Soil and groundwater sampling results for PacifiCorp Union Gap Substation Investigation

PREPARED FOR: Valerie Bound/Washington Department of Ecology

COPY PROVIDED TO: Stan Yeend/PacifiCorp

PREPARED BY: Pat Heins/CH2M HILL

DATE: January 14, 2008

Purpose

This document provides the analytical data and findings obtained from sampling conducted on November 1, 2007 at PacifiCorp's, Union Gap Substation. Attached to this document is a copy of the sample location map, boring logs, and final analytical laboratory report.

Background

While conducting clean-up activities around a recently discovered leaking transformer at the Union Gap Substation, PacifiCorp crews encountered the groundwater interface. This raised concerns that this release may have impacted the shallow groundwater. A soil sample was collected and tested for Polychlorinated Biphenyls (PCBs) which proved to be non-detect. The Washington Department of Ecology (WDOE) requested groundwater sampling to determine what, if any, impact this oil release had on the shallow groundwater. WDOE also requested that soil samples be collected from the borings closest to the release to further confirm the presence or absence of PCBs. The focus of this investigation was to evaluate if impacts to shallow groundwater from the oil release had occurred.

Methodology

Samples were collected and analyzed consistent with the methodology described in the Site Investigation Work Plan (Work Plan) (CH2M HILL August, 2007) submitted to PacifiCorp and WDOE. Continuous soil cores were collected using direct push technology. The lithologies of the cores were then logged and soils subjected to field screening for presence or absence of sheen or olfactory indicators of contamination. The boring logs for the six borings obtained for this investigation are attached to this document. A total of three soil samples were collected (one from each of the borings closest to the area of known release SB1, SB2, SB3, See Figure 1).

Groundwater samples were collected with an extendable stainless steel sampling screen in the boreholes using low flow sampling techniques. Groundwater in each of the six borings was purged at a rate less than 0.5 liter per minute using a peristaltic pump with new, disposable, polyethylene tubing. Each boring was purged for a minimum of three well casings prior to sample collection.

Soil samples were analyzed for PCB aroclors by method SW8082. Groundwater samples were analyzed for Total Petroleum Hydrocarbons (TPH) by method Northwest Total Petroleum Hydrocarbon Oils (NWTPH-Ox) for carbon chains in the oil range.

Sample points were located by loading the proposed locations into a global positioning system (GPS) handheld unit with sub-meter accuracy and navigating to these locations. Some of the sample points were adjusted in the field because of proximity to underground utilities, overhead utilities, or high voltage equipment. Once the sample was collected the actual location was logged using the GPS. These field GPS data was subsequently downloaded and processed for differential correction to attain sub-meter accuracy. The recorded sample locations are shown in Figure 1.

Analytical Data

Analytical data from the groundwater samples are presented in Table 1. Table 2 presents a summary of the data collected from the soil sampling. The full analytical laboratory report is attached to this document.

Table 1
Groundwater Results for Union Gap Substation Investigation
PacifiCorp

Sample #	Diesel Range (mg/L)	Oil Range (mg/L)
Screening levels[1]	0.5	0.5
101-GW-B1	0.25 U	0.5 U
101-GW-B2	0.25 U	0.51 U
101-GW-B3	0.5	0.51 U
101-GW-B4	0.98	0.53
101-GW-B5	0.25 U	0.51 U
101-GW-B6	0.25 U	0.51 U
101-GW-B7[2]	0.25 U	0.5 U

[1] Department of Ecology MTCA Standard Formula and Table Values for Groundwater, Method A.

[2] Field blank for QA/QC

mg/L – milligrams per liter

U – analyte not detected at reporting limit shown

Table 2
Soil Results for Union Gap Substation Investigation
PacifiCorp

	PCB Aroclors (ug/kg)						
Sample #	1016	1221	1232	1242	1248	1254	1260
Screening levels[1]	10,000	10,000	10,000	10,000	10,000	10,000	10,000
101-SB1-4.5	23.5 U	23.5 U	23.5 U	23.5 U	23.5 U	23.5 U	23.5 U
101-SB2-4.5	24.2 U	24.2 U	24.2 U	24.2 U	24.2 U	24.2 U	24.2 U
101-SB3-4.5	23.7 U	23.7 U	23.7 U	23.7 U	23.7 U	23.7 U	23.7 U

[1] Department of Ecology MTCA Standard Formula and Table Values for Groundwater, Method A, Industrial Land Use.

ug/kg – micrograms per kilogram

U – analyte not detected at reporting limit shown

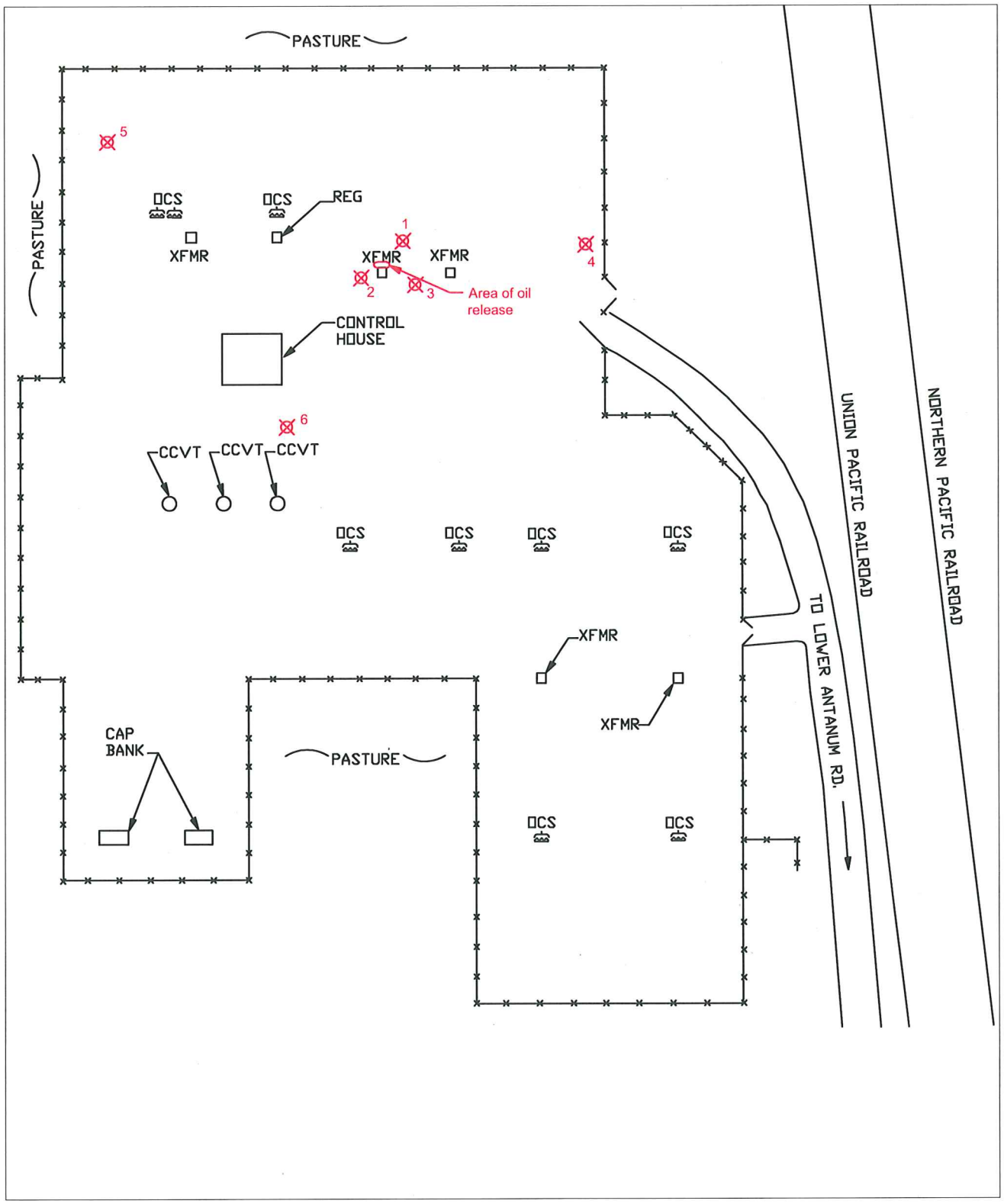
Conclusions

Oil (from transformers) a light non-aqueous phase liquid (LNAPL) is the contaminant of concern at this facility since previous and current testing showed the absence of PCBs. Once released to soil, free-phase oil would be expected to migrate downward through soil until it is stopped by absence of driving head (limited quantity of oil), an impermeable layer in the soil or the presence of groundwater, in which case the oil would spread across the top of the water table.

The groundwater sample collected from the sample point marked B2 had concentrations of diesel range hydrocarbons just at, but not over the MTCA Standard Formula and Table Values. The groundwater sample collected from the sample point marked B3 was found to have concentrations of heavy oil also just at but not above the screening levels and diesel range hydrocarbons just above the screening levels.

With the repair of the leaking transformer and excavation of the contaminated soil, PacifiCorp has removed the source of contamination and left only the small fraction of dissolved phase material. Due to theses low and isolated concentrations as well as petroleum hydrocarbon's tendency to degrade under natural conditions, CH2M HILL recommends no further investigation.

12/5/07



Base file from PacifiCorp

N

0 60

SCALE IN FEET

LEGEND:

Sample location

FIGURE 1
Sample Locations
Union Gap Substation

PacifiCorp
Union Gap, Washington

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\\rosa\proj\PacifiCorp\CAD\UnionGap\251356.dwg

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SOIL BORING LOG

SHEET: 1 of 1

BORING NO: **B1**
PROJECT NO: **363374.01.02**
PROJECT NAME: PacifiCorp Union Gap Substation
LOCATION: NE of transformer
DRILLING CONTRACTOR: Cascade Drilling
TOC ELEVATION:
GROUND ELEVATION:

START DATE: 11/1/2007
END DATE: 11/1/2007
LOGGER: P. Humphreys
DRILLING EQUIPMENT: GeoProbe 7730DT
BORING DIAMETER: 2 in
TOTAL DEPTH: 10 ft
SWL:

Depth (ft)	Sample ID	Interval (ft)	Recovery (%)	SPT blows per 6"	Soil Description soil name, USCS group symbol, color, moisture, density or consistency, structure, mineralogy, grain size and grading	Comments drilling rate, drilling fluid loss, depth of casing, vapor tests, odor, other	Soil Profile	Well Construction
1		0			SILTY GRAVEL (GM) with some sand (general description - no sample collected)	top of boring cleared with Ditch Witch suction system to 30" to verify lack of utilities		
2		2.5			increasing moisture with depth			
3			6"/30"	-	SILT (ML) with some gravel, silt medium brown and non-plastic, gravel sub-rounded to sub-angular to 3/8			
4			20%		diam., saturated at 4.5 ft	no odor		
5	B1-4.5	5				sheen test: negative		
6						drilling easy throughout		
7			40"/60"	-				water sample w/ GeoProbe
8			67%					
9	GW-B1 (water)				GRAVEL (GM) with medium to coarse sand and minor silt, gravel sub-rounded to sub-angular to >1.5" diam., saturated	no odor		screen opened from 6 ft to 10 ft, 1 gal purged prior to sampling
10		10				bottom of boring @ 10 ft		
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SOIL BORING LOG

SHEET: 1 of 1

BORING NO: **B2**
PROJECT NO: **363374.01.02**
PROJECT NAME: PacifiCorp Union Gap Substation
LOCATION: SW of transformer
DRILLING CONTRACTOR: Cascade Drilling
TOC ELEVATION:
GROUND ELEVATION:

START DATE: 11/1/2007
END DATE: 11/1/2007
LOGGER: P. Humphreys
DRILLING EQUIPMENT: GeoProbe 7730DT
BORING DIAMETER: 2 in
TOTAL DEPTH: 10 ft
SWL:

Depth (ft)	Sample ID	Interval (ft)	Recovery (%)	SPT blows per 6"	Soil Description soil name, USCS group symbol, color, moisture, density or consistency, structure, mineralogy, grain size and grading	Comments drilling rate, drilling fluid loss, depth of casing, vapor tests, odor, other	Soil Profile	Well Construction
1		0			SILTY GRAVEL (GM) with some sand (general description - no sample collected) increasing moisture with depth	top of boring cleared with Ditch Witch suction system to 30" to verify lack of utilities		
2		2.5						
3			9"/30" 30%	-	SILT (ML) with some gravel, silt medium brown and non-plastic, gravel sub-rounded to sub-angular, saturated at 4.5 ft			
4						no odor		
5	B2-4.5	5				sheen test: negative		
6						drilling easy throughout		
7			20"/60" 33%	-	GRAVEL (GM) with medium to coarse sand and minor silt, gravel sub-rounded to sub-angular, saturated			water sample w/ GeoProbe
8	GW-B2 (water)					no odor		screen opened from 6 ft to 10 ft, 2 gal purged prior to sampling
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10		10				bottom of boring @ 10 ft		
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SOIL BORING LOG

SHEET: 1 of 1

BORING NO: **B3**
PROJECT NO: **363374.01.02**
PROJECT NAME: PacifiCorp Union Gap Substation
LOCATION: SE of transformer
DRILLING CONTRACTOR: Cascade Drilling
TOC ELEVATION:
GROUND ELEVATION:

START DATE: 11/1/2007
END DATE: 11/1/2007
LOGGER: P. Humphreys
DRILLING EQUIPMENT: GeoProbe 7730DT
BORING DIAMETER: 2 in
TOTAL DEPTH: 10 ft
SWL:

Depth (ft)	Sample ID	Interval (ft)	Recovery (%)	SPT blows per 6"	Soil Description soil name, USCS group symbol, color, moisture, density or consistency, structure, mineralogy, grain size and grading	Comments drilling rate, drilling fluid loss, depth of casing, vapor tests, odor, other	Soil Profile	Well Construction
1		0			SILTY GRAVEL (GM) with some sand (general description - no sample collected) increasing moisture with depth	top of boring cleared with Ditch Witch suction system to 32" to verify lack of utilities		
2		2.7						
3			13"/28"	-	SILT (ML) with some gravel, silt medium brown and non-plastic, gravel sub-rounded to sub-angular to 3/4", saturated at 4.5 ft			
4			46%			no odor		
5	B3-4.5	5				sheen test: negative		
6						drilling easy throughout		
7			25"/60"	-				water sample
8			42%		clean sand (SP), medium, saturated			w/ GeoProbe
9	GW-B3 (water)				GRAVEL (GM) with fine to medium sand and minor silt, gravel sub-rounded to sub-angular to >1.5" diam saturated (gravel at bottom of sampler appears to have impeeded recovery)	no odor		screen opened from 6 ft to 10 ft, 2 gal purged prior to sampling
10		10				bottom of boring @ 10 ft		
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SOIL BORING LOG

SHEET: 1 of 1

BORING NO: **B4**
PROJECT NO: **363374.01.02**
PROJECT NAME: PacifiCorp Union Gap Substation
LOCATION: E side of yard, NE of N gate
DRILLING CONTRACTOR: Cascade Drilling
TOC ELEVATION:
GROUND ELEVATION:

START DATE: 11/1/2007
END DATE: 11/1/2007
LOGGER: P. Humphreys
DRILLING EQUIPMENT: GeoProbe 7730DT
BORING DIAMETER: 2 in
TOTAL DEPTH: 10 ft
SWL:

Depth (ft)	Sample ID	Interval (ft)	Recovery (%)	SPT blows per 6"	Soil Description soil name, USCS group symbol, color, moisture, density or consistency, structure, mineralogy, grain size and grading	Comments drilling rate, drilling fluid loss, depth of casing, vapor tests, odor, other	Soil Profile	Well Construction
1		0			SILTY GRAVEL (GM) with some sand (general description - no sample collected) increasing moisture with depth	top of boring cleared with Ditch Witch suction system to 36" to verify lack of utilities		
2								
3		3		-				
4			12"/24" 50%		SILT (ML), medium brown and non-plastic, saturated at 4.5 ft	no odor		
5	B4-4.5	5				sheen test: negative		
6						drilling easy throughout		
7			50"/60" 83%	-				water sample w/ GeoProbe
8	GW-B4 (water)							screen opened from 6 ft to 10 ft,
9								2 gal purged prior to sampling
10		10			GRAVEL (GM) with medium to coarse sand and minor silt, gravel sub-rounded to sub-angular, saturated	no odor bottom of boring @ 10 ft		
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SOIL BORING LOG

SHEET: 1 of 1

BORING NO: **B5**
PROJECT NO: **363374.01.02**
PROJECT NAME: PacifiCorp Union Gap Substation
LOCATION: NW corner of yard
DRILLING CONTRACTOR: Cascade Drilling
TOC ELEVATION:
GROUND ELEVATION:

START DATE: 11/1/2007
END DATE: 11/1/2007
LOGGER: P. Humphreys
DRILLING EQUIPMENT: GeoProbe 7730DT
BORING DIAMETER: 2 in
TOTAL DEPTH: 10 ft
SWL:

Depth (ft)	Sample ID	Interval (ft)	Recovery (%)	SPT blows per 6"	Soil Description soil name, USCS group symbol, color, moisture, density or consistency, structure, mineralogy, grain size and grading	Comments drilling rate, drilling fluid loss, depth of casing, vapor tests, odor, other	Soil Profile	Well Construction
1		0			SILTY GRAVEL (GM) with some sand (general description - no sample collected)	top of boring cleared with Ditch Witch suction system to 38" to verify lack of utilities		
2					increasing moisture with depth			
3		3.2						
4			9"/22" 41%	-	SILT (ML), medium brown and non-plastic, gravel su rounded to sub-angular, moist at 5 ft	no odor		
5	B5-4.5	5				sheen test: negative		
6					saturated at ~6 ft	drilling easy throughout		
7			36"/60" 60%	-				water sample w/ GeoProbe
8	GW-B5 (water)				GRAVEL (GM) w/ med. to coarse sand, minor silt	no odor		screen opened from 6 ft to 10 ft, 2 gal purged prior to sampling
9					SAND (SM), medium to fine, minor silt			
10		10			GRAVEL (GM) w/ med. to coarse sand, minor silt	bottom of boring @ 10 ft		
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SOIL BORING LOG

SHEET: 1 of 1

BORING NO: **B6**
PROJECT NO: **363374.01.02**
PROJECT NAME: PacifiCorp Union Gap Substation
LOCATION: S of Control House
DRILLING CONTRACTOR: Cascade Drilling
TOC ELEVATION:
GROUND ELEVATION:

START DATE: 11/1/2007
END DATE: 11/1/2007
LOGGER: P. Humphreys
DRILLING EQUIPMENT: GeoProbe 7730DT
BORING DIAMETER: 2 in
TOTAL DEPTH: 10 ft
SWL:

Depth (ft)	Sample ID	Interval (ft)	Recovery (%)	SPT blows per 6"	Soil Description soil name, USCS group symbol, color, moisture, density or consistency, structure, mineralogy, grain size and grading	Comments drilling rate, drilling fluid loss, depth of casing, vapor tests, odor, other	Soil Profile	Well Construction
1		0			SILTY GRAVEL (GM) with some sand (general description - no sample collected)	top of boring cleared with Ditch Witch suction system to 33" to verify lack of utilities		
2		2.8			increasing moisture with depth			
3			2"/27" 7%	-	SILT (ML), medium brown and non-plastic, very mois at 4.5 ft			
4						no odor		
5	B6-4.5	5				sheen test: negative		
6					saturated at ~5 ft	drilling easy throughout		
7			29"/60" 48%	-				water sample w/ GeoProbe
8	GW-B6 (water)					no odor		screen opened from 6 ft to 10 ft, 2 gal purged prior to sampling
9					GRAVEL (GM) with medium to coarse sand and minor silt, gravel sub-rounded to sub-angular, saturated			
10		10				bottom of boring @ 10 ft		
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LEGEND

LITHOLOGIC SYMBOL	LITHOLOGIC DESCRIPTION
	GW - Well Graded GRAVEL
	GP - Pooly Graded GRAVEL
	GM - Silty GRAVEL
	GC - Clayey GRAVEL
	GW-GM - Well Graded GRAVEL with Silt and Sand
	GM/GC - Borderline Classification for Silty/Clayey GRAVEL
	SW - Well Graded SAND
	SP - Poorly Graded SAND
	SM - Silty SAND
	SC - Clayey SAND
	ML - SILT, LL <50
	CL - CLAY, LL <50
	OL - ORANIC SILT/CLAY, LL <50
	MH - SILT, LL >50
	CH - CLAY, LL >50
	OH - ORANIC SILT/CLAY, LL >50
	PT - PEAT, HUMUS, SWAMP SOILS
	BR_x - BEDROCK

WELL SYMBOL	WELL SYMBOL DESCRIPTION
	STEEL MONUMENT - Above Ground Surface Stick-Up Completion
	CASING 2" SCH. 40 PVC - for monitor wells 4" SCH. 80 PVC - for aquifer test wells
	SCREEN 0.020 inch - for monitor wells 0.040 inch - for aquifer test wells
	FILTER SAND: No. 8 x 12 or No. 10 x 20
	3/8 BENTONITE HOLE PLUG
	PVC END CAP
	STAINLESS STEEL CENTRALIZERS
	GROUNDWATER LEVEL
	NATIVE FORMATION (i.e., slough)

Abbreviations:
ags = above ground surface
bgs = below ground surface
btc = below top of casing

CH2M HILL
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CH2MHILL
Applied Sciences Laboratory

December 3, 2007

PacifiCorp Union Gap

363374.01.02

RE: Laboratory Report for PacifiCorp Union Gap
Applied Sciences Laboratory Reference No. G3051

Pat Heins/PDX:

On November 03, 2007, CH2M HILL Applied Sciences Laboratory received 10 samples with a request for analysis of selected parameters. All analyses were performed by CH2M HILL unless otherwise indicated below. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

The analytical results and associated quality control data are enclosed. Any unusual difficulties encountered during the analysis of your samples are discussed in the case narrative.

We certify that the test results meet all NELAC requirements.

CH2M HILL Applied Sciences Laboratory appreciates your business and looks forward to serving your analytical needs again. If you should have any questions concerning the data, or if you need additional information, please call Kathy McKinley at (541) 758-0235, extension 3144.

Sincerely,

Kathy McKinley

Kathy McKinley
Analytical Manager

Enclosures

cc: Paul Humphreys/SPK

ACCREDITED IN ACCORDANCE WITH
OR100022

CLIENT SAMPLE CROSS-REFERENCE

CH2M HILL Applied Sciences Laboratory Reference No. G3051

Sample ID	Client Sample ID	Date Collected	Time Collected
G305101	GW-B1	11/01/2007	
G305102	GW-B2	11/01/2007	
G305103	GW-B3	11/01/2007	
G305104	GW-B4	11/01/2007	
G305105	GW-B5	11/01/2007	
G305106	GW-B6	11/01/2007	
G305107	GW-B7	11/01/2007	
G305108	SB1-4.5	11/01/2007	
G305109	SB2-4.5	11/01/2007	
G305110	SB3-4.5	11/01/2007	

CASE NARRATIVE
ORGANICS

Lab Reference No.: G3051

Client/Project: PacifiCorp Union Gap

I. Holding Times:
All acceptance criteria were met.

II. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Method Blank(s):
All acceptance criteria were met.

C. Duplicate Sample(s):
Analysis performed in accordance with standard operating procedure.

D. Spike Sample(s):
Analysis performed in accordance with standard operating procedure.

E. Lab Control Sample(s):
All acceptance criteria were met.

F. Surrogate Recoveries:
All acceptance criteria were met.

G. Other:
Not applicable.

III. Documentation Exceptions:
None.

IV. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signature.

Prepared by: Amber Jaylor Date: 11/20/07

Reviewed by: JHeathman Date: 11/27/07

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: SB1-4.5
Project Name: PacifiCorp Union Gap
Date Collected: 11/1/2007
Time Collected:
Type: Grab
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: G305108
Date Received: 11/3/2007
Report Revision No.: 0
Analyzed By: AJT
Reviewed By: JBA

Analyte	CAS #	Reporting Limit	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
PCBs as Aroclors							
Aroclor 1016	12674-11-2	23.5	23.5	U	µg/kg	SW 8082	11/12/2007
Aroclor 1221	11104-28-2	23.5	23.5	U	µg/kg	SW 8082	11/12/2007
Aroclor 1232	11141-16-5	23.5	23.5	U	µg/kg	SW 8082	11/12/2007
Aroclor 1242	53469-21-9	23.5	23.5	U	µg/kg	SW 8082	11/12/2007
Aroclor 1248	12672-29-6	23.5	23.5	U	µg/kg	SW 8082	11/12/2007
Aroclor 1254	11097-69-1	23.5	23.5	U	µg/kg	SW 8082	11/12/2007
Aroclor 1260	11096-82-5	23.5	23.5	U	µg/kg	SW 8082	11/12/2007
		Control Limits	% Rec				
Decachlorobiphenyl	2051-24-3	34-133%	78%	SS			

U=Not detected at specified reporting limit
SS=Surrogate standard

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: SB2-4.5
Project Name: PacifiCorp Union Gap
Date Collected: 11/1/2007
Time Collected:
Type: Grab
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: G305109
Date Received: 11/3/2007
Report Revision No.: 0
Analyzed By: AJT
Reviewed By: JBM

Analyte	CAS #	Reporting Limit	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
PCBs as Aroclors							
Aroclor 1016	12674-11-2	24.2	24.2	U	µg/kg	SW 8082	11/12/2007
Aroclor 1221	11104-28-2	24.2	24.2	U	µg/kg	SW 8082	11/12/2007
Aroclor 1232	11141-16-5	24.2	24.2	U	µg/kg	SW 8082	11/12/2007
Aroclor 1242	53469-21-9	24.2	24.2	U	µg/kg	SW 8082	11/12/2007
Aroclor 1248	12672-29-6	24.2	24.2	U	µg/kg	SW 8082	11/12/2007
Aroclor 1254	11097-69-1	24.2	24.2	U	µg/kg	SW 8082	11/12/2007
Aroclor 1260	11096-82-5	24.2	24.2	U	µg/kg	SW 8082	11/12/2007

		Control Limits	% Rec	
Decachlorobiphenyl	2051-24-3	34-133%	76%	SS

U=Not detected at specified reporting limit
SS=Surrogate standard

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: SB3-4.5
Project Name: PacifiCorp Union Gap
Date Collected: 11/1/2007
Time Collected:
Type: Grab
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: G305110
Date Received: 11/3/2007
Report Revision No.: 0
Analyzed By: AJT
Reviewed By: JBrA

Analyte	CAS #	Reporting Limit	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
PCBs as Aroclors							
Aroclor 1016	12674-11-2	23.7	23.7	U	µg/kg	SW 8082	11/12/2007
Aroclor 1221	11104-28-2	23.7	23.7	U	µg/kg	SW 8082	11/12/2007
Aroclor 1232	11141-16-5	23.7	23.7	U	µg/kg	SW 8082	11/12/2007
Aroclor 1242	53469-21-9	23.7	23.7	U	µg/kg	SW 8082	11/12/2007
Aroclor 1248	12672-29-6	23.7	23.7	U	µg/kg	SW 8082	11/12/2007
Aroclor 1254	11097-69-1	23.7	23.7	U	µg/kg	SW 8082	11/12/2007
Aroclor 1260	11096-82-5	23.7	23.7	U	µg/kg	SW 8082	11/12/2007

		Control Limits	% Rec	
Decachlorobiphenyl	2051-24-3	34-133%	79%	SS

U=Not detected at specified reporting limit
SS=Surrogate standard

4

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: Method Blank
Project Name: PacifiCorp Union Gap
Date Collected: N/A
Time Collected: N/A
Type: QC
Matrix: Soil
Basis: N/A

Lab Information

Lab Sample ID: SB1-1111
Date Received: N/A
Report Revision No.: 0
Analyzed By: AJT
Reviewed By: JBA

Analyte	CAS #	Reporting Limit	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
PCBs as Aroclors							
Aroclor 1016	12674-11-2	25.0	25.0	U	µg/kg	SW 8082	11/12/2007
Aroclor 1221	11104-28-2	25.0	25.0	U	µg/kg	SW 8082	11/12/2007
Aroclor 1232	11141-16-5	25.0	25.0	U	µg/kg	SW 8082	11/12/2007
Aroclor 1242	53469-21-9	25.0	25.0	U	µg/kg	SW 8082	11/12/2007
Aroclor 1248	12672-29-6	25.0	25.0	U	µg/kg	SW 8082	11/12/2007
Aroclor 1254	11097-69-1	25.0	25.0	U	µg/kg	SW 8082	11/12/2007
Aroclor 1260	11096-82-5	25.0	25.0	U	µg/kg	SW 8082	11/12/2007

		Control Limits	% Rec	
Decachlorobiphenyl	2051-24-3	34-133%	83%	SS

U=Not detected at specified reporting limit
SS=Surrogate standard

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CH2M HILL
Applied Sciences Group

2300 NW Walnut Blvd., Corvallis, OR 97330-3538
P.O. Box 428, Corvallis, OR 97339-0428
Tel 541.752.4271 Fax 541.752.0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: PacifiCorp Union Gap
Sampling Date: See cross reference
Sampling Time: See cross reference
Type: Grab
Matrix: Water
Basis: As received

Lab Information

Lab Batch ID: G3051
Date Received: 11/3/2007
Analysis Method: TPHNWDx
Report Revision No.: 0
Analyzed By: AJT
Reviewed By: JBH
Units: mg/L

Client ID	Lab ID	Diesel Range Organics C10-C24 MRL	Diesel Range Organics C10-C24 Result	Qualifier	Date Analyzed
Method Blank	WB1-1106	0.25	0.25	U	11/12/2007
GW-B1	G305101	0.25	0.25	U	11/12/2007
GW-B2	G305102	0.25	0.50		11/12/2007
GW-B3	G305103	0.25	0.98		11/12/2007
GW-B4	G305104	0.25	0.25	U	11/12/2007
GW-B5	G305105	0.25	0.25	U	11/12/2007
GW-B6	G305106	0.25	0.25	U	11/12/2007
GW-B7	G305107	0.25	0.25	U	11/12/2007

U=Not detected at specified reporting limit

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: PacifiCorp Union Gap
Sampling Date: See cross reference
Sampling Time: See cross reference
Type: Grab
Matrix: Water
Basis: As received

Lab Information

Lab Batch ID: G3051
Date Received: 11/03/2007
Analysis Method: TPHNWRx
Report Revision No.: 0
Analyzed By: AJT
Reviewed By: JSA
Units: mg/L

Client ID	Lab ID	Oil Range Organics C24-36 MRL	Oil Range Organics C24-36 Result	Qualifier	Date Analyzed
Method Blank	WB1-1106	0.50	0.50	U	11/12/2007
GW-B1	G305101	0.51	0.51	U	11/12/2007
GW-B2	G305102	0.50	0.53		11/12/2007
GW-B3	G305103	0.51	0.51	U	11/12/2007
GW-B4	G305104	0.51	0.51	U	11/12/2007
GW-B5	G305105	0.51	0.51	U	11/12/2007
GW-B6	G305106	0.51	0.51	U	11/12/2007
GW-B7	G305107	0.50	0.50	U	11/12/2007

U=Not detected at specified reporting limit

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: PacifiCorp Union Gap
Sampling Date: See cross reference
Sampling Time: See cross reference
Type: Grab
Matrix: Water

Lab Information

Lab Batch ID: G3051
Date Received: 11/3/2007
Analysis Method: TPHNWDx
Report Revision No.: 0
Analyzed By: AJT
Reviewed By: JBH
Units: %

