Technical Report

Interim Report Summarizing Additional Soil and Roof Runoff Investigation Results

Prepared for

Northwest Pipe Company
Portland Facility

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Prepared by

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1. Introduction

The data presented in this document were generated in accordance with the Final Supplemental Remedial Investigation – Source Control Work Plan (CH2M HILL 2009) for the Northwest Pipe Company, Portland, Oregon facility (Portland Facility). The Work Plan consists of several individual work plans for various elements of the remedial investigation. The work described in this report was completed subject to Work Plan 1 (Soil Investigation Activities) and Work Plan 2 (Roof Sampling). This work was required by the Department of Environmental Quality (DEQ) under the Remedial Investigation/Source Control Evaluation agreement with Northwest Pipe dated December 30, 2004 and the Final Supplemental Remedial Investigation - Source Control Evaluation Work Plan, which was submitted on October 9, 2009, with DEQ comments addressed and approval to proceed with the work.

2. History

In response to DEQ's requirement that the nature and extent of certain constituents in soil at its Portland facility be determined, Northwest Pipe has conducted several soil sampling events with principal sampling efforts completed in September 2001, June 2005, and October 2006. Table 1 presents a summary of the results of these historical surface soil sampling events, with Figure 1 presenting historical surface soil sample locations.

Under the work conducted by Northwest Pipe to investigate the potential sources of zinc as part of its source control evaluation, several storm water roof runoff sampling events have been conducted focusing on zinc concentrations, including sampling events in November 2006, December 2007, June 2008, November 2008, and December 2008. These sampling events were conducted to identify the possible source of zinc concentrations in site storm water and to identify the effectiveness of various methods to address these levels. Table 2 presents a summary of historical roof runoff sampling results, with Figure 2 presenting both historical and current roof runoff sample locations.

3. Sampling Activities and Analytical Results

The surface soil sampling and the storm water roof runoff sampling are presented separately in the subsections below.

3.1 Surface Soil Sampling

The objective of Work Plan 1 (surface soil sampling) as identified in the Final Supplemental Remedial Investigation – Source Control Evaluation Work Plan (CH2M HILL, 2009) is to build on the extensive soil sampling efforts completed previously in response to DEQ requirements by further characterizing the nature and extent of potential constituents of interest (COIs) and other constituents required by DEQ that may be found in surface soil (surface to 6 inches below the surface) at the Portland Facility. The scope of this effort was to collect eleven surface soil samples around the Portland Facility and analyze for the selected constituents identified in Work Plan 1.

Surface soil samples were collected on October 19, 2009 in accordance with the DEQ-approved Work Plan. For each surface soil sample collected, the sample location was determined with a hand held sub-meter global positioning system (GPS) device. The field GPS data were subsequently downloaded and processed for differential correction to address atmospheric interference to attain sub-meter accuracy. The recorded sample locations are shown in Figure 3.

As required by DEQ, surface soil samples were analyzed for inorganic constituents (aluminum, antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc) and organic constituents (phthalates, polychlorinated biphenyls (PCBs), pesticides, and total organic carbon). In addition, DEQ required that selected samples also be analyzed for polynuclear aromatic hydrocarbons (PAHs).

The final laboratory data report (Appendix A) was reviewed and evaluated by a CH2M HILL chemist to determine if project quality assurance and quality controls (QA/QC) were implemented in the field as well as in the laboratory. All data were found to meet the project QA/QC standards established for this work with the addition of a few data qualifying flags. A more detailed discussion is presented in the Data Quality Evaluation report presented in Appendix B.

Sampling results were compared to the initial upland source control screening values (SLVs) for soil listed in Table 3-1 of the Joint Source Control Strategy (JSCS) guidance document (DEQ 2007) and DEQ risk based concentrations for soil ingestion, dermal contact and inhalation for the occupational receptor scenario (DEQ 2009). In this report, either the RBC for the construction worker or occupational worker exposure scenario is used for comparison, depending on which is lower.

For those constituents that DEQ has not published a screening level for, EPA regional screening levels (RSLs) are referenced (EPA 2009). Some SLVs are set at a value DEQ considers to represent background concentrations. Because of natural variability in soil composition, the concentration of any element will vary naturally with location either above or below the background value. In this document, a guideline of 2X the background value is used as a general indication of elevated concentrations of inorganic constituents, an approach suggested by EPA (1998) for identifying naturally-occurring constituent concentrations that are elevated relative to background. A summary of the laboratory data as compared to these screening levels are presented in Table 3.

3.2 Storm Water Roof Runoff

The objective of the storm water roof runoff sampling as identified in the Work Plan was to determine the presence or absence of certain constituents in storm water discharging from roofs at the site and identify the extent of those constituents, if present. The scope of this effort was to collect ten representative samples from locations around the Portland Facility and analyze each sample for the constituents required by DEQ for storm water as presented in Work Plan 2.

Storm water roof runoff samples were collected on November 7, 2009 in accordance with the DEQ-approved Work Plan. For each roof runoff sample collected, the sample location was noted in the field logbook. The recorded sample locations are shown in Figure 2. According to the City of Portland's Hydra rain gauge at the Port of Portland Terminal 4, 1.19 inches of precipitation fell on November 7; the majority of which occurred in the afternoon coincident with sampling activities (USGS 2010).

As stated in Work Plan 2, all storm water roof runoff samples were analyzed for total zinc concentrations, and at least one sample from each of the buildings were analyzed for total concentrations of other inorganic constituents (aluminum, antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc) and for organic constituents (phthalates, PCBs, PAH, volatile organic compounds (VOCs)), as well as total suspended solids.

The final laboratory data report (Appendix A) was reviewed and evaluated by a project chemist to ensure project QA/QC were implemented in the field as well as in the laboratory. All data was found to meet the project QA/QC standards established for this work with the addition of a few data flags. A more detailed discussion is presented in Appendix B.

Sampling results were compared to the initial upland source control screening values for storm water listed in Table 3-1 of the JSCS guidance document (DEQ 2005, table updated July 16, 2007) (SLVs). A summary of the laboratory data as compared to these screening levels are presented in Table 4.

4. Evaluation of Analytical Results

The analytical results from sampling conducted at the Northwest Pipe facility are summarized in this section. As noted in Section 3.1, some concentrations used as screening levels (such as some inorganic constituents for sediment) are set at background concentrations; consequently, concentrations above these values do not necessarily indicate a risk to human or ecological receptors. Similarly, point-by-point comparisons against screening levels are highly conservative, are used as a preliminary screening step, and do not necessarily indicate the presence of excess risk to potential receptors. However, this preliminary screening can be useful in identifying potential areas of concern that may warrant further evaluation using either human or ecological risk assessment. Lastly, the JSCS SLVs are calculated for comparison against concentrations in sediment and surface water in an aquatic habitat. Because upland soil is not sediment, nor is roof runoff an aquatic habitat, constituent concentrations in surface soil or roof runoff above JSCS SLVs do not necessarily indicate an unacceptable risk exists to potential human or ecological receptors.

4.1 Surface Soil Sampling

This section discusses the findings of the October 2009 surface soil sampling as well as the historical surface soil sampling events noted in Section 2 of this document.

4.1.1 Inorganic Constituents

Historical surface soil sampling events focused on zinc concentrations as part of Northwest Pipe's efforts to identify potential sources of zinc in storm water. Of the 19 historical samples analyzed for zinc, none are above the industrial worker RSL calculated by EPA (2009) for zinc (310,000 mg/kg). There is no Oregon RBC for zinc for the industrial or commercial worker exposure pathway (DEQ 2009).

Using the very conservative approach of comparing upland soil concentrations to sediment SLVs, only two historical soil samples analyzed for zinc (SS10 and SS13) were found to have zinc concentrations above the zinc SLV of 459 mg/kg.

The 2009 surface soil sampling event described in this document found concentrations of aluminum, antimony, mercury, and silver to be below screening levels whereas concentrations of arsenic, cadmium, chromium, copper, lead, nickel, selenium, and zinc exceeded screening levels in some samples. The JSCS SLVs for arsenic, cadmium, lead, and selenium are set at regional background concentrations (DEQ 2007). The samples with constituent concentrations above screening levels were:

- Arsenic - Ten of the eleven soil samples exceeded the occupational worker risk-based concentration (RBC) of 1.7 milligrams per kilogram (mg/kg); however, this RBC is well below area background concentrations for arsenic, which DEQ (2007) considers to be 7 mg/kg. Only one of the eleven sample locations (SS-410) had an arsenic concentration greater than twice the background concentration, a value DEQ has identified as a

screening value in the JSCS (DEQ 2007). This sample, SS-410, was collected from a small area of soil near the plant entrance that was paved in October 2009 as an interim remedial measure/source control measure.

- Cadmium – All samples were below the DEQ RBCs for soil ingestion, dermal contact, and inhalation for the construction worker exposure scenario (150 mg/kg), as tabulated in DEQ (2009). Ten of the eleven soil samples are greater than the JSCS SLV/background concentration for sediment of 1 mg/kg. However only seven of eleven samples are greater than twice the sediment background.
- Chromium – DEQ (2009) has not established a construction worker or occupational worker RBC for total chromium; however, the RBC for trivalent chromium (the form of chromium most likely to be present at the Northwest Pipe facility because of the absence of chrome plating operations or other industrial operations involving hexavalent chromium) is greater than 100,000 mg/kg (DEQ 2009). None of the soil samples had a chromium concentration above this RBC. Seven of eleven samples are greater than the JSCS SLV (111 mg/kg) for sediment, with six of eleven greater than twice the background concentration (42 mg/kg).
- Copper – All samples were below the DEQ RBC for the construction worker exposure scenario (12,000 mg/kg). Three of eleven samples are greater than the JSCS SLV for sediment (149 mg/kg).
- Lead - All samples were below the DEQ RBC for the construction worker exposure scenario (800 mg/kg). Seven of eleven samples are greater than the JSCS SLV/Background for sediment (17 mg/kg), with five of eleven greater than twice the background concentration.
- Nickel - All samples were below the DEQ RBC for the construction worker exposure scenario (6,100 mg/kg). Four of eleven samples are greater than the JSCS SLV for sediment (111 mg/kg), with one of eleven greater than twice the background concentration (42 mg/kg).
- Selenium – There is no DEQ RBC for selenium; however EPA (2009) has set an industrial worker RSL of 5,100 mg/kg, more than two orders of magnitude above the maximum concentration detected at the site. One sample, SS-410 at 12.1 mg/kg, was greater than the JSCS SLV/Background concentration for sediment (2 mg/kg). SS-410 was collected from an area of soil that was paved in October 2009.
- Zinc – There is no DEQ RBC for zinc; however the industrial worker RSL for zinc is 310,000 mg/kg, nearly three orders of magnitude above the maximum zinc concentration reported at the site in surface soil. Three of eleven samples had zinc concentrations greater than the JSCS SLV for sediment (111 mg/kg).

Oregon Administrative Rule (OAR) 340-122-115(32)(b) defines a highly concentrated hot spot for carcinogens as having a concentration greater than 100 times the acceptable risk level for individual carcinogens, or – for non carcinogens – having a concentration 10 times the acceptable risk level. The results of the inorganic constituent analysis for surface soil identified no highly concentrated hot spots for inorganic constituents.

4.1.2 Organochlorine Pesticides

Historical surface soil samples were not analyzed for organochlorine pesticides.

This most recent analysis of surface soil samples documented that organochlorine pesticides are not present at the site above reporting limits. Alpha-BHC was identified below the reporting limit but above the method detection limit at one sample location (SS409) in the extreme southwest corner of the site near the Paper Shed building. The laboratory estimated its concentration as 0.00678 mg/kg. There is no screening level value for alpha-BHC indicated in the JSCS. The concentration found at this location is well below the DEQ RBC for the occupational worker exposure scenario (0.34 mg/kg) and also below the RBC for construction worker exposure (2.6 mg/kg).

4.1.3 Polynuclear Aromatic Hydrocarbons (PAHs)

Both historical sample results and the recent data from sampling in 2009 indicate that PAHs are present in surface soil at concentrations that vary with location. Figure 4 presents the most recent sample locations and the corresponding calculated total PAH for each sample location. Total PAH concentrations were calculated by adding the detected values for each PAH analyte and zero for each non detected analyte.

For benzo(a)pyrene, the hot spot screening level is 27 mg/kg for an occupational worker and 210 mg/kg for a construction worker. None of the PAH concentrations exceeded the construction worker hot spot screening level. One sample location from the most recent data set (SS411 - located on leased property, on the south end of the facility next to an offsite rail line) and one sample from the 2007 data set (SS321 – located on a narrow strip of soil at the north end of the lining and coating building) had concentrations of benzo(a)pyrene that exceeded the occupational worker hot spot screening level: SS411 at 29.75 mg/kg and SS321 at 38.2 mg/kg. Sample SS321, which is bounded by pavement and other samples that showed substantially lower PAH concentrations, was collected from north of the lining and coating area, near where coal tar enamel product historically was stored prior to use in lining potable water pipes in accordance with American Water Works Association standard C203 (AWWA 2010). The facility has not used coal tar enamel to coat pipes since 2008. Sample SS411 was collected at the southern edge of the site from soil that had eroded and sloughed onto pavement on the property leased by Northwest Pipe Company from the elevated land that runs along the southern boundary of this leased land. This elevated land includes a rail line and North Terminal Road, where scrap metal delivery trucks and bins associated with the International Terminals scrap yard operation are routinely parked.

4.1.4 Polychlorinated Biphenyls (PCBs)

Both historical sample results and the recent data from 2009 indicate that PCBs are present in surface soil at concentrations that vary across the site. Only PCB Aroclors 1254 and 1260 have been detected at the site, with Aroclor 1260 only detected in approximately half of the historical surface soil samples and in none of the most recent (October 2009) samples. The concentration of Aroclor 1254 was found to range from its highest at SS13 (11 mg/kg) to its lowest at SS408 (0.025 mg/kg). Figure 5 presents the sample locations and the corresponding calculated total PCB concentration for each point. None of the PCB Aroclor concentrations constitute a highly concentrated hot spot for industrial worker exposure

because none exceeded a value of 74 mg/kg, which is one hundred times the industrial worker RSL for Aroclors 1254 and 1260, based on cancer risk (EPA 2010).

4.1.5 Phthalate Esters

Historical surface soil samples were not analyzed for phthalates.

Only bis(2-ethylhexyl)phthalate, butyl benzyl phthalate and di-n-butyl phthalate were detected in the 2009 soil samples.

- Bis(2-ethylhexyl)phthalate was found in all surface soil samples with concentrations ranging from 0.0603 mg/kg at SS408 to 2.44 mg/kg at SS411. None of the samples exceeded DEQ RBC for occupational (150 mg/kg) or construction worker (1,200 mg/kg) scenarios. Five of the eleven samples had bis(2-ethylhexyl)phthalate concentrations greater than the JSCS SLV for sediment (0.33 mg/kg).
- Butyl benzyl phthalate was found in nine of the eleven sample locations. There is no JSCS SLV or DEQ RBC for butyl benzyl phthalate. All results are below the industrial worker RSL of 910 mg/kg calculated by EPA (2009). Five of the nine detections were below the laboratory's calibration curve of accurately quantifying the concentration. As a result, the data set for these locations are flagged indicating the constituent was positively identified but the concentration value is an estimate.
- Di-n-butyl phthalate was only detected in the field duplicate at SS411 (0.38 mg/kg) and was flagged as an estimated value. There is no DEQ RBC for di-n-butyl phthalate. This concentration is below the industrial worker RSL of 62,000 mg/kg calculated by EPA (2009), but slightly above the conservative JSCS SLV for sediment (0.06 mg/kg).

None of the detected phthalate concentrations exceeded highly concentrated hot spot levels. Even though the method blanks associated with these samples did not contain phthalate esters above reporting limits, EPA (2008) recognizes phthalate esters and in particular bis(2-ethylhexyl)phthalate (the most widely reported phthalate in these samples) as common laboratory contaminants. The detection of low concentrations of selected phthalate esters in soil at the site may be influenced by this effect.

4.1.6 Surface Soil Summary

Concentrations of site constituents detected during the 2009 soil sampling effort showed concentrations of PAHs and PCBs similar to those that had been reported previously. The analysis of other constituents required by DEQ (inorganic constituents, pesticides, and phthalates) did not identify significant new findings. The reported concentrations are below industrial worker hot spot levels except for a single constituent (benzo(a)pyrene) at two locations: one sample in a narrow strip of soil north of the Lining and Coating building, which is bounded by pavement and other samples containing lower (non-hot spot) concentrations of benzo(a)pyrene; and the other sample in soil that had sloughed onto pavement from raised ground offsite along a railroad spur and North Terminal Road, which border the site to the south. The consistent detection at low concentrations of bis(2-ethylhexyl)phthalate as well as – in certain samples –two other phthalates, may have some relation to laboratory bias because phthalates are unrelated to site activities but are known laboratory contaminants.

These findings for surface soil samples are consistent with Northwest Pipe Company's Focused Paving Plan as submitted to DEQ on October 14, 2009 and implemented in late 2009, which focused on paving in the southern half of the property (CH2M HILL, 2009b). A comprehensive paving plan will be drafted to address the remaining unpaved portions of the property. The paving plan will consider protectiveness of pavement as a remedy and will address the higher threshold for treatment or excavation of hot spots as described in OAR 340-122-0085(7).

4.2 Storm Water Roof Runoff

4.2.1 Inorganic Constituents

Historical storm water roof runoff samples focused solely on total zinc concentrations. Northwest Pipe Company has completed an extensive roof cleaning and coating program for the main production building (Bays 1 through 6) as a source control measure since many of these samples were collected. Consequently, these historical sample results do not represent current conditions. These data are included in this report to illustrate the effectiveness of the roof coating program.

Six of the 11 roof runoff samples were analyzed for the following inorganic constituents in the November 2009 sampling effort: aluminum, arsenic, chromium, copper and zinc. The remaining five samples were analyzed for zinc. The only inorganic constituents that exceeded the JSCS SLVs in roof runoff are arsenic and zinc, although an exceedance of an SLV in roof runoff does not necessarily indicate that storm water discharge from the site will exceed the SLV because of unavoidable mixing and dilution with runoff from other areas of the site prior to discharge.

Arsenic was detected below the laboratory's reporting limit in three of the six samples analyzed for the full suite of inorganic constituents. The other three samples analyzed for arsenic did not have arsenic concentrations above the method detection limit. Of the three samples that contained arsenic above the detection limit, one sample was a field duplicate sample for a parent sample that contained no detectable arsenic. Arsenic is a naturally occurring element in area soil – DEQ assumes a background concentration of 7 mg/kg – so these low concentrations of arsenic may be attributable to soil dust captured in the sample rather than being from the roofs themselves.

Zinc has been found in varying concentrations in historical storm water samples. The source of this zinc was identified as the protective galvanized coating of steel structures, including some building roofs, which cover a significant portion of the facility. During the summer of 2009, Northwest Pipe cleaned and coated the roof of the main plant building, covering approximately 292,320 square feet (6.7 acres) of galvanized roofing, as part of its source control efforts. This source control effort reduced zinc concentrations in roof runoff from the main plant building by 98 percent, with pre-coating concentrations averaging 2.56 mg/L and the concentrations observed in 2009 samples averaging 0.063 mg/L (Tables 2 and 4).

Zinc values observed in the roof runoff from the 2009 sampling event for the main plant roof (Bays 1-6) are an order of magnitude below the NPDES 122---Z permit benchmark but

are slightly above the very conservative JSCS screening level (0.036 mg/L). Zinc concentrations found in the roof runoff on other buildings range between 0.0171 mg/L and 0.98 mg/L. The wide variance of zinc concentrations in roof runoff can be attributed to the downspout piping, roofing material, and the age of these materials, because older galvanized coatings are more pitted from weathering and age, and this greater surface area exposes more zinc to precipitation and roof runoff. As shown in Figure 6, which shows zinc concentrations in site runoff from April 2005 to February 2010, coating the roof of the main plant building has helped the site maintain compliance with its zinc storm water permit benchmark.

4.2.2 PAHs

Two of the five roof runoff samples analyzed for PAHs (DS005 & DS012) were below detection limits for all PAHs. Two other samples (DS223 & DS221) were found to have very low concentrations of phenanthrene. The reported concentrations of phenanthrene in these samples were below both the conservative screening level and the laboratory reporting level. The remaining sample point, DS120, was the only sample with PAH concentrations above the laboratory reporting level for fluorene and phenanthrene. Pyrene was also detected but below laboratory reporting level. All detected concentrations in each of the roof runoff samples were below the JSCS SLVs for PAHs.

4.2.3 PCBs

There were no detected PCBs in the storm water roof runoff samples.

4.2.4 Phthalate Esters

There were no detected phthalates in the storm water roof runoff samples.

4.2.5 Volatile Organic Compounds

There were no detected VOCs in the storm water roof runoff samples with the exception of 2-butanone (also known as methylethyl ketone) and acetone, which are common laboratory contaminants (EPA 2008). Both of these constituents were detected in all samples analyzed for VOCs, except the trip blank, at very low levels. All detected concentrations were below the JSCS SLVs.

4.2.6 Roof Runoff Summary

With the exception of arsenic and zinc, all constituents analyzed in the roof runoff samples are below the very conservative JSCS screening values. As discussed earlier, arsenic is a naturally occurring element found in soil throughout the Willamette Valley. The low sporadic concentrations observed are likely attributable to arsenic-containing dust that has settled on the facility roofs and is subsequently entrained by storm water. The zinc detected in roof runoff is attributable to the downspout piping, facility roofing material and the roofing material's age. Northwest Pipe Company's source control measure, involving

cleaning and coating the roof of the main plant building, resulted in a 98 percent decrease in zinc concentrations in roof runoff from the main plant building.

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Tables

Table 1

Summary of Historical Surface Soil Sample Results

Northwest Pipe Company

Station ID			SS1		SS2		GP5		SS101		SS102		SS103		SS104		SS-01		SS-02		SS-03		SS-04		SS-05		SS-06		SS-07		SS-08		SS-09		SS-10		SS-11	
Sample ID			SS10_5091001		SS20_5091001		GP50_5091001		SS101		SS102		SS103		SS104		SS-01-0		SS-02-0		SS-03-0		SS-04-0		SS-05-0		SS-06-0		SS-07-0		SS-08-0		SS-09-0		SS-10-0		SS-11-0	
Date Sampled			09/10/01		09/10/01		09/10/01		06/21/05		06/21/05		06/21/05		06/21/05		10/04/06		10/04/06		10/04/06		10/04/06		10/04/06		10/04/06		10/04/06		10/04/06		10/04/06		10/04/06		10/04/06	
Sample Type			N		N		N		N		N		N		N		N		N		N		N		N		N		N		N		N		N		N	
Analyte	**Units**	**Joint Source Control SLVs[1]**																																				
PAH																																						
Acenaphthene	mg/Kg	0.300															0.0023	U							**0.093**						**0.097**		**0.35**					
Acenaphthylene	mg/Kg	0.200															**0.0061**								**0.086**						**0.32**		**0.049**					
Anthracene	mg/Kg	0.845															**0.017**								**0.36**						**0.81**		**1**					
Benzo (a) anthracene	mg/Kg	1.050															**0.04**								**3.7**	D					**8.6**	D	**5.1**	D				
Benzo (a) pyrene	mg/Kg	1.450															**0.052**								**2.8**	D					**5**	D	**3.3**	D				
Benzo (b) fluoranthene	mg/Kg	--															**0.073**								**4.4**	D					**7.4**	D	**5.1**	D				
Benzo (g,h,i) perylene	mg/Kg	0.300															**0.037**								**1.6**						**3.7**	D	**2.8**	D				
Benzo (k) fluoranthene	mg/Kg	13.000															**0.027**								**1.3**						**3**	D	**1.4**					
Chrysene	mg/Kg	1.290															**0.061**								**4.6**	D					**9.7**	D	**5.2**	D				
Dibenzo (a,h) anthracene	mg/Kg	1.300															**0.0095**								**0.57**						**0.94**		**0.64**					
Fluoranthene	mg/Kg	2.230															**0.065**								**4.9**	D					**14**	D	**9.5**	D				
Fluorene	mg/Kg	0.536															**0.0025**								**0.065**	0							**0.39**					
Indeno (1,2,3-cd) pyrene	mg/Kg	0.100															**0.029**								**1.4**						**3**	D	**2.3**	D				
Naphthalene	mg/Kg	0.561															0.0023	U							**0.046**						**0.084**		**0.072**					
Phenanthrene	mg/Kg	1.170															**0.023**								**1.1**						**2.3**	D	**5**	D				
Pyrene	mg/Kg	1.520															**0.062**								**4.9**	D					**14**	D	**8.2**	D				
Total PAHs[3]	mg/Kg	22.8															**0.50**								**31.9**						**73.1**		**50.4**	0				
Metals Total																																						
Zinc	mg/Kg	459.000															**31**		**150**		**260**		**200**		**390**		**240**		**100**		**200**		**140**		**1400**		**150**	
PCBs																																						
Aroclor-1016	mg/Kg	0.530	0.0084	U	0.0081	U			0.0342	U	0.0348	U	0.0345	U	0.0331	U	0.022	U							0.4	U					0.2	U	0.043	U				
Aroclor-1221	mg/Kg	--	0.0084	U	0.0081	U			0.0342	U	0.0348	U	0.0345	U	0.0331	U	0.022	U							0.4	U					0.2	U	0.043	U				
Aroclor-1232	mg/Kg	--	0.0084	U	0.0081	U			0.0342	U	0.0348	U	0.0345	U	0.0331	U	0.022	U							0.4	U					0.2	U	0.043	U				
Aroclor-1242	mg/Kg	--	0.0084	U	0.0081	U			0.0342	U	0.0348	U	0.0345	U	0.0331	U	0.022	U							0.4	U					0.2	U	0.043	U				
Aroclor-1248	mg/Kg	1.500	0.0084	U	0.0081	U			0.0342	U	0.0348	U	0.0345	U	0.0331	U	0.022	U							0.4	U					0.2	U	0.043	U				
Aroclor-1254	mg/Kg	0.300	**2.7**		**6.2**				**0.0657**		**0.0535**		**0.607**		**0.148**		0.022	U							**3.7**						**2.2**		**0.43**					
Aroclor-1260	mg/Kg	0.200	0.0084	U	0.0081	U			0.0342	U	0.0348	U	**0.139**		**0.0595**		0.022	U							**1.1**						**0.41**		**0.1**					
Aroclor-1262	mg/Kg	--																							0.4	U					0.2	U	0.043	U				
Aroclor-1268	mg/Kg	--																							0.4	U					0.2	U	0.043	U				
Total PCBs	mg/Kg	0.00039	2.7		6.2				0.0657		0.0535		0.75		0.21		0.077	U							4.8						2.6		0.5					
TPH																																						
Diesel	mg/Kg	3900[2]															4.7	U							100	U					**360**		120	U				
VOCs			All non-detect																																			

Notes:

*Samples type: N = Normal sample, FD = Field Duplicate

B = Blank contamination

D = Analyzed at a secondary dilution factor

U = The analyte was analyzed for, but not detected.

Bolded = detect

Shaded = detected result exceeded selected criteria

-- = Not Established

[1] Screening level values taken from Table 3-1 of the Portland Harbor Joint Source Control Strategy, Revised July 2007

[2] Screening level values taken from DEQ Risk-Based Decision Making for Petroleum Contaminated Sites, Soil Ingestion, Dermal Contact and Inhalation, Occupational Scenario. Revised July 2007

[3] Total PAH PEC based on MacDonald et al. 2000

These preliminary screening levels are intended to provide conservative values that are useful for placing reported constituent concentrations into context. They do not represent cleanup levels levels and are not based on promulgated regulations.

Table 1

Summary of Historical Surface Soil Sample Results

Northwest Pipe Company

Station ID			SS-12	SS-13	SS-14	SS-15	SS-16	SS-17	SS-18	SS-19	SS301	SS302	SS303	SS304	SS305	SS305	SS306	SS307	SS308	SS309	SS310
Sample ID			SS-12-0	SS-13-0	SS-14-0	SS-15-0	SS-16-0	SS-17-0	SS-18-0	SS-19-0	SS301-0	SS302-0	SS303-0	SS304-0	SS305-0	SS305-1	SS306-0	SS307-0	SS308-0	SS309-0	SS310-0
Date Sampled			10/04/06	10/04/06	10/04/06	10/04/06	10/04/06	10/04/06	10/04/06	10/04/06	09/25/07	09/25/07	09/25/07	09/25/07	09/25/07	09/25/07	09/25/07	09/25/07	09/25/07	09/25/07	09/25/07
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N
Analyte	**Units**	**Joint Source Control SLVs[1]**																			
PAH																					
Acenaphthene	mg/Kg	0.300		**0.58**		**0.013**			**1.9** D		**0.00668** J	**0.00538**		**0.0103**	**0.5**	**0.703**		**0.0821** J		**0.09**	**0.163**
Acenaphthylene	mg/Kg	0.200		**0.34**		**0.0084**			**0.33**		**0.00351** J	**0.00281**		**0.00492**	**0.0646** J	**0.108** J		**0.179**		**0.0331** J	**0.0466** J
Anthracene	mg/Kg	0.845		**1.8**		**0.1**			**10** D		**0.027**	**0.0138**		**0.0202**	**1.42**	**2.71**		**0.417**		**0.312**	**0.602**
Benzo (a) anthracene	mg/Kg	1.050		**13** D		**0.3** D			**34** D		**0.256**	**0.0878**		**0.0958**	**5.11**	**9**		**2.5**		**1.67**	**2.2**
Benzo (a) pyrene	mg/Kg	1.450		**8.9** D		**0.27** D			**19** D		**0.246**	**0.0889**		**0.0903**	**3.48**	**6.66**		**2.52**		**1.66**	**1.96**
Benzo (b) fluoranthene	mg/Kg	--		**14** D		**0.42** D			**31** D		**0.425**	**0.141**		**0.156**	**5.25**	**9.93**		**4.31**		**2.46**	**2.63**
Benzo (g,h,i) perylene	mg/Kg	0.300		**7.2** D		**0.25** D			**14** D		**0.219**	**0.0889**		**0.0845**	**2.03**	**4.16**		**2.14**		**1.28**	**1.37**
Benzo (k) fluoranthene	mg/Kg	13.000		**5.1** D		**0.17**			**12** D		**0.153**	**0.0461**		**0.0512**	**2.11**	**3.35**		**1.62**		**0.937**	**1.27**
Chrysene	mg/Kg	1.290		**15** D		**0.35** D			**37** D		**0.279**	**0.107**		**0.106**	**4.66**	**8.52**		**2.75**		**1.73**	**2.29**
Dibenzo (a,h) anthracene	mg/Kg	1.300		**1.3**		**0.079**			**4.7** D		**0.0399**	**0.0149**		**0.0155**	**0.438**	**0.91**		**0.399**		**0.227**	**0.245**
Fluoranthene	mg/Kg	2.230		**25** D		**0.44** D			**59** D		**0.37**	**0.155**		**0.187**	**12.3**	**23.8**		**3.86**		**3.52**	**5.12**
Fluorene	mg/Kg	0.536		**0.51**		**0.0087**			**2.4** D		**0.00602** J	**0.00386**		**0.0133**	**0.521**	**0.978**		**0.0389** J		**0.11**	**0.167**
Indeno (1,2,3-cd) pyrene	mg/Kg	0.100		**6.2** D		**0.19** D			**13** D		**0.155**	**0.0645**		**0.0598**	**1.51**	**3.19**		**1.57**		**0.885**	**0.983**
Naphthalene	mg/Kg	0.561		**0.14**		**0.0044**			**0.47**		**0.00363** J	**0.00284**		**0.0434**	**0.127** J	**0.156** J		**0.0679** J		**0.103**	**0.0501** J
Phenanthrene	mg/Kg	1.170		**10** D		**0.13**			**28** D		**0.0824**	**0.0562**		**0.105**	**6.66**	**12.3**		**0.936**		**1.34**	**2.32**
Pyrene	mg/Kg	1.520		**22** D		**0.44** D			**53** D		**0.404**	**0.157**		**0.171**	**9.87**	**19.3**		**4.05**		**3.27**	**4.69**
Total PAHs[3]	mg/Kg	22.8		**131.1**		**3.2**			**319.8**		**2.7**	**1.0**		**1.2**	**56.1**	**105.8**		**27.4**		**19.6**	**26.1**
Metals Total																					
Zinc	mg/Kg	459.000	**240**	**520**	**75**	**130**	0	**80**	**71**	**140**	**300**										
PCBs																					
Aroclor-1016	mg/Kg	0.530		1.3 U		0.21 U			0.21 U					0.0248 U	0.123 U	0.12 U	2.34 U	0.49 U		0.476 U	0.489 U
Aroclor-1221	mg/Kg	--		1.3 U		0.21 U			0.21 U					0.0248 U	0.123 U	0.12 U	2.34 U	0.49 U		0.476 U	0.489 U
Aroclor-1232	mg/Kg	--		1.3 U		0.21 U			0.21 U					0.0248 U	0.123 U	0.12 U	2.34 U	0.49 U		0.476 U	0.489 U
Aroclor-1242	mg/Kg	--		1.3 U		0.21 U			0.21 U					0.0248 U	0.123 U	0.12 U	2.34 U	0.49 U		0.476 U	0.489 U
Aroclor-1248	mg/Kg	1.500		1.3 U		0.21 U			0.21 U					0.0248 U	0.123 U	0.12 U	2.34 U	0.49 U		0.476 U	0.489 U
Aroclor-1254	mg/Kg	0.300		**11**		**0.63**			**0.94**					**0.0906**	**0.768**	**0.778**	**8.93**	**7.36**		**2.9**	**3.31**
Aroclor-1260	mg/Kg	0.200		**1.5**		0.21 U			0.21 U					0.0248 U	**0.263**	**0.346**	2.34 U	**0.888**		**1.36**	0.489 U
Aroclor-1262	mg/Kg	--		1.3 U		0.21 U			0.21 U												
Aroclor-1268	mg/Kg	--		1.3 U		0.21 U			0.21 U												
Total PCBs	mg/Kg	0.00039		12.5		0.63			0.94					0.09	1.03	1.12	8.93	8.25		4.26	3.31
TPH																					
Diesel	mg/Kg	3900[2]		**270**		**42**			**650**		**12.3** J	**11.1** J	**7.6** J	**11.3** J	**224** J	**169** J	**276** J	**96.4** J	**44.5** J	**76.9** J	**50.1** J
VOCs				All non-detect																	

Notes:

*Samples type: N = Normal sample, FD = Field Duplicate

B = Blank contamination

D = Analyzed at a secondary dilution factor

U = The analyte was analyzed for, but not detected.

Bolded = detect

Shaded = detected result exceeded selected criteria

-- = Not Established

[1] Screening level values taken from Table 3-1 of the Portland Harbor Joint Source Control Strategy, Revised July 2007

[2] Screening level values taken from DEQ Risk-Based Decision Making for Petroleum Contaminated Sites, Soil Ingestion, Dermal Contact and Inhalation, Occupational Scenario. Revised July 2007

[3] Total PAH PEC based on MacDonald et al. 2000

These preliminary screening levels are intended to provide conservative values that are useful for placing reported constituent concentrations into context. They do not represent cleanup levels levels and are not based on promulgated regulations.

Table 1

Summary of Historical Surface Soil Sample Results

Northwest Pipe Company

Station ID			SS311		SS312		SS313		SS314		SS315		SS315		SS316		SS317		SS318		SS319		SS320		SS321	
Sample ID			SS311-0		SS312-0		SS313-0		SS314-0		SS315-0		SS315-1		SS316-0		SS317-0		SS318-0		SS319-0		SS320-0		SS321-0	
Date Sampled			09/25/07		09/25/07		09/25/07		09/25/07		09/25/07		09/25/07		09/25/07		09/25/07		09/25/07		09/25/07		09/25/07		09/25/07	
Sample Type			N		N		N		N		N		FD		N		N		N		N		N		N	
Analyte	**Units**	**Joint Source Control SLVs[1]**																								
PAH																										
Acenaphthene	mg/Kg	0.300			**2.03**		**0.0193**	**J**			**0.00298**	**J**	**0.00367**	**J**	**0.00463**				**0.0247**	**J**			**0.024**	**J**	**3.72**	
Acenaphthylene	mg/Kg	0.200			**0.0474**	**J**	**0.0212**	**J**			**0.00768**	**J**	**0.0129**	**J**	**0.0032**				**0.0909**				**0.24**		0.18	U
Anthracene	mg/Kg	0.845			**4.82**		**0.0762**	**J**			**0.0159**	**J**	**0.0227**		**0.0178**				**0.2**				**0.603**		**19.2**	
Benzo (a) anthracene	mg/Kg	1.050			**9.38**		**0.33**				**0.0746**		**0.0841**		**0.0843**				**1.57**				**1.47**		**51.6**	
Benzo (a) pyrene	mg/Kg	1.450			**7.83**		**0.356**				**0.0976**		**0.0999**		**0.0888**				**0.734**				**0.917**		**38.2**	
Benzo (b) fluoranthene	mg/Kg	--			**9.81**		**0.663**				**0.246**		**0.275**		**0.137**				**2.18**				**2.78**		**58.2**	
Benzo (g,h,i) perylene	mg/Kg	0.300			**4.54**		**0.325**				**0.151**		**0.116**		**0.0628**				**0.922**				**0.584**		**17.5**	
Benzo (k) fluoranthene	mg/Kg	13.000			**6.53**		**0.248**				**0.121**		**0.0663**		**0.0485**				**0.845**				**0.941**		**30.1**	
Chrysene	mg/Kg	1.290			**9.67**		**0.382**				**0.129**		**0.113**		**0.0828**				**2.82**				**2.15**		**57.3**	
Dibenzo (a,h) anthracene	mg/Kg	1.300			**1.15**		**0.0541**	**J**			**0.026**	**J**	**0.0268**		**0.0134**				**0.203**				**0.136**		**5.4**	
Fluoranthene	mg/Kg	2.230			**33.9**		**0.649**				**0.135**		**0.142**		**0.167**				**1.88**				**2.37**		**166**	
Fluorene	mg/Kg	0.536			**1.92**		0.00818	U			0.00342	U	**0.00404**	**J**	**0.00443**				**0.0122**	**J**			**0.0472**	**J**	**3.07**	
Indeno (1,2,3-cd) pyrene	mg/Kg	0.100			**3.25**		**0.241**				**0.0958**		**0.0864**		**0.0492**				**0.598**				**0.481**		**14**	
Naphthalene	mg/Kg	0.561			**0.308**	**J**	**0.0144**	**J**			**0.00539**	**J**	**0.00549**	**J**	**0.00195**				**0.0104**	**J**			**0.0228**	**J**	**0.599**	**J**
Phenanthrene	mg/Kg	1.170			**24.8**		**0.257**				**0.0375**		**0.0433**		**0.0683**				**0.232**				**0.361**		**61**	
Pyrene	mg/Kg	1.520			**28.2**		**0.623**				**0.143**		**0.146**		**0.153**				**2.12**				**2.48**		**175**	
Total PAHs[3]	mg/Kg	22.8			**148.2**		**4.3**				**1.3**		**1.2**		**1.0**				**14.4**				**15.6**		**700.9**	
Metals Total																										
Zinc	mg/Kg	459.000																								
PCBs																										
Aroclor-1016	mg/Kg	0.530			0.49	U	0.0252	U																		
Aroclor-1221	mg/Kg	--			0.49	U	0.0252	U																		
Aroclor-1232	mg/Kg	--			0.49	U	0.0252	U																		
Aroclor-1242	mg/Kg	--			0.49	U	0.0252	U																		
Aroclor-1248	mg/Kg	1.500			0.49	U	0.0252	U																		
Aroclor-1254	mg/Kg	0.300			**2.73**		**0.186**																			
Aroclor-1260	mg/Kg	0.200			0.49	U	**0.0363**																			
Aroclor-1262	mg/Kg	--																								
Aroclor-1268	mg/Kg	--																								
Total PCBs	mg/Kg	0.00039			2.73		0.22																			
TPH																										
Diesel	mg/Kg	3900[2]	**44.5**	**J**	**64.6**	**J**	**25.3**	**J**	**26.5**	**J**	**35**	**J**	**36.3**	**J**	**6.8**	**J**	**342**	**J**	**36.5**	**J**	**288**	**J**	**183**	**J**	**594**	
VOCs					All non-detect																					

Notes:

*Samples type: N = Normal sample, FD = Field Duplicate

B = Blank contamination

D = Analyzed at a secondary dilution factor

U = The analyte was analyzed for, but not detected.

Bolded = detect

Shaded = detected result exceeded selected criteria

-- = Not Established

[1] Screening level values taken from Table 3-1 of the Portland Harbor Joint Source Control Strategy, Revised July 2007

[2] Screening level values taken from DEQ Risk-Based Decision Making for Petroleum Contaminated Sites, Soil Ingestion, Dermal Contact and Inhalation, Occupational Scenario. Revised July 2007

[3] Total PAH PEC based on MacDonald et al. 2000

These preliminary screening levels are intended to provide conservative values that are useful for placing reported constituent concentrations into context. They do not represent cleanup levels levels and are not based on promulgated regulations.

Table 2

Summary of Historical Stormwater Roof Runoff Sample Results

Northwest Pipe Company

Station ID	Sample ID	Sample Date	Zinc Concentration (mg/L)	Location
DS-011	DS20-11072006	11/7/2006	3.03	Main plant Bay1-6
DS-013	DS19-11072006	11/7/2006	3.19	Main plant Bay1-6
DS-015	DS11-11072006	11/7/2006	2.91	Main plant Bay1-6
DS-117	DS05-11072006	11/7/2006	0.434	Bay 9
DS-120	DS01-11072006	11/7/2006	0.0857	Lining and Coating Facility
DS-007	SW111-120307-0	12/3/2007	1.83	Main plant Bay1-6
DS-008	SW114-120307-0	12/3/2007	2.08	Main plant Bay1-6
DS-011	SW107-120307-0	12/3/2007	2.37	Main plant Bay1-6
DS-013	SW106-120307-0	12/3/2007	2.56	Main plant Bay1-6
DS-015	SW104-120307-0	12/3/2007	2.52	Main plant Bay1-6
DS-016	D5-16-060508	6/5/2008	0.404	Main plant Bay1-6
DS-017	D5-17-060508	6/5/2008	0.248	Main plant Bay1-6
DS-018	D5-18-060508	6/5/2008	0.315	Main plant Bay1-6
DS-019	D5-19-060508	6/5/2008	0.292	Main plant Bay1-6
DS-010	DS10-111208	11/12/2008	0.993	Main plant Bay1-6
DS-005	DS05-121208	12/12/2008	0.605	Main plant Bay1-6

Notes:

mg/L = miligram per liter

A test panel of the roof was coated in 2008 and roof runoff samples collected after then were focused on the coated panel, which exhibited substantially reduced zinc concentrations.

Table 3

Summary of Analytical Results for Surface Soil Samples Collected 10/19/2009

Northwest Pipe Company

Sample ID:							SS-401-101909-0	SS-402-101909-0	SS-403-101909-0	SS-404-101909-0	SS-405-101909-0	SS-406-101909-0	SS-407-101909-0	SS-408-101909-0	SS-409-101909-0	SS-410-101909-0	SS-411-101909-0	SS-411-101909-1
Sample QA Type:							N	N	N	N	N	N	N	N	N	N	N	FD
Chem Group/Chemical	**CAS_NO**	**Method**	**Units**	**Screening Criteria[1]**	**DEQ RBC[2]**	**DEQ[3] Background**												
General Chemistry:																		
% Solids	%SOLIDS	NCA SOP	% by Wei	--	--	--	**90.8**	**93.7**	**92.8**	**85**	**87.3**	**89.7**	**87.5**	**92.9**	**81.6**	**86.9**	**85.4**	**87.7**
Percent Moisture		Moisture	%	--	--	--	**15**	**12**	**9.8**	**19**	**13**	**14**	**15**	**6**	**18**	**12**	**24**	**16**
Percent Solids		Moisture	%	--	--	--	**85**	**88**	**90**	**81**	**87**	**86**	**85**	**94**	**82**	**88**	**76**	**84**
Total Organic Carbon	7440-44-0	9060	mg/Kg	--	--	--	**4,300**	**6,000**	**5,300**	**74,000**	**62,000 J**	**18,000**	**70,000**	**9,300**	**28,000**	**16,000**	**42,000**	**35,000**
Inorganics:																		
Aluminum	7429-90-5	EPA 6010B	mg/kg	--	--	--	**7,040**	**4,720**	**5,450**	**3,730**	**15,800**	**3,160**	**24,200**	**13,000**	**10,600**	**27,000**	**5,430**	**6,310**
Antimony	7440-36-0	EPA 6010B	mg/kg	64	--	4	0.611 U	0.569 U	0.592 U	0.627 U	**3.96**	0.606 U	**2.46**	**2.48**	0.654 U	0.626 U	**1.49 J**	**1.03 J**
Arsenic	7440-38-2	EPA 6010B	mg/kg	7	1.7	7	**2.65 J**	**2.28 J**	**2.92 J**	**1.88 J**	**3.57 J**	**7.80 J**	**4.59 J**	**1.57 J**	**7.21 J**	**31.5**	**10.6 J**	**10.1 J**
Cadmium	7440-43-9	EPA 6010B	mg/kg	1	510	1	**1.00 J**	**1.08 J**	**1.11 J**	**0.916 J**	**5.73**	**7.31**	**6.26**	**4.53**	**8.97**	**1.73 J**	**9.01**	**8.05**
Chromium	7440-47-3	EPA 6010B	mg/kg	111	--	42	**35.6**	**33.6**	**30.0**	**50.5**	**2,360**	**970**	**3,620**	**2,020**	**121**	**45.6**	**261**	**268**
Copper	7440-50-8	EPA 6010B	mg/kg	149	38000	36	**46.9**	**40.5**	**27.6**	**31.5**	**114**	**240**	**137**	**75.4**	**152**	**34.7**	**255 J**	**139 J**
Lead	7439-92-1	EPA 6010B	mg/kg	17	800	17	**6.48 J**	**16.7**	**9.99 J**	**53.1**	**22.1**	**14.1**	**20.9**	**10.6**	**160**	**35.3**	**195**	**167**
Mercury	7439-97-6	EPA 7471A	mg/kg	70	310	0	**0.0140 J**	**0.0104 J**	**0.00633 J**	0.00605 U	**0.00647 J**	0.00614 U	**0.0105 J**	0.00488 U	**0.0897**	**0.0218 J**	**0.0944 J**	**0.203 J**
Nickel	7440-02-0	EPA 6010B	mg/kg	49	20000	38	**22.0**	**17.1**	**14.5**	**16.7**	**35.4**	**519**	**36.7**	**12.4**	**52.5**	**29.2**	**61.6**	**54.6**
Selenium	7782-49-2	EPA 6010B	mg/kg	2	--	2	0.491 U	0.457 U	0.475 U	0.504 U	0.491 U	0.487 U	**1.94 J**	**0.696 J**	0.525 U	**12.1 J**	0.517 U	0.493 U
Silver	7440-22-4	EPA 6010B	mg/kg	5	5100	1	**0.132 J**	**0.182 J**	**0.185 J**	**0.117 J**	**2.54 J**	**0.665 J**	**3.55**	**2.05 J**	**0.922 J**	**4.01**	**1.50 J**	**1.35 J**
Zinc	7440-66-6	EPA 6010B	mg/kg	459	--	86	**91.9**	**152**	**98.8**	**87.0**	**126**	**144**	**97.8**	**74.6**	**753**	**163**	**737**	**756**
Organochlorine Pesticides:[4]																		
4,4´-DDD	72-54-8	EPA 8081A	mg/kg	0.00033	11	0.01	0.000726 U	0.00176 U	0.00178 U	0.00194 U	0.00188 U	0.00184 U	0.000751 U	0.000708 U	0.00403 U	0.0019 U	0.00385 U	0.00763 U
4,4´-DDE	72-55-9	EPA 8081A	mg/kg	0.00033	7.7	0.01	0.00147 U	0.00532 U	0.00722 U	0.00587 U	0.00764 U	0.00557 U	0.00152 U	0.000708 U	0.0819 U	0.00385 U	0.0117 U	0.0114 U
4,4´-DDT	50-29-3	EPA 8081A	mg/kg	0.00033	7.7	0.01	0.00369 U	0.0214 U	0.0289 U	0.0197 U	0.0229 U	0.0224 U	0.00956 U	0.00214 U	0.491 U	0.0154 U	0.0469 U	0.0458 U
Aldrin	309-00-2	EPA 8081A	mg/kg	0.04	0.13	0.029	0.000726 U	0.00176 U	0.00178 U	0.00194 U	0.00188 U	0.00184 U	0.000751 U	0.000708 U	0.00403 U	0.0019 U	0.00385 U	0.00376 U
alpha-BHC	319-84-6	EPA 8081A	mg/kg	--	0.34	--	0.000726 U	0.00176 U	0.00178 U	0.00194 U	0.00188 U	0.00184 U	0.000751 U	0.000708 U	**0.00678 J**	0.0019 U	0.00385 U	0.00376 U
alpha-Chlordane	5103-71-9	EPA 8081A	mg/kg	--	--	1.6	0.000726 U	0.00176 U	0.00178 U	0.00194 U	0.00188 U	0.00184 U	0.000751 U	0.000708 U	0.0122 U	0.0019 U	0.00385 U	0.00376 U
beta-BHC	319-85-7	EPA 8081A	mg/kg	--	--	--	0.000726 U	0.00176 U	0.00178 U	0.00194 U	0.00188 U	0.00184 U	0.000751 U	0.000708 U	0.00403 U	0.0019 U	0.00385 U	0.0153 U
Chlordane (tech)	57-74-9	EPA 8081A	mg/kg	0.00037	--	--	0.0165 U	0.0399 U	0.0404 U	0.044 U	0.0428 U	0.0418 U	0.0171 U	0.0161 U	0.0917 U	0.0431 U	0.0876 U	0.0854 U
delta-BHC	319-86-8	EPA 8081A	mg/kg	--	--	--	0.000726 U	0.00176 U	0.00178 U	0.00194 U	0.00188 U	0.00184 U	0.000751 U	0.000708 U	0.00403 U	0.0019 U	0.00385 U	0.00376 U
Dieldrin	60-57-1	EPA 8081A	mg/kg	0.0000081	0.13	0.023	0.00147 U	0.00357 U	0.00722 U	0.00587 U	0.00958 U	0.00373 U	0.00228 U	0.000708 U	0.0573 U	0.00575 U	0.0196 U	0.0153 U
Endosulfan I	959-98-8	EPA 8081A	mg/kg	--	--	--	0.000726 U	0.00176 U	0.00178 U	0.00194 U	0.00188 U	0.00184 U	0.000751 U	0.000708 U	0.0205 U	0.0019 U	0.00385 U	0.00376 U
Endosulfan II	33213-65-9	EPA 8081A	mg/kg	--	--	--	0.000726 U	0.00176 U	0.00361 U	0.00194 U	0.00382 U	0.00184 U	0.000751 U	0.000708 U	0.0409 U	0.0019 U	0.00782 U	0.00763 U
Endosulfan sulfate	1031-07-8	EPA 8081A	mg/kg	--	--	--	0.000726 U	0.00176 U	0.00178 U	0.00194 U	0.00188 U	0.00184 U	0.000751 U	0.000708 U	0.00403 U	0.0019 U	0.00385 U	0.00376 U
Endrin	72-20-8	EPA 8081A	mg/kg	0.207	230	0.04	0.000726 U	0.00176 U	0.00361 U	0.00194 U	0.00382 U	0.00184 U	0.000751 U	0.000708 U	0.0409 U	0.0019 U	0.00385 U	0.00376 U
Endrin aldehyde	7421-93-4	EPA 8081A	mg/kg	--	--	--	0.000726 U	0.00176 U	0.00361 U	0.00393 U	0.00382 U	0.00184 U	0.000751 U	0.000708 U	0.0328 U	0.0019 U	0.00782 U	0.0229 U
Endrin ketone	53494-70-5	EPA 8081A	mg/kg	--	--	--	0.000726 U	0.00176 U	0.00178 U	0.00393 U	0.0134 U	0.00184 U	0.000751 U	0.000708 U	0.0328 U	0.0019 U	0.0274 U	0.0042 U
gamma-BHC (Lindane)	58-89-9	EPA 8081A	mg/kg	0.00499	1.7	0.014	0.000726 U	0.00176 U	0.00178 U	0.00194 U	0.00188 U	0.00184 U	0.000751 U	0.000708 U	0.00403 U	0.0019 U	0.00385 U	0.00376 U
gamma-Chlordane	5103-74-2	EPA 8081A	mg/kg		--	--	0.000726 U	0.00532 U	0.00178 U	0.00194 U	0.00188 U	0.00557 U	0.000751 U	0.000708 U	0.0819 U	0.0019 U	0.00782 U	0.0114 U
Heptachlor	76-44-8	EPA 8081A	mg/kg	0.01	0.48	0.11	0.000726 U	0.00176 U	0.00178 U	0.00194 U	0.00188 U	0.00184 U	0.000751 U	0.000708 U	0.00403 U	0.0019 U	0.00385 U	0.00376 U
Heptachlor epoxide	1024-57-3	EPA 8081A	mg/kg	0.016	0.24	--	0.000726 U	0.00357 U	0.00361 U	0.00393 U	0.00382 U	0.00373 U	0.00152 U	0.000708 U	0.0491 U	0.0019 U	0.00782 U	0.00763 U
Methoxychlor	72-43-5	EPA 8081A	mg/kg	--	--	--	0.00147 U	0.00176 U	0.0144 U	0.00393 U	0.0115 U	0.00935 U	0.00457 U	0.000708 U	0.205 U	0.00385 U	0.0313 U	0.0229 U
Toxaphene	8001-35-2	EPA 8081A	mg/kg	--	2	--	0.022 U	0.0532 U	0.0538 U	0.0587 U	0.057 U	0.0557 U	0.0228 U	0.0214 U	0.122 U	0.0575 U	0.117 U	0.114 U
Polynuclear Aromatic Hydrocabons:																		
Acenaphthene	83-32-9	EPA 8270m	mg/kg	0.3	41000	20	**0.00545 J**		**0.00567 J**	**0.0589**	**0.0339 J**	**0.0498 J**	**0.0156**	0.00354 U			**2.02**	**2.27**
Acenaphthylene	208-96-8	EPA 8270m	mg/kg	0.2	--	--	0.00362 U		**0.00366 J**	**0.0116 J**	**0.276**	**0.0846 J**	**0.0163**	**0.00545 J**			**0.197**	**0.155**
Anthracene	120-12-7	EPA 8270m	mg/kg	0.845	--	590	**0.0104 J**		**0.025**	**0.272**	**0.413**	**0.156 J**	**0.0411**	**0.0112 J**			**10.1**	**8.41**
Benzo (a) anthracene	56-55-3	EPA 8270m	mg/kg	1.05	2.7	0.08	**0.0736**		**0.376**	**1.78**	**1.67 J**	**0.545**	**0.252**	**0.0411**			**54.2**	**37.2**
Benzo (a) pyrene	50-32-8	EPA 8270m	mg/kg	1.45	0.27	0.015	**0.0786**		**0.43**	**1.49**	**1.55**	**0.274 J**	**0.257**	**0.0515**			**35.3**	**24.2**
Benzo (b) fluoranthene	205-99-2	EPA 8270m	mg/kg	--	2.7	0.15	**0.091**		**0.506**	**1.67**	**2.18**	**2.16**	**0.375**	**0.0965**			**38.6**	**27.6**
Benzo (ghi) perylene	191-24-2	EPA 8270m	mg/kg	0.3	--	--	**0.0726**		**0.371**	**1.05**	**1.18**	**1.8**	**0.218**	**0.0628**			**19.1**	**13.2**
Benzo (k) fluoranthene	207-08-9	EPA 8270m	mg/kg	13	27	1.5	**0.0718**		**0.479**	**1.31**	**1.71**	**1.79**	**0.223**	**0.0687**			**36.7**	**24.3**
Chrysene	218-01-9	EPA 8270m	mg/kg	1.29	270	8	**0.0941**		**0.51**	**1.98**	**2.09 J**	**1.64**	**0.339**	**0.0685**			**56.2**	**38.2**
Dibenzo (a,h) anthracene	53-70-3	EPA 8270m	mg/kg	1.3	0.27	0.015	**0.0181**		**0.105**	**0.367**	**0.451**	**0.29 J**	**0.063**	**0.0163**			**6.35**	**4.34**
Fluoranthene	206-44-0	EPA 8270m	mg/kg	2.23	29000	210	**0.168**		**0.421**	**3.45**	**1.68**	**1.78**	**0.457**	**0.0701**			**115**	**83.1**
Fluorene	86-73-7	EPA 8270m	mg/kg	0.536	35000	28	**0.00623 J**		**0.0046 J**	**0.0631**	**0.0387 J**	**0.0582 J**	**0.00944 J**	0.00354 U			**2.13**	**2.01**
Indeno (1,2,3-cd) pyrene	193-39-5	EPA 8270m	mg/kg	0.1	2.7	0.15	**0.0614**		**0.326**	**0.959**	**1.16**	**1.14**	**0.199**	**0.0518**			**19.2**	**13.1**

Table 3

Summary of Analytical Results for Surface Soil Samples Collected 10/19/2009

Northwest Pipe Company

Sample ID:							SS-401-101909-0	SS-402-101909-0	SS-403-101909-0	SS-404-101909-0	SS-405-101909-0	SS-406-101909-0	SS-407-101909-0	SS-408-101909-0	SS-409-101909-0	SS-410-101909-0	SS-411-101909-0	SS-411-101909-1
Sample QA Type:							N	N	N	N	N	N	N	N	N	N	N	FD
Chem Group/Chemical	**CAS_NO**	**Method**	**Units**	**Screening Criteria[1]**	**DEQ RBC[2]**	**DEQ[3] Background**												
Naphthalene	91-20-3	EPA 8270m	mg/kg	0.561	770	3.8	**0.0123 J**		**0.00446 J**	**0.0171**	**0.0178 J**	**0.139**	**0.0075 J**	0.00354 U			**0.631 J**	**0.135 J**
Phenanthrene	85-01-8	EPA 8270m	mg/kg	1.17	--	--	**0.0773**		**0.0771**	**1.38**	**0.462**	**0.443**	**0.143**	**0.0184**			**46.8**	**35.4**
Pyrene	129-00-0	EPA 8270m	mg/kg	1.52	21000	210	**0.15**		**0.439**	**3.07**	**1.7**	**1.9**	**0.283**	**0.0633**			**127**	**86.5**
Total PAH[5]				--	--		**0.99**		**4.1**	**18.9**	**16.6**	**14.2**	**2.9**	**0.63**			**569.5**	**400.1**
Polychlorinated Biphenyls:																		
Aroclor 1016	12674-11-2	EPA 8082	mg/kg	0.53	--	3.9	0.00367 U	0.0178 U	0.036 U	0.0196 U	0.0191 U	0.0372 U	0.0076 U	0.00179 U	0.408 U	0.00768 U	0.0975 U	0.0761 U
Aroclor 1221	11104-28-2	EPA 8082	mg/kg	--	--	0.22	0.00732 U	0.0355 U	0.0717 U	0.0391 U	0.038 U	0.0742 U	0.0152 U	0.00357 U	0.814 U	0.0153 U	0.194 U	0.152 U
Aroclor 1232	11141-16-5	EPA 8082	mg/kg	--	--	0.22	0.00367 U	0.0178 U	0.036 U	0.0196 U	0.0191 U	0.0372 U	0.0076 U	0.00179 U	0.408 U	0.00768 U	0.0975 U	0.0761 U
Aroclor 1242	53469-21-9	EPA 8082	mg/kg	--	--	0.22	0.00367 U	0.0178 U	0.036 U	0.0196 U	0.0191 U	0.0372 U	0.0076 U	0.00179 U	0.408 U	0.00768 U	0.0975 U	0.0761 U
Aroclor 1248	12672-29-6	EPA 8082	mg/kg	1.5	--	0.22	0.00367 U	0.0178 U	0.036 U	0.0196 U	0.0191 U	0.0372 U	0.0076 U	0.00179 U	0.408 U	0.00768 U	0.0975 U	0.0761 U
Aroclor 1254	11097-69-1	EPA 8082	mg/kg	0.3	--	0.22	**0.0658**	**0.368**	**0.54**	**0.302**	**0.399**	**0.46**	**0.12**	**0.025**	**8.74**	**0.181**	**1.14**	**0.948**
Aroclor 1260	11096-82-5	EPA 8082	mg/kg	0.2	--	0.22	0.00367 U	0.0178 U	0.036 U	0.0196 U	0.0191 U	0.0372 U	0.0076 U	0.00179 U	0.408 U	0.00768 U	0.0975 U	0.0761 U
Aroclor 1262	37324-23-5	EPA 8082	mg/kg	--	--	--	0.00367 U	0.0178 U	0.036 U	0.0196 U	0.0191 U	0.0372 U	0.0076 U	0.00179 U	0.408 U	0.00768 U	0.0975 U	0.0761 U
Aroclor 1268	11100-14-4	EPA 8082	mg/kg	--	--	--	0.00367 U	0.0178 U	0.036 U	0.0196 U	0.0191 U	0.0372 U	0.0076 U	0.00179 U	0.408 U	0.00768 U	0.0975 U	0.0761 U
Total PCBs[5]				0.00039	0.98	0.22	0.07	0.37	0.54	0.30	0.40	0.46	0.12	0.03	8.7	0.18	1.1	0.9
Phthalates:[4]																		
Bis(2-ethylhexyl)phthalate	117-81-7	EPA 8270m	mg/kg	0.33	150000	--	**0.0668**	**0.389 J**	**0.191**	**0.325**	**0.139**	**0.335**	**0.467**	**0.0603**	**0.667**	**0.178**	**1.9 J**	**2.97**
Butyl benzyl phthalate	85-68-7	EPA 8270m	mg/kg	--	--	--	**0.382**	**0.0846 J**	**0.0283 J**	**0.075**	**0.0373 J**	0.148 U	**0.031**	**0.0145 J**	0.163 U	**0.0492**	**0.637 J**	**0.501 J**
Diethyl phthalate	84-66-2	EPA 8270m	mg/kg	0.6	--	--	0.0147 U	0.0707 U	0.0144 U	0.0314 U	0.0306 U	0.148 U	0.0151 U	0.0144 U	0.163 U	0.0153 U	0.157 U	0.304 U
Dimethyl phthalate	131-11-3	EPA 8270m	mg/kg	--	--	--	0.0147 U	0.0707 U	0.0144 U	0.0314 U	0.0306 U	0.148 U	0.0151 U	0.0144 U	0.163 U	0.0153 U	0.157 U	0.304 U
Di-n-butyl phthalate	84-74-2	EPA 8270m	mg/kg	0.06	--	--	0.0147 U	0.0707 U	0.0144 U	0.0314 U	0.0306 U	0.148 U	0.0151 U	0.0144 U	0.163 U	0.0153 U	0.157 U	**0.38 J**
Di-n-octyl phthalate	117-84-0	EPA 8270m	mg/kg	--	--	--	0.0147 U	0.141 U	0.289 U	0.157 U	0.383 U	0.296 U	0.151 U	0.144 U	0.816 U	0.305 U	0.783 U	0.76 U

Notes:

*Samples type: N = Normal sample, FD = Field Duplicate

[1] Portland Harbor Joint Source Control Strategy Table 3-1 Screening Level Values for Soil Stormwater Sediment Stormwater, Groundwater and Surface Water (7/16/07 Revision)

[2] DEQ Risk Based Concentrations Soil Ingestion, Dermal Contact and Inhalation for Occupational Scenario 7/4/07 Revision

[3] DEQ - Northwest Region Clean Fill Screening Table for Unrestricted Upland Disposal. 2/27/08 version

These preliminary screening levels are intended to provide conservative values that are useful for placing reported constituent concentrations into context. They do not represent cleanup levels and are not based on promulgated regulations.

[4] Phthalates and pesticide non-detects were removed from this table

[5] Total PAHs and PCBs calculated using 0 for non-detects.

mg/Kg = milligrams per kilogram

Bold result = detection

Shaded cell = screening criteria exceeded.

-- = no screening level available

J = Estimated value below reporting limit.

U = Not detected at specified reporting limit.

Table 4

Summary of Analytical Results for Stormwater Roof Runoff Samples Collected 10/19/2009

Northwest Pipe Company

Building name:				Main Plant Bay 1 - 6				Bay 9		Lining & Coating			Steam Bay	Maintenance	
Station ID:				DS05	DS06	DS12	DS17	DS117	DS223	DS120	DS120	DS225	DS221	DS224	
Sample ID:				DS005-110709	DS006--110709	DS012-110709	DS017--110709	DS117--110709	DS223-110709	DS120-110709	DS120-110709-1	DS225--110709	DS221-110709	DS224--110709	Trip Blank
Sample Type:				N	N	N	N	N	N	N	FD	N	N	N	TB
Date Collected:				11/7/2009	11/7/2009	11/7/2009	11/7/2009	11/7/2009	11/7/2009	11/7/2009	11/7/2009	11/7/2009	11/7/2009	11/7/2009	11/7/2009
Chem Group/Chemical	**Method**	**Units**	**Screening Criteria[1]**												
General Chemistry:															
Total Suspended Solids	SM 2540D	mg/l	--	3.50 U		3.50 U			3.50 U	3.50 U	3.50 U		3.50 U		
Inorganics:															
Aluminum	EPA 6010B	mg/l	0.050	0.0150 U		0.015 U			0.015 U	0.015 U	0.015 U		**0.0209 J**		
Arsenic	EPA 6010B	mg/l	0.000045	**0.00347 J**		0.003 U			**0.00604 J**	0.003 U	**0.00491 J**		0.003 U		
Chromium	EPA 6010B	mg/l	0.100	0.001 U		0.001 U			**0.00107 J**	0.001 U	0.001 U		0.001 U		
Copper	EPA 6010B	mg/l	0.0027	0.002 U		0.002 U			0.002 U	0.002 U	0.002 U		**0.00211 J**		
Zinc	EPA 6010B	mg/l	0.036	**0.0782**	**0.0908**	**0.0617**	**0.0198 J**	**0.818**	**0.983**	**0.0542**	**0.0557**	**0.870**	**0.0171 J**	**0.382**	
Polynuclear Aromatic Hydrocarbons:															
Acenaphthene	EPA 8270m	ug/l	0.2	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Acenaphthylene	EPA 8270m	ug/l	0.2	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Anthracene	EPA 8270m	ug/l	0.2	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Benzo (a) anthracene	EPA 8270m	ug/l	0.018	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Benzo (a) pyrene	EPA 8270m	ug/l	0.018	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Benzo (b) fluoranthene	EPA 8270m	ug/l	0.018	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Benzo (ghi) perylene	EPA 8270m	ug/l	0.2	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Benzo (k) fluoranthene	EPA 8270m	ug/l	0.018	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Chrysene	EPA 8270m	ug/l	0.018	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Dibenzo (a,h) anthracene	EPA 8270m	ug/l	0.018	0.0952 U		0.0952 U			0.0952 U	0.0952 U			0.0952 U		
Fluoranthene	EPA 8270m	ug/l	0.2	0.0476 U		0.0476 U			0.0476 U	**0.103**			0.0476 U		
Fluorene	EPA 8270m	ug/l	0.2	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Indeno (1,2,3-cd) pyrene	EPA 8270m	ug/l	0.018	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Naphthalene	EPA 8270m	ug/l	0.2	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Phenanthrene	EPA 8270m	ug/l	0.2	0.0476 U		0.0476 U			**0.0561 J**	**0.182**			**0.0949 J**		
Pyrene	EPA 8270m	ug/l	0.2	0.0476 U		0.0476 U			0.0476 U	**0.0590 J**			0.0476 U		
Total PAH		ug/l		0.40		0.40			0.06	0.34			0.09		
Polychlorinated Biphenyls:															
Aroclor 1016	EPA 8082	ug/l	0.96	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Aroclor 1221	EPA 8082	ug/l	0.034	0.0952 U		0.0952 U			0.0952 U	0.0952 U			0.0952 U		
Aroclor 1232	EPA 8082	ug/l	0.034	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Aroclor 1242	EPA 8082	ug/l	0.034	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Aroclor 1248	EPA 8082	ug/l	0.034	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Aroclor 1254	EPA 8082	ug/l	0.033	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Aroclor 1260	EPA 8082	ug/l	0.034	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Aroclor 1262	EPA 8082	ug/l	--	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Aroclor 1268	EPA 8082	ug/l	--	0.0476 U		0.0476 U			0.0476 U	0.0476 U			0.0476 U		
Phthalates:															
Bis(2-ethylhexyl)phthalate	EPA 8270m	ug/l	2.2	0.501 U		0.501 U			0.501 U	0.501 U			0.501 U		
Butyl benzyl phthalate	EPA 8270m	ug/l	3	0.501 U		0.501 U			0.501 U	0.501 U			0.501 U		
Diethyl phthalate	EPA 8270m	ug/l	3	0.501 U		0.501 U			0.501 U	0.501 U			0.501 U		
Dimethyl phthalate	EPA 8270m	ug/l	3	0.501 U		0.501 U			0.501 U	0.501 U			0.501 U		
Di-n-butyl phthalate	EPA 8270m	ug/l	3	0.501 U		0.501 U			0.501 U	0.501 U			0.501 U		
Di-n-octyl phthalate	EPA 8270m	ug/l	3	0.501 U		0.501 U			0.501 U	0.501 U			0.501 U		
Volatile Organic Carbons:															
2-Butanone (MEK)	EPA 8260B	ug/l	7100	**3.56 J**		**19.7 J**			**5.72 J**	**27.1 J**		**52.0 J**	**3.5 J**		3.5 U
Acetone	EPA 8260B	ug/l	1500	**10.0**		**10.6**			**9.74**	**16.2**		**15.9**	**10.6**		7.76 U

Notes:

[1] Portland Harbor Joint Source Control Strategy Table 3-1 Screening Level Values for Soil Stormwater Sediment Stormwater, Groundwater and Surface Water (7/16/07 Revision)

mg/L = milligrams per liter

ug/L = microgram per liter

Bold result = detection

Shaded cell = screening criteria exceeded.

-- = no screening level available

J = Estimated value below reporting limit.

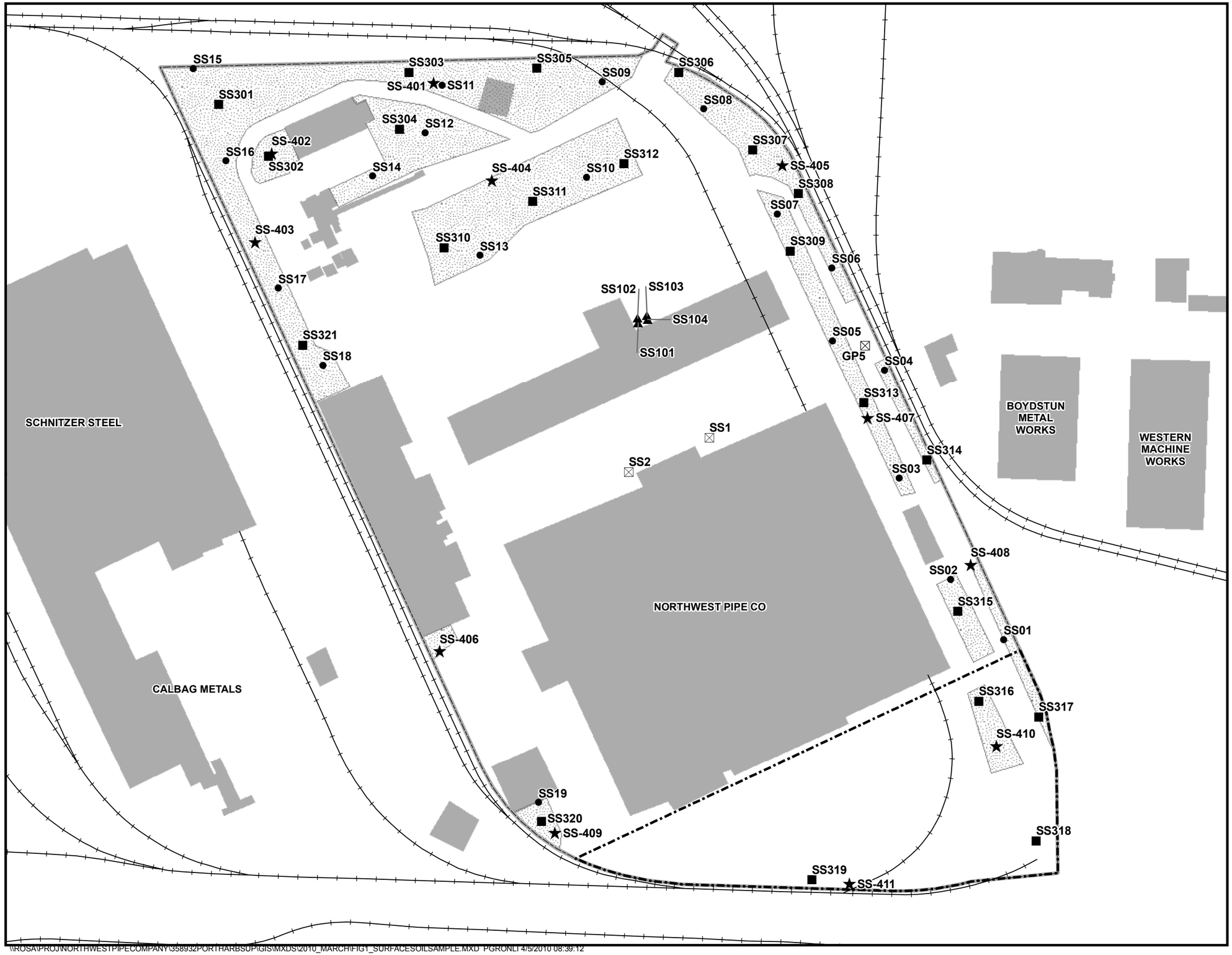
U = Not detected at specified reporting limit.

These preliminary screening levels are intended to provide conservative values that are useful for placing reported constituent concentrations into context. They do not represent cleanup levels and are not based on promulgated regulations.

*Samples type: N = Normal sample, FD = Field Duplicate, TB = Trip Blank

Figures

Figure 1
Surface Soil Sample Locations
Northwest Pipe Company
Portland, Oregon



Legend

Historic Surface Soil Sampling

- 9-01 CH2M Hill
- 6-05 CH2M Hill
- 10-06 CH2M Hill
- 9-07 CH2M Hill
- 10-09 CH2M Hill
- Northwest Pipe Property Boundary
- Building Footprint
- Railroad Line
- Unpaved Area
- Leased Property Boundary

Note: This figure shows both historical and recent surface soil sample locations.

N

0 75 150 225 300

Feet

CH2MHILL

\\ROSA\PROJ\NORTHWESTPIPECOMPANY\358932PORTHARBSUP\GIS\MXDS\2010_MARCH\FIG1_SURFACESOILSAMPLE.MXD PGRONLI 4/5/2010 08:39:12

Figure 2
Downspout Roof Run-Off Sample Locations
Northwest Pipe Company
Portland, Oregon

Legend

- Approximate Downspout Location
- Northwest Pipe Property Boundary
- Leased Property Boundary
- Building Footprint
- Railroad Line
- Unpaved Area

Note: This figure shows both historical and recent downspout sample locations

N

0 40 80 160 240 320

Feet

CH2MHILL

\\ROSA\PROJ\NORTHWESTPIPECOMPANY\358932PORTHARBSUP\GIS\MXDS\2010_MARCH\FIG2_DOWNSPOUTROOFRUNOFF.MXD PGRONLI 4/5/2010 08:52:26

Figure 3
Surface Soil Sample Locations and Total PAH Concentrations
Northwest Pipe Company
Portland, Oregon

SS-15 3.2
SS-303
SS-401 0.99
SS-305 56.1
SS-305 FD
SS-306
SS-08 73.1
SS-09 50.4
SS-11
SS-301 2.7
SS-304 1.21
SS-12
SS-402
SS-16
SS-14
SS-302 1.04
SS-403 4.1
SS-404 18.9
SS-312 148.2
SS-10
SS-311
SS-310 26.1
SS-13 131.1
SS-307 27.4
SS-405 16.6
SS-308
SS-07
SS-309 19.6
SS-06
SS-102
SS-103
SS-104
SS-101
SS-17
SS-321 700.9
SS-18 319.8
SS-05 31.9
GP50
SS-04
SS-313 4.3
SS-407 2.9
SS-314
SS-01
SS-01
SS-02
SCHNITZER STEEL
BOYDSTUN METAL WORKS
WESTERN MACHINE WORKS
NORTHWEST PIPE CO
SS-408 0.63
SS-02
SS-315 1.28
SS-315 FD
SS-01 0.50
SS-406 14.2
SS-316 0.99
SS-317
SS-410
CALBAG METALS
SS-19
SS-320 15.6
SS-409
SS-318 14.4
SS-319
SS-411 485.0

Legend

Surface Soil Sampling

- CH2MHILL 2001, No TPAH Data
- CH2MHILL 2005, No TPAH Data
- CH2MHILL 2006, No TPAH Data
- CH2MHILL 2006, TPAH Data
- CH2MHILL 2007, No TPAH Data
- CH2MHILL 2007, TPAH Data
- CH2MHILL 2009, No TPAH Data
- CH2MHILL 2009, TPAH Data
- Leased Property Boundary
- Northwest Pipe Property Boundary
- Building Footprint
- Railroad Line
- Unpaved Area

0.506 Total Polynuclear Aromatic Hydrocarbons in mg/kg
Total PAH concentration calculated by adding detected values and 0 for non-detects.

Note: A field duplicate was collected at sample point SS411. The value used for this assessment is an average of the two sample results.

N

0 40 80 160 240 320
Feet

CH2MHILL

PDX \\ROSA\PROJ\NORTHWESTPIPECOMPANY\358932PORTHARBSUP\GIS\MXDS\2010_MARCH\FIG3_SURFACESOIL_PAHCONCENTRATIONS.MXD EDIURBA 4/5/2010 12:07:28

Figure 4
Surface Soil Sample Locations and Total PCB Concentrations
Northwest Pipe Company
Portland, Oregon

SS-15 0.63
SS-303
SS-305 1.03
SS-306 8.9
SS-305 FD
SS-11
SS-401 0.07
SS-09 0.5
SS-08 2.6
SS-301
SS-402 0.37
SS-304 0.09
SS-12
SS-307 8.3
SS-16
SS-312 2.7
SS-404 0.3
SS-405 0.4
SS-302
SS-14
SS-10
SS-308
SS-311
SS-07
SS-403 0.45
SS-310 3.3
SS-309 4.3
SS-13 12.5
SS-06
SS-102 0.05
SS-103 0.75
SS-17
SS-104 0.21
SS-05 4.8
SS-321
SS-101 0.07
GP50
SS-18 0.94
SS-04
SS-313 0.22
SS-407 0.12
SS-01
SS-01
SS-314
SS-02
SCHNITZER STEEL
BOYDSTUN METAL WORKS
WESTERN MACHINE WORKS
NORTHWEST PIPE CO
SS-408 0.03
SS-02
SS-315
SS-315 FD
SS-01 0.08
SS-406 0.46
CALBAG METALS
SS-316
SS-317
SS-410 0.18
SS-19
SS-320
SS-409 8.7
SS-318
SS-319
SS-411 1.0

Legend

Surface Soil Sampling

- CH2MHILL 2001, No PCB Data
- CH2MHILL 2005, No PCB Data
- CH2MHILL 2005, PCB Data
- CH2MHILL 2006, No PCB Data
- CH2MHILL 2006, PCB Data
- CH2MHILL 2007, No PCB Data
- CH2MHILL 2007, PCB Data
- CH2MHILL 2009, No PCB Data
- CH2MHILL 2009, PCB Data
- Leased Property Boundary
- Northwest Pipe Property Boundary
- Building Footprint
- Railroad Line
- Unpaved Area

3.31 Total Polychlorinated Biphenyls in mg/kg
Total PCB concentration calculated by adding detected values and 0 for non-detects.

Note: A field duplicate was collected at sample point SS411. The value used for this assessment is an average of the two sample results.

N

0 40 80 160 240 320
Feet

CH2MHILL

PDX \\ROSA\PROJ\NORTHWESTPIPECOMPANY\358932PORTHARBSUP\GIS\MXDS\2010_MARCH\FIG4_SURFACESOIL_PCBCONCENTRATIONS.MXD EDIURBA 4/5/2010 12:09:09

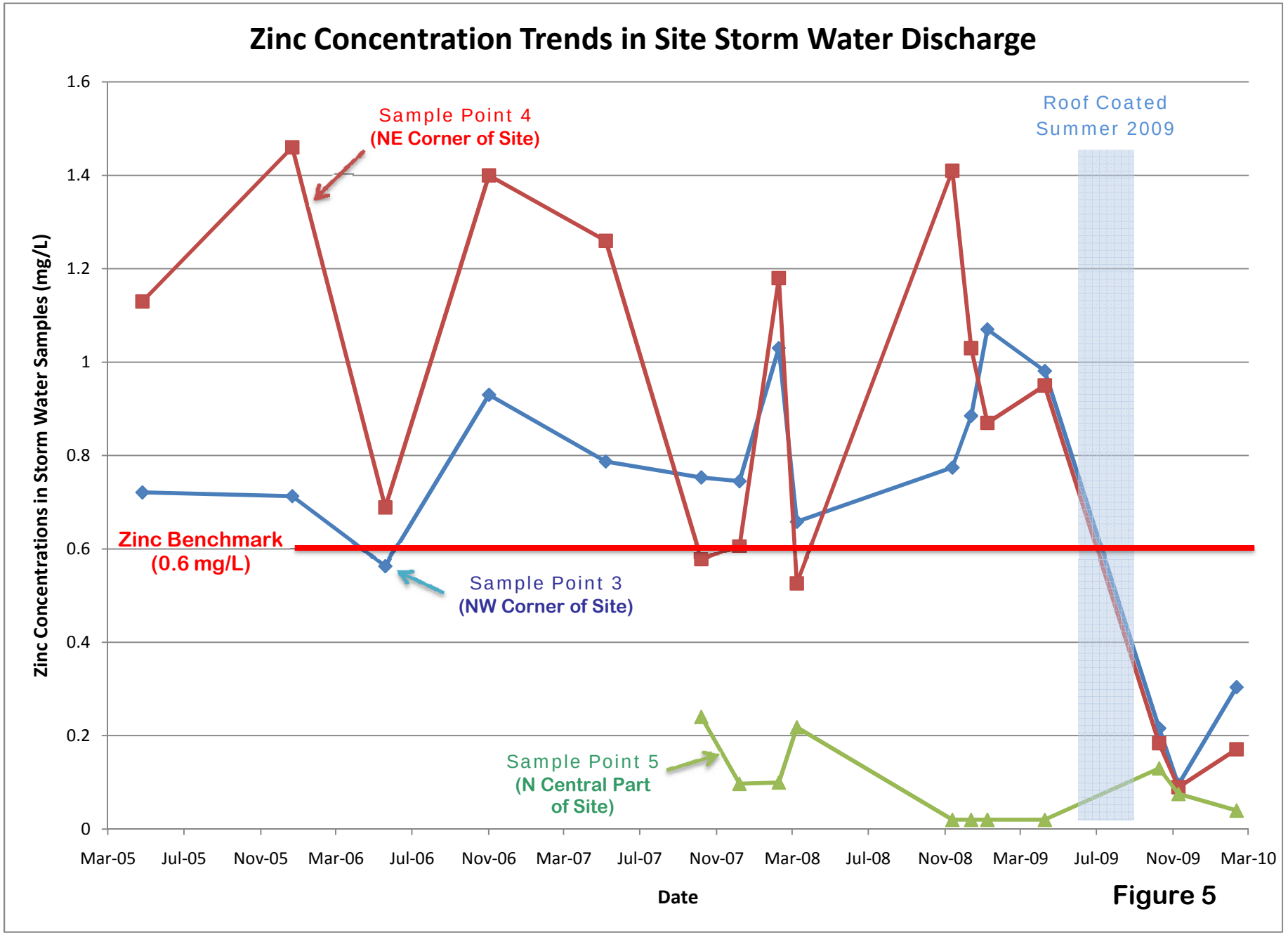

Zinc Concentration Trends in Site Storm Water Discharge
Zinc Concentrations in Storm Water Samples (mg/L)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Sample Point 4
(NE Corner of Site)
Roof Coated
Summer 2009
Zinc Benchmark
(0.6 mg/L)
Sample Point 3
(NW Corner of Site)
Sample Point 5
(N Central Part
of Site)
Mar-05
Jul-05
Nov-05
Mar-06
Jul-06
Nov-06
Mar-07
Jul-07
Nov-07
Mar-08
Jul-08
Nov-08
Mar-09
Jul-09
Nov-09
Mar-10
Date

Figure 5

APPENDIX A

Analytical Laboratory Results (included on CD)

APPENDIX B
Data Quality Evaluation (included on CD)