		1500
Iodomethane	ND		300
Carbon Disulfide	ND		60
Methylene Chloride	ND		600
(trans) 1,2-Dichloroethene	ND		60
Methyl t-Butyl Ether	ND		60
1,1-Dichloroethane	ND		60
Vinyl Acetate	ND		600
2,2-Dichloropropane	ND		60
(cis) 1,2-Dichloroethene	ND		60
2-Butanone	ND		1500
Bromochloromethane	ND		60
Chloroform	ND		60
1,1,1-Trichloroethane	ND		60
Carbon Tetrachloride	ND		60
1,1-Dichloropropene	ND		60
Benzene	ND		60
1,2-Dichloroethane	ND		60
Trichloroethene	1100		60
1,2-Dichloropropane	ND		60
Dibromomethane	ND		60
Bromodichloromethane	ND		60
2-Chloroethyl Vinyl Ether	ND		300
(cis) 1,3-Dichloropropene	ND		60
Methyl Isobutyl Ketone	ND		600
Toluene	ND		300
(trans) 1,3-Dichloropropene	ND		60

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-249-03
Client ID: HC-N6-3 GW

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		60
Tetrachloroethene	11000		60
1,3-Dichloropropane	ND		60
2-Hexanone	ND		600
Dibromochloromethane	ND		60
1,2-Dibromoethane	ND		60
Chlorobenzene	ND		60
1,1,1,2-Tetrachloroethane	ND		60
Ethylbenzene	ND		60
m,p-Xylene	ND		120
o-Xylene	ND		60
Styrene	ND		60
Bromoform	ND		300
Isopropylbenzene	ND		60
Bromobenzene	ND		60
1,1,2,2-Tetrachloroethane	ND		60
1,2,3-Trichloropropane	ND		60
n-Propylbenzene	ND		60
2-Chlorotoluene	ND		60
4-Chlorotoluene	ND		60
1,3,5-Trimethylbenzene	ND		60
tert-Butylbenzene	ND		60
1,2,4-Trimethylbenzene	ND		60
sec-Butylbenzene	ND		60
1,3-Dichlorobenzene	ND		60
p-Isopropyltoluene	ND		60
1,4-Dichlorobenzene	ND		60
1,2-Dichlorobenzene	ND		60
n-Butylbenzene	ND		60
1,2-Dibromo-3-chloropropane	ND		300
1,2,4-Trichlorobenzene	ND		60
Hexachlorobutadiene	ND		60
Naphthalene	ND		300
1,2,3-Trichlorobenzene	ND		60

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	90	71-126
Toluene-d8	92	76-116
4-Bromofluorobenzene	91	70-123

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-29-10
Date Analyzed:	9-29-10
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-249-04
Client ID:	**HC-N6-4 GW**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		100
Chloromethane	ND		500
Vinyl Chloride	ND		100
Bromomethane	ND		100
Chloroethane	ND		500
Trichlorofluoromethane	ND		100
1,1-Dichloroethene	ND		100
Acetone	ND		2500
Iodomethane	ND		500
Carbon Disulfide	ND		100
Methylene Chloride	ND		1000
(trans) 1,2-Dichloroethene	ND		100
Methyl t-Butyl Ether	ND		100
1,1-Dichloroethane	ND		100
Vinyl Acetate	ND		1000
2,2-Dichloropropane	ND		100
(cis) 1,2-Dichloroethene	280		100
2-Butanone	ND		2500
Bromochloromethane	ND		100
Chloroform	ND		100
1,1,1-Trichloroethane	ND		100
Carbon Tetrachloride	ND		100
1,1-Dichloropropene	ND		100
Benzene	ND		100
1,2-Dichloroethane	ND		100
Trichloroethene	1800		100
1,2-Dichloropropane	ND		100
Dibromomethane	ND		100
Bromodichloromethane	ND		100
2-Chloroethyl Vinyl Ether	ND		500
(cis) 1,3-Dichloropropene	ND		100
Methyl Isobutyl Ketone	ND		1000
Toluene	ND		500
(trans) 1,3-Dichloropropene	ND		100

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-249-04
Client ID: HC-N6-4 GW

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		100
Tetrachloroethene	17000		100
1,3-Dichloropropane	ND		100
2-Hexanone	ND		1000
Dibromochloromethane	ND		100
1,2-Dibromoethane	ND		100
Chlorobenzene	ND		100
1,1,1,2-Tetrachloroethane	ND		100
Ethylbenzene	ND		100
m,p-Xylene	ND		200
o-Xylene	ND		100
Styrene	ND		100
Bromoform	ND		500
Isopropylbenzene	ND		100
Bromobenzene	ND		100
1,1,2,2-Tetrachloroethane	ND		100
1,2,3-Trichloropropane	ND		100
n-Propylbenzene	ND		100
2-Chlorotoluene	ND		100
4-Chlorotoluene	ND		100
1,3,5-Trimethylbenzene	ND		100
tert-Butylbenzene	ND		100
1,2,4-Trimethylbenzene	ND		100
sec-Butylbenzene	ND		100
1,3-Dichlorobenzene	ND		100
p-Isopropyltoluene	ND		100
1,4-Dichlorobenzene	ND		100
1,2-Dichlorobenzene	ND		100
n-Butylbenzene	ND		100
1,2-Dibromo-3-chloropropane	ND		500
1,2,4-Trichlorobenzene	ND		100
Hexachlorobutadiene	ND		100
Naphthalene	ND		500
1,2,3-Trichlorobenzene	ND		100

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	86	71-126
Toluene-d8	84	76-116
4-Bromofluorobenzene	82	70-123

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted: 9-29-10
Date Analyzed: 9-29-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0929W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Acetone	ND		5.0
Iodomethane	ND		1.0
Carbon Disulfide	ND		0.20
Methylene Chloride	ND		2.0
(trans) 1,2-Dichloroethene	ND		0.20
Methyl t-Butyl Ether	ND		0.20
1,1-Dichloroethane	ND		0.20
Vinyl Acetate	ND		2.0
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
2-Butanone	ND		5.0
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
Benzene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
Methyl Isobutyl Ketone	ND		2.0
Toluene	ND		1.0
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0929W1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
2-Hexanone	ND		2.0
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Ethylbenzene	ND		0.20
m,p-Xylene	ND		0.40
o-Xylene	ND		0.20
Styrene	ND		0.20
Bromoform	ND		1.0
Isopropylbenzene	ND		0.20
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
n-Propylbenzene	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3,5-Trimethylbenzene	ND		0.20
tert-Butylbenzene	ND		0.20
1,2,4-Trimethylbenzene	ND		0.20
sec-Butylbenzene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
p-Isopropyltoluene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
n-Butylbenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
Naphthalene	ND		1.0
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	88	71-126
Toluene-d8	91	76-116
4-Bromofluorobenzene	92	70-123

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 9-29-10
Date Analyzed: 9-29-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0929W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	10.0	8.40	84	8.69	87	70-130	
Benzene	10.0	9.35	94	9.69	97	73-130	
Trichloroethene	10.0	9.65	97	9.48	95	79-122	
Toluene	10.0	9.78	98	9.90	99	80-121	
Chlorobenzene	10.0	10.0	100	10.2	102	83-116	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	3	15	
Benzene	4	14	
Trichloroethene	2	14	
Toluene	1	13	
Chlorobenzene	2	13	

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-28-10
Date Analyzed:	9-28-10
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	09-249-05
Client ID:	**HC-N6-1-S3**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0013
Chloromethane	ND		0.0063
Vinyl Chloride	ND		0.0013
Bromomethane	ND		0.0013
Chloroethane	ND		0.0063
Trichlorofluoromethane	ND		0.0013
1,1-Dichloroethene	ND		0.0013
Acetone	ND		0.013
Iodomethane	ND		0.0063
Carbon Disulfide	ND		0.0013
Methylene Chloride	ND		0.0063
(trans) 1,2-Dichloroethene	ND		0.0013
Methyl t-Butyl Ether	ND		0.0013
1,1-Dichloroethane	ND		0.0013
Vinyl Acetate	ND		0.0063
2,2-Dichloropropane	ND		0.0013
(cis) 1,2-Dichloroethene	0.0043		0.0013
2-Butanone	ND		0.0063
Bromochloromethane	ND		0.0013
Chloroform	ND		0.0013
1,1,1-Trichloroethane	ND		0.0013
Carbon Tetrachloride	ND		0.0013
1,1-Dichloropropene	ND		0.0013
Benzene	ND		0.0013
1,2-Dichloroethane	ND		0.0013
Trichloroethene	0.011		0.0013
1,2-Dichloropropane	ND		0.0013
Dibromomethane	ND		0.0013
Bromodichloromethane	ND		0.0013
2-Chloroethyl Vinyl Ether	ND		0.0063
(cis) 1,3-Dichloropropene	ND		0.0013
Methyl Isobutyl Ketone	ND		0.0063
Toluene	ND		0.0063
(trans) 1,3-Dichloropropene	ND		0.0013

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-249-05
Client ID: HC-N6-1-S3

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0013
Tetrachloroethene	0.18		0.0013
1,3-Dichloropropane	ND		0.0013
2-Hexanone	ND		0.0063
Dibromochloromethane	ND		0.0013
1,2-Dibromoethane	ND		0.0013
Chlorobenzene	ND		0.0013
1,1,1,2-Tetrachloroethane	ND		0.0013
Ethylbenzene	ND		0.0013
m,p-Xylene	ND		0.0025
o-Xylene	ND		0.0013
Styrene	ND		0.0013
Bromoform	ND		0.0013
Isopropylbenzene	ND		0.0013
Bromobenzene	ND		0.0013
1,1,2,2-Tetrachloroethane	ND		0.0013
1,2,3-Trichloropropane	ND		0.0013
n-Propylbenzene	ND		0.0013
2-Chlorotoluene	ND		0.0013
4-Chlorotoluene	ND		0.0013
1,3,5-Trimethylbenzene	ND		0.0013
tert-Butylbenzene	ND		0.0013
1,2,4-Trimethylbenzene	ND		0.0013
sec-Butylbenzene	ND		0.0013
1,3-Dichlorobenzene	ND		0.0013
p-Isopropyltoluene	ND		0.0013
1,4-Dichlorobenzene	ND		0.0013
1,2-Dichlorobenzene	ND		0.0013
n-Butylbenzene	ND		0.0013
1,2-Dibromo-3-chloropropane	ND		0.0063
1,2,4-Trichlorobenzene	ND		0.0013
Hexachlorobutadiene	ND		0.0063
Naphthalene	ND		0.0013
1,2,3-Trichlorobenzene	ND		0.0013

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	100	66-128
Toluene-d8	104	68-126
4-Bromofluorobenzene	92	53-134

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-28-10
Date Analyzed:	9-28-10
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	09-249-06
Client ID:	**HC-N6-2-S3**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.0013
Chloromethane	ND		0.0065
Vinyl Chloride	ND		0.0013
Bromomethane	ND		0.0013
Chloroethane	ND		0.0065
Trichlorofluoromethane	ND		0.0013
1,1-Dichloroethene	ND		0.0013
Acetone	ND		0.013
Iodomethane	ND		0.0065
Carbon Disulfide	0.041		0.0013
Methylene Chloride	ND		0.0065
(trans) 1,2-Dichloroethene	ND		0.0013
Methyl t-Butyl Ether	ND		0.0013
1,1-Dichloroethane	ND		0.0013
Vinyl Acetate	ND		0.0065
2,2-Dichloropropane	ND		0.0013
(cis) 1,2-Dichloroethene	0.038		0.0013
2-Butanone	ND		0.0065
Bromochloromethane	ND		0.0013
Chloroform	ND		0.0013
1,1,1-Trichloroethane	ND		0.0013
Carbon Tetrachloride	ND		0.0013
1,1-Dichloropropene	ND		0.0013
Benzene	ND		0.0013
1,2-Dichloroethane	ND		0.0013
Trichloroethene	0.19		0.0013
1,2-Dichloropropane	ND		0.0013
Dibromomethane	ND		0.0013
Bromodichloromethane	ND		0.0013
2-Chloroethyl Vinyl Ether	ND		0.0065
(cis) 1,3-Dichloropropene	ND		0.0013
Methyl Isobutyl Ketone	ND		0.0065
Toluene	ND		0.0065
(trans) 1,3-Dichloropropene	ND		0.0013

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-249-06
Client ID: HC-N6-2-S3

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0013
Tetrachloroethene	1.5		0.069
1,3-Dichloropropane	ND		0.0013
2-Hexanone	ND		0.0065
Dibromochloromethane	ND		0.0013
1,2-Dibromoethane	ND		0.0013
Chlorobenzene	ND		0.0013
1,1,1,2-Tetrachloroethane	ND		0.0013
Ethylbenzene	ND		0.0013
m,p-Xylene	ND		0.0026
o-Xylene	ND		0.0013
Styrene	ND		0.0013
Bromoform	ND		0.0013
Isopropylbenzene	ND		0.0013
Bromobenzene	ND		0.0013
1,1,2,2-Tetrachloroethane	ND		0.0013
1,2,3-Trichloropropane	ND		0.0013
n-Propylbenzene	ND		0.0013
2-Chlorotoluene	ND		0.0013
4-Chlorotoluene	ND		0.0013
1,3,5-Trimethylbenzene	ND		0.0013
tert-Butylbenzene	ND		0.0013
1,2,4-Trimethylbenzene	ND		0.0013
sec-Butylbenzene	ND		0.0013
1,3-Dichlorobenzene	ND		0.0013
p-Isopropyltoluene	ND		0.0013
1,4-Dichlorobenzene	ND		0.0013
1,2-Dichlorobenzene	ND		0.0013
n-Butylbenzene	ND		0.0013
1,2-Dibromo-3-chloropropane	ND		0.0065
1,2,4-Trichlorobenzene	ND		0.0013
Hexachlorobutadiene	ND		0.0065
Naphthalene	ND		0.0013
1,2,3-Trichlorobenzene	ND		0.0013

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	101	66-128
Toluene-d8	109	68-126
4-Bromofluorobenzene	93	53-134

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-28-10
Date Analyzed:	9-28-10
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	09-249-07
Client ID:	**HC-N6-3-S3**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.0012
Chloromethane	ND		0.0058
Vinyl Chloride	ND		0.0012
Bromomethane	ND		0.0012
Chloroethane	ND		0.0058
Trichlorofluoromethane	ND		0.0012
1,1-Dichloroethene	ND		0.0012
Acetone	ND		0.012
Iodomethane	ND		0.0058
Carbon Disulfide	ND		0.0012
Methylene Chloride	ND		0.0058
(trans) 1,2-Dichloroethene	ND		0.0012
Methyl t-Butyl Ether	ND		0.0012
1,1-Dichloroethane	ND		0.0012
Vinyl Acetate	ND		0.0058
2,2-Dichloropropane	ND		0.0012
(cis) 1,2-Dichloroethene	ND		0.0012
2-Butanone	ND		0.0058
Bromochloromethane	ND		0.0012
Chloroform	ND		0.0012
1,1,1-Trichloroethane	ND		0.0012
Carbon Tetrachloride	ND		0.0012
1,1-Dichloropropene	ND		0.0012
Benzene	ND		0.0012
1,2-Dichloroethane	ND		0.0012
Trichloroethene	0.011		0.0012
1,2-Dichloropropane	ND		0.0012
Dibromomethane	ND		0.0012
Bromodichloromethane	ND		0.0012
2-Chloroethyl Vinyl Ether	ND		0.0058
(cis) 1,3-Dichloropropene	ND		0.0012
Methyl Isobutyl Ketone	ND		0.0058
Toluene	ND		0.0058
(trans) 1,3-Dichloropropene	ND		0.0012

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-249-07
Client ID: HC-N6-3-S3

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0012
Tetrachloroethene	0.14		0.0012
1,3-Dichloropropane	ND		0.0012
2-Hexanone	ND		0.0058
Dibromochloromethane	ND		0.0012
1,2-Dibromoethane	ND		0.0012
Chlorobenzene	ND		0.0012
1,1,1,2-Tetrachloroethane	ND		0.0012
Ethylbenzene	ND		0.0012
m,p-Xylene	ND		0.0023
o-Xylene	ND		0.0012
Styrene	ND		0.0012
Bromoform	ND		0.0012
Isopropylbenzene	ND		0.0012
Bromobenzene	ND		0.0012
1,1,2,2-Tetrachloroethane	ND		0.0012
1,2,3-Trichloropropane	ND		0.0012
n-Propylbenzene	ND		0.0012
2-Chlorotoluene	ND		0.0012
4-Chlorotoluene	ND		0.0012
1,3,5-Trimethylbenzene	ND		0.0012
tert-Butylbenzene	ND		0.0012
1,2,4-Trimethylbenzene	ND		0.0012
sec-Butylbenzene	ND		0.0012
1,3-Dichlorobenzene	ND		0.0012
p-Isopropyltoluene	ND		0.0012
1,4-Dichlorobenzene	ND		0.0012
1,2-Dichlorobenzene	ND		0.0012
n-Butylbenzene	ND		0.0012
1,2-Dibromo-3-chloropropane	ND		0.0058
1,2,4-Trichlorobenzene	ND		0.0012
Hexachlorobutadiene	ND		0.0058
Naphthalene	ND		0.0012
1,2,3-Trichlorobenzene	ND		0.0012

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	105	66-128
Toluene-d8	108	68-126
4-Bromofluorobenzene	105	53-134

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-28-10
Date Analyzed:	9-28-10
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	09-249-08
Client ID:	**HC-N6-4-S3**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0013
Chloromethane	ND		0.0063
Vinyl Chloride	ND		0.0013
Bromomethane	ND		0.0013
Chloroethane	ND		0.0063
Trichlorofluoromethane	ND		0.0013
1,1-Dichloroethene	ND		0.0013
Acetone	ND		0.013
Iodomethane	ND		0.0063
Carbon Disulfide	ND		0.0013
Methylene Chloride	ND		0.0063
(trans) 1,2-Dichloroethene	ND		0.0013
Methyl t-Butyl Ether	ND		0.0013
1,1-Dichloroethane	ND		0.0013
Vinyl Acetate	ND		0.0063
2,2-Dichloropropane	ND		0.0013
(cis) 1,2-Dichloroethene	ND		0.0013
2-Butanone	ND		0.0063
Bromochloromethane	ND		0.0013
Chloroform	ND		0.0013
1,1,1-Trichloroethane	ND		0.0013
Carbon Tetrachloride	ND		0.0013
1,1-Dichloropropene	ND		0.0013
Benzene	ND		0.0013
1,2-Dichloroethane	ND		0.0013
Trichloroethene	0.0085		0.0013
1,2-Dichloropropane	ND		0.0013
Dibromomethane	ND		0.0013
Bromodichloromethane	ND		0.0013
2-Chloroethyl Vinyl Ether	ND		0.0063
(cis) 1,3-Dichloropropene	ND		0.0013
Methyl Isobutyl Ketone	ND		0.0063
Toluene	ND		0.0063
(trans) 1,3-Dichloropropene	ND		0.0013

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-249-08
Client ID: HC-N6-4-S3

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0013
Tetrachloroethene	0.074		0.0013
1,3-Dichloropropane	ND		0.0013
2-Hexanone	ND		0.0063
Dibromochloromethane	ND		0.0013
1,2-Dibromoethane	ND		0.0013
Chlorobenzene	ND		0.0013
1,1,1,2-Tetrachloroethane	ND		0.0013
Ethylbenzene	ND		0.0013
m,p-Xylene	ND		0.0025
o-Xylene	ND		0.0013
Styrene	ND		0.0013
Bromoform	ND		0.0013
Isopropylbenzene	ND		0.0013
Bromobenzene	ND		0.0013
1,1,2,2-Tetrachloroethane	ND		0.0013
1,2,3-Trichloropropane	ND		0.0013
n-Propylbenzene	ND		0.0013
2-Chlorotoluene	ND		0.0013
4-Chlorotoluene	ND		0.0013
1,3,5-Trimethylbenzene	ND		0.0013
tert-Butylbenzene	ND		0.0013
1,2,4-Trimethylbenzene	ND		0.0013
sec-Butylbenzene	ND		0.0013
1,3-Dichlorobenzene	ND		0.0013
p-Isopropyltoluene	ND		0.0013
1,4-Dichlorobenzene	ND		0.0013
1,2-Dichlorobenzene	ND		0.0013
n-Butylbenzene	ND		0.0013
1,2-Dibromo-3-chloropropane	ND		0.0063
1,2,4-Trichlorobenzene	ND		0.0013
Hexachlorobutadiene	ND		0.0063
Naphthalene	ND		0.0013
1,2,3-Trichlorobenzene	ND		0.0013

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	97	66-128
Toluene-d8	103	68-126
4-Bromofluorobenzene	91	53-134

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted: 9-28-10
Date Analyzed: 9-28-10

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0928S1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0010
Chloromethane	ND		0.0050
Vinyl Chloride	ND		0.0010
Bromomethane	ND		0.0010
Chloroethane	ND		0.0050
Trichlorofluoromethane	ND		0.0010
1,1-Dichloroethene	ND		0.0010
Acetone	ND		0.010
Iodomethane	ND		0.0050
Carbon Disulfide	ND		0.0010
Methylene Chloride	ND		0.0050
(trans) 1,2-Dichloroethene	ND		0.0010
Methyl t-Butyl Ether	ND		0.0010
1,1-Dichloroethane	ND		0.0010
Vinyl Acetate	ND		0.0050
2,2-Dichloropropane	ND		0.0010
(cis) 1,2-Dichloroethene	ND		0.0010
2-Butanone	ND		0.0050
Bromochloromethane	ND		0.0010
Chloroform	ND		0.0010
1,1,1-Trichloroethane	ND		0.0010
Carbon Tetrachloride	ND		0.0010
1,1-Dichloropropene	ND		0.0010
Benzene	ND		0.0010
1,2-Dichloroethane	ND		0.0010
Trichloroethene	ND		0.0010
1,2-Dichloropropane	ND		0.0010
Dibromomethane	ND		0.0010
Bromodichloromethane	ND		0.0010
2-Chloroethyl Vinyl Ether	ND		0.0050
(cis) 1,3-Dichloropropene	ND		0.0010
Methyl Isobutyl Ketone	ND		0.0050
Toluene	ND		0.0050
(trans) 1,3-Dichloropropene	ND		0.0010

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0928S1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0010
Tetrachloroethene	ND		0.0010
1,3-Dichloropropane	ND		0.0010
2-Hexanone	ND		0.0050
Dibromochloromethane	ND		0.0010
1,2-Dibromoethane	ND		0.0010
Chlorobenzene	ND		0.0010
1,1,1,2-Tetrachloroethane	ND		0.0010
Ethylbenzene	ND		0.0010
m,p-Xylene	ND		0.0020
o-Xylene	ND		0.0010
Styrene	ND		0.0010
Bromoform	ND		0.0010
Isopropylbenzene	ND		0.0010
Bromobenzene	ND		0.0010
1,1,2,2-Tetrachloroethane	ND		0.0010
1,2,3-Trichloropropane	ND		0.0010
n-Propylbenzene	ND		0.0010
2-Chlorotoluene	ND		0.0010
4-Chlorotoluene	ND		0.0010
1,3,5-Trimethylbenzene	ND		0.0010
tert-Butylbenzene	ND		0.0010
1,2,4-Trimethylbenzene	ND		0.0010
sec-Butylbenzene	ND		0.0010
1,3-Dichlorobenzene	ND		0.0010
p-Isopropyltoluene	ND		0.0010
1,4-Dichlorobenzene	ND		0.0010
1,2-Dichlorobenzene	ND		0.0010
n-Butylbenzene	ND		0.0010
1,2-Dibromo-3-chloropropane	ND		0.0050
1,2,4-Trichlorobenzene	ND		0.0010
Hexachlorobutadiene	ND		0.0050
Naphthalene	ND		0.0010
1,2,3-Trichlorobenzene	ND		0.0010

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	105	66-128
Toluene-d8	111	68-126
4-Bromofluorobenzene	97	53-134

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 9-28-10
Date Analyzed: 9-28-10

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: SB0928S1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	0.0500	0.0400	80	0.0418	84	70-130	
Benzene	0.0500	0.0462	92	0.0484	97	70-121	
Trichloroethene	0.0500	0.0457	91	0.0464	93	70-124	
Toluene	0.0500	0.0488	98	0.0497	99	70-123	
Chlorobenzene	0.0500	0.0459	92	0.0469	94	71-119	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	4	14	
Benzene	5	10	
Trichloroethene	2	12	
Toluene	2	12	
Chlorobenzene	2	9	

Date of Report: October 1, 2010
Samples Submitted: September 23, 2010
Laboratory Reference: 1009-249
Project: 17581-00 23

% MOISTURE

Date Analyzed: 9-28-10

Client ID	Lab ID	% Moisture
HC-N6-1-S3	09-249-05	19
HC-N6-2-S3	09-249-06	17
HC-N6-3-S3	09-249-07	14
HC-N6-4-S3	09-249-08	16

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical gas.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Sample Custody Record

1 OF 1

N-6

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

Samples Shipped to: ONSITE

JOB 17581-00 23 LAB NUMBER 09-249

PROJECT NAME PoT UST Program N-6

HART CROWSER CONTACT C. Rust

SAMPLED BY: P. Cordell

REQUESTED ANALYSIS

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	NWTPH-Gx	NWTPH-Dx	BTEX (DB)	VOCs 8260	% Moisture	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
1	HC-N6-1 GW	CHARC.	9/22/10	1140	WATER				X		5	
2	HC-N6-2 GW			1240					X		5	
3	HC-N6-3 GW			1040					X		5	
4	HC-N6-4 GW			1340					X		5	
5	HC-N6-1-S3			1115	SOIL				X	X	6	
6	HC-N6-2-S3			1210					X		6	
7	HC-N6-3-S3			1000					X		6	
8	HC-N6-4-S3			1310					X		6	X Added 9/28/10, DB (STA)

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	9/22/10	SIGNATURE	9/22/10
PRINT NAME Phil Cordell	TIME	PRINT NAME Colleen Rust	TIME
COMPANY Hart Crowser	1745	COMPANY HC	1745
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	9/23/10	SIGNATURE	9/23/10
PRINT NAME Colleen Rust	TIME	PRINT NAME	TIME
COMPANY HC	1715	COMPANY	1715

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

44 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian