PBS | Engineering + Environmental

Soil and Groundwater Testing

Former Ross Simmons Hardwood, Inc.
250 Industrial Way
Longview, Washington

Prepared for:
Catherine Simmons

July 28, 2016

Project No. 22488.000 Phase 3

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1.0 INTRODUCTION

PBS Engineering and Environmental Inc. (PBS) has completed Soil and Groundwater Testing at the former Ross Simmons Hardwood, Inc., facility located at 250 Industrial Way, Longview, Washington. This report summarizes the previous work performed at the site, and presents the results of the current investigation and PBS' conclusions.

1.1 Site Description and Topography

The property (site) is listed as Tax Lots 79B, 94B, 95B, C, E, F and G of the J. Burbee Donation Land Claim, Cowlitz County; in Section 3 of Township 7 North, Range 2 West, Willamette Base and Meridian (Figure 1). The site is located in a relatively flat area of industrial properties primarily associate with lumber milling, trucking and related businesses. The subject property is located near the confluence of the Cowlitz and Columbia Rivers at an elevation of approximately 10-15 feet above mean sea level.

1.2 Site Ownership and History

The property is currently owned by Catherine Simmons. The site was used by the L.R. Smith Hardwood Lumber Company by 1951. In 1963, the mill became Ross Simmons Hardwood Lumber Company, which included land north of the railroad tracks (subsequently sold and not part of the current subject property). The facility shut down and equipment and buildings were cleared from the site in 2001.

2.0 PREVIOUS ENVIRONMENTAL ASSESSMENTS

Figure 2 illustrates the locations of previous soil and groundwater testing the the site. Laboratory data associated with the following assessment projects is compiled into Tables 1 and 2 of this report. The laboratory reports for each assessment were reviewed to ensure the accuracy of the data contained in the tables.

2.1 Phase I Environmental Site Assessment (PBS Environmental, July 1997)

PBS Environmental completed a Phase I Environmental Site Assessment (Phase I ESA) of the property for Ross Simmons Hardwood Lumber Company and had the following findings:

- In 1991, approximately 110 cubic yards of petroleum-contaminated soil were removed from the east side of the truck shop and spread out in an undetermined area of the log yard on the north portion of the property.
- The former use of the truck shop for maintenance and repair for over 30 years was considered to present an environmental concern.

2.2 Phase II Environmental Site Assessment (PBS Environmental, July 1997)

In June 1997, PBS Environmental completed five test pits were completed. Soil and groundwater were tested. Saturated soil was encountered at 4-7 feet below ground surface (bgs). Elevated concentrations of diesel and heavy oil petroleum hydrocarbons were identified on the south and west sides of the truck shop building. The lateral extent of contaminated soils appears to cover an area of approximately 4,500 square feet with an average thickness of 3.5 feet. The total estimated volume was 600 cubic yards.

Groundwater at TP-1, completed between the two buildings and north of the septic tank, contained petroleum at 2.09 mg/L, in excess of MTCA (1.0 mg/L). No elevated heavy metals or volatile organic compounds (VOCs) were identified. The source of the petroleum contamination

appears to be the result of dumping or spillage of oil and diesel fuel on the former ground surface.

2.3 Environmental Site Investigation and Risk Assessment (PBS Environmental, Jan. 2000)

In December 1999, PBS Environmental completed seven additional test pits at the site and six temporary borings using a pushprobe drilling rig. The most contaminated soil appeared to be located at shallow depths between the two shop building and immediately south and extends to approximately 6 feet bgs.

Diesel-range petroleum was detected in groundwater, exceeding the MTCA limit at GP-3 and GP-4. VOCs and polynuclear aromatic hydrocarbons (PAHs) were detected; at GP-4, two carcinogenic PAHs exceeded MTCA limits.

A conceptual site model was prepared, potential contaminant migration pathways and potential receptors were evaluated, and a risk assessment was performed under MTCA Method B and C. Unacceptable risk was found for residential receptors; the groundwater ingestion pathway was considered to be incomplete; based on industrial usage, the direct contact pathway was not considered to be a risk.

Because of the risk of groundwater migrating offsite to the east, the highest beneficial use of groundwater as drinking water was applied and the MTCA Method A regulatory criteria of 1.0 mg/L was applied to groundwater.

In order to reduce the level of petroleum in groundwater, it was recommended that contaminated soils be removed followed by periodic testing of groundwater. Institutional controls were also recommended to prevent residential use of the site; as well as precautions related to management of petroleum-contaminated soils during future site work.

3.0 REGIONAL GEOLOGY AND HYDROGEOLOGY

Surficial geologic units in the immediate vicinity of the subject property are comprise of Recent silts, sands and gravels deposited by the Cowlitz and Columbia Rivers. Beneath the alluvial deposits are Eocene marine sedimentary rocks of the Cowlitz Formation, which are locally interbedded with volcanic rocks and the Miocene basalt rock of the Columbia River Basalt Group.

Groundwater is present in the silt and sand beds within the alluvial deposits. The local depth to groundwater has been measured at 6-8 feet bgs during previous investigations, however was over 16 feet bgs in the present study. Based on the location of major waterways to the north, east and south of the site, the local direction of shallow groundwater flow probably varies throughout the year in response to changing river levels, precipitation events and tidal influences.[1]

4.0 PURPOSE AND SCOPE

The purpose of the current investigation was to retest soil and groundwater at the locations of previous elevated petroleum concentrations, to determine if any degradation has occurred since the last round of testing was conducted in 1999.

[1] From *Environmental Site Investigation and Risk Assessment,* PBS Environmental, January 2000.

The proposed scope of work for the current investigation consisted of the completion of four test pits in the following areas (refer to Figure 2):

- Near the former septic tank between the truck shop and fab shop; testing soil at 4 feet bgs and groundwater at around 10-12 feet bgs (TP-8)
- Off the southeast corner of the truck shop; testing groundwater at around 10-12 feet bgs (TP-11)
- Between the two buildings off of the southeast corner of the fab shop; testing soil at 4' bgs (TP-9)
- About 40 feet south of the fab shop; testing soil at 2 feet bgs (TP-10)

5.0 SOIL AND GROUNDWATER SAMPLING

On July 8, 2016, PBS supervised Breaking Ground Excavation to conduct the test pitting. Test pits were numbered starting at TP-8.

Figure 2 shows the location of the test pits advanced at the site, as well as historic test pits and pushprobe test locations. In all test pits, soils were logged continuously, noting grain size, color, odor, and moisture. Photoionization detector (PID) measurements were taken to assess for the presence of volatile contaminants. For the PID screening, soil was collected at approximately 2-foot intervals and placed into a disposable zipper-type plastic bag that was sealed, gently shaken, and allowed to rest for 5 to 15 minutes. The PID tip was then inserted into the bag to measure total volatile compounds.

When collecting soil samples in the temporary test pits, PBS followed its standard operating procedure (SOP) provided in Appendix B. When collecting groundwater samples from the test pits, a peristaltic pump was utilized. A weighted stainless steel tube weight was attached to the sampling end of the polyurethane tubing and lowered into the water column. This procedure allowed sampling of a representative groundwater sample while avoiding contaminants that may be floating or suspended near the water surface. Groundwater was purged until turbidity visually cleared to an acceptable level before collecting a sample.

All samples were collected in laboratory-supplied containers, placed on ice in a cooler and transported to ECS Lab Sciences with chain-of-custody documentation. Analyses were conducted under normal turnaround time.

Sampling equipment was decontaminated using a detergent wash and a deionized water rinse. PBS personnel wore new disposable nitrile gloves when collecting samples. Upon completion of sampling, the test pits were backfilled with removed soil to the original surface grade.

6.0 INVESTIGATION-DERIVED WASTES

Gloves, tubing and other disposable field supplies were disposed of as solid waste. Excavated soil, purged groundwater, and decontamination water were placed back into the test pits from which they originated.

7.0 FINDINGS

7.1 Soil and Groundwater Field Observations

The surface of most of the site was covered by compacted gravel or dirt with some concrete foundation remnants. Generally, the subsurface across the site consisted of silty gravelly sand

underlain by medium silt that increasing in clay content with depth. Soils had a petroleum odor; groundwater seeping into TP-11 had a sheen. Graphic test pit logs are provided in Appendix E.

Groundwater was encountered between 16-17' bgs at TP-8 and at 11-12' bgs at TP-11.

7.2 Soil Analytical Results

Soil was tested at three of the four test pit locations. TP-8 was completed in the north end of the known impact area near former test points TP-1 and GP-4 to reassess for elevated diesel/heavy oil petroleum found around 4 feet bgs. Samples TP-8-4 contained levels of diesel and heavy oil higher than any previously found at the site.

TP-9 was completed between the two shop building near the south end near previous test points TP-3 and GP-2, where petroleum was elevated in soil at 4 feet bgs. TP-9-4 contained detectable petroleum but at two orders of magnitude less; levels now are well below the regulatory limits.

TP-10 was located south of the fab shop near the location of the previous test point GP-1, where soil at 2 feet bgs contained very high levels of petroleum hydrocarbons. TP-10-2 contained very low levels of petroleum, near the laboratory detection limit, therefore this location now appears to be well below the regulatory limits.

Table 1summarizes the soil sample analytical results; the laboratory report is provided in Appendix C.

7.3 Groundwater Analytical Results

Groundwater was tested at two previous locations where previous groundwater tests had shown elevated petroleum levels. TP-8-GW was collected near GP4-W and TP-1; petroleum content at TP-8-GW was higher than GP-4 but lower than had been detected at TP-1. Petroleum levels in groundwater at TP-8 are above the regulatory limit.

TP-11-GW was a groundwater sample collected near the previous GP-3 near the east central property line. The petroleum level found at TP-11-GW was much less that previously detected, and levels are well below the regulatory limit.

Table 2 summarizes the groundwater sample analytical results; the laboratory report is provided in Appendix C.

8.0 EXTENT OF CONTAMINATION

The test pits were located as close as could be determined in the field to the previous test points. In some locations, significant attenuation of petroleum levels was observed over a 17-year interval of time. Soil at GP-1 at 2 feet bgs contained 47,400 mg/kg diesel and 62,400 mg/kg heavy oil. The new test pit at that location, TP-10, contained levels of diesel and heavy oil both below 50 mg/kg. A similar attenuation was seen between the previous sample GP-2-4 and sample TP-9-4. Although inhomogenities in the soil and in the contamination play a part of this difference, it can be concluded that the extent of elevated petroleum at these locations is limited.

In contrast, sample GP-4-4 near the former septic tank was followed by sample TP-8-4 containing much higher levels of petroleum. Deeper soil sample TP-8-9 contained petroleum an order of magnitude less than at 4 feet bgs.

Groundwater comparison samples showed attenuation between former GP-3 and TP-11, where the levels are now below regulatory limits. Groundwater at TP-8 near the former septic tank, however, is above regulatory limits.

The remaining zones of soil contamination appear to lie within 0 to 4 feet of the ground surface between and around the foundation pads of the former shop buildings. In particular, there is a thin layer of cohesive, tarry soil at approximately 18 inches depth. This may represent a former oiled road surface.

The second zone consists of diesel and heavy oil-impacted soil from a depth of 2 to 10 feet in the north area between the shops and near the former septic tank (vicinity of test point GP-4). This zone may have been a result of dumping waste oil or fuel on the ground as well as possible discharge from the septic tank. It is also the location of groundwater contamination that exceeds regulatory limits.

Groundwater contamination appears to remain only in the vicinity of the former septic tank.

9.0 RISK-BASED EVALUATION

A Conceptual Site Model (CSM) and risk assessment performed in 2000 describes the known or suspected sources of contamination, considers how the contaminants are likely to migrate (pathways), and identifies who is likely to be affected by the contaminants (receptors). In order for risk to be present at the site, a source must be present, pathways must be complete, and receptors must be present.

The risk assessment under MTCA Methods B and C found three potential exposure pathways:

- Direct human contact with contaminated soil
- Soil contaminants leaching to groundwater that is ingested
- Direct ingestion of contaminants in groundwater

It was assumed that industrial was the current and likely future use of the property.

Completion of the evaluation indicated no unacceptable risk to an industrial receptor via the "soil contact" pathway. Soil impacts between the shop buildings pose an unacceptable risk to a receptor who might ingest groundwater from a well in that area. However, since there are no water supply wells drawing water from this impacted zone, neither groundwater pathway is considered to be complete.

10.0 CONCLUSIONS AND RECOMMENDATIONS

Based on a continued industrial use of the property, the existing levels of petroleum contamination do not present a risk to industrial site workers. In order to maintain protection of future occupants, institutional controls (deed restrictions) are recommended to ensure that the property remains industrial in usage, and that water supply wells are not constructed in the areas of impact.

In addition, a Contaminated Media Management Plan should be developed for use by future property owners to aid in the identification of contaminated soil and proper handling and disposal.

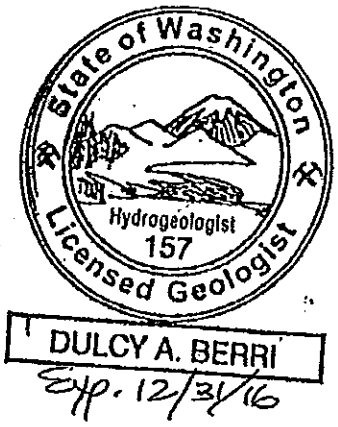
11.0 LIMITATIONS

PBS has prepared this report for use by Catherine Simmons. This report is for the exclusive use of the client and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced in total or in part without the expressed written consent of the client and PBS.

This study was limited to the tests, locations, and depths as indicated to determine the absence or presence of certain contaminants. The site as a whole may have other contamination that was not characterized by this study. The findings and conclusions of this report are not scientific certainties but, rather, probabilities based on professional judgment concerning the significance of the data gathered during the course of this investigation. PBS is not able to represent that the site or adjoining land contain no hazardous waste, oil or other latent conditions beyond that detected or observed by PBS. Groundwater data collected from temporary borings is considered preliminary; detections may need confirmation by installation of permanent wells.

PBS Engineering and Environmental Inc.

Dulcy A. Berri



July 28, 2016

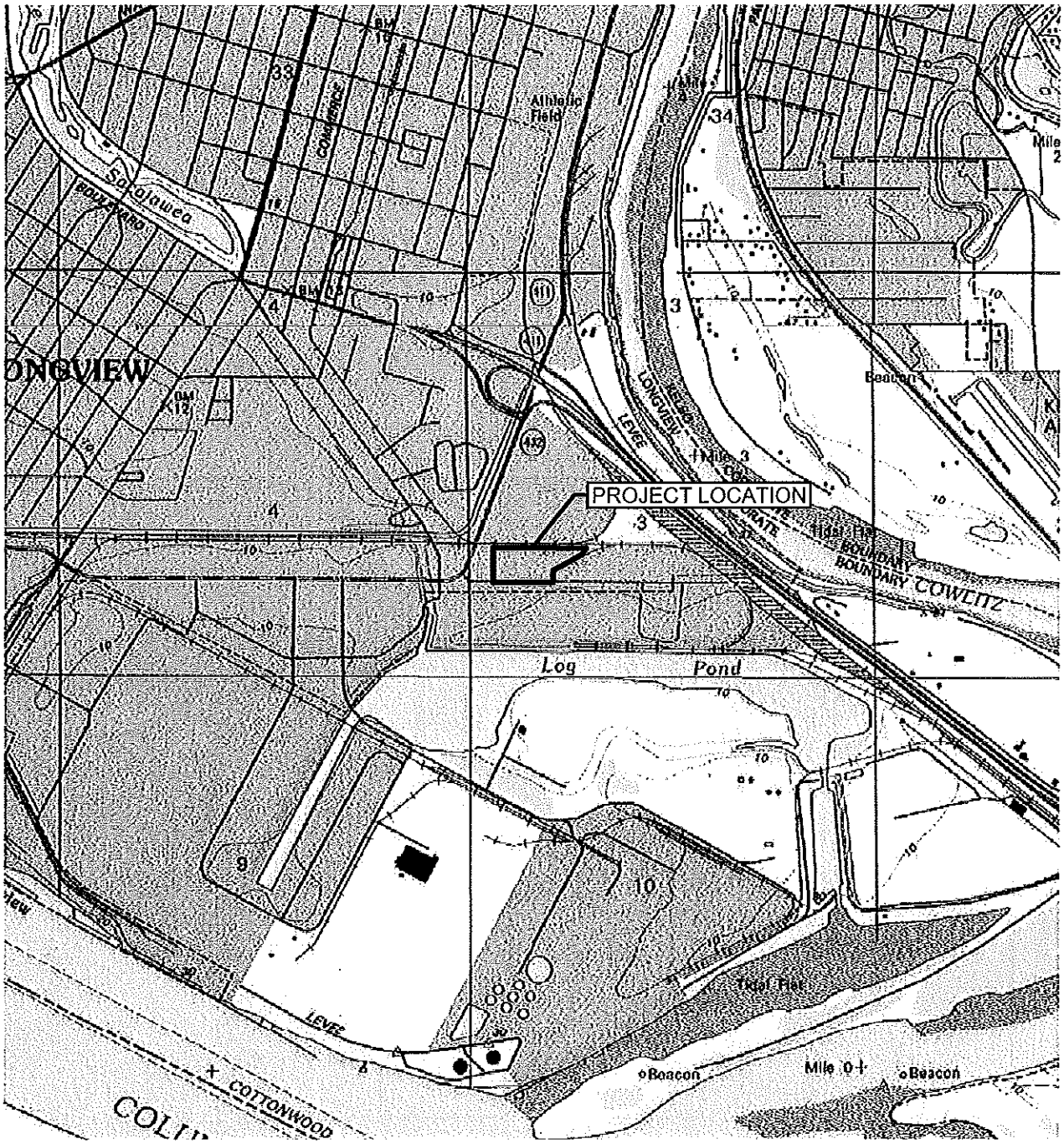
Dulcy A. Berri, LHG — Date
Senior Hydrogeologist

Chad Koepfle

July 21, 2016

Chad Koepfle — Date
Staff Geologist

FIGURES



SOURCE: USGS RAINIER, OR WA QUADRANGLE 1990.

0' 1,000' 2,000' 4,000'

SCALE: 1" = 2,000'

PREPARED FOR: CATHERINE SIMMONS

PBS	PROJECT # 22488.000 DATE JUNE 2016	VICINITY MAP 250 INDUSTRIAL WAY LONGVIEW, WASHINGTON	FIGURE 1

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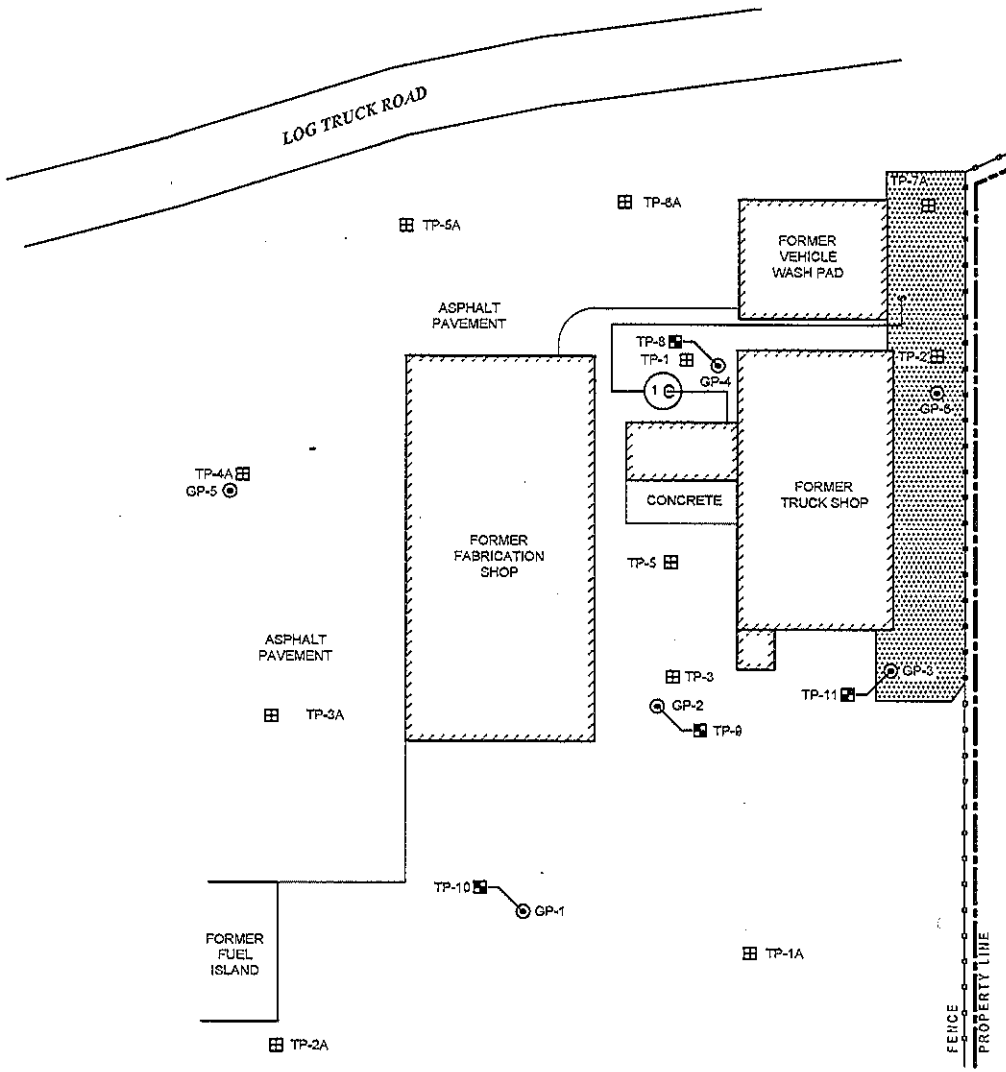

GENERAL NOTES

1. RECENT 2016 TEST PITS WERE PLACED AT THE APPROXIMATE CENTER OF GEOPROBE LOCATIONS BY MEASURING OFF OF BUILDING CORNERS USING THE MAP AS SCALE.

LEGEND

- TP-8 TEST PIT NUMBER AND LOCATION (PBS JULY 2016)
- TP-1 TEST PIT NUMBER AND LOCATION (PBS 1997/1999)
- GP-1 GEOPROBE BORING NUMBER AND LOCATION (PBS 1999)
- AREA OF PETROLEUM-CONTAIMINATED SOIL REMOVAL IN 1991
- (1) FORMER SEPTIC TANK LOCATION

0' 10' 20' 40'

SCALE: 1" = 20'

PREPARED FOR: CATHERINE SIMMONS

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SOIL SAMPLING SITE PLAN

250 INDUSTRIAL WAY
LONGVIEW, WASHINGTON

SITE PLAN

PROJECT: 22488.000_0003

DATE: JULY 2016

FIGURE: 2

TABLES

Table 1. Soil Sample Results
Former Ross Simmons
Longview, Washington

		TPH (mg/kg)			VOCs (mg/kg)				
Sample ID	Sample Date	Sampling Depth	Diesel	Heavy Oil	Benzene	Toluene	Ethylbenzene	o,m,p-Xylenes	Naphthalene
		feet bgs							
TP1-4	6/24/1997	4	1,140 (total)		ND	ND	ND	ND	15.1
TP3-3	6/24/1997	3	**17,500 (total)**		ND	ND	ND	0.631	ND
TP3-7	6/24/1997	7	**8,850 (total)**		ND	0.177	0.222	1.355	6.76
TP1a-1	12/06/99	1	ND	58.6	nt	nt	nt	nt	nt
TP2a-1	12/06/99	1	ND	ND	nt	nt	nt	nt	nt
TP3a-2	12/06/99	2	ND	945	nt	nt	nt	nt	nt
TP4a-4	12/06/99	4	ND	4,710	nt	nt	nt	nt	nt
TP4a-8	12/06/99	8	ND	ND	nt	nt	nt	nt	nt
TP5a-2	12/06/99	2	1,580	4,390	nt	nt	nt	nt	nt
TP6a-2	12/06/99	2	1,970	7,920	nt	nt	nt	nt	nt
GP1-2	12/06/99	2	**47,400**	**62,400**	ND	ND	ND	1.108	8.71
GP1-3	12/06/99	3	ND	ND	nt	nt	nt	nt	nt
GP2-4	12/06/99	4	**14,400**	**16,500**	ND	0.617	0.543	3.98	16.2
GP2-6	12/06/99	6	ND	ND	nt	nt	nt	nt	nt
GP3-7	12/06/99	7	ND	ND	nt	nt	nt	nt	nt
GP4-4	12/06/99	4	4,320	4,500	ND	ND	ND	ND	0.709
GP4-10	12/06/99	10	241	351	nt	nt	nt	nt	nt
GP5-4	12/06/99	4	ND	4,710	ND	ND	ND	ND	0.132
GP5-8	12/06/99	8	ND	ND	nt	nt	nt	nt	nt
TP-8-4	07/08/16	4	**58,100**	**74,300**	nt	nt	nt	nt	nt
TP-8-9	07/08/16	9	**2,420**	**2,320**	nt	nt	nt	nt	nt
TP-9-4	07/08/16	4	238	227	nt	nt	nt	nt	nt
TP-10-2	07/08/16	2	35.4	47.5	nt	nt	nt	nt	nt
Washington MTCA Method A Limits for Industrial Soil			2,000		0.03	7	6	9	5

Bold text indicates an exceedance of the cleanup levels
nt: Not tested for that analyte
mg/kg: milligrams per kilogram
GP-6, TP2, TP4, TP5, TP7 and TP11 - no soil sampled
ND: No detection

Table 2. Groundwater Sample Results
Former Ross Simmons
Longview, Washington

Sample ID	Sample Date	TPH (mg/L)		VOCs (ug/L)				
		Diesel	Heavy Oil	Benzene	Toluene	Ethylbenzene	o,m,p-Xylenes	Naphthalene
TP1-W	6/24/1997	**2.09 (total)**		ND	24.4	ND	ND	ND
TP2-W	6/24/1997	**0.662 (total)**		ND	ND	ND	ND	ND
TP3-W	6/24/1997	ND		ND	ND	ND	ND	ND
TP5-W	06/24/97	ND		ND	ND	ND	ND	ND
GP1-W	12/06/99	ND	ND	ND	11.7	ND	ND	ND
GP2-W	12/06/99	0.317	ND	ND	ND	ND	ND	0.210
GP3-W	12/06/99	0.470	**0.989**	ND	ND	ND	ND	ND
GP4-W	12/06/99	**0.589**	**0.613**	ND	ND	ND	ND	ND
GP5-W	12/06/99	0.354	ND	ND	ND	ND	4.75	0.150
GP6-W	12/06/99	0.359	ND	ND	ND	ND	ND	0.356
TP-8-GW	07/08/16	**1.380**	**1.580**	nt	nt	nt	nt	5.01
TP-11-GW	07/08/16	0.122	ND	nt	nt	nt	nt	nt
Washington MTCA Method A Cleanup Levels		0.50		5	1,000	700	1,000	160

Bold text indicates an exceedance of the cleanup level
nt: Not tested for that analyte
NS: No standard set for this compound
ND: No detection
mg/L: milligrams per Liter; ug/L: micrograms per Liter

APPENDIX A

Standard Operating Procedure

PBS | Engineering + Environmental *Est. 1982*

STANDARD OPERATING PROCEDURE
DRILLING AND SOIL SAMPLING PROCEDURES

1.0 PURPOSE

This Standard Operating Procedure (SOP) provides an overview of mobile drilling methods typically used during environmental investigations along with associated health and safety issues. This document outlines procedures to be followed by PBS personnel during drilling and soil sampling activities. Groundwater and soil gas sample collection through the use of drill rigs are covered under separate SOPs.

2.0 TYPES OF DRILL RIGS

There are three types of drilling methods that are typically used for environmental investigations: direct push, auger, and sonic. Each type of drilling method is described below. A fourth option, discussed in Section 2.4, is a hand auger tool.

2.1 Direct-Push Drilling

Direct-push drilling methods are a common drilling technology used in environmental investigations due to the small diameter borehole (two and one-quarter inch (2.25")) that generates significantly less investigation-derived waste (IDW). The rigs are hydraulically powered, and use static and percussion force to advance the drill rods. Limited access rigs are available for interior locations while track-mounted rigs allow for sampling in locations with unimproved roads.

The rods are equipped with disposable plastic liners that contain the soil retrieved for observation and sampling. The entire column of rods is removed from the ground each time to retrieve soil for sampling. The rod lengths can be 3, 4, or 5 feet. Because of this, if caving or excessive slough is a concern, the borehole may be temporarily cased to keep it clear and open during soil sample retrieval.

2.2 Hollow Stem Auger Drilling (HSA)

Hollow stem auger drilling methods use hollow corkscrew drilling flights to advance into the subsurface. The borehole is typically 11 inches in diameter, with the flights having a 6-inch inner diameter space in which to retrieve samples or construct wells. The hollow stem auger drill rigs have better capability to penetrate higher density deposits that the direct push probe method. Some direct-push rigs have the capacity to drill with hollow stem auger flights, but these rigs typically do not have the mechanical power to drill through challenging soil. The use of auger drill rigs for environmental investigations is typically for the installation and decommissioning of monitoring wells.

Soil sampling with an auger drill rig is conducted through the use of split spoon samplers or Shelby tubes deployed through the inner hollow space. Split spoon samplers are typically 2.5 feet in length and advanced by hammer weight blow into the undisturbed soil. Shelby tubes are typically used in soft deposits such as clays. Soil brought to the surface on the exterior of drilling flights is considered drill or soil cuttings. Soil samples should not be collected and analyzed from the cuttings because that soil may have come in contact with other soil or contamination from varying depths.

2.3 Rotosonic Drilling

Rotosonic drilling methods (hereafter referenced as sonic method) advance drill rod flights into the ground through the use of vibration, and full-size sonic rigs can advance rods through very challenging unconsolidated geologic formations including large cobbles. The borehole size varies but typically is 4 to 6 inches in diameter. Due to the nature of the drilling technology, the soil can be disturbed by the vibrations, so consistency and compaction are unreliable. Soil is vibrated out of the lead flight into plastic bags for observation and sampling. The entire column of rods is removed from the ground each time to retrieve soil for sampling; if caving or excessive slough is a concern, the borehole may be temporarily cased to keep it clear during soil sample retrieval.

2.4 Hand Auger Tool

A fourth drilling option is the use of a hand auger tool, sometimes called a handheld auger. This tool, made of steel, is used to bore a hole in soil or sediments. It is intended for use only by hand and is powered by human force by twisting or screwing the tool into the soil. The soil is retrieved through a short barrel that attaches to the base of the auger rods. This tool is used for sites where the soil is relatively easy to penetrate, and when sampling is limited to the upper 5 to 10 feet of the shallow surface. Different barrels are available for coarse-grained or fine-grained material.

3.0 HEALTH AND SAFETY PLAN

A Health and Safety Plan (HASP) must be developed prior to fieldwork commencing. Typically, a site-specific HASP is prepared from a PBS template for drilling investigations. In all cases, pertinent safety information must be relayed to field personnel, including subcontractors, to communicate mandatory elements from the federal code for hazardous waste operations and emergency response (29 CFR 1910.120(b)(4)).

4.0 UTILITY LOCATES

Utility locates will be completed on all drilling projects including hand-augered sampling. The property owner or site manager should be interviewed regarding the potential location of buried utilities or other subsurface obstructions on the property. The call-in numbers are provided below. Alternately, PBS personnel can obtain log-ins to file locate requests on-line (Internet Ticket Processing, http://www.callbeforeyoudig.org/index.asp).

Oregon Utility Notification Center: 1-800-332-2344
Washington Utility Notification Center: 1-800-424-5555

The Utility Notification Center needs to be contacted at least 48 hours (two business days) in advance to locate utility-owned lines up to the meter (e.g., water, gas, electric), and public utilities within the public right-of-way (e.g., sewer). In addition, a private utility locating company is typically contracted to survey for private utilities such as utility lines from meters to buildings, drain lines, buried electric cables, or irrigation and sprinkler lines.

When filing utility notification requests, PBS personnel should be as specific as possible about where to locate. Washington law requires that the proposed excavation/drilling work areas are field-marked with white paint prior to the locating event.

When beginning a project, PBS personnel must carefully think through where boreholes can be safely drilled, considering both subsurface and overhead obstructions. A site walk may be prudent once the utilities have been marked and prior to the drilling fieldwork. If safe drilling conditions

cannot be confirmed, the PBS Project Manager should determine if engineering controls should be implemented, such as shielding or shutting down utility and/or power lines.

SAFETY NOTE: Drill rig masts must be a safe distance from overhead power lines to prevent mast lines and power lines being moved together by wind. Occupational Safety and Health Administration (OSHA) rules for drillers require a minimum distance of 10 feet, with additional spacing required depending on the voltage carried by the power line. The drill rig subcontractor is responsible for ensuring sufficient clearance. However, PBS personnel should verify that potentially unsafe conditions do not exist.

5.0 SAFETY EQUIPMENT REQUIREMENTS

The following safety equipment is required for all drilling investigations:

- Hard hat
- Hearing protection (ear muffs or plugs, must be worn when drill rig is in operation)
- Safety-toe work boots
- Safety vest
- Gloves (typically disposable)
- Safety goggles or glasses
- Life vests (only when working over water)

6.0 FIELD EQUIPMENT AND SUPPLIES REQUIREMENTS

The following equipment is typically required for drilling projects when soil sampling will occur. Groundwater or soil gas sampling is discussed in separate SOPs. PBS personnel should confirm that the drilling contractor will provide decontamination water, soap, brushes, and buckets.

General field supplies/equipment includes:

- 5-gallon buckets
- Bags (garbage)
- Bags (plastic zipper-type)
- Camera
- Cellular telephone and phone numbers of client, project laboratory, subcontractors, etc.
- Field notebook or daily log
- Measuring tape
- Paper towels
- Pens
- Spray paint (optional)

Soil sampling supplies/equipment includes:

- Project proposal/scope of work
- Alconox/Liquinox or similar decontamination detergent
- Distilled water (for decontamination)
- Environmental borehole log forms
- Hand auger (if required by scope)
- Ice chest with blue ice or party ice
- Nitrile or other chemically compatible gloves
- Photoionization detector (PID)
- Sample chain-of-custody forms

- Sample containers (ask lab about sample volume, preservatives, etc.)
- Sampling spade or spoons (if required by scope)

7.0 PRE-DRILLING ACTIVITIES

The following tasks must be performed before beginning work:

- Conduct tailgate safety meeting with all field personnel, including visitors such as the client or regulator; review Health and Safety Plan.
- Install traffic cones/barrier tape or other barrier to control pedestrian and vehicle access to work area as necessary.

The drilling subcontractor is responsible to ensure that the area on which the rig is to be positioned is cleared of removable obstacles and the rig should be leveled if parked on a sloped surface. The cleared/leveled area should be large enough to accommodate the rig and supplies. PBS personnel must confirm that the work area is cleared and safe for work prior to initiating drilling activities.

8.0 SOIL SAMPLING PROCEDURES

8.1 Logging and Field Screening Soil

Upon retrieval of the soil, describe as per the Geo-Environmental Field Classification chart for soil (included as an attachment). Record observations on an environmental borehole log.

If conducting head-space screening with a PID, remove one-quarter to one-half cup of soil and place in a sealable plastic bag. Seal the bag, break up the soil, and let sit for a minimum of five minutes (in colder weather, either wait for 15 to 30 minutes or put into a warm car or room). The purpose of the headspace screening is to measure what is off-gassing from the sample, and sufficient time must be allowed for that to occur. After the appropriate interval, place the end of the PID probe into the bag (through a small opening in the "zipper") and record the peak value.

If performing sheen testing, place a small sample volume (preferably darker or stained material) in a bowl partially filled with water and observe sheen indicative of petroleum contamination.

8.2 Collecting Soil Samples for Laboratory Analysis

Prior to collecting a sample for laboratory analysis, the sampler should don new gloves. If there are multiple samples to be collected from a single borehole, the gloves should be replaced to avoid cross-contamination.

Collect soil samples using a gloved hand or a clean sampling tool and place directly into the sample jar(s). For volatile organic compounds (VOCs), pack the soil to minimize jar headspace, or field preserve for VOCs using EPA Method 5035 (the field kit is obtained from the laboratory). Label samples as described under Section 8.3 Sample Numbering. Place labeled sample container(s) in the cooler with ice.

8.3 Sample Identification

Sample labels will be completed and attached to the jars in the field to prevent misidentification. All sample labels will include the following information:

- Project name or number
- Sample identification
- Sample collection date and time

The sample identification is unique to a particular sample and the format must be consistently used for all samples collected at the site. The sample identification typically includes the sample location and the collection depth. The sample location is the soil boring number or otherwise designated sample location. Standard abbreviations for sample location types are:

- DP = Direct push
- MW = Monitoring well
- SB = Soil boring
- SE = Sediment
- SO = Surface soil
- SS = Soil sample
- TP = Test pit
- WP = Well point

Examples of sample identifications are: DP-5 (4'), SS-22 (1'), and MW-3 (15')

Other naming conventions may be used, as long as the labeling is consistent and each location is clearly identifiable.

9.0 BOREHOLE ABANDONMENT

The licensed driller is responsible for abandoning boreholes in compliance with state regulations. PBS personnel should ensure that this occurs, and that the sealing material (typically bentonite chips) is sufficiently hydrated for a proper seal. State regulations governing this are:

- Oregon Administration Rule (OAR) 690-240
- Washington Administrative Code (WAC) 173-160

10.0 DECONTAMINATION PROCEDURES

Minimizing the possibility of cross-contamination between samples is a critical component of a successful soil sampling project. This is achieved by consistent and thorough decontamination of sampling equipment, such as drill rods, sampling devices (split spoons, trowels, etc.), and other tools that may come in contact with soil to be sampled.

For drilling equipment, the drilling contractor is responsible for the decontamination procedures. Typically, a pressure washer with hot water or water with added detergent is used to clean drill rods and other equipment. The use of a steam cleaner is not appropriate because of the risk of burns, and steam cleaners do a poor job of removing soil particles from equipment.

For equipment and supplies used by PBS personnel, water with added detergent is typically used for decontamination. Alternately, disposable supplies, such as gloves and sampling scoops, can be used to avoid having to decontaminate them.

PBS field personnel should work with the PBS Project Manager to confirm the appropriate decontamination procedure for each project. For example, it may be important to know the source of the driller's water used for decontamination, and distilled or deionized water may need to be used to clean hand tools.

All water and sludge generated during decontamination will be captured for later disposal. Release of water directly onto the ground or into drains or catch basins is not allowed.

11.0 INVESTIGATION-DERIVED WASTE

Investigation-derived waste consists of soil cuttings, decontamination water, purge water (if groundwater is encountered), and personal protective equipment (e.g., nitrile gloves, rags, paper towels, Tyvex suits, disposable bailers, and tubing). All disposable personal protective equipment may be disposed of as general refuse unless otherwise instructed by the PBS Project Manager.

Soil cuttings are typically placed in 5-gallon buckets or other appropriate containers during the execution of the fieldwork, and transferred to 55-gallon drums as the project progresses. If appropriate, the cuttings may remain in buckets as long as tight-fitting lids are placed on each bucket. For some projects, the PBS Project Manager may request that decontamination/purge water be placed into the same drums as the soil, instead of keeping the two media separate. Depending on the type of contamination, this may result in cost savings for the client during disposal. Field personnel should confirm how to contain soil and water prior to each field event.

11.1 Drum Labeling

The storage containers must be labeled as hazardous, non-hazardous, or unknown pending laboratory results. The labels must be completed using an indelible marker and include:

- Date that the contents were generated
- Nature of the contents - for example:
  - Drill cuttings
  - Purged groundwater
  - Decontamination water and/or sludge
- Contact phone number in the event emergency response personnel need to identify the contents of the container.

Drums or other storage containers should be placed in as secure a location as possible, which may be a building if the exterior area is not secure from vandalism.

12.0 POST-DRILLING ACTIVITIES

Upon return to the office, PBS personnel should:

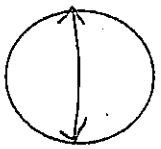
- Clean and calibrate equipment prior to placing back into storage. If there were any operational issues noted, they should be reported immediately to the equipment manager.
- Submit field borehole logs for electronic formatting for future reports.
- Submit the daily field notes to the PBS Project Manager for placement into the project file. If a field notebook was used, and that notebook is not dedicated to that project, a copy of those notebook pages should be submitted.

APPENDIX B

Test Pit Logs

PBS

Test Pit Log

Test Pit Direction:  Test Pit Azimuth Degrees: 0 - 180°	Project Number: 22488.000	Test Pit Number: TP-8	Surface Conditions: Dirt
	Project Name: Former Ross Simmons Lumber	Page 1 of 4	
	Location: Longview		
	Equipment Used: excavator	Bucket Size: ~24"	Seepage: Yes, bottom
	Backhoe Contractor: Breaking Ground / Start Date: 7/8/16	Time: 900	Caving: Yes
	Logged By: Chad K / End Date: 7/8/16	Time: 1030	Lat: —
	Elevation: — AMSL	Elevation Source:	Long: —

Sample Depth	Sample No.	PPT or Torvane	Depth (ft)	Soil/Material Description
			1	0-3 Silty Gravel Sand
			2	
			3	3-17 Elastic silt, medium plasticity, Damp, brown-gray color, low to
X	TP-8-4		4	moderate petro odor
			5	
			6	
			7	
			8	Increasing Clay % with depth, less graininess/smoothness
X	TP-8-9		9	
			10	
			11	
			12	
			13	
	TP-8-GW		14	Backfilled with excavated soil + compacted with bucket

Horizontal Length (ft.): 0, 2, 4, 6, 8, 10, 12

← PVC pipe / sand backfill

Max PID 6.5 ppm 8'

Max PID 30.0 ppm 9-10'

Total depth 17', GW encountered 16-17' bgs, low recharge

Dated: 09/11/14

PBS

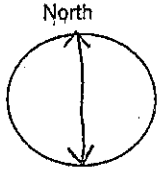
Test Pit Log

Test Pit Direction: North	Project Number: 22488.000	Test Pit Number: TP-9	Surface Conditions: Grass/dirt
Test Pit Azimuth Degrees: 0-180°	Project Name: Former Ross Simmons Lumber	Page 2 of 4	
	Location: Longview		
	Equipment Used: CAT Excavator	Bucket Size: ~24"	Seepage: no
	Backhoe Contractor: Breaking Ground Exc	Start Date: 7/18/16 Time: 1030	Caving: no
	Logged By: Chad K	End Date: 7/8/16 Time: 1100	Lat: —
	Elevation: — AMSL	Elevation Source: —	Long: —

Sample Depth	Sample No.	PPT or Torvane	Depth (ft.)	Soil/Material Description	Horizontal Length (ft.) 0 2 4 6 8 10 12
				0-0.5 Dirt/surface gravel	
			1		
			2	0.5-4 Elastic Silt, MP-HP, no sand/gravels, dry slightly damp, slight gray hue 2-4', moderate petro odor.	Max PID: 2.3 ppm
			3		
X	TP9-4		4		
			5	Backfilled + compacted with excavated dirt	
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		

PBS

Test Pit Log

Test Pit Direction:  Test Pit Azimuth Degrees: 0° - 180°	Project Number: 22488.000	Test Pit Number: TP-10	Surface Conditions: Dirt
	Project Name: Former Ross Simmons Lumber	Page 3 of 4	
	Location: Longview		
	Equipment Used: CAT Excavator	Bucket Size: ~24" wide	Seepage: NO
	Backhoe Contractor: Breaking Ground Exc	Start Date: 7/18/16 Time: 0845	Caving: NO
	Logged By: Chad K	End Date: 7/18/16 Time: 1330	Lat: —
	Elevation: — AMSL	Elevation Source: —	Long: —

Sample Depth	Sample No.	PPT or Torvane	Depth (ft.)	Soil/Material Description	Horizontal Length (ft.) 0 2 4 6 8 10 12
			0	0-0.5 Dirt/surface gravels	
			1		
X	TP-10-2		2	0.5-4 Brown Silt, Medium plasticity, no sand/gravel, mostly dry, slight Petro odor, slight gray hue 2-4'	max ppm: 1.2
			3		
			4		
			5	Backfilled with excavated dirt/compacted	
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		

Dated: 09/11/14

PBS

Test Pit Log

Test Pit Direction: North	Project Number: 22488.000	Test Pit Number: TP-11	Surface Conditions: Dirt
	Project Name: Former Ross Simmons Lumber	Page 4 of 4	
	Location: Longview		
	Equipment Used: Excavator	Bucket Size: 24"	Seepage: Yes, bottom
Test Pit Azimuth Degrees: 45 - 225°	Backhoe Contractor: Breaking ground	Start Date: 7/18/16 Time: 1130	Caving: NO
	Logged By: Chad K	End Date: 7/18/16 Time: 1230	Lat: —
	Elevation: — AMSL	Elevation Source: —	Long: —

Sample Depth	Sample No.	PPT or Torvane	Depth (ft.)	Soil/Material Description
			0	0-1 surface dirt/gravel
			1	1-12 Elastic Silt, brown, slight odor
			2	
			3	
			4	Increase clay % with depth
			5	
			6	Sandy fill 0-8' NE end pit Some water seepage
			7	
			8	
			9	Saturated soils 11-12', sheen on gw entering ~~pit~~ pit
			10	slow seepage rate, sample immediately
			11	
X	TP-11-GW		12	
			13	Backfilled with excavated soil + compacted
			14	

Horizontal Length (ft.): 0 2 4 6 8 10 12

Sandy fill material 0-8' bgs NE end Seepage

GW encountered 11-12'

NO Soil Samples Collected

Dated: 09/11/14

APPENDIX C

Laboratory Reports
Chain-of-Custody Documentation

ESC LAB SCIENCES
YOUR LAB OF CHOICE

ANALYTICAL REPORT

July 20, 2016

myESC
REAL TIME DATA ACCESS

PBS Engineering & Environmental

Sample Delivery Group:	L846205
Samples Received:	07/09/2016
Project Number:	22488.000
Description:	Former Ross Simmons Hardwood Lumber

Report To: Dulcy Berri, Chad Koepfle
4412 SW Corbett Ave
Portland, OR 97239

Entire Report Reviewed By: Brian Ford

Brian Ford
Technical Service Representative

TABLE OF CONTENTS

TP-8-4 L846205-01 Solid

Collected by: Chad Koepfle | Collected date/time: 07/08/16 09:35 | Received date/time: 07/09/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX	WG887361	400	07/10/16 08:13	07/11/16 15:41	KLM
Total Solids by Method 2540 G-2011	WG887981	1	07/12/16 13:38	07/12/16 13:49	KDW

TP-8-GW L846205-02 GW

Collected by: Chad Koepfle | Collected date/time: 07/08/16 11:50 | Received date/time: 07/09/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Semi Volatile Organic Compounds (GC/MS) by Method 8270D-SIM	WG887750	20	07/11/16 21:55	07/13/16 06:04	FMB
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX	WG888161	5	07/14/16 08:58	07/14/16 16:26	TRF

TP-9-4 L846205-03 Solid

Collected by: Chad Koepfle | Collected date/time: 07/08/16 10:40 | Received date/time: 07/09/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX	WG887361	10	07/10/16 08:13	07/11/16 15:04	KLM
Total Solids by Method 2540 G-2011	WG887981	1	07/12/16 13:38	07/12/16 13:49	KDW

TP-10-2 L846205-04 Solid

Collected by: Chad Koepfle | Collected date/time: 07/08/16 11:10 | Received date/time: 07/09/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX	WG887361	1	07/10/16 08:13	07/11/16 17:09	KLM
Total Solids by Method 2540 G-2011	WG887981	1	07/12/16 13:38	07/12/16 13:49	KDW

TP-11-GW L846205-05 GW

Collected by: Chad Koepfle | Collected date/time: 07/08/16 12:00 | Received date/time: 07/09/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX	WG889512	1	07/15/16 20:39	07/19/16 03:25	CLG

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford

Brian Ford
Technical Service Representative

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	90.5		1	07/12/2016 13:49	WG887981

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Diesel Range Organics (DRO)	58100		1770	400	07/11/2016 15:41	WG887361
Residual Range Organics (RRO)	74300		4420	400	07/11/2016 15:41	WG887361
(S) o-Terphenyl	*0.000*	J7	*50.0-150*		*07/11/2016 15:41*	WG887361

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Diesel Range Organics (DRO)	1380	B	500	5	07/14/2016 16:26	WG888161
Residual Range Organics (RRO)	1580		1250	5	07/14/2016 16:26	WG888161
(S) o-Terphenyl	*71.8*		*50.0-150*		*07/14/2016 16:26*	WG888161

Semi Volatile Organic Compounds (GC/MS) by Method 8270D-SIM

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Anthracene	2.59		1.00	20	07/13/2016 06:04	WG887750
Acenaphthene	4.29		1.00	20	07/13/2016 06:04	WG887750
Acenaphthylene	ND		1.00	20	07/13/2016 06:04	WG887750
Benzo(a)anthracene	ND		1.00	20	07/13/2016 06:04	WG887750
Benzo(a)pyrene	ND		1.00	20	07/13/2016 06:04	WG887750
Benzo(b)fluoranthene	ND		1.00	20	07/13/2016 06:04	WG887750
Benzo(g,h,i)perylene	ND		1.00	20	07/13/2016 06:04	WG887750
Benzo(k)fluoranthene	ND		1.00	20	07/13/2016 06:04	WG887750
Chrysene	2.87		1.00	20	07/13/2016 06:04	WG887750
Dibenz(a,h)anthracene	ND		1.00	20	07/13/2016 06:04	WG887750
Fluoranthene	ND		1.00	20	07/13/2016 06:04	WG887750
Fluorene	5.52		1.00	20	07/13/2016 06:04	WG887750
Indeno(1,2,3-cd)pyrene	ND		1.00	20	07/13/2016 06:04	WG887750
Naphthalene	5.01	B	5.00	20	07/13/2016 06:04	WG887750
Phenanthrene	11.7		1.00	20	07/13/2016 06:04	WG887750
Pyrene	4.91		1.00	20	07/13/2016 06:04	WG887750
1-Methylnaphthalene	67.1		5.00	20	07/13/2016 06:04	WG887750
2-Methylnaphthalene	ND		5.00	20	07/13/2016 06:04	WG887750
2-Chloronaphthalene	ND		5.00	20	07/13/2016 06:04	WG887750
(S) Nitrobenzene-d5	*66.9*	J7	*45.1-170*		*07/13/2016 06:04*	WG887750
(S) 2-Fluorobiphenyl	*83.9*	J7	*57.7-153*		*07/13/2016 06:04*	WG887750
(S) p-Terphenyl-d14	*77.9*	J7	*53.2-156*		*07/13/2016 06:04*	WG887750

Sample Narrative:

8270D-SIM L846205-02 WG887750: Dilution due to matrix

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	74.0		1	07/12/2016 13:49	WG887981

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Diesel Range Organics (DRO)	238	J3 V	54.0	10	07/11/2016 15:04	WG887361
Residual Range Organics (RRO)	227	J3 V	135	10	07/11/2016 15:04	WG887361
(S) o-Terphenyl	*74.2*		*50.0-150*		*07/11/2016 15:04*	WG887361

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	74.0		1	07/12/2016 13:49	WG887951

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Diesel Range Organics (DRO)	35.4		5.40	1	07/11/2016 17:09	WG887361
Residual Range Organics (RRO)	47.5		13.5	1	07/11/2016 17:09	WG887361
(S) o-Terphenyl	*50.9*		*50.0-150*		*07/11/2016 17:09*	WG887361

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Diesel Range Organics (DRO)	405		100	1	07/19/2016 03:25	WG889512
Residual Range Organics (RRO)	621		250	1	07/19/2016 03:25	WG889512
(S) o-Terphenyl	*76.4*		*50.0-150*		*07/19/2016 03:25*	WG889512

Method Blank (MB)

(MB) R3149287-1 07/12/16 13:49

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.000800			

L846203-16 Original Sample (OS) • Duplicate (DUP)

(OS) L846203-16 07/12/16 13:49 • (DUP) R3149287-3 07/12/16 13:49

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	77.3	77.4	1	0.159		5

Laboratory Control Sample (LCS)

(LCS) R3149287-2 07/12/16 13:49

Analyte	Spike Amount %	LCS Result %	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Solids	50.0	50.0	99.9	85.0-115	

Method Blank (MB)

(MB) R3148761-1 07/10/16 12:45

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Diesel Range Organics (DRO)	U		1.33	4.00
Residual Range Organics (RRO)	U		3.33	10.0
(S) o-Terphenyl	*71.4*			*50.0-150*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3148761-2 07/10/16 12:57 • (LCSD) R3148761-3 07/10/16 13:09

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Diesel Range Organics (DRO)	30.0	25.2	21.7	84.1	72.2	50.0-150			15.2	20
Residual Range Organics (RRO)	30.0	17.2	16.2	57.2	53.9	50.0-150			6.02	20
(S) o-Terphenyl				*73.9*	*67.0*	*50.0-150*				

L846205-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L846205-03 07/11/16 15:04 • (MS) R3148788-1 07/11/16 15:16 • (MSD) R3148788-2 07/11/16 15:29

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Diesel Range Organics (DRO)	4.05	238	479	1400	595	2880	10	50.0-150	V	J3 V	98.1	20
Residual Range Organics (RRO)	4.05	227	419	1240	476	2510	10	50.0-150	V	J3 V	99.1	20
(S) o-Terphenyl					*76.3*	*118*		*50.0-150*				

Method Blank (MB)

(MB) R3149916-1 07/14/16 14:31

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Diesel Range Organics (DRO)	69.0	J	33.3	100
Residual Range Organics (RRO)	U		83.3	250
(S) o-Terphenyl	*69.5*			*50.0-150*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3149916-2 07/14/16 14:47 • (LCSD) R3149916-3 07/14/16 15:04

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Diesel Range Organics (DRO)	750	671	714	89.4	95.2	50.0-150			6.32	20
Residual Range Organics (RRO)	750	708	771	94.3	103	50.0-150			8.53	20
(S) o-Terphenyl				*66.5*	*71.1*	*50.0-150*				

Method Blank (MB)

(MB) R3150567-1 07/18/16 18:32

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Diesel Range Organics (DRO)	U		33.3	100
Residual Range Organics (RRO)	U		83.3	250
(S) o-Terphenyl	*64.4*			*50.0-150*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3150567-2 07/18/16 18:49 • (LCSD) R3150567-3 07/18/16 19:05

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Diesel Range Organics (DRO)	750	686	608	91.4	81.0	50.0-150			12.1	20
Residual Range Organics (RRO)	750	652	623	86.9	83.0	50.0-150			4.54	20
(S) o-Terphenyl				*68.5*	*63.4*	*50.0-150*				

Method Blank (MB)

(MB) R3149250-3 07/12/16 14:41

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Anthracene	U		0.0140	0.0500
Acenaphthene	U		0.0100	0.0500
Acenaphthylene	U		0.0120	0.0500
Benzo(a)anthracene	0.00415	J	0.00410	0.0500
Benzo(a)pyrene	U		0.0116	0.0500
Benzo(b)fluoranthene	U		0.00212	0.0500
Benzo(g,h,i)perylene	U		0.00227	0.0500
Benzo(k)fluoranthene	U		0.0136	0.0500
Chrysene	U		0.0108	0.0500
Dibenz(a,h)anthracene	U		0.00396	0.0500
Fluoranthene	U		0.0157	0.0500
Fluorene	U		0.00850	0.0500
Indeno(1,2,3-cd)pyrene	U		0.0148	0.0500
Naphthalene	0.0285	J	0.0198	0.250
Phenanthrene	U		0.00820	0.0500
Pyrene	U		0.0117	0.0500
1-Methylnaphthalene	U		0.00821	0.250
2-Methylnaphthalene	U		0.00902	0.250
2-Chloronaphthalene	U		0.00647	0.250
(S) Nitrobenzene-d5	*102*			*33.8-179*
(S) 2-Fluorobiphenyl	*111*			*55.5-150*
(S) p-Terphenyl-d14	*99.7*			*46.2-163*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3149250-1 07/12/16 13:55 • (LCSD) R3149250-2 07/12/16 14:18

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Anthracene	2.00	2.27	2.23	113	111	68.9-153			1.75	20
Acenaphthene	2.00	2.09	2.02	104	101	67.7-141			3.39	20
Acenaphthylene	2.00	2.04	1.98	102	98.9	66.9-141			2.92	20
Benzo(a)anthracene	2.00	1.87	1.81	93.4	90.6	63.1-147			3.06	20
Benzo(a)pyrene	2.00	2.18	2.12	109	106	62.2-150			2.55	20
Benzo(b)fluoranthene	2.00	1.75	1.71	87.4	85.5	58.4-148			2.24	20
Benzo(g,h,i)perylene	2.00	2.04	2.00	102	100	57.4-152			2.08	20
Benzo(k)fluoranthene	2.00	2.23	2.15	111	108	60.5-154			3.57	20
Chrysene	2.00	2.20	2.18	110	109	64.8-155			0.890	20
Dibenz(a,h)anthracene	2.00	1.97	1.91	98.5	95.3	53.5-153			3.30	20
Fluoranthene	2.00	2.13	2.05	106	102	68.6-153			3.69	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3149250-1 07/12/16 13:55 • (LCSD) R3149250-2 07/12/16 14:18

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Fluorene	2.00	2.03	1.98	101	99.0	67.3-141			2.35	20
Indeno(1,2,3-cd)pyrene	2.00	2.04	1.96	102	98.2	57.0-155			3.75	20
Naphthalene	2.00	2.05	1.99	103	99.4	66.7-135			3.24	20
Phenanthrene	2.00	1.93	1.87	96.5	93.6	64.3-143			3.11	20
Pyrene	2.00	2.25	2.24	113	112	60.2-154			0.660	20
1-Methylnaphthalene	2.00	2.24	2.20	112	110	68.3-144			1.70	20
2-Methylnaphthalene	2.00	2.20	2.17	110	108	67.6-143			1.63	20
2-Chloronaphthalene	2.00	2.00	1.93	99.9	96.7	69.7-144			3.30	20
(S) Nitrobenzene-d5				*107*	*99.4*	*33.8-179*				
(S) 2-Fluorobiphenyl				*114*	*106*	*55.5-150*				
(S) p-Terphenyl-d14				*98.1*	*93.1*	*46.2-163*				

Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.
V	The sample concentration is too high to evaluate accurate spike recoveries.

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.**
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [14]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

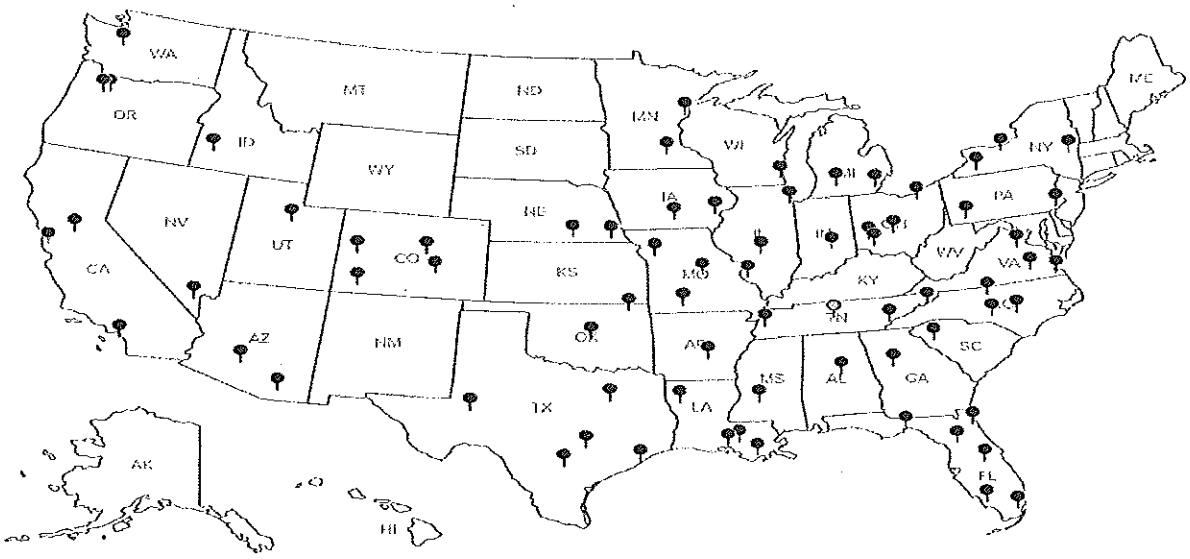
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [14] Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



D004

PBS Engineering
4412 SW Corbett Ave
Portland, OR. 97239

Billing Information:

Report to: Darcy.Berry@pbsenv.com
Chad.Koepfle@ " "
Email to: @pbsenv.com

Project Description: Former Ross Simmons Hardwood Lumber
City/State Collected: Longview, WA

Phone: 541-729-6445
FAX:
Client Project #: 22488.000
ESC Key:
Collected by: Chad Koepfle
Site/Facility ID#:
P.O.#:

Collected by (signature): Chad Koepfle
mackenzie Billings
Immediately Packed on Ice N (Y)

Rush? (Lab MUST Be Notified)
____ Same Day.....200%
____ Next Day.....100%
____ Two Day.....50%
____ Three Day.....25%

Date Results Needed: Std turn
Email? __No__Yes
FAX? __No__Yes

Analysis/Container/Preservative

Chain of Custody
Page 1 of 1

ESC LABORATORY SCIENCES
12065 Lebanon Road
Mt. Juliet, TN 37122
Phone: (800) 767-5859
Phone: (615) 758-5858
Fax: (615) 758-5859

CoCode: PBSENGPOR (lab use only)
Template/Prelogin
Shipped Via:

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	VOCs by EPA Method 5035	VOCs	NWTPH-Dx	PAH's by 8270 SIM	hold	Remarks/Contaminant	Sample # (lab only)
TP-8-4	Grab	SS	4	7/8/16	0935	5			X				846205-01
TP-8-9		SS	9		1215	5					X		
TP-8-GW		GW	—		1150	7			X				02
TP-9-4		SS	4		1040	5			X				03
TP-10-2		SS	2		1110	5			X				04
TP-11-GW	↓	GW	—	↓	1200	7			X				05

*Matrix: SS - Soil/Solid GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other

7-037

pH ____ Temp ____

Remarks: 677 7000 0582 2

Flow ____ Other ____

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐	Condition: (lab use only)
Chad Koepfle	7/8/16	1415			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 4.3 / Bottles Received: 34	CoC Seals Intact: ___Y ___N ✓NA
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 7-9-16 / Time: 940	pH Checked: / NCF:

Andy Vann

From: Brian Ford
Sent: Monday, July 11, 2016 10:56 AM
To: Login; Sample Storage
Cc: Due SVOC; Extractions; Chris Johnson
Subject: L846205-02 and -05 *PBSENGPOR* add extract and hold PAHs

L846205-02 and -05 GWs: Please add extract and hold for PAHSIMLVID. Hold # is 7-037.

Thanks,

Brian Ford | Technical Service Representative
ESC Lab Sciences
12065 Lebanon Rd. | Mt. Juliet, TN 37122
Office: 615.773.9772 | Cell: 931.510.2229
bford@esclabsciences.com
www.esclabsciences.com

ESC LAB SCIENCES
YOUR LAB OF CHOICE

ANALYTICAL REPORT

July 28, 2016

myESC
REAL TIME DATA ACCESS

PBS Engineering & Environmental

Sample Delivery Group:	L848528
Samples Received:	07/09/2016
Project Number:	22488.000
Description:	Former Ross Simmons Hardwood Lumber

Report To: Dulcy Berri, Chad Koepfle
4412 SW Corbett Ave
Portland, OR 97239

Entire Report Reviewed By:

Jason Romer
Technical Service Representative

TABLE OF CONTENTS

ONE LAB. NATIONWIDE.

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.

TP-8-9 L848528-01 Solid

			Collected by	Collected date/time	Received date/time
			Chad Koeplie	07/08/16 12:15	07/09/16 06:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX	WG891271	20	07/22/16 22:14	07/27/16 18:16	KLM
Total Solids by Method 2540 G-2011	WG891560	1	07/22/16 14:45	07/22/16 14:55	MEL

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jason Romer
Technical Service Representative

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	77.5		1	07/22/2016 14:55	WG891560

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Diesel Range Organics (DRO)	2420		103	20	07/27/2016 18:16	WG891271
Residual Range Organics (RRO)	2320		258	20	07/27/2016 18:16	WG891271
(S) o-Terphenyl	*208*	J7	*50.0-150*		*07/27/2016 18:16*	WG891271

Method Blank (MB)

(MB) R3151768-1 07/22/16 14:55

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00130			

L848528-01 Original Sample (OS) • Duplicate (DUP)

(OS) L848528-01 07/22/16 14:55 • (DUP) R3151768-3 07/22/16 14:55

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	77.5	77.5	1	0.0157		5

Laboratory Control Sample (LCS)

(LCS) R3151768-2 07/22/16 14:55

Analyte	Spike Amount %	LCS Result %	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Solids	50.0	50.0	100	85.0-115	

Method Blank (MB)

(MB) R3152456-1 07/26/16 14:59

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Diesel Range Organics (DRO)	U		1.33	4.00
Residual Range Organics (RRO)	U		3.33	10.0
(S) o-Terphenyl	*61.5*			*50.0-150*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3152456-2 07/26/16 15:13 • (LCSD) R3152456-3 07/26/16 15:25

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Diesel Range Organics (DRO)	30.0	25.8	25.3	86.0	84.2	50.0-150			2.09	20
Residual Range Organics (RRO)	30.0	22.3	21.1	74.4	70.3	50.0-150			5.62	20
(S) o-Terphenyl				*81.5*	*77.4*	*50.0-150*				

Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.

ACCREDITATIONS & LOCATIONS

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Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [14]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [14] Accreditation not applicable

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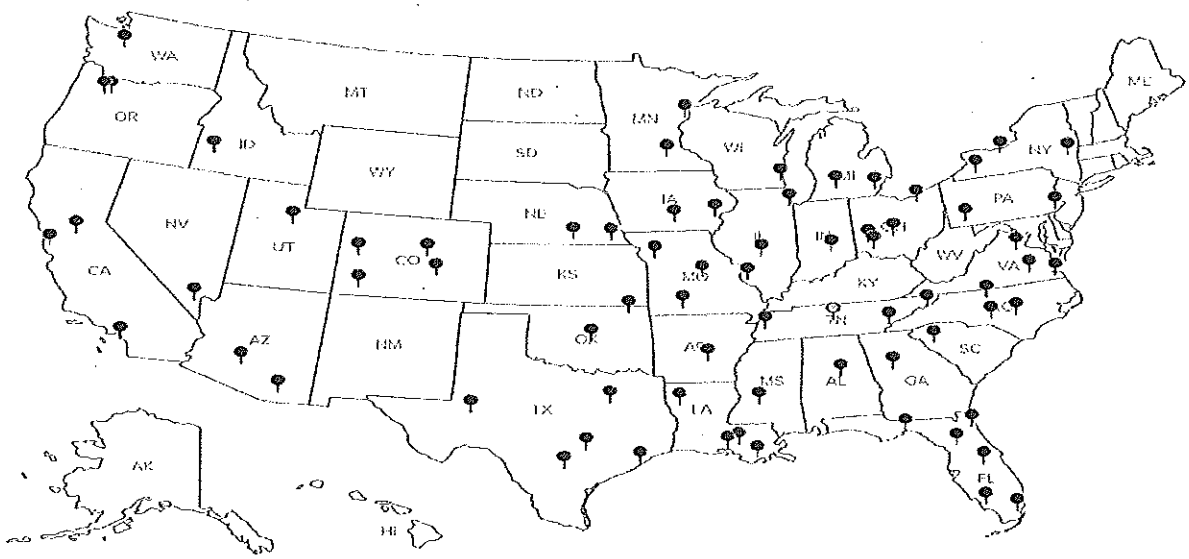

D004

PBS Engineering
4412 SW Corbett Ave
Portland, OR. 97239

Billing Information:

Report to: Darcy.Berri@pbsenv.com
Chad.Koepfle@ "
Email to: @pbsenv.com

Project Description: Former Ross Simmons Hardwood Lumber
City/State Collected: Longview, WA

Phone: 541-729-6445
FAX:

Client Project #: 22488.000

ESC Key:

Collected by: Chad Koepfle

Site/Facility ID#:

P.O.#:

Collected by (signature): Chad Koepfle
mackenzie Billings
Immediately Packed on Ice N (Y)

Rush? (Lab MUST Be Notified)
___ Same Day.....200%
___ Next Day.....100%
___ Two Day.....50%
___ Three Day.....25%

Date Results Needed: Std turn
Email? __No __Yes
FAX? __No __Yes

Analysis/Container/Preservative

Chain of Custody
Page 1 of 1

ESC LAB SCIENCES
12065 Lebanon Road
Mt. Juliet, TN 37122
Phone: (800) 767-5859
Phone: (615) 758-5858
Fax: (615) 758-5859

CoCode: PBSENGPOR (lab use only)
Template/Prelogin
Shipped Via: L848528

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	VOCS by EPA Method 5035	VOCs	NWTPH-Dx	PAH's by 8270 SIM	Hold	Remarks/Contaminant	Sample # (lab only)
TP-8-4	Grab	SS	4	7/8/16	0935	5			X				~~81625-01~~
TP-8-9		SS	9		1215	5				X			-01 ~~-06~~
TP-8-GW		GW	—		1150	7			X				~~-02~~
TP-9-4		SS	4		1040	5			X				~~-03~~
TP-10-2		SS	2		1110	5			X				~~-04~~
TP-11-GW	↓	GW	—	↓	1200	7			X				~~-05~~

*Matrix: SS - Soil/Solid GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other

7-037

pH ____ Temp ____

Remarks:

677 70000582

Flow ____ Other ____

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
	7/8/16	1415	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)
			Dal

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐

Temp: 4.3 Bottles Received: 34

Date: 7-9-16 Time: 9:00

Condition: (lab use only) OK

CoC Seals Intact: ___ Y ___ N ✓ NA

pH Checked: NCF: