MEMORANDUM

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Work Plan for Additional Investigation of Stained Soil Area Northwest Pipe Company, Portland Plant (ECSI #138)

PREPARED FOR: Jim Orr/DEQ

PREPARED BY: Rob Healy/CH2M HILL
Ken Shump/CH2M HILL

COPIES: Tim Whitson/Northwest Pipe Company
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Claudia Powers/Ater Wynne LLP

DATE: October 21, 2011

Background

Northwest Pipe Company (NW Pipe) and contractor Bravo Environmental Northwest, Inc. of Portland, Oregon conducted a hot spot soil removal at an identified hot spot area north of the Lining and Coating building during the first two weeks of September 2011. The excavation was conducted in general accordance with the *Interim Remedial Action Work Plan* (CH2M HILL 2011). The hot spot soil excavation targeted surface soil (0 to 1 foot below grade)based on the results of prior surface and subsurface samples collected from depths of 1 and 3 feet below ground surface.

During hot spot removal, stained soil was encountered in the southwest corner of the hot spot excavation. NW Pipe advanced the excavation at this location to a greater depth in an attempt to identify the bottom of the stained zone. After encountering groundwater at approximately 8 feet below ground surface, NW Pipe stopped excavating and contacted CH2M HILL to observe the excavation and collect samples. CH2M HILL's Ken Shump and Rob Healy visited the site on September 9, 2011, documented conditions of the deeper excavation and collected sidewall soil samples for laboratory analysis. Because of safety concerns that would be associated with leaving a deep excavation open for an extended period, NW Pipe's contractor placed a fabric demarcation layer over the bottom and sidewalls of the deep excavation and backfilled it with clean sand. The excavation was backfilled to a depth of approximately 2 to 3 feet below former grade, roughly even with the rest of the hot spot excavation in this area.

Ken Shump telephoned Jim Orr of DEQ on Friday to inform him of the observations, but was not able to connect until the call was returned on Monday morning, September 12. In response to Mr. Orr's request in the telephone conversation, polychlorinated biphenyl (PCB) analysis was added to the sample request in addition to polynuclear aromatic hydrocarbon (PAH) analysis.

Known past practices in the vicinity of the stained soil area include a former coal tar demister associated with lining steel water pipe and long-term staging of rail cars – including diesel-electric locomotives – on rail lines adjacent to the stained soil area. In a letter dated September 20, 2011, DEQ requested that NW Pipe investigate the area of stained soil and its possible effect on soil and groundwater. DEQ requested that the investigation include common coal tar constituents, PCBs, as well as determining the specific total petroleum hydrocarbon (TPH) fraction to develop appropriate risk screening values for TPH.

This memorandum presents the work plan to further investigate the stained soil area, as requested by DEQ. This work plan summarizes the deeper excavation sample results, presents the proposed work plan approach, and the proposed schedule for completing the investigation.

Summary of Deeper Excavation Observations, Sampling, and Results

The deeper excavation was located in the southwestern corner of the shallower hot spot excavation. It was about 8 feet deep, and its horizontal dimensions were approximately 12 feet north to south and 11 feet east to west, with the western edge located less than one foot from the chain-link fence that defines the western NW Pipe property boundary. The southern edge of the excavation bordered a concrete pad that extended approximately 12 feet north from the north wall of the Lining & Coating Building. The staining caused the soil to appear gray rather than brown.

The gray stained soil was visible in the excavation sidewalls from near the former ground surface (as observed on the sidewall next to the fence) to the bottom of the excavation with a roughly vertical demarcation between gray-stained soil and the native brown soil. The edge of gray staining was approximately 10 feet north of and 10 feet west of the southwestern corner of the deeper excavation on the west sidewall and south sidewall respectively. Water was observed entering the bottom of the deeper excavation area. The water was presumed to be groundwater, and upon contact with the stained soil, exhibited a visible sheen.

During the CH2M HILL site visit on September 9, 2011, soil samples were collected from the sidewalls of the deeper excavation. Figure 1 displays the hot spot excavation extent based on hand-held tape measurements, the extent of the deeper excavation area and associated sidewall sample locations.

Soil samples were collected approximately 5.5 feet below the original grade, and 2 feet below the excavated grade at that location. The excavation depth of the hot spot area adjacent to the deeper excavation was approximately 3 feet below the original grade. Samples from the west and south sidewalls were collected from gray-stained soil. Samples from the north and east sidewalls were of native brown soil, as no staining was visible on these sidewalls. The samples were analyzed for PAHs via Environmental Protection Agency (EPA) method SW 8270-SIM and PCBs via EPA method SW 8082. The analytical laboratory report representing the deeper excavation samples is included in Attachment A.

Table 1 presents the deeper excavation sample analytical results, compared with construction worker and excavation worker risk scenarios. These screening levels were selected because the depth of the sample interval below grade (5.5 feet) is below surface soil (defined in DEQ risk assessment guidance as 0 to 3 feet) and within the range of subsurface soil (defined in guidance as 0 to 15 feet).

Sample results indicate that some PAH constituent concentrations in the deeper excavation sidewalls are above the construction worker scenario risk-based concentration, but all are below the both excavation worker scenario and hot spot concentrations (100X the construction worker screening level for carcinogens). PCB Aroclor 1254 was detected in each of the four sidewall samples, but at concentrations below both the construction worker scenario and excavation worker scenario risk based concentrations. No other PCB Aroclors were detected.

Work Plan Approach

NW Pipe intends to conduct the suspected stained soil area investigation using a step-out approach. The investigation will be conducted using direct push sampling technology to characterize subsurface conditions in the vicinity of the staining. Subsurface observations and analytical results for soil and groundwater samples will be used to document the effect of the release on soil and groundwater. The results of the investigation (nature and extent of constituents) will be evaluated to assess whether they provide additional insight into the possible source of the material that caused the observed soil staining.

Direct Push Probe Locations

Proposed direct push probe locations are shown on Figure 2. The initial direct push borings will be advanced at three locations 20 feet north, northeast, and east of the deep excavation. The second step-out locations are 45 feet from the deep excavation in the same directions. At each probe location, direct push technology will be used to collect continuous soil cores. The cores will be field screened, and soil samples will be collected for analysis. Based on the field screening results, additional step-outs will be completed as needed to determine the edge of the visibly-affected zone of soil and groundwater. Particular interest will be paid to soil within 3 to 5 feet of the water table, as the principal transport mechanisms are expected to be lateral spreading and/or possible advection of phase-separated hydrocarbons floating on the water table and/or advection of dissolved constituents. Groundwater from the probes will be observed to see if a sheen is visible in the field. If field observations on the first step-out indicate no visible effect on soil or groundwater, the second step-out will not be needed. If field observations on the second step-out indicate visible effects to soil or groundwater, then additional step-outs will be conducted.