Client ID	Lab ID	Surrogate Spike o-Terphenyl % Recovery	Range % Recovery
Method Blank	WB1-1106	106	70-130%
GW-B1	G305101	105	70-130%
GW-B2	G305102	89	70-130%
GW-B3	G305103	101	70-130%
GW-B4	G305104	102	70-130%
GW-B5	G305105	100	70-130%
GW-B6	G305106	98	70-130%
GW-B7	G305107	92	70-130%

Client ID	Lab ID	Surrogate Spike Octacosane % Recovery	Range % Recovery
Method Blank	WB1-1106	106	70-130%
GW-B1	G305101	107	70-130%
GW-B2	G305102	83	70-130%
GW-B3	G305103	101	70-130%
GW-B4	G305104	105	70-130%
GW-B5	G305105	102	70-130%
GW-B6	G305106	99	70-130%
GW-B7	G305107	93	70-130%

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CH2MHILL Applied Sciences Lab
CHAIN OF CUSTODY RECORD
AND AGREEMENT TO PERFORM SERVICES

CVO 2300 NW Walnut Boulevard
Corvallis, OR 97330-3638
(541) 752-4271 FAX (541) 752-0276

COC # _____

Project # 363374.01.02	Purchase Order #
Project Name: PacifiCorp Union Gap Substation	
Company Name: CH2M-Hill	
Project Manager or Contact & Phone #: Pat Heins / PDX; Paul Humphreys / SPK	Report Copy to: Pat Heins / PDX; Paul Humphreys / SPK
Requested Completion Date: normal TAT	Site ID
Sample Disposal: Dispose ☒ Return ☐	

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	CLIENT SAMPLE ID (9 CHARACTERS)	LAB QC	TOTAL # OF CONTAINERS	Requested Analytical Method # SW8015 TPH-ORO	Requested Analytical Method # SW8082 PCBs	Preservative cool	Preservative cool	Lab ID
11-1-07			X	X			101-GW-B1		1	X				1
11-1-07			X	X			GW-B2		1	X				2
11-1-07			X	X			GW-B3		1	X				3
11-1-07			X	X			GW-B4		1	X				4
11-1-07			X	X			GW-B5		1	X				5
11-1-07			X	X			GW-B6		1	X				6
11-1-07			X	X			GW-B7		1	X				7
11-1-07			X		X		SB1-4.5		1		X			8
11-1-07			X		X		SB2-4.5		1		X			9
11-1-07			X		X		SB3-4.5		1		X			10

THIS AREA FOR LAB USE ONLY

Lab #	Page	of
G3051	1	1

34°C

EPA Tier QC Level: 1 (Screening) (2) 3 4

Alternate Description	Lab ID
	1
	2
	3
	4
	5
	6
	7
	8
	9
	10

Relinquished By: Paul Humphreys	Date/Time: 11-2-07/11:00	Received By	Date/Time
Sampled By and Title (Please sign and print name): Paul Humphreys, Hydrogeologis	Date/Time	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name): D. Hubbard D. Hubbard 11-3-07 12:00	Date/Time	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Shipped Via: UPS Fed-Ex Other _____	Shipping #

Special Instructions:

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original - LAB, Yellow - LAB, Pink - Client
REV 09/2006 LAB FORM 340

CH2MHILL
Applied Sciences Laboratory

Sample Receipt Record

Batch Number: G3051 Date received: 11-3-07

Client/Project PacifiCorp - Union Gap Station

VERIFICATION OF SAMPLE CONDITIONS (verify all items) * HD = Client Hand delivered Samples

Observation	YES	NO
Radiological Screening for AFCEE		NA
Were custody seals intact and on the outside of the cooler?	✓	
If yes, Where? Front ✓ Rear ✓ Lt Side ____ Rt Side ____		
Type of packing material: (Ice) Blue Ice (Bubble wrap)		
Was the Chain of Custody inside the cooler?	✓	
Was the Chain of Custody properly filled out?	✓	
Were the sample containers in good condition?	✓	
Containers supplied by ASL?	✓	
Any sample with < 1/2 holding time remaining? If so contact LPM		✓
Was there ice in the cooler? Enter temp. 3.4° C	✓	
All VOCs free of air bubbles ?		NA

VERIFICATION OF SAMPLE PRESERVATION

Sample No	Nutrients pH <2	Metals pH <2	Volatiles pH <2	Cyanides pH >12	TOC pH <2	TOX pH <2	Other (specify)	N/A (soils/unpres)
1								↓
2								↓
3								↓
4								↓
5								↓
6								↓
7								↓
8								Soil
9								↓
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

LOGIN AND pH VERIFICATIONS PERFORMED BY

D. Hubbard 11-5-07 15:55
Date/Time

Date/Time

12

RECPTRCD.XLS