
To: Greg Andrina and John Rork – Puget Sound Energy
From: Rob Leet and Steve Woodward
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Subject: Soil and Groundwater Data Summary – Limited Environmental Site Assessment
PSE Tacoma LNG Project

INTRODUCTION

This memorandum presents soil and groundwater analytical results obtained as part of a limited environmental site assessment (ESA) conducted for Puget Sound Energy's Tacoma Liquefied Natural Gas (LNG) Project. The soil and groundwater sampling was completed between May 20 and June 2, 2014 in general accordance with the April 24, 2014 sampling and analysis plan (SAP). The SAP provides details about the project background, field methods, and the analytical testing program.

In this document and the SAP, project-specific cardinal directions are used when describing locations of site features and sampling locations. Consistent with past projects conducted on the Blair-Hylebos Peninsula by the Port of Tacoma (Port) and others, "project north" corresponds approximately to true northwest (Figure 1).

DEVIATIONS FROM THE SAMPLING AND ANALYSIS PLAN

Borings logs for the ESA soil borings are attached. The following deviations from the SAP occurred during the ESA soil and groundwater sampling:

- A sonic drilling rig was used to complete six of the nine borings inside the warehouse (Building 50; borings B-9 and B-12 through B-16) and one boring outside the warehouse (boring B-19). Initial attempts to complete the subject borings in the warehouse with a direct-push rig were unsuccessful due to repeated drilling refusals encountered within the structural fill beneath the building.
- For the borings completed inside the warehouse, "ground surface" was defined as the warehouse floor. In these borings, the soil samples that were originally planned to be collected at depths of 2 feet below ground surface (bgs) and 8 feet bgs were instead collected at depths between 6 and 8 feet bgs and 11 and 13 feet bgs to account for the warehouse floor being elevated approximately 5 feet above the surrounding site grade. The warehouse floor appeared to be constructed on structural fill. A similar adjustment was not made to groundwater sampling depths.
- Four samples of the apparent structural fill pad beneath the warehouse were collected for analytical testing. These samples were not originally scoped in the SAP.
- A groundwater sample was not obtained from 25 feet bgs in boring B-15 (Figure 1) due to low groundwater yield.

- Groundwater was not purged from the temporary well casing and water quality field parameters were not measured prior to collecting the 25-foot bgs groundwater sample in boring B-12 and the 50-foot bgs groundwater sample in boring B-16 due to low groundwater yield at the target depth interval. Consequently, these groundwater samples may not be representative of the targeted intervals.
- Soil and groundwater samples originally planned to be analyzed for total petroleum hydrocarbons as gasoline (TPH-G) and benzene, toluene, ethylbenzene, and xylenes (BTEX) by Methods NWTPH-Gx and 8021 (per SAP Table 2) were analyzed for BTEX by Method 8021 only if the samples were not analyzed by Method 8260 (BTEX compounds are included on the Method 8260 target analyte list).

ANALYTICAL RESULTS

The analytical results for the soil and groundwater samples are presented in Tables 1 and 2. The results are compared to potentially applicable risk-based screening levels developed for the Alexander Avenue Petroleum Tank Facilities Site Remedial Investigation/Feasibility Study Work Plan (Port Work Plan; Aspect Consulting, 2014). These screening levels consider protection of marine surface water, Model Toxics Control Act (MTCA) cleanup levels for industrial sites, and MTCA Method C groundwater screening levels published in the Washington Department of Ecology's current vapor intrusion guidance (Ecology Publication no. 09-09-047; October 2009), and reflect current toxicological information provided in Ecology's Cleanup Levels and Risk Calculations (CLARC) database. The soil screening levels for lead and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) published in the Port Work Plan have been adjusted in Table 1, based on discussions with the Port, to account for an empirical demonstration (based on existing groundwater data) that concentrations of these constituents in soil are protective of the soil-to-groundwater-to-surface water pathway. Additionally, the Federal drinking water Maximum Contaminant Level (MCL) for arsenic is included in Table 2 for comparison; the arsenic MCL has been proposed as a potential surface water cleanup level (Ecology, 2014).

Further evaluation of the data may be completed as necessary, including comparison of the soil analytical results to appropriate criteria for determining reuse and/or disposal options for soil that may be excavated during future construction activities.

The quality of the laboratory analytical data was reviewed in accordance with United States Environmental Protection Agency guidelines for Stage 2A data validation. The laboratory data quality review is summarized in the attached data validation report. The results of the data quality review indicate that the analytical data are useable for their intended purpose. However, based on a review of sampling procedures and field observations, some of the analytical data may not be representative of site conditions. These suspect data are identified below in the discussion of analytical results.

Soil Analytical Results

The soil analytical results are presented in Table 1. The following analytes were detected in soil at concentrations exceeding Port screening levels:

- Total petroleum hydrocarbons as diesel (TPH-D)
- Bis(2-ethylhexyl)phthalate (BEHP)

BEHP slightly exceeded the associated screening level in a soil sample obtained from 8 feet bgs in boring B-18, and TPH-D exceeded the associated screening level in a sample obtained from 8 feet bgs in boring B-20 (Table 1, Figure 1). The BEHP detection in boring B-18 was the only detection of BEHP reported in soil. This detection may reflect laboratory contamination of the sample, as BEHP is a common laboratory contaminant.

The estimated southerly extent of soil contamination (screening level exceedances) inferred to be related to the former petroleum bulk storage facility based on the ESA results is shown in Figure 1.

Groundwater Analytical Results

The groundwater analytical results are presented in Table 2. The following analytes were detected in groundwater at concentrations exceeding Port screening levels:

- TPH-D
- Total petroleum hydrocarbons as lube oil (TPH-LO)
- Benzene
- Metals (arsenic, chromium, copper, and lead)
- BEHP
- pH

Concentrations of one or more of these analytes exceeded screening levels in groundwater samples obtained from six borings completed in the warehouse (B-10, B-12, B-13, B-14, B-15, and B-16), two borings completed north of the warehouse (B-21 and B-24), and two borings completed near the Hylebos Waterway embankment (B-17 and B-19) (Table 2, Figure 1). The samples with exceedances were collected at depths ranging from approximately 11 feet to 51 feet bgs. Chlorinated volatile organic compounds, which are the primary constituents of concern in groundwater beneath the Occidental Chemical Corporation (OCC) Site north of Parcel 2, were not detected in the ESA groundwater samples.

The results for constituents detected above screening levels are summarized as follows:

- Metals (arsenic, chromium, copper, and lead) were the most prevalent analytes that exceeded screening levels. The groundwater samples submitted for metals analysis were filtered in the field (using a disposable 0.45-micron filter) to reduce potential high bias of results from suspended particulates. The highest metal concentrations were detected in the samples obtained from approximately 23 feet and 50 feet bgs in boring B-16. However, some of the metals data may not be representative of groundwater conditions, as discussed below.
 - Solids were observed at the bottom of the 23- and 50-foot bgs filtered samples obtained from boring B-16, suggesting that filter breakthrough occurred. Consequently, the metals results for these samples may be biased high.
 - As previously noted, the 25-foot bgs sample from B-12 and the 50-foot bgs sample from B-16 may not be representative of the targeted depth interval because groundwater was not purged from the temporary well casing prior to collecting these samples (due to low groundwater yield).

- Elevated electrical conductivity (greater than 0.750 millisiemens per centimeter [mS/cm]) was observed in all but one of the samples in which metals exceeded screening levels. High conductivity can indicate elevated salinity, which can cause analytical interferences and high bias of metals analyses (Port, personal communication). Four of the samples (B-10 at 50 feet, B-13 at 15 feet, B-15 at 15 feet, and B-17 at 25 feet) exceeded the Port Work Plan criterion of 1.0 mS/cm for triggering laboratory sample preparation using the reductive precipitation procedure, which can reduce salinity-related interferences. Reductive precipitation was not used in this limited ESA. Consequently, based on discussions with the Port, the metals results for the subject samples obtained from borings B-10, B-13, B-15, and B-17 may be biased high due to elevated salinity in these samples.
- BEHP was detected slightly above the screening level in a groundwater sample obtained from boring B-17. Like the single BEHP detection in soil, this single BEHP detection in groundwater may reflect laboratory contamination.
- Groundwater exceedances of TPH-D and/or TPH-LO were detected at borings B-12 (27 feet bgs: TPH-LO only), B-14 (26 feet bgs: TPH-D and TPH-LO), and B-24 (11 feet bgs: TPH-LO only). These detections are not contiguous with previously reported detections of TPH-D or TPH-LO in soil or groundwater beneath the former petroleum bulk storage facility in the northern portion of Parcel 2 (Port, personal communication). TPH-D and TPH-LO are subject to high bias in unfiltered groundwater grab samples. Additionally, due to low groundwater yield at 27 feet bgs in boring B-12, this sample was collected without first purging the temporary well casing. Therefore, the TPH-D and TPH-LO data may not be representative of groundwater conditions.
- Groundwater exceedances of benzene were detected at borings B-12 (27 feet bgs), B-13 (25 feet bgs), B-21 (26 feet bgs), and B-24 (11 feet and 28 feet bgs). These exceedances are consistent with previously reported detections of petroleum constituents in groundwater beneath the former petroleum bulk storage facility in the northern portion of Parcel 2.
- Three pH exceedances (values greater than 8.5) were detected, at borings B-16, B-19, and B-24. These exceedances range between 8.60 and 8.90, which is only slightly higher than the typical pH range of marine waters, and are not contiguous with exceedances of pH in groundwater beneath the OCC Site (Port, personal communication).

The previously estimated (in the SAP) southerly extent of groundwater contamination (screening level exceedances) inferred to be related to the OCC Site and/or the former petroleum bulk storage facility has been revised based on the ESA results; the revised extent is shown in Figure 1.

References

- Aspect Consulting, 2014. Work Plan For Remedial Investigation/Feasibility Study, Alexander Avenue Petroleum Tank Facilities Site, Tacoma, Washington, Ecology Facility Site No. 1377/Cleanup Site No. 743. Prepared for Port of Tacoma and Mariana Properties Inc.
- Washington Department of Ecology, 2009. Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action (Review Draft). Publication No. 09-09-047. October 2009.
- Washington Department of Ecology, 2014. Washington Human Health Criteria Review Documents (Draft). Revised August 8, 2014.

Attachments:

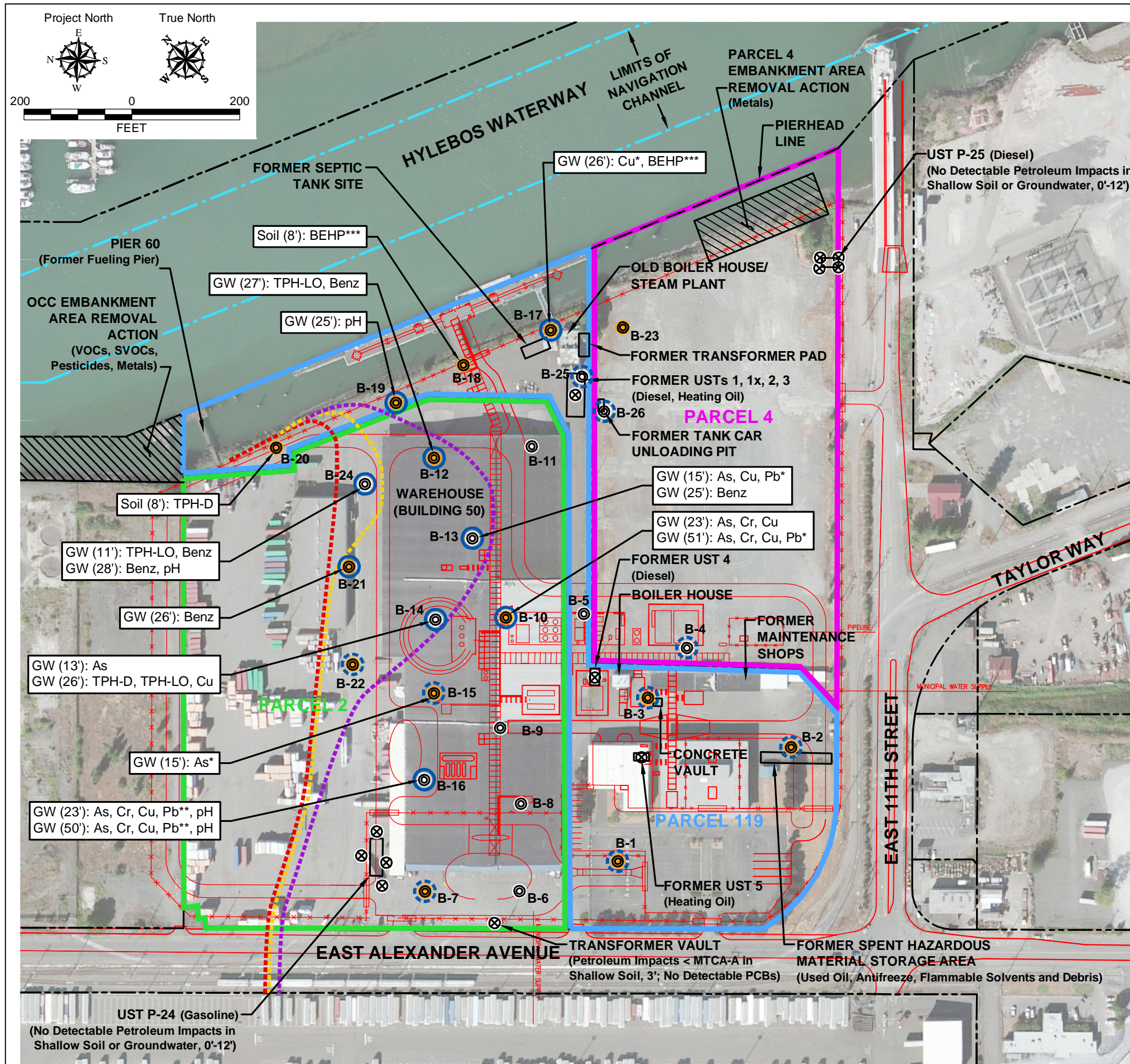
- Figure 1 – Site Plan Showing Constituents Exceeding Screening Levels in ESA Samples
- Table 1 – Soil Analytical Data Summary
- Table 2 – Groundwater Analytical Data Summary
- Data Validation Report
- Boring Logs

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P:\101086914\02\CAD\TASK 400 SOIL GW EVALUATION\101086914-02 Fig 1 SITE PLAN W_MAY-JUNE 2014 SAMPLING RESULTS.DWG\TAB:LANDSCAPE (2) MODIFIED BY THICHAUD ON SEP 04, 2014 - 13:53



Legend

Previous Sampling Locations

⊗ Previous Soil and/or Groundwater Grab Sample Locations (represents one or more samples collected at locations shown)

May-June 2014 ESA Sampling Locations

- ⊙ Soil Boring
- ⊙ Soil Boring with Soil Samples Tested for Full Analytical Suite
- ⊙ Shallow (11') Groundwater Sample
- ⊙ Shallow (11') and Deep (25' and/or 50') Groundwater Samples
- Estimated Extent of Soil Contamination Inferred to be Related to Former Petroleum Bulk Storage Facility
- Estimated Extent of Groundwater Contamination Inferred to be Related to OCC Site and/or Former Petroleum Bulk Storage Facility - 10-15 Foot Depth Zone (May-June 2014; Metals and pH Data Not Used in Delineating Extent)
- Estimated Extent of Groundwater Contamination Inferred to be Related to OCC Site and/or Former Petroleum Bulk Storage Facility - 20-30 Foot Depth Zone (May-June 2014; Metals and pH Data Not Used in Delineating Extent)

- GW = Groundwater
- (28') = 28 Feet Below Ground Surface (example)
- UST = Underground Storage Tank
- OCC = Occidental Chemical Corporation
- VOCs = Volatile Organic Compounds
- SVOCs = Semivolatile Organic Compounds
- PCBs = Polychlorinated Biphenyls
- MTCA-A = Model Toxics Control Act Method A Cleanup Levels
- As = Arsenic
- Cr = Chromium
- Cu = Copper
- Pb = Lead
- Benz = Benzene
- TPH-D = Total Petroleum Hydrocarbons as Diesel
- TPH-LO = Total Petroleum Hydrocarbons as Lube Oil
- BEHP = Bis(2-ethylhexyl)phthalate
- * = Metals results for this sample may be biased high due to elevated salinity.
- ** = Metals results for this sample may be biased high due to the presence of solids in the filtered sample.
- *** = Possible laboratory contaminant

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Preliminary Plot Plan by CH-IV International dated 1/29/14.

Site Plan Showing Constituents Exceeding Screening Levels in ESA Samples

Puget Sound Energy
 Tacoma LNG Project
 Tacoma, Washington



Figure 1

TABLE 1
SOIL ANALYTICAL DATA SUMMARY
 May-June 2014
 Puget Sound Energy LNG Project
 Tacoma, WA

Group	Analytical Method	Analyte	Units	Port Screening Level	B-1-2.0 2-3 ft	B-1-8.0 7-8 ft	B-2-2.0 1.5-2.5 ft	B-2-8.0 8-9 ft	B-3-2.0 1.5-2.5 ft	B-3-8.0 7-8.5 ft	B-4-2.0 1.5-2.5 ft	B-4-8.0 7-8 ft	B-5-2.0 2-3 ft	B-5-8.0 7.5-8.5 ft	B-6-2.0 2-3 ft	B-6-8.0 7-8 ft	B-7-2.0 1.5-2.5 ft	B-7-8.0 8-9 ft	B-8-6.0 5.5-6.5 ft	B-8-11.0 10.5-11.5 ft	B-9-7.0 6-7.5 ft	B-9-13.0 13-14 ft	B-10-2.0 1.5-2.5 ft (fill)	B-10-7.0 6.5-7.5 ft	B-10-13.0 12-13.5 ft	B-11-8.0 8-9 ft	B-11-12.0 11.5-13 ft	B-12-2.0 2 ft (fill)	B-12-7.0 7 ft	B-12-13.0 13 ft	B-13-7.0 7-8 ft		
BTEX	5035A/8021	Benzene	mg/Kg	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX	5035A/8021	Ethylbenzene	mg/Kg	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX	5035A/8021	Toluene	mg/Kg	6.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX	5035A/8021	Xylene, m,p-	mg/Kg	9.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX	5035A/8021	Xylene, o-	mg/Kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fuels	NWTPH-Gx	Total petroleum hydrocarbons as gasoline	mg/Kg	30	6.6 U	8.7 U	6.8 U	7.3 U	5.4 U	6.8 U	7.9 U	8.2 U	--	--	--	--	6.7 U	8.2 U	--	--	--	--	5.6 U	5.3 U	6.6 U	--	--	6.7 U	7.3 U	6.9 U	--	--	
Fuels	NWTPH-Dx	Total petroleum hydrocarbons as diesel	mg/Kg	2000	150 U	35 U	29 U	32 U	27 U	32 U	34 U	37 U	27 U	32 U	27 U	30 U	27 U	32 U	26 U	34 U	27 U	34 U	27 U	26 U	36 U	40 U	35 U	30 U	31 U	31 U	26 U	--	--
Fuels	NWTPH-Dx	Total petroleum hydrocarbons as lube oil	mg/Kg	2000	1800	71 U	59 U	63 U	54 U	65 U	67 U	73 U	55 U	64 U	53 U	59 U	54 U	65 U	53 U	68 U	54 U	67 U	54 U	52 U	72 U	79 U	70 U	61 U	62 U	61 U	52 U	--	--
Metals	6010/6020	Arsenic	mg/Kg	20	12 U	14 U	12 U	13 U	11 U	13 U	13 U	15 U	11 U	13 U	11 U	12 U	11 U	13 U	11 U	14 U	11 U	13 U	11 U	10 U	14 U	16 U	14 U	12 U	12 U	12 U	10 U	--	--
Metals	6010/6020	Cadmium	mg/Kg	--	0.60 U	0.71 U	0.59 U	0.63 U	0.54 U	0.64 U	0.67 U	0.73 U	0.55 U	0.64 U	0.53 U	0.59 U	0.54 U	0.65 U	0.53 U	0.68 U	0.54 U	0.67 U	0.54 U	0.52 U	0.72 U	0.79 U	0.70 U	0.61 U	0.62 U	0.61 U	0.52 U	--	--
Metals	6010/6020	Chromium	mg/Kg	1000	11	8.5	14	11	18	11	7.9	20	9.5	9.5	8.2	7.5	14	9.5	7.8	12	8.6	13	33	7.6	18	16	8.1	30	7.6	9.7	11	--	--
Metals	6010/6020	Copper	mg/Kg	36	12	7.9	9.5	7.3	14	11	12	30	12	11	8.6	6.7	10	9.6	8.1	20	9.4	13	11	9.1	33	20	11	11	7.7	8.4	13	--	--
Metals	6010/6020	Lead	mg/Kg	1000 (a)	6.0 U	7.1 U	5.9 U	6.3 U	6.9	7.4	6.7 U	7.3 U	5.5 U	6.4 U	5.3 U	5.9 U	5.4 U	6.5 U	5.3 U	6.8 U	5.4 U	6.7 U	5.4 U	5.2 U	7.2 U	7.9 U	7.0 U	6.1 U	6.2 U	6.1 U	5.2 U	--	--
Metals	7471	Mercury	mg/Kg	--	0.30 U	0.35 U	0.29 U	0.32 U	0.27 U	0.32 U	0.34 U	0.37 U	0.27 U	0.32 U	0.27 U	0.30 U	0.27 U	0.32 U	0.26 U	0.34 U	0.27 U	0.34 U	0.27 U	0.26 U	0.36 U	0.40 U	0.35 U	0.30 U	0.31 U	0.31 U	0.26 U	--	--
PCBs	8082	PCB-aro-clor 1016	mg/Kg	--	0.0030 U	0.0035 U	0.0029 U	0.0032 U	0.0027 U	0.0032 U	0.0034 U	0.0037 U	--	--	--	--	0.0027 U	0.0032 U	--	--	--	--	0.0025 U	0.0026 U	0.0036 U	--	--	0.0030 U	0.0031 U	0.0031 U	--	--	
PCBs	8082	PCB-aro-clor 1221	mg/Kg	--	0.0030 U	0.0035 U	0.0029 U	0.0032 U	0.0027 U	0.0032 U	0.0034 U	0.0037 U	--	--	--	--	0.0027 U	0.0032 U	--	--	--	--	0.0025 U	0.0026 U	0.0036 U	--	--	0.0030 U	0.0031 U	0.0031 U	--	--	
PCBs	8082	PCB-aro-clor 1232	mg/Kg	--	0.0030 U	0.0035 U	0.0029 U	0.0032 U	0.0027 U	0.0032 U	0.0034 U	0.0037 U	--	--	--	--	0.0027 U	0.0032 U	--	--	--	--	0.0025 U	0.0026 U	0.0036 U	--	--	0.0030 U	0.0031 U	0.0031 U	--	--	
PCBs	8082	PCB-aro-clor 1242	mg/Kg	--	0.0030 U	0.0035 U	0.0029 U	0.0032 U	0.0027 U	0.0032 U	0.0034 U	0.0037 U	--	--	--	--	0.0027 U	0.0032 U	--	--	--	--	0.0025 U	0.0026 U	0.0036 U	--	--	0.0030 U	0.0031 U	0.0031 U	--	--	
PCBs	8082	PCB-aro-clor 1248	mg/Kg	--	0.0030 U	0.0035 U	0.0029 U	0.0032 U	0.0027 U	0.0032 U	0.0034 U	0.0037 U	--	--	--	--	0.0027 U	0.0032 U	--	--	--	--	0.0025 U	0.0026 U	0.0036 U	--	--	0.0030 U	0.0031 U	0.0031 U	--	--	
PCBs	8082	PCB-aro-clor 1254	mg/Kg	--	0.0030 U	0.0035 U	0.0029 U	0.0032 U	0.0027 U	0.0032 U	0.0034 U	0.0037 U	--	--	--	--	0.0027 U	0.0032 U	--	--	--	--	0.0025 U	0.0026 U	0.0036 U	--	--	0.0030 U	0.0031 U	0.0031 U	--	--	
PCBs	8082	PCB-aro-clor 1260	mg/Kg	--	0.0030 U	0.0035 U	0.0029 U	0.0032 U	0.0027 U	0.0032 U	0.0034 U	0.0037 U	--	--	--	--	0.0027 U	0.0032 U	--	--	--	--	0.0025 U	0.0026 U	0.0036 U	--	--	0.0030 U	0.0031 U	0.0031 U	--	--	
PAHs	8270	1-Methylnaphthalene	mg/Kg	--	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
PAHs	8270	2-Methylnaphthalene	mg/Kg	320	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
PAHs	8270	Acenaphthene	mg/Kg	0.5	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
PAHs	8270	Acenaphthylene	mg/Kg	--	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
PAHs	8270	Anthracene	mg/Kg	1	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
PAHs	8270	Benzo(g,h,i)perylene	mg/Kg	--	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
PAHs	8270	Fluoranthene	mg/Kg	2.5	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
PAHs	8270	Fluorene	mg/Kg	0.6	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
PAHs	8270	Naphthalene	mg/Kg	2.6	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
PAHs	8270	Phenanthrene	mg/Kg	--	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
PAHs	8270	Pyrene	mg/Kg	3.3	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0089	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
cPAHs	8270-SIM	Benzo(a)anthracene	mg/Kg	--	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
cPAHs	8270-SIM	Benzo(a)pyrene	mg/Kg	--	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
cPAHs	8270-SIM	Benzo(b)fluoranthene	mg/Kg	--	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
cPAHs	8270-SIM	Benzo(k)fluoranthene	mg/Kg	--	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--	--	
cPAHs	8270-SIM	Chrysene	mg/Kg	--	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U								

TABLE 1
SOIL ANALYTICAL DATA SUMMARY
 May-June 2014
 Puget Sound Energy LNG Project
 Tacoma, WA

Group	Analytical Method	Analyte	Units	Port Screening Level	B-1-2.0 2-3 ft	B-1-8.0 7-8 ft	B-2-2.0 1.5-2.5 ft	B-2-8.0 8-9 ft	B-3-2.0 1.5-2.5 ft	B-3-8.0 7-8.5 ft	B-4-2.0 1.5-2.5 ft	B-4-8.0 7-8 ft	B-5-2.0 2-3 ft	B-5-8.0 7.5-8.5 ft	B-6-2.0 2-3 ft	B-6-8.0 7-8 ft	B-7-2.0 1.5-2.5 ft	B-7-8.0 8-9 ft	B-8-6.0 5.5-6.5 ft	B-8-11.0 10.5-11.5 ft	B-9-7.0 6-7.5 ft	B-9-13.0 13-14 ft	B-10-2.0 1.5-2.5 ft (fill)	B-10-7.0 6.5-7.5 ft	B-10-13.0 12-13.5 ft	B-11-8.0 8-9 ft	B-11-12.0 11.5-13 ft	B-12-2.0 2 ft (fill)	B-12-7.0 7 ft	B-12-13.0 13 ft	B-13-7.0 7-8 ft
SVOCs	8270	Benzene, 1,4-Dinitro-	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Benzidine	mg/Kg	--	2.0 U	0.47 U	0.39 U	0.42 U	0.36 U	0.43 U	0.45 U	0.49 U	--	--	--	--	0.36 U	0.43 U	--	--	--	--	0.36 U	0.35 U	0.48 U	--	--	0.40 U	0.41 U	0.41 U	--
SVOCs	8270	Benzyl Alcohol	mg/Kg	--	1.0 U	0.24 U	0.20 U	0.21 U	0.18 U	0.21 U	0.22 U	0.24 U	--	--	--	--	0.18 U	0.22 U	--	--	--	--	0.18 U	0.17 U	0.24 U	--	--	0.20 U	0.21 U	0.20 U	--
SVOCs	8270	Bis(2-chloroethoxy)methane	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Bis(2-chloroethyl)ether	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Bis(2-chloroisopropyl)ether	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Bis(2-ethylhexyl)phthalate (BEHP)	mg/Kg	0.13	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Butyl benzyl phthalate	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Carbazole	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Di-N-Octyl Phthalate	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Dibenzofuran	mg/Kg	160	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Dibutyl phthalate	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Diethyl phthalate	mg/Kg	0.9	1.0 U	0.24 U	0.20 U	0.21 U	0.18 U	0.21 U	0.22 U	0.24 U	--	--	--	--	0.18 U	0.22 U	--	--	--	--	0.18 U	0.17 U	0.24 U	--	--	0.20 U	0.21 U	0.20 U	--
SVOCs	8270	Dimethyl phthalate	mg/Kg	80000	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Hexachlorobenzene	mg/Kg	0.01	0.040 U	0.0094 U	0.0078 U	0.0084 U	0.0072 U	0.0086 U	0.0090 U	0.0097 U	--	--	--	--	0.0072 U	0.0086 U	--	--	--	--	0.0071 U	0.0069 U	0.0096 U	--	--	0.0081 U	0.0083 U	0.0082 U	--
SVOCs	8270	Hexachlorobutadiene	mg/Kg	0.01	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Hexachlorocyclopentadiene	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Hexachloroethane	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Hexachlorobutadiene, Bis(2-Ethylhexyl) Ester	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Isophorone	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	m,p-Cresol	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	N-Nitrosodi-n-propylamine	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	N-Nitrosodimethylamine	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	N-Nitrosodiphenylamine (as diphenylamine)	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Nitrobenzene	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	o-Cresol (2-methylphenol)	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	O-DINITROBENZENE	mg/Kg	--	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Pentachlorophenol	mg/Kg	0.1	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Phenol	mg/Kg	4.6	0.20 U	0.047 U	0.039 U	0.042 U	0.036 U	0.043 U	0.045 U	0.049 U	--	--	--	--	0.036 U	0.043 U	--	--	--	--	0.036 U	0.035 U	0.048 U	--	--	0.040 U	0.041 U	0.041 U	--
SVOCs	8270	Pyridine	mg/Kg	--	2.0 U	0.47 U	0.39 U	0.42 U	0.36 U	0.43 U	0.45 U	0.49 U	--	--	--	--	0.36 U	0.43 U	--	--	--	--	0.36 U	0.35 U	0.48 U	--	--	0.40 U	0.41 U	0.41 U	--
VOCs	5035A/8260	1,1,1,2-Tetrachloroethane	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	1,1,1-Trichloroethane	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	1,1,2,2-Tetrachloroethane	mg/Kg	0.005	0.067 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	1,1,2-Trichloroethane	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	1,1-Dichloroethane	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	1,1-Dichloropropene	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	1,2,3-Trichlorobenzene	mg/Kg	--	0.067 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--</				

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Group	Analytical Method	Analyte	Units	Port Screening Level	B-1-2.0 2-3 ft	B-1-8.0 7-8 ft	B-2-2.0 1.5-2.5 ft	B-2-8.0 8-9 ft	B-3-2.0 1.5-2.5 ft	B-3-8.0 7-8.5 ft	B-4-2.0 1.5-2.5 ft	B-4-8.0 7-8 ft	B-5-2.0 2-3 ft	B-5-8.0 7.5-8.5 ft	B-6-2.0 2-3 ft	B-6-8.0 7-8 ft	B-7-2.0 1.5-2.5 ft	B-7-8.0 8-9 ft	B-8-6.0 5.5-6.5 ft	B-8-11.0 10.5-11.5 ft	B-9-7.0 6-7.5 ft	B-9-13.0 13-14 ft	B-10-2.0 1.5-2.5 ft (fill)	B-10-7.0 6.5-7.5 ft	B-10-13.0 12-13.5 ft	B-11-8.0 8-9 ft	B-11-12.0 11.5-13 ft	B-12-2.0 2 ft (fill)	B-12-7.0 7 ft	B-12-13.0 13 ft	B-13-7.0 7-8 ft
VOCs	5035A/8260	Cis-1,3-Dichloropropene	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Dibromochloromethane	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Dibromomethane	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Dichlorodifluoromethane (CFC-12)	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Ethylbenzene	mg/Kg	0.02	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.0031	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Hexachlorobutadiene	mg/Kg	0.01	0.34 U	0.0067 U	0.0079 U	0.0082 U	0.0061 U	0.0050 U	0.0079 U	0.0089 U	--	--	--	--	0.0058 U	0.0065 U	--	--	--	--	0.0048 U	0.0058 U	0.0075 U	--	--	0.0050 U	0.0064 U	0.0044 U	--
VOCs	5035A/8260	Isopropylbenzene (Cumene)	mg/Kg	8000	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.0019	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Methyl Iodide (Iodomethane)	mg/Kg	--	0.0079 U	0.0067 U	0.0079 U	0.0082 U	0.0061 U	0.0050 U	0.0079 U	0.0089 U	--	--	--	--	0.0058 U	0.0065 U	--	--	--	--	0.0048 U	0.0058 U	0.0075 U	--	--	0.0050 U	0.0064 U	0.0044 U	--
VOCs	5035A/8260	Methyl t-butyl ether	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Methylene Chloride	mg/Kg	0.18	0.0080	0.0067 U	0.0079 U	0.0082 U	0.0061 U	0.0050 U	0.0079 U	0.0089 U	--	--	--	--	0.0058 U	0.0065 U	--	--	--	--	0.0048 U	0.0058 U	0.0075 U	--	--	0.0050 U	0.0064 U	0.0044 U	--
VOCs	5035A/8260	n-Butylbenzene	mg/Kg	--	0.0067 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.0085	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	n-Propylbenzene	mg/Kg	--	0.0067 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.0047	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Naphthalene	mg/Kg	2.6	0.067 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	p-Isopropyltoluene	mg/Kg	--	0.0067 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.0036	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Sec-Butylbenzene	mg/Kg	--	0.0067 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.0048	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Styrene	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Tert-Butylbenzene	mg/Kg	--	0.0067 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Tetrachloroethene	mg/Kg	0.005	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Toluene	mg/Kg	6.4	0.0079 U	0.0067 U	0.0079 U	0.0082 U	0.0061 U	0.0050 U	0.0079 U	0.0089 U	--	--	--	--	0.0058 U	0.0065 U	--	--	--	--	0.0048 U	0.0058 U	0.0075 U	--	--	0.0050 U	0.0064 U	0.0044 U	--
VOCs	5035A/8260	Trans-1,2-Dichloroethene	mg/Kg	3.2	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Trans-1,3-Dichloropropene	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Trichloroethene	mg/Kg	0.01	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Trichlorofluoromethane (CFC-11)	mg/Kg	--	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Vinyl Acetate	mg/Kg	--	0.0079 U	0.0067 U	0.0079 U	0.0082 U	0.0061 U	0.0050 U	0.0079 U	0.0089 U	--	--	--	--	0.0058 U	0.0065 U	--	--	--	--	0.0048 U	0.0058 U	0.0075 U	--	--	0.0050 U	0.0064 U	0.0044 U	--
VOCs	5035A/8260	Vinyl Chloride	mg/Kg	0.005	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.00097 U	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--
VOCs	5035A/8260	Xylene, m-p-	mg/Kg	9.0	0.0031 U	0.0027 U	0.0032 U	0.0033 U	0.0025 U	0.0020 U	0.0032 U	0.0036 U	--	--	--	--	0.0023 U	0.0026 U	--	--	--	--	0.012	0.0023 U	0.0030 U	--	--	0.0020 U	0.0026 U	0.0018 U	--
VOCs	5035A/8260	Xylene, o-	mg/Kg	0.1	0.0016 U	0.0013 U	0.0016 U	0.0016 U	0.0012 U	0.00099 U	0.0016 U	0.0018 U	--	--	--	--	0.0012 U	0.0013 U	--	--	--	--	0.0054	0.0012 U	0.0015 U	--	--	0.0010 U	0.0013 U	0.00088 U	--

TABLE 2
GROUNDWATER ANALYTICAL DATA SUMMARY¹
 May-June 2014
 Puget Sound Energy LNG Project
 Tacoma, WA

Group	Analytical Method	Analyte	Units	Port Screening Level	Other Potentially Applicable Screening Levels (a)	B-1-11.0-WATER 6-11 ft	B-2-11.0-WATER 8-13 ft	B-3-11.0-WATER 6-11 ft	B-4-11.0-WATER 7-11 ft	B-7-11.0-WATER 8-13 ft	B-10-11.0-WATER 10-13 ft	B-10-25.0-WATER 21-25 ft	B-10-50.0-WATER 49-53 ft	B-12-11.0-WATER 10-15 ft	B-12-25.0-WATER ² 26-28 ft	B-13-15.0-WATER 10-15 ft (b)	B-13-25.0-WATER 20-25 ft (b)
VOCs	8260	Cis-1,3-Dichloropropene	mg/L	--	0.016	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Dibromochloromethane	mg/L	--	0.0022	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Dibromomethane	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Dichlorodifluoromethane (CFC-12)	mg/L	--	0.022	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Ethylbenzene	mg/L	0.049	6.1	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Hexachlorobutadiene	mg/L	0.0002	0.0081	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Isopropylbenzene (Cumene)	mg/L	1.6	1.6	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Methyl Iodide (Iodomethane)	mg/L	--	--	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.02 U
VOCs	8260	Methyl t-butyl ether	mg/L	--	6.1	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Methylene Chloride	mg/L	0.59	0.94	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.02 U
VOCs	8260	n-Butylbenzene	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	n-Propylbenzene	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Naphthalene	mg/L	0.36	0.36	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0010 U	0.0010 U	0.0010 U	0.02 U
VOCs	8260	p-Isopropyltoluene	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Sec-Butylbenzene	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Styrene	mg/L	--	0.78	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Tert-Butylbenzene	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Tetrachloroethene	mg/L	0.0033	0.010	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Toluene	mg/L	15	33	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.02 U
VOCs	8260	Trans-1,2-Dichloroethene	mg/L	0.25	0.29	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Trans-1,3-Dichloropropene	mg/L	--	0.016	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Trichloroethene	mg/L	0.0084	0.0042	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Trichlorofluoromethane (CFC-11)	mg/L	--	0.26	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Vinyl Acetate	mg/L	--	17	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.02 U
VOCs	8260	Vinyl Chloride	mg/L	0.0024	0.0035	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
VOCs	8260	Xylene, m-,p-	mg/L	15	0.67	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.0080 U
VOCs	8260	Xylene, o-	mg/L	0.166	0.96	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.0040 U
pH	FP/4500 HB	pH (lab measurement except as noted)	SU	6-8.5	--	7.20	8.20	7.90	7.90	7.50	8.00	7.68 (d)	8.43 (d)	7.54 (d)	--	8.10	8.30
Salinity	2520B	Salinity (lab measurement)	g/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Salinity	(d)	Salinity (field measurement)	g/Kg	--	--	0.3	0.1	0.3	0.5	0.1	0.8	--	1.9	1.5	--	0.7	0.1
Conductivity	(d)	Electrical conductivity	mS/cm	--	--	0.606	0.291	0.580	0.977	0.298	1.57	0.300	3.65	2.96	--	1.09	0.174
Turbidity	(d)	Turbidity (unfiltered sample)	NTU	--	--	387	0 (e)	536	96	287	462	296	690	288	--	>1,000	>1,000

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 May-June 2014
 Puget Sound Energy LNG Project
 Tacoma, WA

Group	Analytical Method	Analyte	Units	Port Screening Level	Other Potentially Applicable Screening Levels (a)	B-14-11.0-WATER	B-14-25.0-WATER	B-15-11.0-WATER	B-16-11.0-WATER	B-16-25.0-WATER	B-16-50.0-WATER ²	B-17-11.0-WATER	B-17-25.0-WATER	B-19-11.0-WATER	B-19-25.0-WATER	B-19-50.0-WATER	B-21-11.0-WATER
						10-15 ft	25-27 ft	10-20 ft	15-20 ft	20-25 ft	48-52 ft (b)	10-15 ft (b)	24.5-28.5 ft	5.5-10.5 ft	23-25 ft (b)	47-49 ft	7-12 ft
VOCs	8260	Cis-1,3-Dichloropropene	mg/L	--	0.016	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Dibromochloromethane	mg/L	--	0.0022	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Dibromomethane	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Dichlorodifluoromethane (CFC-12)	mg/L	--	0.022	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Ethylbenzene	mg/L	0.049	6.1	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Hexachlorobutadiene	mg/L	0.0002	0.0081	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Isopropylbenzene (Cumene)	mg/L	1.6	1.6	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00029
VOCs	8260	Methyl Iodide (Iodomethane)	mg/L	--	--	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U
VOCs	8260	Methyl t-butyl ether	mg/L	--	6.1	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Methylene Chloride	mg/L	0.59	0.94	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U
VOCs	8260	n-Butylbenzene	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	n-Propylbenzene	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Naphthalene	mg/L	0.36	0.36	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U
VOCs	8260	p-Isopropyltoluene	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Sec-Butylbenzene	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Styrene	mg/L	--	0.78	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Tert-Butylbenzene	mg/L	--	--	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Tetrachloroethene	mg/L	0.0033	0.010	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Toluene	mg/L	15	33	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0025	0.0010 U
VOCs	8260	Trans-1,2-Dichloroethene	mg/L	0.25	0.29	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Trans-1,3-Dichloropropene	mg/L	--	0.016	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Trichloroethene	mg/L	0.0084	0.0042	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Trichlorofluoromethane (CFC-11)	mg/L	--	0.26	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Vinyl Acetate	mg/L	--	17	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U
VOCs	8260	Vinyl Chloride	mg/L	0.0024	0.0035	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
VOCs	8260	Xylene, m-,p-	mg/L	15	0.67	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U	0.00040 U
VOCs	8260	Xylene, o-	mg/L	0.166	0.96	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
pH	FP/4500 HB	pH (lab measurement except as noted)	SU	6-8.5	--	8.30	8.40	8.50	7.90	8.60	8.70	7.00	8.50	7.30	8.90	8.20	7.40
Salinity	2520B	Salinity (lab measurement)	g/Kg	--	--	--	--	--	--	--	--	0.09	0.86	0.52	0.77	9.66	--
Salinity	(d)	Salinity (field measurement)	g/Kg	--	--	0.5	0.4	0.6	0.3	0.4	--	0.1	0.9	0.6	0.8	11.3	0.2
Conductivity	(d)	Electrical conductivity	mS/cm	--	--	0.958	0.786	1.20	0.688	0.773	--	0.170	1.74	1.11	1.58	19.1	0.408
Turbidity	(d)	Turbidity (unfiltered sample)	NTU	--	--	278	276	386	1,000	>1,000	--	237	769	>1,000	>1,000	529	164

TABLE 2
GROUNDWATER ANALYTICAL DATA SUMMARY¹
 May-June 2014
 Puget Sound Energy LNG Project
 Tacoma, WA

Group	Analytical Method	Analyte	Units	Port Screening Level	Other Potentially Applicable Screening Levels (a)	B-21-25.0-WATER 24-28 ft	B-21-50.0-WATER 46-50 ft (b)	B-22-11.0-WATER 6-11 ft	B-24-11.0-WATER 7-11 ft (b)	B-24-25.0-WATER 26-30 ft	B-25-11.0-WATER 8-12 ft	B-26-11.0-WATER 7-12 ft
BTEX	8021	Benzene	mg/L	0.024	0.024	--	--	--	--	--	0.0010 U	0.0010 U
BTEX	8021	Ethylbenzene	mg/L	0.049	6.1	--	--	--	--	--	0.0010 U	0.0010 U
BTEX	8021	Toluene	mg/L	15	33	--	--	--	--	--	0.0010 U	0.0010 U
BTEX	8021	Xylene, m-,p-	mg/L	15	0.67	--	--	--	--	--	0.0010 U	0.0010 U
BTEX	8021	Xylene, o-	mg/L	0.166	0.96	--	--	--	--	--	0.0010 U	0.0010 U
Fuels	NWTPH-Gx	Total petroleum hydrocarbons as gasoline	mg/L	0.80	--	0.4 U	--	0.1 U	0.61	0.1 U	0.1 U	0.1 U
Fuels	NWTPH-Dx	Total petroleum hydrocarbons as diesel	mg/L	0.50	--	0.26 U	--	0.26 U	0.46 J	0.26 U	0.27 U	0.26 U
Fuels	NWTPH-Dx	Total petroleum hydrocarbons as lube oil	mg/L	0.50	--	0.42 U	--	0.41 U	0.60	0.41 U	0.43 U	0.41 U
Dissolved Metals	200.8	Arsenic	mg/L	0.0050	0.010 (c)	0.0030 U	0.0030 U	0.0030 U	0.0030 U	0.0030 U	--	--
Dissolved Metals	200.8	Cadmium	mg/L	0.0090	--	0.0040 U	0.0040 U	0.0040 U	0.0040 U	0.0040 U	--	--
Dissolved Metals	200.8	Chromium	mg/L	0.050	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--
Dissolved Metals	200.8	Copper	mg/L	0.0031	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--
Dissolved Metals	200.8	Lead	mg/L	0.0081	--	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	--	--
Dissolved Metals	7470	Mercury	mg/L	0.00020	0.0019	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	--	--
PCBs	8082	PCB-aroclor 1016	mg/L	--	--	--	--	--	--	--	--	--
PCBs	8082	PCB-aroclor 1221	mg/L	--	--	--	--	--	--	--	--	--
PCBs	8082	PCB-aroclor 1232	mg/L	--	--	--	--	--	--	--	--	--
PCBs	8082	PCB-aroclor 1242	mg/L	--	--	--	--	--	--	--	--	--
PCBs	8082	PCB-aroclor 1248	mg/L	--	--	--	--	--	--	--	--	--
PCBs	8082	PCB-aroclor 1254	mg/L	0.0000017	--	--	--	--	--	--	--	--
PCBs	8082	PCB-aroclor 1260	mg/L	0.000020	--	--	--	--	--	--	--	--
PAHs	8270	1-Methylnaphthalene	mg/L	--	--	--	--	--	--	--	--	--
PAHs	8270	2-Methylnaphthalene	mg/L	--	--	--	--	--	--	--	--	--
PAHs	8270	Acenaphthene	mg/L	0.102	--	--	--	--	--	--	--	--
PAHs	8270	Acenaphthylene	mg/L	--	--	--	--	--	--	--	--	--
PAHs	8270	Anthracene	mg/L	0.041	--	--	--	--	--	--	--	--
PAHs	8270	Benzo(g,h,i)perylene	mg/L	--	--	--	--	--	--	--	--	--
PAHs	8270	Fluoranthene	mg/L	0.051	--	--	--	--	--	--	--	--
PAHs	8270	Fluorene	mg/L	0.070	--	--	--	--	--	--	--	--
PAHs	8270	Naphthalene	mg/L	0.36	--	--	--	--	--	--	--	--
PAHs	8270	Phenanthrene	mg/L	--	--	--	--	--	--	--	--	--
PAHs	8270	Pyrene	mg/L	0.049	--	--	--	--	--	--	--	--
cPAHs	8270-SIM	Benzo(a)anthracene	mg/L	0.00002	--	--	--	--	--	--	--	--
cPAHs	8270-SIM	Benzo(a)pyrene	mg/L	0.00002	--	--	--	--	--	--	--	--
cPAHs	8270-SIM	Benzo(b)fluoranthene	mg/L	0.00002	--	--	--	--	--	--	--	--
cPAHs	8270-SIM	Benzo(j,k)fluoranthene	mg/L	0.00002	--	--	--	--	--	--	--	--
cPAHs	8270-SIM	Chrysene	mg/L	0.00002	--	--	--	--	--	--	--	--
cPAHs	8270-SIM	Dibenzo(a,h)anthracene	mg/L	0.00002	--	--	--	--	--	--	--	--
cPAHs	8270-SIM	Indeno(1,2,3-cd)pyrene	mg/L	0.00002	--	--	--	--	--	--	--	--
cPAHs	8270-SIM	Total cPAHs TEC (ND=0.5MRL)	mg/L	0.00002	--	--	--	--	--	--	--	--
SVOCs	8270	1,2,4-Trichlorobenzene	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	1,2-Dichlorobenzene (o-Dichlorobenzene)	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	1,2-Diphenylhydrazine	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	1,3-Dichlorobenzene (m-Dichlorobenzene)	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	1,3-Dinitrobenzene	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	1,4-Dichlorobenzene (p-Dichlorobenzene)	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2,3,4,6-Tetrachlorophenol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2,3,5,6-Tetrachlorophenol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2,3-DICHLOROANILINE	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2,4,5-Trichlorophenol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2,4,6-Trichlorophenol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2,4-Dichlorophenol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2,4-Dimethylphenol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2,4-Dinitrophenol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2,4-Dinitrotoluene	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2,6-Dinitrotoluene	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2-Chloronaphthalene	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2-Chlorophenol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2-Nitroaniline	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	2-Nitrophenol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	3,3'-Dichlorobenzidine	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	3-Nitroaniline	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	4,6-Dinitro-2-Methylphenol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	4-Bromophenyl phenyl ether	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	4-Chloro-3-Methylphenol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	4-Chloroaniline	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	4-Chlorophenyl-Phenylether	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	4-Nitroaniline	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	4-Nitrophenol (p-Nitrophenol)	mg/L	--	--	--	--	--	--	--	--	--

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 Puget Sound Energy LNG Project
 Tacoma, WA

Group	Analytical Method	Analyte	Units	Port Screening Level	Other Potentially Applicable Screening Levels (a)	B-21-25.0-WATER	B-21-50.0-WATER	B-22-11.0-WATER	B-24-11.0-WATER	B-24-25.0-WATER	B-25-11.0-WATER	B-26-11.0-WATER
						24-28 ft	46-50 ft (b)	6-11 ft	7-11 ft (b)	26-30 ft	8-12 ft	7-12 ft
SVOCs	8270	Aniline	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Benzene, 1,4-Dinitro-	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Benzidine	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Benzyl Alcohol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Bis(2-chloroethoxy)methane	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Bis(2-chloroethyl)ether	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Bis(2-chloroisopropyl)ether	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Bis(2-ethylhexyl)phthalate (BEHP)	mg/L	0.0012	--	--	--	--	--	--	--	--
SVOCs	8270	Butyl benzyl phthalate	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Carbazole	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Di-N-Octyl Phthalate	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Dibenzofuran	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Dibutyl phthalate	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Diethyl phthalate	mg/L	0.903	--	--	--	--	--	--	--	--
SVOCs	8270	Dimethyl phthalate	mg/L	72.016	--	--	--	--	--	--	--	--
SVOCs	8270	Hexachlorobenzene	mg/L	0.0002	--	--	--	--	--	--	--	--
SVOCs	8270	Hexachlorobutadiene	mg/L	0.0002	--	--	--	--	--	--	--	--
SVOCs	8270	Hexachlorocyclopentadiene	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Hexachloroethane	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Hexanedioic Acid, Bis(2-Ethylhexyl) Ester	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Isophorone	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	m,p-Cresol	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	N-Nitrosodi-n-propylamine	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	N-Nitrosodimethylamine	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	N-Nitrosodiphenylamine (as diphenylamine)	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Nitrobenzene	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	o-Cresol (2-methylphenol)	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	O-DINITROBENZENE	mg/L	--	--	--	--	--	--	--	--	--
SVOCs	8270	Pentachlorophenol	mg/L	0.0030	--	--	--	--	--	--	--	--
SVOCs	8270	Phenol	mg/L	5.401	--	--	--	--	--	--	--	--
SVOCs	8270	Pyridine	mg/L	--	--	--	--	--	--	--	--	--
VOCs	8260	1,1,1,2-Tetrachloroethane	mg/L	--	0.074	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,1,1-Trichloroethane	mg/L	--	25	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,1,2,2-Tetrachloroethane	mg/L	0.0040	0.062	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,1,2-Trichloroethane	mg/L	--	0.079	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,1-Dichloroethane	mg/L	--	5.0	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,1-Dichloroethene	mg/L	0.0032	0.28	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,1-Dichloropropene	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,2,3-Trichlorobenzene	mg/L	--	--	0.0020 U	0.00020 U	0.00031 U	0.0030 U	0.00060 U	--	--
VOCs	8260	1,2,3-Trichloropropane	mg/L	--	--	0.0025 U	0.00025 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,2,4-Trichlorobenzene	mg/L	--	8.4	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,2,4-Trimethylbenzene	mg/L	0.061	0.052	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,2-Dibromo-3-Chloropropane	mg/L	--	--	0.01 U	0.0010 U	0.0010 U	0.01 U	0.0020 U	--	--
VOCs	8260	1,2-dibromoethane	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,2-Dichlorobenzene (o-Dichlorobenzene)	mg/L	--	4.0	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,2-Dichloroethane	mg/L	0.037	0.042	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,2-Dichloropropane	mg/L	--	0.062	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,3,5-Trimethylbenzene	mg/L	--	0.054	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,3-Dichlorobenzene (m-Dichlorobenzene)	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,3-Dichloropropane	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	1,4-Dichlorobenzene (p-Dichlorobenzene)	mg/L	--	17	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	2,2-Dichloropropane	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	2-Butanone (MEK)	mg/L	--	760	0.05 U	0.0050 U	0.0066 U	0.05 U	0.01 U	--	--
VOCs	8260	2-Chloroethyl vinyl ether	mg/L	--	--	0.01 U	0.0010 U	0.0016 U	0.043 U	0.0086 U	--	--
VOCs	8260	2-Chlorotoluene	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	2-Hexanone	mg/L	--	--	0.02 U	0.0020 U	0.0026 U	0.02 U	0.0040 U	--	--
VOCs	8260	4-Chlorotoluene	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	4-Methyl-2-Pentanone (Methyl isobutyl ketone)	mg/L	--	24	0.02 U	0.0020 U	0.0025 U	0.02 U	0.0040 U	--	--
VOCs	8260	Acetone	mg/L	--	--	0.05 U	0.0050 U	0.0077 U	0.05 U	0.01 U	--	--
VOCs	8260	Benzene	mg/L	0.024	0.024	0.39	0.0014	0.00020 U	0.27	0.078	--	--
VOCs	8260	Bromobenzene	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Bromochloromethane	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Bromodichloromethane	mg/L	--	0.0009	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Bromoform (Tribromomethane)	mg/L	--	2.0	0.01 U	0.0010 U	0.0010 U	0.01 U	0.0020 U	--	--
VOCs	8260	Bromomethane	mg/L	--	0.028	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Carbon Disulfide	mg/L	--	0.87	0.0020 U	0.00045	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Carbon Tetrachloride	mg/L	--	0.0022	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Chlorobenzene	mg/L	--	0.22	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Chloroethane	mg/L	--	--	0.01 U	0.0010 U	0.0010 U	0.01 U	0.0020 U	--	--
VOCs	8260	Chloroform	mg/L	0.012	0.012	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Chloromethane	mg/L	--	0.052	0.01 U	0.0010 U	0.0010 U	0.01 U	0.0020 U	--	--
VOCs	8260	cis-1,2-Dichloroethene	mg/L	--	0.35	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--

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						24-28 ft	46-50 ft (b)	6-11 ft	7-11 ft (b)	26-30 ft	8-12 ft	7-12 ft
VOCs	8260	Cis-1,3-Dichloropropene	mg/L	--	0.016	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Dibromochloromethane	mg/L	--	0.0022	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Dibromomethane	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Dichlorodifluoromethane (CFC-12)	mg/L	--	0.022	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Ethylbenzene	mg/L	0.049	6.1	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Hexachlorobutadiene	mg/L	0.0002	0.0081	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Isopropylbenzene (Cumene)	mg/L	1.6	1.6	0.0020 U	0.00020 U	0.00020 U	0.010	0.00040 U	--	--
VOCs	8260	Methyl iodide (Iodomethane)	mg/L	--	--	0.01 U	0.0010 U	0.0010 U	0.01 U	0.0020 U	--	--
VOCs	8260	Methyl t-butyl ether	mg/L	--	6.1	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Methylene Chloride	mg/L	0.59	0.94	0.01 U	0.0010 U	0.0010 U	0.01 U	0.0020 U	--	--
VOCs	8260	n-Butylbenzene	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	n-Propylbenzene	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.011	0.00040 U	--	--
VOCs	8260	Naphthalene	mg/L	0.36	0.36	0.01 U	0.0010 U	0.0016 U	0.016 U	0.0032 U	--	--
VOCs	8260	p-Isopropyltoluene	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Sec-Butylbenzene	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Styrene	mg/L	--	0.78	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Tert-Butylbenzene	mg/L	--	--	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Tetrachloroethene	mg/L	0.0033	0.010	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Toluene	mg/L	15	33	0.01 U	0.0010 U	0.0010 U	0.01 U	0.0025	--	--
VOCs	8260	Trans-1,2-Dichloroethene	mg/L	0.25	0.29	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Trans-1,3-Dichloropropene	mg/L	--	0.016	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Trichloroethene	mg/L	0.0084	0.0042	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Trichlorofluoromethane (CFC-11)	mg/L	--	0.26	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Vinyl Acetate	mg/L	--	17	0.01 U	0.0010 U	0.0010 U	0.01 U	0.0020 U	--	--
VOCs	8260	Vinyl Chloride	mg/L	0.0024	0.0035	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
VOCs	8260	Xylene, m-,p-	mg/L	15	0.67	0.0040 U	0.00040 U	0.00040 U	0.0040 U	0.00080 U	--	--
VOCs	8260	Xylene, o-	mg/L	0.166	0.96	0.0020 U	0.00020 U	0.00020 U	0.0020 U	0.00040 U	--	--
pH	FP/4500 HB	pH (lab measurement except as noted)	SU	6-8.5	--	8.20	8.00	7.60	7.00	8.60	6.90	6.70
Salinity	2520B	Salinity (lab measurement)	g/Kg	--	--	--	--	--	--	--	0.15	0.14
Salinity	(d)	Salinity (field measurement)	g/Kg	--	--	1.0	6.9	0.2	0.3	0.6	0.2	0.1
Conductivity	(d)	Electrical conductivity	mS/cm	--	--	2.04	11.8	0.326	0.586	1.17	0.317	0.278
Turbidity	(d)	Turbidity (unfiltered sample)	NTU	--	--	>1,000	>1,000	530	172	152	789	305

¹ The groundwater grab samples analyzed for this investigation were obtained using direct-push and sonic drilling methods; consequently, the tabulated data are considered screening-level data rather than definitive data.

² Temporary well casing was not purged prior to collecting sample due to low groundwater yield; sample may not be representative of the targeted depth interval.

ft = Feet below ground surface

mg/L = Milligrams per liter (parts per million)

g/Kg = Grams per kilogram (parts per thousand)

mS/cm = Millisiemens per centimeter

SU = pH standard units

NTU = Nephelometric turbidity units

VI = Vapor intrusion

ND = Non-detect result

MRL = Method reporting limit

TEC = Toxic equivalent concentration

U = Not detected above the listed method reporting limit

J = Estimated concentration

BOLD typeface = Analyte/concentration detected above method reporting limit

Red background = Analyte/sample/concentration exceeds screening level

-- = No value available or not analyzed

* Per discussion with the Port of Tacoma, result may be biased high due to analytical interference from elevated salinity in the sample (as indicated by conductivity values >1 mS/cm).

** Result may be biased high based on the observed presence of solids at bottom of field-filtered sample (filtering did not remove all suspended particulates).

*** Result may reflect laboratory contamination (BEHP is a common laboratory contaminant).

(a) Listed values are Ecology Method C vapor intrusion screening levels (Ecology, 2009) unless otherwise indicated.

(b) A single depth was recorded on the field sampling form; the listed depth range (temporary well casing screened interval) was estimated based on the depth range of other samples collected on the same date and/or in the same vicinity.

(c) Federal Drinking Water Maximum Contaminant Level (MCL) (proposed surface water protection standard; Ecology, 2014)

(d) Field measurement

(e) Measurement is suspect based on measured turbidities of other samples and the fact that the sample was visibly cloudy.

Project: PSE Tacoma LNG – Environmental Site Assessment

GEI File No: 00186-914-02

Date: July 12, 2014

This report documents the results of a United States Environmental Protection Agency (USEPA)-defined Stage 2A data validation (USEPA Document 540-R-08-005; USEPA, 2009) of analytical data from the analyses of samples collected as part of the Environmental Site Assessment conducted in May and June 2014, and the associated laboratory and field quality control (QC) samples. The samples were collected at the Puget Sound Energy (PSE) Tacoma LNG Property of Interest located on the Blair-Hylebos Peninsula in Tacoma, Washington.

OBJECTIVE AND QUALITY CONTROL ELEMENTS

GeoEngineers, Inc. (GeoEngineers) completed the data validation consistent with USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (National Functional Guidelines; USEPA, 2008) and USEPA Contract Laboratory Program National Functional Guidelines for Superfund Inorganic Methods Data Review (National Functional Guidelines; USEPA, 2010) to determine if the laboratory analytical results meet the project objectives and are usable for their intended purpose. Data usability was assessed by determining whether:

- The samples were analyzed using well-defined and acceptable methods that provide reporting limits below applicable regulatory criteria;
- The precision and accuracy of the data are well-defined and sufficient to provide defensible data; and
- The quality assurance/quality control (QA/QC) procedures utilized by the laboratory meet acceptable industry practices and standards.

The data validation included review of the following quality control (QC) elements, as applicable:

- Data Package Completeness
- Chain-of-Custody Documentation
- Holding Times and Sample Preservation
- Surrogate Recoveries
- Method, Trip, and Rinsate Blanks
- Matrix Spikes/Matrix Spike Duplicates
- Laboratory Control Samples/Laboratory Control Sample Duplicates
- Field Duplicates
- Reporting Limits

VALIDATED SAMPLE DELIVERY GROUPS

This data validation included review of the sample delivery groups (SDGs) listed below in Table 1.

TABLE 1: SUMMARY OF VALIDATED SAMPLE DELIVERY GROUPS

Laboratory SDG	Samples Validated (Bold typeface indicates one or more analytical results associated with the sample were qualified)
1405-178	(Soil Samples) B-2-2.0, B-2-8.0, B-3-2.0, B-3-8.0, B-4-2.0, B-4-8.0, B-23-2.0, B-23-8.0, B-26-2.0, and B-26-8.0
	(Water Samples) B-2-11.0-WATER, B-3-11.0-WATER, B-4-11.0-WATER, and B-26-11.0-WATER
1405-184	(Soil Samples) B-1-2.0, B-1-8.0, B-5-2.0, B-5-8.0, B-6-2.0, B-6-8.0, B-8-6.0, B-8-11.0, B-11-8.0, B-11-12.0, B-20-2.0, B-20-8.0 , B-22-2.0, and B-22-8.0
	(Water Samples) B-1-11.0-WATER, and B-22-11.0-WATER
1405-193	(Soil Samples) B-10-2.0, B-10-7.0, and B-10-13.0
	(Water Samples) B-10-11.0-WATER, B-10-25.0-WATER, and B-10-50.0-WATER
1405-209	(Soil Samples) B-7-2.0, B-7-8.0, B-18-2.0, B-18-8.0, B-24-2.0, and B-24-8.0
	(Water Samples) B-7-11.0-WATER, B-24-11.0-WATER , and B-24-25.0-WATER
1405-229	(Soil Samples) B-17-2.0, B-17-8.0, B-21-2.0, and B-21-8.0
	(Water Samples) B-17-11.0-WATER, B-17-25.0-WATER, B-21-11.0-WATER, B-21-25.0-WATER, B-21-50.0-WATER, and B-25-11.0-WATER
1405-249	(Soil Samples) B-9-7.0, B-9-13.0, B-19-2.0, and B-19-8.0,
	(Water Samples) B-19-11.0-WATER, B-19-25.0-WATER, and B-19-50.0-WATER
1405-253	(Soil Samples) B-13-7.0, B-13-13.0, B-14-7.0, and B-14-13.0,



1405-253	(Water Samples) B-13-15.0-WATER, B-13-25.0-WATER, B-14-11.0-WATER, B-14-25.0-WATER
1405-255	(Soil Samples) B-12-2.0, B-12-7.0, and B-12-13.0
	(Water Samples) B-12-11.0-WATER and B-12-25.0-WATER
1406-007	(Soil Samples) B-15-2.0, B-15-7.0, B-15-13.0, B-16-2.0, B-16-7.0, and B-16-13.0
	(Water Samples) B-15-11.0-WATER, B-16-11.0-WATER, B-16-25.0-WATER, and B-16-50.0-WATER

CHEMICAL ANALYSIS PERFORMED

Onsite Environmental, Inc. in Redmond, Washington (OnSite), performed laboratory analysis on the soil and water samples using the following methods:

- Gasoline-Range Hydrocarbons by Method NWTPH-Gx
- Diesel- and Lube Oil-Range Hydrocarbons by Method NWTPH-Dx (with sulfuric acid and silica gel clean-up)
- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) by USEPA Method SW8021B
- Volatile Organic Compounds (VOCs) by USEPA Method SW8260B
- Semi-Volatile Organic Compounds (SVOCs) by USEPA Methods SW8270C/SW8270-SIM
- Polychlorinated Biphenyls (PCBs) by USEPA Method SW8082A
- Total and Dissolved Metals by USEPA Methods SW6010C/200.8 and SW7470A/7471B
- pH by SM 4500 HB

AmTest Inc. in Kirkland, Washington (AmTest), performed laboratory analysis on the water samples using the following methods:

- Salinity by SM 2520B

DATA VALIDATION SUMMARY

Data Package Completeness

Onsite was the primary laboratory that analyzed the soil and water samples. OnSite subcontracted the salinity analyses to AmTest. Both laboratories provided all required deliverables for this assessment. The laboratories followed adequate corrective action procedures and all identified anomalies were discussed in the case narratives.



Chain-of-Custody Documentation

Chain-of-custody (COC) forms were provided with the laboratory analytical reports. The COC forms were accurate and complete when submitted to and received from the laboratory.

Sample Holding Times and Sample Preservation

The sample holding time is defined as the time that elapses between sample collection and sample analysis. Maximum holding time criteria exist for each analysis to help ensure that the analyte concentrations found at the time of analysis reflect the concentration present at the time of sample collection. Established holding times were met for all analyses.

Surrogate Recoveries

A surrogate compound is a compound that is chemically similar to the organic analytes of interest, but unlikely to be found in any environmental sample. Surrogates are used for organic analyses and are added to all samples, standards, and blanks to serve as an accuracy and specificity check of each analysis. The surrogates are added to the samples at a known concentration and percent recovery (%R) values are calculated following analysis. All surrogate %R values for the field samples were within the laboratory control limits, with the exceptions listed below.

SDG 1405-178: (SVOCs) The %R value for 2,4,6-tribromophenol was less than the control limit in Sample B-3-8.0. Also, the %R value for phenol-d6 was greater than the control limit in Sample B-4-2.0. These samples were spiked with three acidic fraction surrogates, and in all cases at least two of these surrogates exhibited recoveries that were within the required control limits. No action was required for these surrogate outliers.

The %R value for terphenyl-d14 was greater than the control limit in Sample B-3-11.0-WATER. This sample was spiked with three base-neutral fraction surrogates, and in this case at least two of these surrogates exhibited recoveries that were within the required control limits. No action was required for this surrogate outlier.

SDG 1405-184: (SVOCs) The %R values for 2-fluorobiphenyl were greater than the control limits in Samples B-1-2.0 and B-20-8.0. These samples were spiked with three base-neutral fraction surrogates, and in all cases at least two of these surrogates exhibited recoveries that were within the required control limits. No action was required for these surrogate outliers.

SDG 1405-193: (VOCs) The %R value for dibromofluoromethane was greater than the control limit in Sample B-10-11.0-WATER. There were no positive results for any target analytes in this sample. No action was required for this surrogate outlier.

(SVOCs) The %R values for phenol-d6 were greater than the control limits in Samples B-10-2.0 and B-10-13.0. These samples were spiked with three acidic fraction surrogates, and in all cases at least two of these surrogates exhibited recoveries that were within the required control limits. No action was required for these surrogate outliers.

SDG 1405-209: (VOCs) The %R value for dibromofluoromethane was greater than the control limit in Sample B-24-11.0-WATER. There were no positive results for any target analytes in this sample. No action was required for this surrogate outlier.

SDG 1406-007: (SVOCs) The %R value for 2,4,6-tribromophenol was less than the control limits in Sample B-15-13.0. This sample was spiked with three acidic fraction surrogates, and in all cases at least two of these surrogates exhibited recoveries that were within the required control limits. No action was required for this surrogate outlier.



Method Blanks

Method blanks are analyzed to ensure that laboratory procedures and reagents do not introduce measurable concentrations of the analytes of interest. Method blanks were analyzed with each batch of field samples, at a frequency of 1 per 20 samples. For all sample batches, method blanks for all applicable methods were analyzed at the required frequency. None of the analytes of interest were detected above the reporting limits in any of the method blanks.

Matrix Spikes/Matrix Spike Duplicates

Because the actual analyte concentration in an environmental sample is not known, the accuracy of a particular analysis is usually inferred by performing a matrix spike (MS) analysis. One aliquot of sample is analyzed in the normal manner, and then a second aliquot of the sample is spiked with a known amount of analyte concentration and analyzed. From these analyses, a %R value is calculated. In the event that a %R value for a particular analyte is outside the associated control limits in the MS sample, the laboratory is required to analyze a “post-spiked” sample in to further isolate any potential QC issues with the given analyte.

MS analyses should be performed once per analytical batch or every 20 field samples, whichever is more frequent. The control limits for MS samples are 75% to 125% for all of the analytes of interest for this study.

Laboratory Control Samples/Laboratory Control Sample Duplicates

A laboratory control sample is a blank sample that is spiked with a known amount of analyte concentration and analyzed. It is treated much like an MS sample, without the possibility of matrix interference. As there is no actual sample matrix (such as soil or groundwater) in the analysis, the analytical expectations for accuracy and precision are usually more rigorous, and qualification would apply to all samples in the batch.

Laboratory control sample analyses should be performed once per analytical batch or every 20 field samples, whichever is more frequent. The control limits for laboratory control samples are specified in the laboratory documents as are the relative percent difference (RPD) values. The frequency requirements were met for all analyses, and the %R/RPD values were within the control limits.

Field Duplicates

No field duplicates were collected during this sampling event.

Reporting Limits and Miscellaneous

The contract required quantitation limits (CRQL) were met by the laboratory for all target analytes, with the exceptions listed below.

SDG 1405-184: (NWTPH-Dx) The contract-required reporting limits were not met for Diesel-Range Hydrocarbons in Sample B-1-2.0. The reporting limits were elevated because of the high concentration of Lube Oil-Range Hydrocarbons in the sample. Consequently, no action was taken.

Also, the laboratory recognized that the chromatogram for Lube Oil-Range Hydrocarbons in Sample B-20-8.0 did not match that of the calibration standard. For this reason, the positive result for Lube Oil-Range Hydrocarbons was qualified as estimated (J) in this sample.



SDG 1405-209: The laboratory recognized that the chromatogram for Diesel-Range Hydrocarbons in Sample B-24-11.0-WATER did not match that of the calibration standard. For this reason, the positive result for Diesel-Range Hydrocarbons was qualified as estimated (J) in this sample.

OVERALL ASSESSMENT

The laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the surrogate, LCS/LCSD, and MS/MSD %R values. Precision was also acceptable, as demonstrated by the laboratory duplicate, LCS/LCSD, and MS/MSD RPD or absolute difference values.

Selected data were qualified as estimated (J) because chromatograms did not match those of the calibration standards.

All data, as qualified, are considered acceptable for their intended use.

REFERENCES

U.S. Environmental Protection Agency (USEPA). "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use," EPA-540-R-08-005. January 2009.

U.S. Environmental Protection Agency (USEPA). "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review," EPA-540-R-08-01. June 2008.

U.S. Environmental Protection Agency (USEPA). "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review," EPA 540-R-10-011. January 2010.

GeoEngineers, Inc., "Sampling and Analysis Plan", prepared for Puget Sound Energy, April 24, 2014.



SOIL CLASSIFICATION CHART

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

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

	2.4-inch I.D. split barrel
	Standard Penetration Test (SPT)
	Shelby tube
	Piston
	Direct-Push
	Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS		TYPICAL DESCRIPTIONS
GRAPH	LETTER	
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/Quarry Spalls
	TS	Topsoil/Forest Duff/Sod

Groundwater Contact



Measured groundwater level in exploration, well, or piezometer



Measured free product in well or piezometer

Graphic Log Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Material Description Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PP	Pocket penetrometer
PPM	Parts per million
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27523 -122.4004		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0		24					AC	2 inches asphalt concrete			
							SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
				E1			SP	Gray fine to medium sand with trace silt (loose, moist) (fill)			
5		48									
				E2			SP-SM	Gray fine to medium sand with silt (loose, wet) (Till)			Groundwater observed at approximately 6 feet at the time of drilling
10		48					SM	Gray silty fine to medium sand with occasional organics (shells and wood)			
				G3			ML	Gray silt with occasional fine sand			
15		36									

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-1



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-2
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEOTECH_STANDARD

Start Drilled 5/20/2014	End 5/20/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D
Latitude Longitude 47.27506 -122.39887		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing							
0	36						AC	2 inches asphalt concrete				
					E1		SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)				
					E2		SP-SM	Gray fine to medium sand with silt (medium dense, moist) (fill)				
5	48						ML	Gray silt with occasional fine sand and organics (wood) (soft, wet)				Groundwater observed at approximately 7 feet at the time of drilling
					G3							
					E4		SP	Gray fine to medium sand with trace silt and occasional organics (shells) (loose, moist to wet)				
	48											
10												
	36											
15												

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-2



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/14/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEO TECH_STANDARD

Start Drilled 5/20/2014	End 5/20/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27574 -122.39941		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0		42						SM	Brown silty fine to coarse sand with gravel (medium dense, moist) (fill)	Groundwater observed at approximately 7 feet at the time of drilling
					E1					
		48			G2			SP-SM	Gray fine to medium sand with silt (loose, moist) (fill)	
5					G3			ML	Gray silt (soft, wet) (fill)	
		48			E4			SM	Gray silty fine sand (loose, wet) (fill)	
					G5			ML	Gray silt with occasional fine sand (very soft, wet)	
10								SM	Gray silty fine sand with occasional organics (shells) (loose, wet)	
		36			G6			ML	Gray silt with occasional fine sand (very soft, wet)	
15										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-3



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-4
 Sheet 1 of 1

Tacoma: Date: 9/25/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS.GDT\GEBR_GEOTECH_STANDARD

Start Drilled 5/20/2014	End 5/20/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27579 -122.39894		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0	42						SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			Groundwater observed at approximately 5.5 feet at the time of drilling
				E1			SP-SM	Gray fine to medium sand with silt (loose, moist) (fill)			
5	48						ML/SM	Interbedded gray silt and gray silty fine sand (loose/soft, wet) (fill)			
				E2			ML	Gray silt with occasional fine sand (loose, wet)			
10	48										
				G3							
	36						SM	Gray silty fine sand (loose, wet)			
15				G4			ML	Gray silt with occasional fine sand (soft, wet)			

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-4



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/5/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402_GEOENGINEERS.GDT\GEIR_GEOTECH_STANDARD

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 15	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27632 -122.39938		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks		
Notes:						

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0		24						AC	3 inches asphalt concrete	
					E1			SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)	
5		12						SP-SM	Gray fine to medium sand with silt (loose, moist) (fill)	
10		48			E2				Grades to wet at 9 feet	Groundwater observed at approximately 9 feet at the time of drilling
					G3			ML	Gray silt with occasional fine sand (very soft, wet)	
15		36						SM	Gray silty fine sand (loose, wet)	

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-5



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-6
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEBR_GEOTECH_STANDARD

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 15	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27545 -122.40109		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks		
Notes:						

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS		
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					Water Level	Graphic Log
0		42						AC	2 inches asphalt concrete			
								SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
					E1							
								SP-SM	Gray fine to medium sand with silt (medium dense, moist) (fill)			
48												
5												
									Grades to wet at 7 feet			Groundwater observed at approximately 7 feet at the time of drilling
					E2							
10		48										
								SM	Gray silty fine to medium sand with occasional organics (shells) (loose, wet)			
								SM/ML	Interbedded silty fine to medium sand and gray silt with occasional sand, with occasional organics (wood and shells) (loose/very soft, wet)			
15		36										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-6



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-7
 Sheet 1 of 1

Start Drilled 5/27/2014	End 5/27/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27578 -122.40161		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	48						AC	2 inches asphalt concrete		
							SM	Brown silty fine to medium sand with gravel (loose, moist) (fill)		
							SP-SM	Gray fine to medium sand with silt (medium dense, moist)		
5	48							Becomes dark gray		
								Becomes wet at 8 feet		Groundwater observed at approximately 8 feet at the time of drilling
10	48									
15	36									

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-7



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/5/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEBR_GEOTECH_STANDARD

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 20	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude		47.27578 -122.40064	System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft)	
Notes:					See Remarks	

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS		
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					Water Level	Graphic Log
0		48						AC	6 inches asphalt concrete			
								SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
					E1							
5		48						SM	Gray silty fine to medium sand (loose to medium dense, moist)			
					E2							
									Grades to wet			
10		48						ML	Gray silt with fine sand (very stiff, wet)			Groundwater observed at approximately 10 feet at the time of drilling
					E3			SM	Gray silty fine to medium sand (loose, moist)			
								SP-SM	Gray fine to medium sand with silt and occasional organics (shells) (loose, wet)			
								SM	Gray silty fine to medium sand (loose, wet)			
15		48						ML/SM	Gray silt with occasional fine sand with interbedded silty fine to medium sand lenses (very stiff/loose, wet)			
					G4							
20												

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-8



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/5/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEO\GINT\018691402\GEO\ENGINEERS\GDT\GDIR_GEO\TECH_STANDARD

Start Drilled 5/29/2014	End 5/29/2014	Total Depth (ft) 20	Logged By BL/GH Checked By MM	Driller Cascade Drilling, Inc.	Drilling Method Sonic
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Geoprobe 8/40LS
Latitude Longitude 47.27613 -122.40039		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	60						CC SM			4 inches concrete Brown silty fine to medium sand with occasional gravel (medium dense, moist) (fill) Grades to with gravel
5	36			E1			SP-SM			Gray fine to medium sand with silt (loose, moist) (fill)
10	60			E2			ML			Gray silt with occasional sand and organics (wood) (soft, wet)
15	60			E3			SM			Gray silty fine to medium sand (loose, wet) (fill)
20	60						ML			Gray silt with occasional fine sand (very soft, wet)
							SM			Gray silty fine to medium sand (loose, wet)

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-9



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-10
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GDIR_GEO TECH_STANDARD

Start Drilled 5/22/2014	End 5/22/2014	Total Depth (ft) 20	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27651 -122.39978		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks		
Notes:						

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS		
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					Water Level	Graphic Log
0		48						AC	4 inches asphalt concrete			
								SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
					E1							
		48										
5								SP-SM	Gray fine to medium sand with silt (loose, moist) (fill)			
					E2							
		48						ML	Gray silt (very soft, wet) (fill)			
					G3			SM	Gray silt fine to medium sand with occasional organics (wood) (loose, wet)			
10								ML	Gray silt with occasional fine sand (very stiff, wet)			
		48						SM	Gray silty fine to medium sand (loose, wet)			
					E4							
		48						ML	Gray silt with occasional fine sand (very stiff, wet)			
					G5			SM/ML	Interbedded gray silty fine sand and gray silt (loose/very stiff, wet)			
15												
		48										
20												

Groundwater observed at approximately 9.5 feet at the time of drilling

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-10



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-11
 Sheet 1 of 1

Tacoma: Date: 9/14/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GDIR_GEO TECH_STANDARD

Start Drilled	5/21/2014	End 5/21/2014	Total Depth (ft)	20	Logged By Checked By	BL/GH MM	Driller	Holocene Drilling, Inc.	Drilling Method	Direct Push	
Surface Elevation (ft) Vertical Datum	Undetermined				Hammer Data					Drilling Equipment	Power Probe 9500D
Latitude Longitude	47.27708 -122.39877				System Datum	Geographic WGS84				Groundwater Date Measured	Depth to Water (ft) Elevation (ft)
Notes:									See Remarks		

Elevation (feet)	FIELD DATA							Moisture Content (%)	Fines Content (%)	REMARKS	
	Interval Depth (feet)	Recovered (in)	Blows/foot	Collected Sample Sample Name Testing	Water Level	Graphic Log	Group Classification				MATERIAL DESCRIPTION
0	24					CC	6 inches concrete				
						SP-SM	Brown fine to coarse sand with silt and gravel (dense, moist) (fill)				
				E1							
						ML	Brown silt with occasional fine sand (soft, moist) (fill)				
5	36					SP-SM	Gray fine to medium sand with silt (loose, moist) (fill)				
				E2							
						SP	Gray fine to medium sand with trace silt (loose, moist) (fill)				
10	48										
				E3							
						ML	Gray silt with occasional fine sand (very soft, wet)				
15	48					SP-SM	Gray fine to medium sand with silt (loose, wet)				
20										Groundwater observed at approximately 11 feet at the time of drilling	

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-11



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-12
 Sheet 1 of 1

Start Drilled 5/30/2014	End 5/30/2014	Total Depth (ft) 15	Logged By BL/GH	Checked By MM	Driller Cascade Drilling, Inc.	Drilling Method Sonic
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Geoprobe 8/40LS	
Latitude Longitude 47.27737 -122.39937		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks		
Notes:						

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	60			E1			SM	Brown silty fine to coarse sand with gravel (medium dense, moist)		
5	60			E2			SP-SM	Gray silty fine to medium sand (loose, moist)		
10	60			E3				Becomes wet		
							ML	Gray sandy silt (soft, wet)		
							SM	Gray silty fine to medium sand with organics (shells) (soft, wet)		
15										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-12



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-13
 Sheet 1 of 1

Tacoma: Date: 9/14/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402_GEOENGINEERS.GDT\GEBR_GEOTECH_STANDARD

Start Drilled 5/30/2014	End 5/30/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Cascade Drilling, Inc.	Drilling Method Sonic
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Geoprobe 8/40LS	
Latitude Longitude 47.27702 -122.39966		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	60						CC			4 inches concrete
							SM			Brown silty fine to coarse sand with gravel (medium dense, moist) (fill)
				E1						
5	60						SP-SM			Gray fine to medium sand with silt (loose, moist) (fill)
				E2						
10	60						SM			Gray silty fine to medium sand with occasional organics (shells) (loose, moist) (fill)
				E3						
15										Grades to wet at 11 feet
										Groundwater observed at approximately 10 feet at the time of drilling

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-13



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-14
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GDIR_GEO TECH_STANDARD

Start Drilled 5/30/2014	End 5/30/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Cascade Drilling, Inc.	Drilling Method Sonic
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Geoprobe 8/40LS
Latitude Longitude 47.27686 -122.40009		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	60						AC	7 inches asphalt concrete		
				E1			SM	Brown silty fine to coarse sand with gravel (medium dense, moist)		
5	60			E2			SP-SM	Gray fine to medium sand with silt (loose, moist)		
10	60			E3			SM	Gray silty sand (soft, wet)		
15										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-14



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/14/14 Path: \\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEO TECH_STANDARD

Drilled	Start 6/2/2014	End 6/2/2014	Total Depth (ft)	20	Logged By BL/GH	Checked By MM	Driller Cascade Drilling, Inc.	Drilling Method	Sonic
Surface Elevation (ft) Vertical Datum			Undetermined		Hammer Data		Drilling Equipment Geoprobe 8/40LS		
Latitude Longitude		47.27651 -122.40055		System Datum		Geographic WGS84		Groundwater Date Measured	
Notes:								Depth to Water (ft) Elevation (ft) See Remarks	

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	60						CC	6 inches concrete		
							SM	Brown silty fine to coarse sand with occasional gravel (medium dense, moist)		
				E1				With gravel		
5	60						SP-SM	Gray fine to medium sand with silt (loose, moist)		
				E2						
10	60						SM	Gray silty fine to coarse sand with gravel (loose, wet)		
				E3			ML	Gray silt with sand (soft, wet)		
							SM	Gray silty fine to coarse sand with gravel (loose, wet)		
15	60									
20										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-15



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-16
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402_GEOENGINEERS.GDT\GDIR_GEO TECH_STANDARD

Drilled	Start 6/2/2014	End 6/2/2014	Total Depth (ft)	20	Logged By BL/GH	Checked By MM	Driller Cascade Drilling, Inc.	Drilling Method	Sonic	
Surface Elevation (ft) Vertical Datum			Undetermined		Hammer Data		Drilling Equipment Geoprobe 8/40LS			
Latitude Longitude		47.2762 -122.40105		System Datum		Geographic WGS84		Groundwater Date Measured		
Notes:								Depth to Water (ft)		Elevation (ft)
								See Remarks		

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0		36								
					E1			CC	4 inches concrete	
								SM	Brown silty fine to coarse sand with gravel (medium dense, moist) (fill)	
5		60			E2			SP-SM	Gray fine to medium sand with silt and occasional gravel and organics (shells) (loose, moist) (fill)	
10		60			E3				Grades to wet at 12 feet	Groundwater observed at approximately 12 feet at the time of drilling
15		60						SM	Gray silty fine to medium sand with occasional organics (shells, grass) (loose, wet)	
20										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-16



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-17
 Sheet 1 of 1

Tacoma: Date: 6/14/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GDIR_GEO TECH_STANDARD

Start Drilled	5/28/2014	End	5/28/2014	Total Depth (ft)	15	Logged By	BL/GH	Checked By	MM	Driller	Holocene Drilling, Inc.	Drilling Method	Direct Push
Surface Elevation (ft) Vertical Datum	Undetermined				Hammer Data				Drilling Equipment	Power Probe 9500D			
Latitude	47.27745				System Datum	Geographic WGS84			Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)		
Longitude	-122.39808												
Notes:									See Remarks				

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	28					AC	3 inches asphalt concrete			
						SM	Brown silty sand with gravel (medium dense, moist)			
				E2		SP-SM	Gray fine to medium sand with silt (loose, moist)			
5	42									
				E1			Becomes wet at 7 feet			Groundwater observed at approximately 6.6 feet at the time of drilling
10	48									
15	36					ML	Gray silt with sand (soft, wet)			

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-17



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/14/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEO TECH_STANDARD

Start Drilled 5/27/2014	End 5/27/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27761 -122.3987		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	48						AC	5 inches asphalt concrete		
							SM	Brown silty fine to coarse sand with gravel		
				E1			SP-SM	Gray fine to medium sand with silt (loose, moist)		
5	42							Grades to brown		
10	42			E2				Becomes wet at 9 feet		
15	36						SP-SM	Black sand with silt and trace gravel (gravel subangular up to 2 inches in diameter) (loose, wet)		

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-18



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/5/14 Path: \\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEOTECH_STANDARD

Start Drilled	5/29/2014	End	5/29/2014	Total Depth (ft)	20	Logged By	BL/GH	Checked By	MM	Driller	Cascade Drilling, Inc.	Drilling Method	Sonic	
Surface Elevation (ft) Vertical Datum	Undetermined					Hammer Data				Drilling Equipment	Geoprobe 8/40LS			
Latitude	47.27651			Longitude	-122.39978			System Datum	Geographic WGS84			Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
Notes:											See Remarks			

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0		48					AC			5 inches asphalt concrete
							SM			Brown silty fine to coarse sand with gravel (medium dense, moist) (fill)
				E1						
5		60					SP-SM			Gray fine to medium sand with silt and occasional organics (shells) (loose, moist) (fill)
				E2						Grades to wet at 8 feet
10		96								
							SM			Gray silty fine to medium sand with occasional organics (shells and wood) (loose, wet)
15							SP-SM			Gray fine to medium sand with silt (loose, wet)
20										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-19



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-20
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402_GEOENGINEERS.GDT\GDIR_GEO TECH_STANDARD

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D
Latitude Longitude 47.27792 -122.40019		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0		42					AC	2 inches asphalt concrete			
							SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
							SP-SM	Gray fine to medium sand with silt (loose, moist) (fill)			
				E1							
		48									
5											
		48									
				E2							
10											
		36									
				E3			SM	Gray silty fine to medium sand with occasional organics (shells) (loose, wet)			
							ML	Gray silt (very soft, wet)			
							SM	Gray silty fine to medium sand (loose, wet)			
15											
Grades to wet at 7 feet											
Groundwater observed at approximately 7 feet at the time of drilling											

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-20



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-21
 Sheet 1 of 1

Start Drilled 5/28/2014	End 5/28/2014	Total Depth (ft) 15	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum		Undetermined	Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude		47.27726 -122.40038	System Datum Geographic WGS84		Groundwater Date Measured	Depth to Water (ft) Elevation (ft) See Remarks
Notes:						

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0		42					AC	2 inches asphalt concrete			
							SM	Brown silty sand with gravel			
				E1			SP-SM	Gray fine to medium sand with silt (medium dense, moist)			
48							ML	Gray silt with sand (soft, moist to wet)			
5							SP-SM	Dark gray to black fine to medium sand with silt (loose, wet)			Groundwater observed at approximately 6.5 feet at the time of drilling
				E2			ML/SM	Interbedded gray silt and gray silty sand (loose/soft, wet)			
10											
		48									
		36									
15											

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-21



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-22
 Sheet 1 of 1

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27682 -122.40075		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0		42					AC	2 inches asphalt concrete			
							SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
				E1			SP-SM	Brown fine to medium sand with silt (loose, moist) (fill)			
		48		E2							
5							SM	Gray silty fine to medium sand (loose, moist)			
							ML	Gray silt (very soft, wet) (fill)			
							SM	Gray silty fine to medium sand (loose, wet) (fill)			
		48		E3							
10							ML	Gray silt (very soft, wet)			
							SP-SM	Gray fine to medium sand with silt (loose, wet)			
		36						Grades to with occasional organics (shells)			
15											

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-22



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-23
 Sheet 1 of 1

Tacoma: Date: 9/14/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402_GEOENGINEERS.GDT\GEIR_GEOTECH_STANDARD

Start Drilled 5/20/2014	End 5/20/2014	Total Depth (ft) 15	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27721 -122.39767		System Datum		Geographic WGS84		Groundwater Date Measured
Notes:						Depth to Water (ft) Elevation (ft) See Remarks

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS		
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					Water Level	Graphic Log
0		30						GP-GM	Brown gravel with sand and silt (dense, moist) (fill)			
								SP-SM	Gray fine to medium sand with silt (medium dense, moist) (fill)			
					E1							
		42										
5									Grades to wet at 6.5 feet			
		48			E2							
								SM	Gray silty fine to medium sand (medium dense, wet) (fill)			
10												
		36						ML	Gray sandy silt (medium stiff, wet)			
15												

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-23



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-24
 Sheet 1 of 1

Start Drilled 5/27/2014	End 5/27/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27761 -122.39989		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	48						AC	2 inches asphalt concrete		
							SM	Brown silty fine to medium sand (very loose, moist)		
				E1			SP-SM	Gray fine to medium sand with silt (loose, moist)		
5	48							Becomes wet at 6.5 feet		
				E2			SP-SM	Black fine to medium sand with silt (loose, wet)		Petroleum odor
10	36									Petroleum odor
15										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-24



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/5/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEOTECH_STANDARD

Start Drilled	5/20/2014	End	5/20/2014	Total Depth (ft)	12	Logged By	BL/GH	Checked By	MM	Driller	Holocene Drilling, Inc.	Drilling Method	Direct Push
Surface Elevation (ft) Vertical Datum	Undetermined				Hammer Data				Drilling Equipment	Power Probe 9500D			
Latitude	47.27695				System Datum	Geographic			Groundwater		Depth to Water (ft)	Elevation (ft)	
Longitude	-122.39822					WGS84			Date Measured	See Remarks			
Notes:													

Elevation (feet)	FIELD DATA						Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					
0	36					GP-GM	Brown gravel with silt and sand (medium dense, moist) (fill)				
				E1		SP	Gray fine to medium sand with trace silt (medium dense, moist) (fill)				
5	48					SP-SM	Gray fine to medium sand with silt (medium dense, moist) (fill)				
				E2							
10	48			E3							
											4 feet of heave at 12 feet

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-26



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02