Figure 1
Stained Soil Area Investigation
Northwest Pipe Company
Portland, Oregon

HSCS-2
HSCS-1
HSCS-3
HSCS-4

Legend

- Deep Excavation Sidewall Soil Sample Locations
- Northwest Pipe Property Boundary
- Excavation Area Extent
- Deeper Excavation
- Railroad Line

N

0 5 10 20
Feet

CH2MHILL

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TABLE 1

Analytical Results for Deeper Excavation Sidewall Samples Associated with Hot Spot Excavation

Northwest Pipe Company Stained Soil Area Investigation

Chemical	Units	Basis of Screening Level	DEQ Soil Ingestion, Dermal Contact, and Inhalation		HSCS-1 East Sidewall 9/9/2011	HSCS-2 North Sidewall 9/9/2011	HSCS-3 West Sidewall 9/9/2011	HSCS-4 South Sidewall 9/9/2011
			Const. Wkr.	Excav. Wkr.				
PAHs (mg/Kg): Method 8270-SIM								
1-Methylnaphthalene	mg/Kg	c	--	--	0.261 U	0.269 U	72	57.7
2-Methylnaphthalene	mg/Kg	nc	--	--	0.261 U	0.269 U	119	94.3
Acenaphthene	mg/Kg	nc	19,000	> max	0.261 U	0.269 U	1180	924
Acenaphthylene	mg/Kg	--	--	--	0.993	2.96	25.9 U	27.1 U
Anthracene	mg/Kg	nc	93,000	> max	0.548	1.6	144	128
Benzo (a) anthracene	mg/Kg	c	21	590	0.608	0.873	**209**	**160**
Benzo (a) pyrene	mg/Kg	c	2.1	59	**5.55**	**8.92**	**35.6**	27.1 U
Benzo (b) fluoranthene	mg/Kg	c	21	590	10.4	13.2	**70.8**	**52**
Benzo (g,h,i) perylene	mg/Kg	--	--	--	5.78	11.2	25.9 U	27.1 U
Benzo (k) fluoranthene	mg/Kg	c	210	5,900	1.27	2.37	29.5	27.1 U
Chrysene	mg/Kg	c	2,100	59,000	3.47	6.43	150	118
Dibenzo (a,h) anthracene	mg/Kg	c	2.1	59	1.24	1.99	25.9 U	27.1 U
Fluoranthene	mg/Kg	nc	8,900	> max	1.71	1.73	1890	1470
Fluorene	mg/Kg	nc	12,000	> max	0.261 U	0.269 U	580	442
Indeno (1,2,3-cd) pyrene	mg/Kg	c	21	590	5.56	9.63	25.9 U	27.1 U
Naphthalene	mg/Kg	c	580	16,000	0.261 U	0.269 U	392	299
Phenanthrene	mg/Kg	--	--	--	0.261 U	0.269 U	1860	1440
Pyrene	mg/Kg	nc	6,700	> max	1.56	2.67	1330	952
PCBs (mg/Kg): Method SW8082								
Aroclor-1016	mg/Kg	--	--	--	0.246 U	0.538 U	0.255 U	0.252 U
Aroclor-1260	mg/Kg	--	--	--	0.246 U	0.538 U	0.255 U	0.252 U
Aroclor-1221	mg/Kg	--	--	--	0.246 U	0.538 U	0.255 U	0.252 U
Aroclor-1232	mg/Kg	--	--	--	0.246 U	0.538 U	0.255 U	0.252 U
Aroclor-1242	mg/Kg	--	--	--	0.246 U	0.538 U	0.255 U	0.252 U
Aroclor-1248	mg/Kg	--	--	--	0.246 U	0.538 U	0.255 U	0.252 U
Aroclor-1254	mg/Kg	--	--	--	1.39	4.28	0.644	0.785
Total PCBs	mg/Kg	c	4.4	120	1.39	4.28	0.644	0.785

-- = Criterion Not Established

QA Type: N1 = Normal sample

Bolded = detected result exceeds Construction Worker screening criteria, but falls below Excavation Worker criteria.

U = Not detected at or above specified reporting limit.

mg/Kg = milligrams per killogram

RSLs = Values from Enivornmental Protection Agency's (EPA) Regional Screening Level (RSL) Master Table, November 2010, Industrial Soil.

RBC = Values from Oregon Department of Environmental Quality (DEQ) guidance document, "Risk-Based Decision Making (RBDM) for the Remediation of Petroleum-Contaminated Sites; Soil Ingestion, Dermal Contact, and Inhalation, Construction Worker, revised September 15, 2009.

Total PCB results are calculated by summing the detected Aroclors if more than one Aroclor is detected.

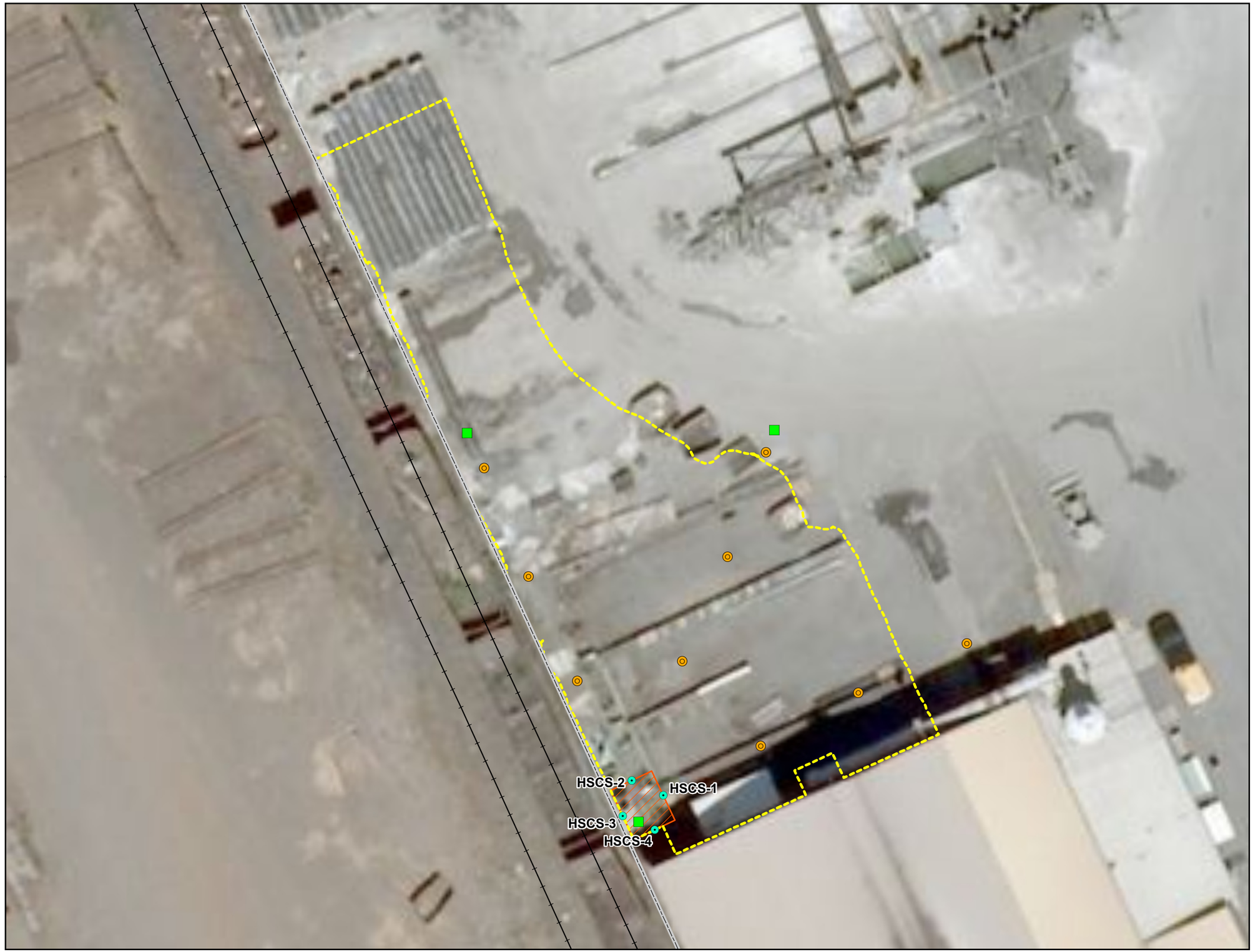

Figure 2
Proposed Direct Push Sample and Monitoring Well Locations
Northwest Pipe Company
Portland, Oregon

Legend

- Proposed Direct Push Sample Locations
- Preliminary Proposed Monitoring Well Locations
- Deep Excavation Sidewall Soil Sample Locations
- Northwest Pipe Property Boundary
- Excavation Area Extent
- Deeper Excavation
- Railroad Line

N

0 5 10 20

Feet

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be installed using direct-push technology to determine groundwater flow direction and potential water quality effects on groundwater. The first monitoring well will be installed within the footprint of the deeper excavation to identify conditions at that location. Based on the hydraulic effect of the International Terminals Slip and Willamette River on the shallow aquifer, the groundwater flow direction in this area is anticipated to be generally northward. Consequently, one monitoring well will be installed north of the deep excavation along the fence line, and the other will be installed northeast of the deep excavation. The monitoring well locations may be adjusted based on the direct push probe field observations of soil, and based on physical access considerations such as plant infrastructure and traffic patterns. The proposed north and northeast monitoring wells will be installed approximately10 feet beyond the last step-out direct push probe location where field observations indicate no visible effect on soil or groundwater.

Field Screening and Subsurface Soil Sampling

Continuous soil cores will be collected from the direct push probes by advancing a stainless steel sampling probe equipped with a disposable liner into the soil at the bottom of the direct push borehole. The sampler will be withdrawn from the borehole and its liner removed and cut longitudinally to allow access to the soil core. The core will be logged and observations regarding debris or contamination will be noted. Field screening observations will include visual and olfactory characteristics for all samples. Field screening for soil samples will include visual observations for obvious soil staining and sheen test, and field screening using a hand-held photoionization detector equipped with a 10.6 electron-volt lamp.

Based on the migration potential of light, phase-separated hydrocarbons, CH2M HILL anticipates that the most visually-affected depth interval will occur in the vicinity of the water table. Soil samples will be collected for chemical analysis from the appropriate depth interval of these cores, based on visual observations and the professional judgment of the field technician. Alternate sample depths may be substituted based on the professional judgment of the CH2M HILL field crew if visual or other indicators suggest the presence of hydrocarbon constituents at intervals other than those outlined in this work plan.

Once the designated sample depth is attained, environmental soil samples will be collected from the sample sleeve using a clean, disposable stainless steel spoon. Soil samples will be collected to represent soil quality over the sample interval. The sample will be homogenized and then divided among the sample jars. Gloves and spoons will be changed between samples to reduce the potential for cross-contamination. After sample jars are filled, samples will be placed in a clean, chilled insulated cooler filled with ice for storage and transport to the laboratory under custody control.

Monitoring Well Installation and Groundwater Sampling

Three proposed monitoring wells are shown on Figure 2, and would allow water level measurements and groundwater sampling. At each monitoring well location continuous soil cores will be collected and logged in general conformance with ASTM International D2488-09 (Standard Practice for Description and Identification of Soils, Visual-Manual Procedure). Once the desired depth for the monitoring well is reached, a 4-inch-diameter casing fitted with an expendable drive point will be advanced to just below the desired depth for the well. The expendable drive point will be released from the drive casing and a pre-constructed monitoring well will be lowered inside the drive casing. A 10-foot well screen will be placed at depth to straddle the water table at the time the well is installed. Once the monitoring well is seated and capped, the drive casing will be slowly raised to allow the formation to collapse against the lower section of the pre-packed screen. Clean silica sand will be poured down the drive casing as it is extracted to place a 2-ft-thick sand pack above the monitoring well's pre-packed screen. Once this 2-foot sand pack is installed, bentonite chips and water will be poured in as the drive casing is removed. The bentonite chips and water mixture will be added up to approximately 1 foot below the finished grade. Concrete will be mixed and poured onto the hydrated bentonite chips, and a well monument will be seated into the wet concrete. Additional concrete will be added until the final finished grade is reached. The monitoring wells installed will be fitted with flush-mount monuments and locking well caps.

Following installation the wells will be developed, allowed to equilibrate for 2 weeks, and then sampled. The wells also will be surveyed to the nearest 0.01 foot relative to the North American Vertical Datum of 1988 to allow the groundwater elevation at each point to be calculated and to determine the groundwater flow direction.

Sample Analysis, Handling, and Custody

Coal tar constituents of interest are TPH-diesel range hydrocarbons and PAHs. PCBs are also constituents of interest for the site and the presence of PCB Aroclor 12 54 has been confirmed in the deeper excavation sidewall samples. To allow development of appropriate risk screening values, TPH faction analysis will be conducted on selected soil samples. Total organic carbon (TOC) will be analyzed in one soil sample collected from the saturated zone at each monitoring well location (three TOC samples total) to provide insight into the influence fractional organic carbon may have on advection of constituents in the subsurface.

Soil samples collected from the initial direct push borings will be analyzed for PAH-SIM, PCBs, TPH-Dx, and extractable/volatile petroleum hydrocarbons (EPH/VPH). Samples collected from the step-out locations will be analyzed for PAH-SIM, PCBs, and TPH-Dx, with TOC analysis of saturated-zone soil samples at each monitoring well location.

Groundwater samples will be collected using minimal-disturbance sampling methods. After determining the static depth to groundwater, a peristaltic pump with new header tubing and polyethylene pump tubing will be used to purge the each well at a low pumping rate (less than 0.5 gallon per minute) until field parameters (temperature, pH, turbidity, dissolved oxygen [DO], and redox potential) stabilize according to the following criteria in two aliquots collected 3 to 5 minutes apart:

- Turbidity: 10 percent (for values greater than 1 nephelometric turbidity unit)
- DO: 10 percent
- Specific conductance: 3 percent
- Temperature: 3 percent
- pH: ± 0.1 unit
- Redox: ± 10 millivolts or 10 percent between readings

Field parameters will be measured using calibrated equipment in an overflow cell to reduce the potential for bias from atmospheric oxygen. Groundwater levels will be monitored and noted periodically to document well performance during purging. After purging is complete at a well, groundwater samples will be collected from that well. Samples from the three new monitoring wells installed for this investigation will be submitted for laboratory analysis for PAH-SIM, PCBs, and TPH-Dx.

Pre-cleaned containers will be procured from the analytical laboratory. Samples will be held on ice in a cooler until received at the laboratory. The sampling container, preservation, and holding time requirements are included in Table 2.

TABLE 2

Samples—Methods, Preservation, Holding Times and Target Reporting Limits

NW Pipe Stained Soil Area Investigation

Constituent	Method	Bottle/Preservation	Holding Time	Target Reporting Limit
Soil Samples				
TPH	NWTPH-Dx	2 oz Glass, 4 °C	14 days	25 mg/kg
PAH	SW 8270-SIM	4 oz. Glass, 4 °C	14 days[a]/40[b]	0.001 mg/kg
EPH/VPH	NWTPH EPH and NWTPH VPH	4 oz. Glass, 4 °C	14 days[a]/40[b]	2 mg/kg
PCBs	SW 8082	4 oz. Glass, 4 °C	14 days[a]/40[b]	0.25 mg/kg
TOC	SW 9060	4 oz. Glass, 4 °C	28 days	200 mg/kg

TABLE 2

Samples—Methods, Preservation, Holding Times and Target Reporting Limits

NW Pipe Stained Soil Area Investigation

Constituent	Method	Bottle/Preservation	Holding Time	Target Reporting Limit
Groundwater Samples				
TPH	NWTPH-Dx	2 x 1000 mL Amber Glass, 4 °C	7 days[a]/40[b]	250 µg/L
PAH	SW 8270-SIM	2 x 1000 mL Amber Glass, 4 °C	7 days[a]/40[b]	0.01 µg/L
PCBs	SW 8082	2 x 1000 mL Amber Glass, 4 °C	7 days[a]/40[b]	0.05 µg/L

[a] = Days from sampling to extraction.

[b] = Days from extraction to analysis

Sample IDs for this investigation will adhere to the following nomenclature:

Each field sample collected during the investigation will be assigned a unique sample ID. The sample ID will indicate the sampling location and type using the following components:

- **Sampling matrix**: "GP" for direct push soil borings, "MW" for monitoring well groundwater samples.
- **Sampling location**: 301, 302, 303… (for direct push probes to match historical direct push activities at the facility) and 7, 8 and 9 for the three proposed monitoring wells. Monitoring wells MW-1 through MW-6 already exist and are located in the southeast portion of the facility.
- **Sample depth for soil samples:** upper and lower extent of sample in feet as appropriate (for example, "8-10" is the interval between 8 and 10 feet below the surface.
- **Sample date**: "110511" (November 5, 2011) for monitoring wells only

The following are examples of different types of samples:

- GP101-8-10 (represents soil sample obtained from 8 to 10 feet below ground surface at location GP101)
- MW7-110511 (represents a groundwater sample taken on November 5, 2011 from MW-7)

Samples will be held in the custody of the field sampler from the time of collection until the samples are packed and ready for shipment. Upon transferring custody of the samples, the individuals relinquishing and receiving them will sign, date, and note the time of transfer on the chain of custody (COC) form(s). Before any cooler leaves the site by means other than laboratory courier or field personnel, the COC form will be placed in a sealed Ziploc® bag and taped to the inside of the cooler. The cooler will then be sealed with adhesive packing tape, and a custody seal will be signed and dated by the relinquishing party and placed on the cooler so that the cooler cannot be opened without the custody seal being broken.

Investigation-Derived Waste

Drill cuttings and water associated with sampling will be contained and stored in separate Department of Transportation-approved drums. The drums will be labeled with a description of the contents and accumulation date. The disposal of IDW will be determined based on analytical results from this investigation.

Project Schedule

The field work described in this document is anticipated to be started in November and completed in December 2011, assuming DEQ approval of this work plan. It is anticipated that the direct-push field work will be completed within 3 days of starting field efforts. Groundwater sampling will be completed approximately two weeks after well construction and development are completed. Assuming standard laboratory turnaround, a technical memorandum describing sample results should be available in late January or early February 2012.

Reference

CH2M HILL. 2011. *Interim Remedial Action Work Plan, Excavation and Capping, Northwest Pipe Company, Portland, Oregon.* Unpublished consultant's report prepared for Northwest Pipe Company. February, 2011.

Attachment A

Deep Excavation Sidewall Sample Laboratory Report

CH2M HILL
Applied Sciences Laboratory (ASL)
1000 NE Circle Blvd, Building 10
Suite 10350
Corvallis, OR 97330
Tel 541.768.3120
Fax 541.752.0276
ASL@CH2M.com

CH2MHILL
Applied Sciences Laboratory (ASL)

September 23, 2011

NW Pipe

358932.FS.04

RE: Laboratory Report for NW Pipe
ASL Report #: K2723

Healy, Rob/PDX:

On September 10, 2011, CH2M HILL Applied Sciences Laboratory received four 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.

This data package meets standards requested by client and is not intended or implied to meet any other standard.

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 23144.

Sincerely,

Kathy McKinley

Kathy McKinley
Analytical Manager

Enclosures

Samples will be disposed at no additional cost to clients, 30 days (10 days for air) after the final report is issued. Storage of samples and containers beyond this may be available for an additional fee. Samples classed as hazardous based on hazardous waste regulations under Subtitle C of RCRA and 40CFR will either be returned to client at the client's expense or the client will be charged a $5 per sample disposal fee.

CLIENT SAMPLE CROSS-REFERENCE
For Samples Received September 10, 2011

ASL Report #: K2723

Sample ID	Client Sample ID	Date Collected	Time Collected
K272301	HSCA-1	09/09/2011	12:04
K272302	HSCS-2	09/09/2011	12:09
K272303	HSCS-3	09/09/2011	12:13
K272304	HSCS-4	09/09/2011	12:17

CASE NARRATIVE
PCB AROCLORS ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: K2723

Project: NW Pipe Project #: 358932.FS.04

I. Method(s):

Analysis: SW8082
Preparation: SW3550

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):

All acceptance criteria were met.

B. Calibration Verification(s):

All acceptance criteria were met.

C. Blank(s):

All acceptance criteria were met.

D. Laboratory Control Sample(s):

All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):

Analyzed in accordance with standard operating procedure.

F. Surrogate Standard(s):

Surrogate recovery of DCBP(149%) in HSCA-1 did not meet acceptance criteria of 25-143%. Surrogate DCBP in HSCS-2 was diluted out. Surrogate recovery of DCBP(152%) in HSCS-4 did not meet acceptance criteria of 25-143%. DCBP as a PCB congener may exist in native samples as a positive interference.

G. Analytical Exception(s):

For HSCS-3 and -4, A1254 was quantified off of the confirmation column because of matrix interferences obscuring major identifying peaks in the primary column; in particular, only two (2) peaks could be used for A1254 in HSCS-4 in the primary column. This was done only after the presence of A1254 was confirmed in both samples by visually fingerprinting it in both the primary and confirmation columns.

IV. Documentation Exception(s):

None.

V. 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 signatures.

Prepared by: C. Hopper Date: 9/22/11

Reviewed by: Date: 22 Sept 2011

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: HSCA-1
Project Name: NW Pipe
Sample Date: 09/09/11
Sample Time: 12:04
Type: Grab
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: K272301
Date Received: 09/10/11
Dilution Factor: 10
Report Revision No.: 0

Analyte	CAS#	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Semi-Volatiles							
Aroclor-1016	12674-11-2	246	246	U	ug/Kg	SW8082	09/21/11
Aroclor-1260	11096-82-5	246	246	U	ug/Kg	SW8082	09/21/11
Aroclor-1221	11104-28-2	246	246	U	ug/Kg	SW8082	09/21/11
Aroclor-1232	11141-16-5	246	246	U	ug/Kg	SW8082	09/21/11
Aroclor-1242	53469-21-9	246	246	U	ug/Kg	SW8082	09/21/11
Aroclor-1248	12672-29-6	246	246	U	ug/Kg	SW8082	09/21/11
Aroclor-1254	11097-69-1	246	1390		ug/Kg	SW8082	09/21/11

Surrogate	% Recovery	Control Limits		Qualifier
DCBP	149	25-143	1	*

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

CH2M HILL ASL
1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: HSCS-2
Project Name: NW Pipe
Sample Date: 09/09/11
Sample Time: 12:09
Type: Grab
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: K272302
Date Received: 09/10/11
Dilution Factor: 20
Report Revision No.: 0

Analyte	CAS#	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Semi-Volatiles							
Aroclor-1016	12674-11-2	538	538	U	ug/Kg	SW8082	09/21/11
Aroclor-1260	11096-82-5	538	538	U	ug/Kg	SW8082	09/21/11
Aroclor-1221	11104-28-2	538	538	U	ug/Kg	SW8082	09/21/11
Aroclor-1232	11141-16-5	538	538	U	ug/Kg	SW8082	09/21/11
Aroclor-1242	53469-21-9	538	538	U	ug/Kg	SW8082	09/21/11
Aroclor-1248	12672-29-6	538	538	U	ug/Kg	SW8082	09/21/11
Aroclor-1254	11097-69-1	538	4280		ug/Kg	SW8082	09/21/11

Surrogate	% Recovery	Control Limits		Qualifier
DCBP	0.0	25-143	1	*

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: HSCS-3
Project Name: NW Pipe
Sample Date: 09/09/11
Sample Time: 12:13
Type: Grab
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: K272303
Date Received: 09/10/11
Dilution Factor: 10
Report Revision No.: 0

Analyte	CAS#	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Semi-Volatiles							
Aroclor-1016	12674-11-2	255	255	U	ug/Kg	SW8082	09/21/11
Aroclor-1260	11096-82-5	255	255	U	ug/Kg	SW8082	09/21/11
Aroclor-1221	11104-28-2	255	255	U	ug/Kg	SW8082	09/21/11
Aroclor-1232	11141-16-5	255	255	U	ug/Kg	SW8082	09/21/11
Aroclor-1242	53469-21-9	255	255	U	ug/Kg	SW8082	09/21/11
Aroclor-1248	12672-29-6	255	255	U	ug/Kg	SW8082	09/21/11
Aroclor-1254	11097-69-1	255	644		ug/Kg	SW8082	09/21/11

Surrogate	% Recovery	Control Limits	Qualifier
DCBP	139	25-143	

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: HSCS-4
Project Name: NW Pipe
Sample Date: 09/09/11
Sample Time: 12:17
Type: Grab
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: K272304
Date Received: 09/10/11
Dilution Factor: 10
Report Revision No.: 0

Analyte	CAS#	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Semi-Volatiles							
Aroclor-1016	12674-11-2	252	252	U	ug/Kg	SW8082	09/21/11
Aroclor-1260	11096-82-5	252	252	U	ug/Kg	SW8082	09/21/11
Aroclor-1221	11104-28-2	252	252	U	ug/Kg	SW8082	09/21/11
Aroclor-1232	11141-16-5	252	252	U	ug/Kg	SW8082	09/21/11
Aroclor-1242	53469-21-9	252	252	U	ug/Kg	SW8082	09/21/11
Aroclor-1248	12672-29-6	252	252	U	ug/Kg	SW8082	09/21/11
Aroclor-1254	11097-69-1	252	785		ug/Kg	SW8082	09/21/11

Surrogate	% Recovery	Control Limits		Qualifier
DCBP	152	25-143	1	*

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: SB2-0916

Project Name: NW Pipe
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: SB2-0916

Date Received: N/A
Dilution Factor: 1
Report Revision No.: 0

Analyte	CAS#	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC Semi-Volatiles							
Aroclor-1016	12674-11-2	25.0	25.0	U	ug/Kg	SW8082	09/19/11
Aroclor-1260	11096-82-5	25.0	25.0	U	ug/Kg	SW8082	09/19/11
Aroclor-1221	11104-28-2	25.0	25.0	U	ug/Kg	SW8082	09/19/11
Aroclor-1232	11141-16-5	25.0	25.0	U	ug/Kg	SW8082	09/19/11
Aroclor-1242	53469-21-9	25.0	25.0	U	ug/Kg	SW8082	09/19/11
Aroclor-1248	12672-29-6	25.0	25.0	U	ug/Kg	SW8082	09/19/11
Aroclor-1254	11097-69-1	25.0	25.0	U	ug/Kg	SW8082	09/19/11

Surrogate	% Recovery	Control Limits	Qualifier
DCBP	103	25-143	

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: BS2S0916

Project Name: NW Pipe
Type: QC
Matrix: Soil

Lab Information

Lab Sample ID: BS2S0916

Dilution Factor: 1
Report Revision No.: 0

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
GC Semi-Volatiles							
Aroclor-1016	12674-11-2	125	116	ug/Kg	93	SW8082	09/19/11
Aroclor-1260	11096-82-5	125	127	ug/Kg	102	SW8082	09/19/11

Surrogate	% Recovery	Control Limits	Qualifier
DCBP	105	25-143	

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CASE NARRATIVE
GC/MS SEMI-VOLATILES ANALYSIS

Lab Name: CH2M HILL/LAB/CVO ASL SDG#: K2723

Project: NW Pipe Project #: 358932.FS.04

I. Method(s):

Analysis: SW8270SIM
Preparation: SW3550

II. Receipt/Holding Times:

All acceptance criteria were met.

III. Analysis:

A. Initial Calibration(s):

All acceptance criteria were met.

B. Calibration Verification(s):

All acceptance criteria were met.

C. Blank(s):

All acceptance criteria were met.

D. Laboratory Control Sample(s):

All acceptance criteria were met.

E. Matrix Spike/Matrix Spike Duplicate Sample(s):

Analyzed in accordance with standard operating procedure.

F. Surrogate Standard(s):

Surrogate Terphenyl-d14 in HSCA-1 was diluted out. Surrogate Terphenyl-d14 in HSCS-2 was diluted out. Surrogate Terphenyl-d14 in HSCS-3 was diluted out. Surrogate Terphenyl-d14 in HSCS-4 was diluted out.

G. DFTPP Tune Verification(s):

All acceptance criteria were met.

H. Internal Standard(s):

All acceptance criteria were met.

I. Analytical Exception(s):

None.

IV. Documentation Exception(s):

None.

V. 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 signatures.

Prepared by: Hill Date: 9/15/11

Reviewed by: Date: 16 Sept 2011

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: HSCA-1

Project Name: NW Pipe
Sample Date: 09/09/11
Sample Time: 12:04
Type: Grab
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: K272301

Date Received: 09/10/11
Dilution Factor: 100
Report Revision No.: 0

Analyte	CAS#	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC/MS Semi-Volatiles							
Naphthalene	91-20-3	261	261	U	ug/Kg	SW8270SIM	09/13/11
2-Methylnaphthalene	91-57-6	261	261	U	ug/Kg	SW8270SIM	09/13/11
1-Methylnaphthalene	90-12-0	261	261	U	ug/Kg	SW8270SIM	09/13/11
Acenaphthylene	208-96-8	261	993		ug/Kg	SW8270SIM	09/13/11
Acenaphthene	83-32-9	261	261	U	ug/Kg	SW8270SIM	09/13/11
Fluorene	86-73-7	261	261	U	ug/Kg	SW8270SIM	09/13/11
Phenanthrene	85-01-8	261	261	U	ug/Kg	SW8270SIM	09/13/11
Anthracene	120-12-7	261	548		ug/Kg	SW8270SIM	09/13/11
Fluoranthene	206-44-0	261	1710		ug/Kg	SW8270SIM	09/13/11
Pyrene	129-00-0	261	1560		ug/Kg	SW8270SIM	09/13/11
Benzo(a)anthracene	56-55-3	261	608		ug/Kg	SW8270SIM	09/13/11
Chrysene	218-01-9	261	3470		ug/Kg	SW8270SIM	09/13/11
Benzo(b)fluoroanthene	205-99-2	261	10400		ug/Kg	SW8270SIM	09/13/11
Benzo(k)fluoranthene	207-08-9	261	1270		ug/Kg	SW8270SIM	09/13/11
Benzo(a)pyrene	50-32-8	261	5550		ug/Kg	SW8270SIM	09/13/11
Indeno(1,2,3-c,d)pyrene	193-39-5	261	5560		ug/Kg	SW8270SIM	09/13/11
Dibenzo(a,h)anthracene	53-70-3	261	1240		ug/Kg	SW8270SIM	09/13/11
Benzo(g,h,i)perylene	191-24-2	261	5780		ug/Kg	SW8270SIM	09/13/11

Surrogate	% Recovery	Control Limits		Qualifier
Terphenyl-d14	0.0	18-137	1	*

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: HSCS-2

Project Name: NW Pipe
Sample Date: 09/09/11
Sample Time: 12:09
Type: Grab
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: K272302

Date Received: 09/10/11
Dilution Factor: 100
Report Revision No.: 0

Analyte	CAS#	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC/MS Semi-Volatiles							
Naphthalene	91-20-3	269	269	U	ug/Kg	SW8270SIM	09/13/11
2-Methylnaphthalene	91-57-6	269	269	U	ug/Kg	SW8270SIM	09/13/11
1-Methylnaphthalene	90-12-0	269	269	U	ug/Kg	SW8270SIM	09/13/11
Acenaphthylene	208-96-8	269	2960		ug/Kg	SW8270SIM	09/13/11
Acenaphthene	83-32-9	269	269	U	ug/Kg	SW8270SIM	09/13/11
Fluorene	86-73-7	269	269	U	ug/Kg	SW8270SIM	09/13/11
Phenanthrene	85-01-8	269	269	U	ug/Kg	SW8270SIM	09/13/11
Anthracene	120-12-7	269	1600		ug/Kg	SW8270SIM	09/13/11
Fluoranthene	206-44-0	269	1730		ug/Kg	SW8270SIM	09/13/11
Pyrene	129-00-0	269	2670		ug/Kg	SW8270SIM	09/13/11
Benzo(a)anthracene	56-55-3	269	873		ug/Kg	SW8270SIM	09/13/11
Chrysene	218-01-9	269	6430		ug/Kg	SW8270SIM	09/13/11
Benzo(b)fluoroanthene	205-99-2	269	13200		ug/Kg	SW8270SIM	09/13/11
Benzo(k)fluoranthene	207-08-9	269	2370		ug/Kg	SW8270SIM	09/13/11
Benzo(a)pyrene	50-32-8	269	8920		ug/Kg	SW8270SIM	09/13/11
Indeno(1,2,3-c,d)pyrene	193-39-5	269	9630		ug/Kg	SW8270SIM	09/13/11
Dibenzo(a,h)anthracene	53-70-3	269	1990		ug/Kg	SW8270SIM	09/13/11
Benzo(g,h,i)perylene	191-24-2	269	11200		ug/Kg	SW8270SIM	09/13/11

Surrogate	% Recovery	Control Limits		Qualifier
Terphenyl-d14	0.0	18-137	1	*

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: HSCS-3

Project Name: NW Pipe
Sample Date: 09/09/11
Sample Time: 12:13
Type: Grab
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: K272303

Date Received: 09/10/11
Dilution Factor: 10000
Report Revision No.: 0

Analyte	CAS#	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC/MS Semi-Volatiles							
Naphthalene	91-20-3	25900	392000		ug/Kg	SW8270SIM	09/14/11
2-Methylnaphthalene	91-57-6	25900	119000		ug/Kg	SW8270SIM	09/14/11
1-Methylnaphthalene	90-12-0	25900	72000		ug/Kg	SW8270SIM	09/14/11
Acenaphthylene	208-96-8	25900	25900	U	ug/Kg	SW8270SIM	09/14/11
Acenaphthene	83-32-9	25900	1180000		ug/Kg	SW8270SIM	09/14/11
Fluorene	86-73-7	25900	580000		ug/Kg	SW8270SIM	09/14/11
Phenanthrene	85-01-8	25900	1860000		ug/Kg	SW8270SIM	09/14/11
Anthracene	120-12-7	25900	144000		ug/Kg	SW8270SIM	09/14/11
Fluoranthene	206-44-0	25900	1890000		ug/Kg	SW8270SIM	09/14/11
Pyrene	129-00-0	25900	1330000		ug/Kg	SW8270SIM	09/14/11
Benzo(a)anthracene	56-55-3	25900	209000		ug/Kg	SW8270SIM	09/14/11
Chrysene	218-01-9	25900	150000		ug/Kg	SW8270SIM	09/14/11
Benzo(b)fluoroanthene	205-99-2	25900	70800		ug/Kg	SW8270SIM	09/14/11
Benzo(k)fluoranthene	207-08-9	25900	29500		ug/Kg	SW8270SIM	09/14/11
Benzo(a)pyrene	50-32-8	25900	35600		ug/Kg	SW8270SIM	09/14/11
Indeno(1,2,3-c,d)pyrene	193-39-5	25900	25900	U	ug/Kg	SW8270SIM	09/14/11
Dibenzo(a,h)anthracene	53-70-3	25900	25900	U	ug/Kg	SW8270SIM	09/14/11
Benzo(g,h,i)perylene	191-24-2	25900	25900	U	ug/Kg	SW8270SIM	09/14/11

Surrogate	% Recovery	Control Limits	Qualifier	
Terphenyl-d14	0.0	18-137	1	*

U=Not detected at specified reporting limit
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E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: HSCS-4

Project Name: NW Pipe
Sample Date: 09/09/11
Sample Time: 12:17
Type: Grab
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: K272304

Date Received: 09/10/11
Dilution Factor: 10000
Report Revision No.: 0

Analyte	CAS#	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC/MS Semi-Volatiles							
Naphthalene	91-20-3	27100	299000		ug/Kg	SW8270SIM	09/14/11
2-Methylnaphthalene	91-57-6	27100	94300		ug/Kg	SW8270SIM	09/14/11
1-Methylnaphthalene	90-12-0	27100	57700		ug/Kg	SW8270SIM	09/14/11
Acenaphthylene	208-96-8	27100	27100	U	ug/Kg	SW8270SIM	09/14/11
Acenaphthene	83-32-9	27100	924000		ug/Kg	SW8270SIM	09/14/11
Fluorene	86-73-7	27100	442000		ug/Kg	SW8270SIM	09/14/11
Phenanthrene	85-01-8	27100	1440000		ug/Kg	SW8270SIM	09/14/11
Anthracene	120-12-7	27100	128000		ug/Kg	SW8270SIM	09/14/11
Fluoranthene	206-44-0	27100	1470000		ug/Kg	SW8270SIM	09/14/11
Pyrene	129-00-0	27100	952000		ug/Kg	SW8270SIM	09/14/11
Benzo(a)anthracene	56-55-3	27100	160000		ug/Kg	SW8270SIM	09/14/11
Chrysene	218-01-9	27100	118000		ug/Kg	SW8270SIM	09/14/11
Benzo(b)fluoroanthene	205-99-2	27100	52000		ug/Kg	SW8270SIM	09/14/11
Benzo(k)fluoranthene	207-08-9	27100	27100	U	ug/Kg	SW8270SIM	09/14/11
Benzo(a)pyrene	50-32-8	27100	27100	U	ug/Kg	SW8270SIM	09/14/11
Indeno(1,2,3-c,d)pyrene	193-39-5	27100	27100	U	ug/Kg	SW8270SIM	09/14/11
Dibenzo(a,h)anthracene	53-70-3	27100	27100	U	ug/Kg	SW8270SIM	09/14/11
Benzo(g,h,i)perylene	191-24-2	27100	27100	U	ug/Kg	SW8270SIM	09/14/11

Surrogate	% Recovery	Control Limits	Qualifier
Terphenyl-d14	0.0	18-137	1 *

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: SB1-0912

Project Name: NW Pipe
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Soil
Basis: Dry Weight

Lab Information

Lab Sample ID: SB1-0912

Date Received: N/A
Dilution Factor: 1
Report Revision No.: 0

Analyte	CAS#	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
GC/MS Semi-Volatiles							
Naphthalene	91-20-3	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
2-Methylnaphthalene	91-57-6	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
1-Methylnaphthalene	90-12-0	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Acenaphthylene	208-96-8	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Acenaphthene	83-32-9	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Fluorene	86-73-7	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Phenanthrene	85-01-8	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Anthracene	120-12-7	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Fluoranthene	206-44-0	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Pyrene	129-00-0	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Benzo(a)anthracene	56-55-3	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Chrysene	218-01-9	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Benzo(b)fluoroanthene	205-99-2	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Benzo(k)fluoranthene	207-08-9	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Benzo(a)pyrene	50-32-8	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Indeno(1,2,3-c,d)pyrene	193-39-5	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Dibenzo(a,h)anthracene	53-70-3	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11
Benzo(g,h,i)perylene	191-24-2	2.50	2.50	U	ug/Kg	SW8270SIM	09/13/11

Surrogate	% Recovery	Control Limits	Qualifier
Terphenyl-d14	62	18-137	

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: BS1S0912

Project Name: NW Pipe
Type: QC
Matrix: Soil

Lab Information

Lab Sample ID: BS1S0912

Dilution Factor: 1
Report Revision No.: 0

Analyte	CAS#	Spike Amount	Sample Result	Units	%Recovery	Analysis Method	Date Analyzed
GC/MS Semi-Volatiles							
Fluoranthene	206-44-0	50.0	36.1	ug/Kg	72	SW8270SIM	09/13/11
Pyrene	129-00-0	50.0	33.5	ug/Kg	67	SW8270SIM	09/13/11
Benzo(a)anthracene	56-55-3	50.0	42.8	ug/Kg	86	SW8270SIM	09/13/11
Chrysene	218-01-9	50.0	39.4	ug/Kg	79	SW8270SIM	09/13/11
Benzo(b)fluoroanthene	205-99-2	50.0	42.1	ug/Kg	84	SW8270SIM	09/13/11
Benzo(k)fluoranthene	207-08-9	50.0	42.3	ug/Kg	85	SW8270SIM	09/13/11
Benzo(a)pyrene	50-32-8	50.0	36.0	ug/Kg	72	SW8270SIM	09/13/11
Indeno(1,2,3-c,d)pyrene	193-39-5	50.0	34.4	ug/Kg	69	SW8270SIM	09/13/11
Naphthalene	91-20-3	50.0	37.7	ug/Kg	75	SW8270SIM	09/13/11
2-Methylnaphthalene	91-57-6	50.0	38.3	ug/Kg	77	SW8270SIM	09/13/11
1-Methylnaphthalene	90-12-0	50.0	39.2	ug/Kg	78	SW8270SIM	09/13/11
Acenaphthylene	208-96-8	50.0	39.9	ug/Kg	80	SW8270SIM	09/13/11
Acenaphthene	83-32-9	50.0	37.6	ug/Kg	75	SW8270SIM	09/13/11
Fluorene	86-73-7	50.0	38.8	ug/Kg	78	SW8270SIM	09/13/11
Phenanthrene	85-01-8	50.0	38.0	ug/Kg	76	SW8270SIM	09/13/11
Anthracene	120-12-7	50.0	36.4	ug/Kg	73	SW8270SIM	09/13/11
Dibenzo(a,h)anthracene	53-70-3	50.0	34.9	ug/Kg	70	SW8270SIM	09/13/11
Benzo(g,h,i)perylene	191-24-2	50.0	36.6	ug/Kg	73	SW8270SIM	09/13/11

Surrogate	% Recovery	Control Limits	Qualifier
Terphenyl-d14	60	18-137	

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2MHILL Applied Sciences Lab
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AND AGREEMENT TO PERFORM SERVICES

1000 NE Circle Blvd., Suite 10350
Corvallis, OR 97330
(541) 768-3120 FAX (541) 752-0276

COC #

Project # or Purchase Order #	358932.FS.04
Project Name	NW PIPE
Company Name or Home Address/Phone Number	CH2M HILL / PDX
Email Address for Reporting	RHEALY@CH2M.com
Report Copy to:	
Turnaround Time	☐24 hours ☐48 hours ☐72 hours ☐7 days ☐14 days ☐21 days (STD)
Drinking Water?	Yes ☐ No ☑
Sample Disposal:	Dispose ☑ Return ☐

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	CLIENT SAMPLE ID	TOTAL # OF CONTAINERS	Requested Analytical Method # PAH-SIM 8270	Preservative UNPRES	Preservative H_2SO_4	Preservative HNO_3	Preservative HCl	Preservative NaOH	Preservative ZnAcNaOH	Canister ID	Lab ID
9/9/11	1204				X		HSCS-1	1	X								1
9/9/11	1209				X		HSCS-2	1	X								2
9/9/11	1213				X		HSCS-3	1	X								3
9/9/11	1217				X		HSCS-4	1	X								4

THIS AREA FOR LAB USE ONLY

Lab # K2723 Page 1 of 1

EPA Tier QC Level 1 (Screening) 2 3 4

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Volatile Contaminants/Odorous ☐ Biohazard ☐ Other _____

Relinquished By	R. Healy	**Date/Time**	9/9/11 1500
Sampled By and Title	(Please sign and print name)	**Date/Time**	9/9/11 1500
Received By	Carmen Bell (Please sign and print name)	**Date/Time**	9/10/11 Log in 9/12/11 @ 0820
Received By	(Please sign and print name)	**Date/Time**	
Special Instructions	5 DAY T.A.T.!!		

Received By:		**Date/Time**
Relinquished By	(Please sign and print name)	**Date/Time**
Relinquished By	(Please sign and print name)	**Date/Time**
Shipped Via UPS (Fed-Ex) Other_____		**Tracking #**

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original – LAB, Yellow – LAB, Pink – Client
Rev 09/2010 LAB FORM 340

CH2MHILL
Applied Sciences Laboratory (ASL)

Sample Receipt Record

Batch Number: K2723

Client/Project: NW Pipe

Log in date.
Date received: 9-12-11 received 9-10-11

Checked by: CRS

Checked by: _____

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

Observation	NA	YES	NO
Radiological Screening for DoD	✓		
Were custody seals intact and on the outside of the cooler?		✓	
Type of packing material: (Ice) Blue Ice Bubble wrap			
Was a Chain of Custody provided?		✓	
Was the Chain of Custody properly filled out? If not document in SRER		✓	
Were the sample containers in good condition (broken or leaking)?		✓	
Containers supplied by ASL?		✓	
Any sample with < 1/2 holding time remaining? If so contact LPM			✓
Samples have multi-phase? If yes, document on SRER			✓
Was there ice in the cooler? Enter temp. If >6°C contact client/SRER 0.6 °C		✓	

All VOCs free of air bubbles? No, document on SRER	✓		
pH of all samples checked and met requirements? No, then document in SRER	✓		
Enough sample volume provided for analysis? No, document in SRER		✓	
Did sample labels agree with COC? No, document in SRER		✓	
Dissolved/Soluble metals filtered in the field?	✓		
Dissolved/Soluble metals have sediment in bottom of container? Document in SRER	✓		

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials

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Sample Receipt Exception Report

Sample Batch Number: K2723 **Client/Project** NW PIPE

The following exceptions were noted:		Comments (write number of exception description and the impacted sample numbers)
	1. No custody seal as required by project	11) Client called and emailed and requested PCB on all 4 soil samples. I notified it would be standard 14day TAT
	2. No chain-of-custody provided	
	3. Analysis, description, date of collection not provided	
	4. Samples broken or leaking on receipt.	
	5. Temperature of samples inappropriate for analysis requested	
	6. Container inappropriate for analysis requested	
	7. Inadequate sample volume.	
	8. Preservation inappropriate for analysis requested	
	9. Samples received out of holding time for analysis requested	
	10. Discrepancies between COC form and container labels.	
X	11. Other.	

ACTION TAKEN:

Originator: Kathy Mcleans Date: 9/12/11

Client was notified on: (Date/Time) Client Contact:

Client Services: