March 17, 2004
10077.005

Oregon Department of Environmental Quality
Northwest Region
2020 SW Fourth Avenue
Suite 400
Portland, Oregon 97201-4987

VIA Email/First Class

Attention: Anna Coates

Subject: Technical Memorandum
Storm Water Sampling – Fourth Quarter 2003
Remedial Investigation/Feasibility Study/Interim Removal Action Measures
Astoria Area-Wide Petroleum Site
Astoria, Oregon
DEQ ECSI File #2277

Dear Ms. Coates:

This technical memorandum presents the results of storm water sampling performed at the Astoria Area-Wide Petroleum Site in Astoria, Oregon, during the fourth quarter of 2003. A remedial investigation/feasibility study (RI/FS) is being performed pursuant to a Unilateral Order issued in December 2001 by the Oregon Department of Environmental Quality (DEQ) (No. ECSR-NWR-01-11) to eight entities. The Order requires these current and former facility owners, and operators involved in industrial and commercial activities to investigate and potentially cleanup properties within the Astoria Area-Wide site. ChevronTexaco Products Company (ChevronTexaco), Delphia Oil Company (Delphia), McCall Oil and Chemical Company (McCall), Ed Niemi Oil Company (Niemi Oil), Flying Dutchman and Harris Enterprises (Harris/Van West), Port of Astoria (the Port), Qwest Communications International (Qwest), and Shell Oil Company (Shell) are identified in the Order, collectively, as potentially responsible parties (PRPs), and have agreed to comply with its requirements. In addition, ExxonMobil Corporation is part of the PRP Group.

In fall 2002, Phase 1 field activities were conducted at the site in accordance with the RI/FS Work Plan (*EnviroLogic Resources*, 2002b). As part of the Phase 1 field activities a geophysical survey was completed on portions of the site, one goal of which was to map the storm water piping system. This piping system is shown on Figure 2 in the Work Plan, Storm Water Monitoring (*EnviroLogic Resources*, 2003). *EnviroLogic Resources* has reviewed the results of the geophysical mapping along with additional information obtained during the Phase 1 field activities and compiled a storm water catchment map, presented on Figure 3 of the Work Plan, Storm Water Monitoring (*EnviroLogic Resources*, 2003).

Based on the areas drained, the areas of focus for the RI/FS, off-site contribution to drainage, and outfall accessibility, Outfall #2 in Catchment Area 2 and Outfall #6 in Catchment Area 4

have been selected for monitoring (Figure 2). Outfall #2 was selected because it drains the north-central portion of the Astoria Area-Wide site. Outfall #6 was selected because it drains the central portion of the Astoria Area-Wide site. The remaining catchments do not represent areas of investigative interest or are serviced by a combined sanitary and storm sewer system.

STORM WATER SAMPLING METHODS AND PROCEDURES

On November 25, 2003, the Fourth Quarter 2003 (2nd Round) of quarterly storm water sampling was conducted. Storm water samples were collected from the Outfall #2 sampling location and Outfall #6. As shown on Figure 2, the sampling location for Outfall #2 is the first catch basin upstream of the Outfall. The actual outfall cannot be sampled due to the inability to locate the exact discharge point. A dye test performed in January 2003 indicated the approximate location of the discharge area within the riprap on the bank of Slip 2.

Storm water from the sampling point for Outfall #2 was collected by lowering a disposable plastic beaker into the catch basin and collecting the water directly from the inlet pipe. A separate disposable plastic beaker was lowered to Outfall #6 for the storm water sample collection. The water was collected directly at the discharge point. From the beaker the water was transferred into the appropriate bottles and stored in a cooler with ice until the samples were delivered to the laboratory.

The storm water samples were analyzed for RBDM volatile organic compounds (VOCs), RBDM polyaromatic hydrocarbons (PAHs/SVOCs), total copper, total lead, total zinc, pH, total suspended solids, and oil and grease. Laboratory analytical work was performed by North Creek Analytical, Inc. (NCA), of Beaverton, Oregon. The absence of oil and grease or floating solids in the storm water was also noted during the sampling event on the Storm Water Monitoring Form, which is attached as Appendix A.

SUMMARY OF STORM WATER ANALYTICAL RESULTS

The laboratory analytical reports are included in Appendix B attached to this technical memorandum. Tables 1, 2, 3, and 4 summarize the laboratory analytical results. The results of the 3rd Quarter 2003 sampling event are also included on the tables. A validation of the data has been performed and the data are considered of an acceptable quality. The data validation report for this sampling event is included in Appendix A.

As shown on Tables 1 and 2, there were no VOCs or SVOCs detected in the storm water sample. Table 3 presents the metals in storm water. Lead and zinc were detected in samples from both outfalls. Copper was detected in the sample from Outfall #6. Outfall #6 contained the higher levels of metals with 6.87 µg/L of copper, 3.4 µg/L of lead, and 139 µg/L of zinc. Table 4

presents the results of additional chemical analyses performed on the storm water samples. Oil and grease was not detected by NCA in the storm water samples. There were 51.0 mg/L of total suspended solids (TSS) in Outfall #6. Outfall #2 only contained 3.00 mg/L of TSS.

CLOSING COMMENTS

There does not seem to have been an impact from the petroleum contamination at the Astoria Area-Wide site on the storm water discharging from Outfall #2 or Outfall #6. The outfalls will be sampled again in the First Quarter 2004. Please call me at (503)768-5121 if you have any questions or comments regarding this technical memorandum.

Sincerely,
EnviroLogic Resources, Inc.

Thomas J. Calabrese, RG, CWRE
Principal/Hydrogeologist
Project Manager

Attachments:	Table 1	VOCs in Storm Water
	Table 2	SVOCs in Storm Water
	Table 3	Metals in Storm Water
	Table 4	Additional Analytes in Storm Water
	Figure 1	Site Plan
	Figure 2	Storm Water Sampling Locations
	Appendix A	Storm Water Monitoring Forms
	Appendix B	Analytical Results and Data Validation Report

cc: Distribution list attached

ASTORIA AREA-WIDE PETROLEUM SITE
Distribution List

1 Anna Coates, DEQ Project Manager, Site Response
1 Mike Lilly, Attorney for Port of Astoria
1 Peter Gearin, Port of Astoria
1 Tom Calabrese, *EnviroLogic Resources, Inc*., Consultant for PoA and AAW PRP Group
1 Max Miller, Tonkon Torp, Attorney for McCall Oil and Chemical Corporation
1 Ted McCall, McCall Oil and Chemical Corporation
1 John Edwards, Anchor Environmental, LLC, Consultant for McCall Oil and Chemical Corp
1 Cary E. Bechtolt, Niemi Oil Company
1 Allan B. Bakalian, Marten Law Group, PLLC, Attorney for Niemi Oil Company
1 Kurt Harrington, AMEC, Inc., Consultant for Niemi Oil Company
1 Ed Platt, Shell Oil Company
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1 Larry Vandermay, Flying Dutchman
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1 Brian Jacobson, Qwest Communications International, Inc.
1 David Bledsoe, Perkins Coie LLP, Attorney for Qwest Communications International, Inc.
1 Donna LaCombe, Tetra Tech EM, Inc., Consultant for Qwest Communications International
1 Anita W. Lovely, for Exxon Mobil Corporation

TABLES

TABLE 1
VOCs IN STORM WATER

Remedial Investigation/Feasibility Study
Astoria Area-Wide Petroleum Site
Astoria, Oregon

Locator ID	Sample ID	Sample Date	1,2,4-Trimethyl benzene	1,2-Dibromo ethane	1,2-Dichloro ethane	1,3,5-Trimethyl benzene	Benzene
			ug/L	ug/L	ug/L	ug/L	ug/L
Outfall#2	Outfall #2	9/9/2003	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Outfall#2	Outfall #2	11/25/2003	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Outfall #6	Outfall #6	11/25/2003	1 U	0.5 U	0.5 U	0.5 U	0.5 U

Locator ID	Sample ID	Sample Date	Ethylbenzene	Isopropyl benzene	Methyl-t-butyl ether	n-Propyl benzene	Toluene
			ug/L	ug/L	ug/L	ug/L	ug/L
Outfall#2	Outfall #2	9/9/2003	0.5 U	2 U	2 U	0.5 U	0.5 U
Outfall#2	Outfall #2	11/25/2003	0.5 U	2 U	2 U	0.5 U	0.5 U
Outfall #6	Outfall #6	11/25/2003	0.5 U	2 U	2 U	0.5 U	0.5 U

Locator ID	Sample ID	Sample Date	Xylenes
			ug/L
Outfall#2	Outfall #2	9/9/2003	1 U
Outfall#2	Outfall #2	11/25/2003	1 U
Outfall #6	Outfall #6	11/25/2003	1 U

Notes:
ug/L Micrograms per liter
na not analyzed
U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

TABLE 2
SVOCs IN STORM WATER

Remedial Investigation/Feasibility Study
Astoria Area-Wide Petroleum Site
Astoria, Oregon

Locator ID	Sample ID	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene
			ug/L	ug/L	ug/L	ug/L	ug/L
Outfall#2	Outfall #2	9/9/2003	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Outfall#2	Outfall #2	11/25/2003	0.05 U	0.05 U	0.05 U	0.01 U	0.01 U
Outfall #6	Outfall #6	11/25/2003	0.05 U	0.05 U	0.05 U	0.01 U	0.01 U

Locator ID	Sample ID	Sample Date	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene
			ug/L	ug/L	ug/L	ug/L	ug/L
Outfall#2	Outfall #2	9/9/2003	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
Outfall#2	Outfall #2	11/25/2003	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Outfall #6	Outfall #6	11/25/2003	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U

Locator ID	Sample ID	Sample Date	Fluoranthene	Fluorene	Indeno(1,2,3-cd) pyrene	Naphthalene	Phenanthrene
			ug/L	ug/L	ug/L	ug/L	ug/L
Outfall#2	Outfall #2	9/9/2003	0.1 U	0.1 U	0.1 U	2 U	0.1 U
Outfall#2	Outfall #2	9/9/2003				0.1 U	
Outfall#2	Outfall #2	11/25/2003	0.05 U	0.05 U	0.01 U	0.05 U	0.05 U
Outfall#2	Outfall #2	11/25/2003				2 U	
Outfall #6	Outfall #6	11/25/2003	0.05 U	0.05 U	0.01 U	2 U	0.05 U
Outfall #6	Outfall #6	11/25/2003				0.05 U	

TABLE 2
SVOCs IN STORM WATER

Remedial Investigation/Feasibility Study
Astoria Area-Wide Petroleum Site
Astoria, Oregon

Locator ID	Sample ID	Sample Date	Pyrene
			ug/L
Outfall#2	Outfall #2	9/9/2003	0.1 U
Outfall#2	Outfall #2	11/25/2003	0.05 U
Outfall #6	Outfall #6	11/25/2003	0.05 U

Notes:
ug/L Micrograms per liter
U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

TABLE 3
METALS IN STORM WATER

Remedial Investigation/Feasibility Study
Astoria Area-Wide Site
Astoria, Oregon

Locator ID	Sample ID	Sample Date	Copper	Lead	Zinc
			ug/L	ug/L	ug/L
Outfall#2	Outfall #2	9/9/2003	3.2 J	5.1 J	16.6 J
Outfall#2	Outfall #2	11/25/2003	2 U B	0.72 J	19
Outfall #6	Outfall #6	11/25/2003	6.87	3.4	139

Notes:
ug/L Micrograms per liter
na not analyzed
U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

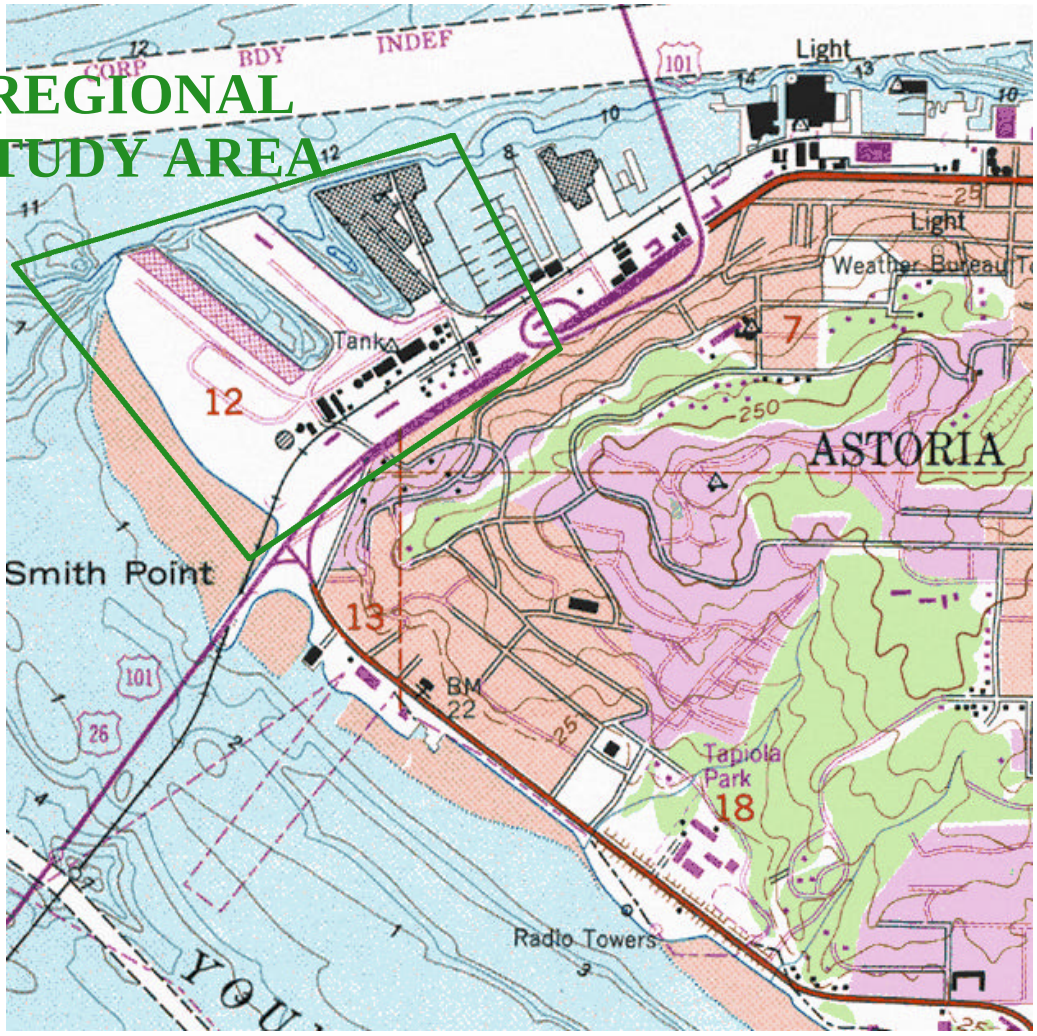
TABLE 4
ADDITIONAL ANALYSES IN STORM WATER

Remedial Investigation/Feasibility Study
Astoria Area-Wide Petroleum Site
Astoria, Oregon

Locator ID	Sample ID	Sample Date	Oil and Grease	Oil & Grease (polar)	Oil & Grease (nonpolar)	pH	Total Suspended Solids
			mg/L	ug/L	ug/L	pH Units	mg/L
Outfall#2	Outfall #2	9/9/2003	950 U	950 U	950 U	6.11	2,000 J
Outfall#2	Outfall #2	11/25/2003	5 U	na	na	6.18 J	3 J
Outfall #6	Outfall #6	11/25/2003	5.00 U	na	na	6.74 J	51.0

Notes:
ug/L Micrograms per liter
mg/L Milligrams per liter
na not analyzed
U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

FIGURES



(from USGS, Astoria {1984}, OR 7.5' Quadrangles)

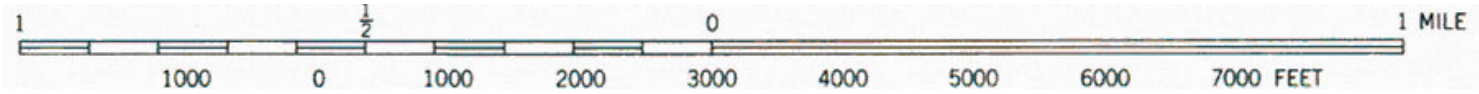


FIGURE 1

SITE LOCATION

Remedial Investigation/Feasibilty Study
Astoria Area-Wide Petroleum Site
Astoria, Oregon

EnviroLogic Resources, Inc.

Consulting Environmental & Water Resources Scientists

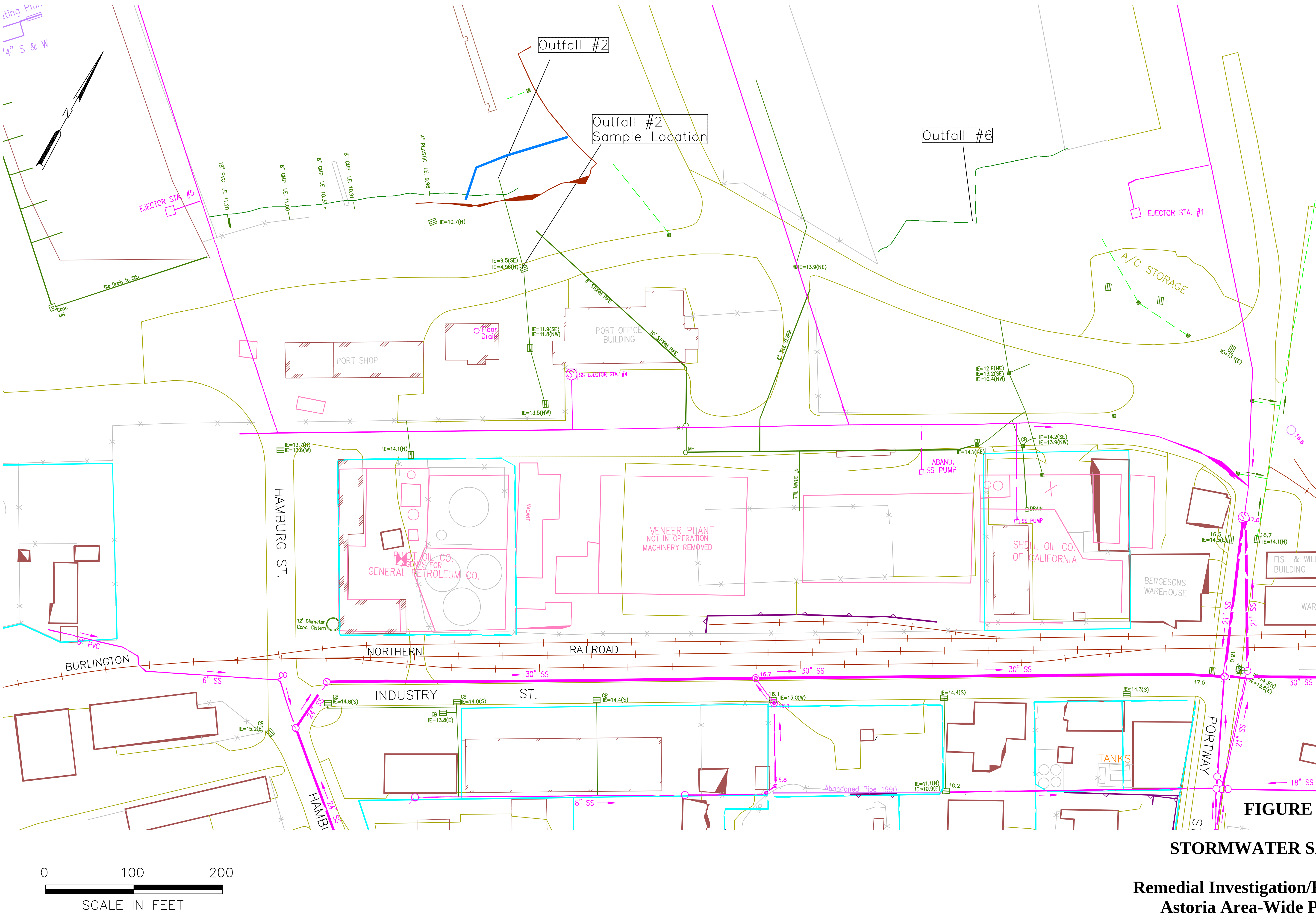


FIGURE 2

STORMWATER SAMPLING

Remedial Investigation/Feasibility Study
Astoria Area-Wide Petrleum Site
Astoria, Oregon

APPENDIX A

STORM WATER MONITORING FORMS

ASTORIA AREA-WIDE

STORM WATER SAMPLE FORM

OUTFALL #2

Instructions: Make visual observations at outfalls. Monitor temperature and pH of storm water. Collect water samples into the appropriate bottles in the order specified. No headspace shall be left in the bottle. Be sure not to spill preservatives or create overflow in bottles with preservatives. Place bottles into cooler with blue ice for laboratory. Label all bottles. Fill out chain of custody form.

Date: November 25, 2003	
Time Sample Collected: 900	
Sample Collection Method: Disposable plastic beaker	
Weather: Overcast; Showers, few sun breaks	Water Flow: Strong **Medium** Light
Color: Mostly clear	Odor: None
Temperature: 8.9 deg C	Other: Conductivity = 61.8 µS

Analyses Requested:

ORP = 131 mV
pH = 6.90

RBDM VOCs 8260B
RBDM PAHs
Total Copper (500 mL plastic bottle)
Total Lead (500 mL plastic bottle)
Total Zinc (500 mL plastic bottle)
PH (500 mL plastic bottle)
Total Suspended Solids (TSS) (1,000 mL plastic bottle)
Oil & Grease (1000 mL amber glass bottles)

Label shall include: sample number, date, time, sampler, and preservatives.

No sheen was observed.

ASTORIA AREA-WIDE

STORM WATER SAMPLE FORM

OUTFALL #6

Instructions: Make visual observations at outfalls. Monitor temperature and pH of storm water. Collect water samples into the appropriate bottles in the order specified. No headspace shall be left in the bottle. Be sure not to spill preservatives or create overflow in bottles with preservatives. Place bottles into cooler with blue ice for laboratory. Label all bottles. Fill out chain of custody form.

Date: November 25, 2003	
Time Sample Collected: 815	
Sample Collection Method: Disposable plastic beaker	
Weather: Overcast; Showers	Water Flow: Strong **Medium** Light
Color: Transparent, slightly light brown	Odor: None
Temperature: 7.5 deg C	Other: Conductivity = 132 μS

Analyses Requested:

ORP = 94 mV
pH = 7.36

RBDM VOCs 8260B
RBDM PAHs
Total Copper (500 mL plastic bottle)
Total Lead (500 mL plastic bottle)
Total Zinc (500 mL plastic bottle)
PH (500 mL plastic bottle)
Total Suspended Solids (TSS) (1,000 mL plastic bottle)
Oil & Grease (1000 mL amber glass bottles)

Label shall include: sample number, date, time, sampler, and preservatives.

Seep visible in Slip 2
Outfall #13a = light water flow
Outfall #13b = No water
Outfall #14 = Light water flow
Outfall #15 = Water (Hamburg Road discharge)
City Outfall = High tide, therefore below water, no sheen
Slip 1 = High Tide, therefore below water, no sheen
Manhole behind Portway tavern = no apparent odor

APPENDIX B

ANALYTICAL RESULTS AND DATA VALIDATION REPORT

QUALITY ASSURANCE/QUALITY CONTROL REVIEW
STORM WATER – 4th QUARTER 2003

Remedial Investigation/Feasibility Study
Astoria Area-Wide Petroleum Site
Astoria, Oregon

This report presents the results of our review of the laboratory analytical report and the data validation conducted based on the laboratory report referenced below. The samples collected were the fourth quarter 2003 storm water samples for the Astoria Area-Wide Petroleum Site. The samples were collected on November 25, 2003. Sample handling, analysis and quality control (QC) procedures were established in the July 15, 2002, Remedial Investigation /Feasibility Study, Astoria Area-Wide Petroleum Site, Astoria, Oregon, Phase 1 Work Plan (Phase 1 RI/FS) and in the March 26, 2003, Work Plan, Storm Water Monitoring, Remedial Investigation/Feasibility Study, Astoria Area-Wide Petroleum Site, Astoria. *EnviroLogic Resources, Inc*., prepared both documents. The samples were submitted to North Creek Analytical (NCA) of Portland, Oregon for analysis.

A total of 4 samples were submitted for analysis. Basic information about the lab order associated with this sample is presented below:

Lab Order	No. of Samples	Matrix	Date(s) Collected	Field Locations
P3K0784	2 2	Water Water	11/25/03 11/25/03	Outfall #2 & #6 Trip Blanks

As stated in Appendix B, Sections 8.0, 9.0 and 10.0 of the Phase I RI/FS our goal is to review the laboratory report and chain of custody for Quality Assurance/Quality Control (QA/QC) parameters and statistical parameters. The findings of our review are presented in the following pages. Qualified data is summarized in the attached table. Analyses performed are listed below.

Analysis	Reference
Total Suspended Solids	EPA Method 160.2
Fats, Oil & Grease	EPA Method 1664
Total Metals – (Copper, Lead, Zinc)	EPA Method 200 Series
Volatile Organic Compounds (VOCs)	EPA Method 8260B
Polynuclear Aromatic Compounds (PAHs)	EPA Method 8270M-SIM
pH	EPA Method 150.1/9040A

EPA = U.S. Environmental Protection Agency

CHAIN OF CUSTODY REVIEW

Chain of custodies (COC) were reviewed to determine sample condition upon arrival at the lab, that analysis requested was in accordance with the RI/FS Work Plan as updated by the Storm Water Work Plan, and that analyses requested were performed.

- One special condition was noted on the COC. One metals sample jar had no identification on it. All the other sample jars were labeled and there was no metals jar for Outfall #2 so it was assumed the missing sample identification was for Outfall #2. No sample containers were broken or otherwise in any adverse condition upon arrival at the laboratory.

- Both cooler (2) temperatures were recorded as 5.8°C for P3K0784 when it was received at the laboratory.

- Analyses requested on the COC accurately reflect the analysis presented in the laboratory reports.

QUALITY CONTROL/QUALITY ASSURANCE REVIEW

DATA QUALIFIERS
The following data qualifier was used in this data validation report:

- **B.** The analyte was also identified in a field or laboratory blank associated with this sample or sample group.

- **U.** The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

- **J.** The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

- **J+.** The analyte was positively identified; the associated numerical value is the estimated high of the analyte in the sample

  The laboratory in their laboratory report used this and other data qualifiers. Those data qualifiers are defined in the laboratory report.

HOLDING TIMES

We reviewed the laboratory reports and compared sample dates, prepared dates and analyzed dates for all the analyses. The laboratory provided us with holding times for each analytical method for soil and water samples. Based on this review pH was analyzed outside the EPA recommended holding time. The pH is qualified with a J flag

FIELD BLANKS

Equipment Blanks and Trip Blanks
No equipment blank was utilized. A trip blank was utilized for each cooler. The recommended frequency presented in the Phase 1 RI/FS work plan was one equipment blank for every 20 samples delivered to the laboratory and one trip blank for every cooler delivered to the laboratory. No analytes were detected in the trip blanks.

LABORATORY METHOD BLANKS

Laboratory method blanks were analyzed at the required frequency for all analyses in the lab order. Laboratory blanks were performed on sample batches so each blank is associated with a batch of field samples. The batch sample associated with each field sample is identified in the laboratory report. One analyte was detected in the laboratory blank for metals analyses.

Copper was detected in the metals laboratory blank at a concentration of 0.000300 mg/l (milligrams per liter). Field samples in the same batch that had copper detected within 10 times the blank concentration are qualified. If the sample concentration was between the MDL (Method Detection Limit) and the RL (Reporting Limit) then the result was qualified by placing a UB flag next to the RL. If the sample concentration was above the RL then the detected concentration was qualified with a J+ and B flag. Data is not qualified where field samples had analytes detected at concentrations greater than 10 times the corresponding blank concentration. Laboratory dilution of field samples was considered.

SURROGATE RECOVERIES

Field Sample
One or more surrogates were utilized for each analysis except for total metals, total suspended solids, pH, and fats, oil & grease analysis. We reviewed all of the surrogate recoveries relative to the specified control limits. No surrogate recoveries were outside control limits.

SPIKE AND SURROGATE RECOVERIES

Laboratory Control Samples
Laboratory Control Samples (LCS) were conducted at the required frequency. Based on our review all LCS quality control information was acceptable. No data was qualified.

Matrix Spike Samples
Matrix Spike (MS) were conducted at the required frequency. Based on our review all spike compounds and/or surrogates met quality control limits.

LABORATORY AND FIELD DUPLICATES/RELATIVE PERCENT DIFFERENCE

MSD, Laboratory Control Sample Duplicates (LCSDs), laboratory duplicates and field duplicate analytical information was reviewed. Based on our review all duplicate sample relative percent differences (RPDs) were within acceptable limits for laboratory duplicates. No field duplicate was obtained. No surrogate recovery exceptions for duplicate samples were noted.

STATISTICAL EVALUATION

Precision
Precision is a measure of the ability to reproduce data and is evaluated using duplicate samples. This includes field duplicates, laboratory duplicates, MSDs and LCSDs. Relative percent difference (RPD) is used to measure the reproducibility as described in section 10.1 of Appendix B of the RI/FS Work Plan. The RPD control limits are listed in the laboratory reports. These control limits may be slightly different than those presented in the Work Plan, but they are still acceptable. Overall precision for the analysis was acceptable

RPDs outside the control limits would represent statistical exceptions and indicate a lack of ability to reproduce the data. LCSD evaluate the affect laboratory conditions have on precision; no RPD exceptions were noted in LCSDs. Field duplicates, MSDs and lab duplicates evaluate the effect field and laboratory conditions have on precision. No RPD exceptions were noted in MSDs. No field duplicates were obtained so no evaluation of the reproducibility of the field data can be made. Overall the precision of the laboratory data is acceptable and no data is qualified due to lack of precision.

Accuracy
Accuracy measures the bias in a system and is evaluated using percent recovery of surrogate, spikes and LCS. LCS evaluates bias due to laboratory conditions. Bias due to field and laboratory conditions is evaluated using surrogates and matrix spikes. All surrogate and spike recoveries meet control limits. Overall the accuracy of the laboratory data is acceptable and no data is qualified due to a lack of accuracy

Representatives
Equipment blanks, laboratory blanks and field duplicate samples evaluate how representative analytical results are of actual site conditions. Blanks evaluate the introduction of "analytes" from outside sources such as field equipment, transportation equipment and the laboratory environment. Duplicate field samples attempt to evaluate how representative a sample is of site conditions by seeing if two samples are statistically representative of each other.

Equipment blanks and field duplicates were not utilized with sample delivery group. Trip blanks were utilized and no problems were noted with the trip blanks. One analyte was detected in the laboratory blank resulting in one data point being qualified. No data was rejected due to lack of representativeness.

Completeness

Completeness evaluates how successful the data set is at being valid. No data was rejected so the data group was 100 percent complete with respect to rejected analysis. One analysis was qualified with a J flag due to an exceeded holding time.

QUALIFIED DATA

The following data were qualified as a result of the data validation:

Laboratory Identification	Sample Name	Analyte	Original Result	Qualified Result	Method Detection Limit	Reporting Limit	Units
P3K0784-01	Outfall #2	Total Copper	0.00170 J	0.00200 U B	0.000259	0.00200	mg/l
		pH	6.18	6.18 J	NA	NA	ph Units
P3K0784-02	Outfall #6	pH	6.74	6.74 J	NA	NA	ph Units

Notes:
NA= Not applicable
Data Qualifiers U, B and J are defined in the text.

REFERENCES

USEPA (U.S. Environmental Protection Agency). 2002. USEPA Contract Laboratory Program, National Functional Guidelines For Inorganics Data Review. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency. EPA 540/R-01/008.

USEPA (United States Environmental Protection Agency). 2003. Inorganic National Functional Guidelines Proposed Changes. http://www.epa.gov/superfundprograms/clp/inorgfgchanges. htm

USEPA (United States Environmental Protection Agency). 1999. USEPA Contract Laboratory Program, National Functional Guidelines for Organic Data Review. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency. EPA 540/R-99/008.

EnviroLogic Resources, Inc. RI/FS and IRAM Development Work Plan, Phase I, Remedial Investigation/Feasibility Study, Astoria Area-Wide Petroleum Site, Astoria, Oregon, July 15, 2002.

EnviroLogic Resources, Inc. Work Plan, Storm Water Monitoring, Remedial Investigation/ Feasibility Study, Astoria Area-Wide Petroleum Site, Astoria, Oregon, March 26, 2003

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12 December 2003

Tom Calabrese
EnviroLogic Resources, Inc.
P.O. Box 80762
Portland, OR 97280-0762

RE: Astoria Area-Wide Petroleum Site RI-1

Enclosed are the results of analyses for samples received by the laboratory on 11/26/03 08:47. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Mary A. Fritzmann Smith For Joy D. Chang
Project Manager

www.ncalabs.com

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EnviroLogic Resources, Inc.
P.O. Box 80762
Portland OR, 97280-0762

Project: Astoria Area-Wide Petroleum Site RI-1
Project Number: 10077.005
Project Manager: Tom Calabrese

Reported:
12/12/03 15:46

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Outfall #2	P3K0784-01	Water	11/25/03 09:00	11/26/03 08:47
Outfall #6	P3K0784-02	Water	11/25/03 08:15	11/26/03 08:47
Trip Blank	P3K0784-03	Water	11/25/03 09:00	11/26/03 08:47
Trip Blank	P3K0784-04	Water	11/25/03 08:15	11/26/03 08:47

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Mary A. Fritzmann Smith For Joy D. Chang, Project Manager

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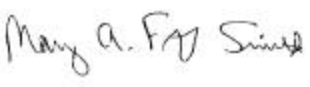
EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Oil and Grease Analysis per EPA Method 1664
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Outfall #2 (P3K0784-01) Water	**Sampled: 11/25/03 09:00**		**Received: 11/26/03 08:47**							
Oil & Grease	ND	3.24	5.00	mg/l	1	3120115	12/03/03	12/03/03	EPA 1664	F-02, U
Outfall #6 (P3K0784-02) Water	**Sampled: 11/25/03 08:15**		**Received: 11/26/03 08:47**							
Oil & Grease	ND	3.24	5.00	mg/l	1	3120115	12/03/03	12/03/03	EPA 1664	F-02, U



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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Total Metals per EPA 200 Series Methods
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Outfall #2 (P3K0784-01) Water	**Sampled: 11/25/03 09:00**		**Received: 11/26/03 08:47**							
Copper	**0.00170**	0.000259	0.00200	mg/l	1	3120352	12/09/03	12/10/03	EPA 200.8	J
Lead	**0.000720**	0.0000870	0.00100	"	"	"	"	"	"	J
Zinc	**0.0190**	0.00102	0.00500	"	"	"	"	"	"	
Outfall #6 (P3K0784-02) Water	**Sampled: 11/25/03 08:15**		**Received: 11/26/03 08:47**							
Copper	**0.00687**	0.000259	0.00200	mg/l	1	3120352	12/09/03	12/10/03	EPA 200.8	
Lead	**0.00340**	0.0000870	0.00100	"	"	"	"	"	"	
Zinc	**0.139**	0.00102	0.00500	"	"	"	"	"	"	

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Selected Volatile Organic Compounds per EPA Method 8260B
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Outfall #2 (P3K0784-01) Water Sampled: 11/25/03 09:00 Received: 11/26/03 08:47										
1,2-Dibromoethane	ND	0.187	0.500	ug/l	1	3120073	12/02/03	12/02/03	EPA 8260B	U
1,2-Dichloroethane	ND	0.142	0.500	"	"	"	"	"	"	U
Benzene	ND	0.147	0.500	"	"	"	"	"	"	U
Toluene	ND	0.155	0.500	"	"	"	"	"	"	U
Ethylbenzene	ND	0.110	0.500	"	"	"	"	"	"	U
Xylenes (total)	ND	0.262	1.00	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.0865	2.00	"	"	"	"	"	"	U
Naphthalene	ND	0.0989	2.00	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.0884	1.00	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.157	0.500	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.107	2.00	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.138	0.500	"	"	"	"	"	"	U
Surrogate: 4-BFB	*83.5 %*		*75-120*			"	"	"	"	
Surrogate: 1,2-DCA-d4	*102 %*		*77-129*			"	"	"	"	
Surrogate: Dibromofluoromethane	*106 %*		*80-121*			"	"	"	"	
Surrogate: Toluene-d8	*101 %*		*80-120*			"	"	"	"	
Outfall #6 (P3K0784-02) Water Sampled: 11/25/03 08:15 Received: 11/26/03 08:47										
1,2-Dibromoethane	ND	0.187	0.500	ug/l	1	3120073	12/02/03	12/02/03	EPA 8260B	U
1,2-Dichloroethane	ND	0.142	0.500	"	"	"	"	"	"	U
Benzene	ND	0.147	0.500	"	"	"	"	"	"	U
Toluene	ND	0.155	0.500	"	"	"	"	"	"	U
Ethylbenzene	ND	0.110	0.500	"	"	"	"	"	"	U
Xylenes (total)	ND	0.262	1.00	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.0865	2.00	"	"	"	"	"	"	U
Naphthalene	ND	0.0989	2.00	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.0884	1.00	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.157	0.500	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.107	2.00	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.138	0.500	"	"	"	"	"	"	U
Surrogate: 4-BFB	*75.5 %*		*75-120*			"	"	"	"	
Surrogate: 1,2-DCA-d4	*101 %*		*77-129*			"	"	"	"	
Surrogate: Dibromofluoromethane	*100 %*		*80-121*			"	"	"	"	
Surrogate: Toluene-d8	*99.0 %*		*80-120*			"	"	"	"	

North Creek Analytical - Portland

Mary A. Fritzmann Smith For Joy D. Chang, Project Manager

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Selected Volatile Organic Compounds per EPA Method 8260B
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (P3K0784-03) Water	**Sampled: 11/25/03 09:00**		**Received: 11/26/03 08:47**							
1,2-Dibromoethane	ND	0.187	0.500	ug/l	1	3120073	12/02/03	12/02/03	EPA 8260B	U
1,2-Dichloroethane	ND	0.142	0.500	"	"	"	"	"	"	U
Benzene	ND	0.147	0.500	"	"	"	"	"	"	U
Toluene	ND	0.155	0.500	"	"	"	"	"	"	U
Ethylbenzene	ND	0.110	0.500	"	"	"	"	"	"	U
Xylenes (total)	ND	0.262	1.00	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.0865	2.00	"	"	"	"	"	"	U
Naphthalene	ND	0.0989	2.00	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.0884	1.00	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.157	0.500	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.107	2.00	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.138	0.500	"	"	"	"	"	"	U
Surrogate: 4-BFB	*82.5 %*		*75-120*			"	"	"	"	
Surrogate: 1,2-DCA-d4	*100 %*		*77-129*			"	"	"	"	
Surrogate: Dibromofluoromethane	*108 %*		*80-121*			"	"	"	"	
Surrogate: Toluene-d8	*106 %*		*80-120*			"	"	"	"	
Trip Blank (P3K0784-04) Water	**Sampled: 11/25/03 08:15**		**Received: 11/26/03 08:47**							
1,2-Dibromoethane	ND	0.187	0.500	ug/l	1	3120073	12/02/03	12/02/03	EPA 8260B	U
1,2-Dichloroethane	ND	0.142	0.500	"	"	"	"	"	"	U
Benzene	ND	0.147	0.500	"	"	"	"	"	"	U
Toluene	ND	0.155	0.500	"	"	"	"	"	"	U
Ethylbenzene	ND	0.110	0.500	"	"	"	"	"	"	U
Xylenes (total)	ND	0.262	1.00	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.0865	2.00	"	"	"	"	"	"	U
Naphthalene	ND	0.0989	2.00	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.0884	1.00	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.157	0.500	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.107	2.00	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.138	0.500	"	"	"	"	"	"	U
Surrogate: 4-BFB	*81.0 %*		*75-120*			"	"	"	"	
Surrogate: 1,2-DCA-d4	*99.0 %*		*77-129*			"	"	"	"	
Surrogate: Dibromofluoromethane	*105 %*		*80-121*			"	"	"	"	
Surrogate: Toluene-d8	*104 %*		*80-120*			"	"	"	"	

North Creek Analytical - Portland

Mary A. Fritzmann Smith For Joy D. Chang, Project Manager

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Polynuclear Aromatic Compounds per EPA 8270M-SIM
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Outfall #2 (P3K0784-01) Water Sampled: 11/25/03 09:00 Received: 11/26/03 08:47										
Acenaphthene	ND	0.0500	0.0500	ug/l	1	3120019	12/01/03	12/04/03	EPA 8270m	U
Acenaphthylene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Anthracene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Benzo (a) anthracene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Benzo (a) pyrene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Benzo (b) fluoranthene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Benzo (ghi) perylene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Benzo (k) fluoranthene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Chrysene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Dibenzo (a,h) anthracene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Fluoranthene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Fluorene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Indeno (1,2,3-cd) pyrene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Naphthalene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Phenanthrene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Pyrene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Surrogate: Fluorene-d10	*55.9 %*		*25-150*			"	"	"	"	
Surrogate: Pyrene-d10	*70.8 %*		*23-150*			"	"	"	"	
Surrogate: Benzo (a) pyrene-d12	*66.9 %*		*10-150*			"	"	"	"	
Outfall #6 (P3K0784-02) Water Sampled: 11/25/03 08:15 Received: 11/26/03 08:47										
Acenaphthene	ND	0.0500	0.0500	ug/l	1	3120019	12/01/03	12/04/03	EPA 8270m	U
Acenaphthylene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Anthracene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Benzo (a) anthracene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Benzo (a) pyrene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Benzo (b) fluoranthene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Benzo (ghi) perylene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Benzo (k) fluoranthene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Chrysene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Dibenzo (a,h) anthracene	ND	0.0100	0.0100	"	"	"	"	"	"	U
Fluoranthene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Fluorene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Indeno (1,2,3-cd) pyrene	ND	0.0100	0.0100	"	"	"	"	"	"	U

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Mary A. Fritzmann Smith For Joy D. Chang, Project Manager

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Polynuclear Aromatic Compounds per EPA 8270M-SIM
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Outfall #6 (P3K0784-02) Water Sampled: 11/25/03 08:15 Received: 11/26/03 08:47										
Naphthalene	ND	0.0500	0.0500	ug/l	1	3120019	12/01/03	12/04/03	EPA 8270m	U
Phenanthrene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Pyrene	ND	0.0500	0.0500	"	"	"	"	"	"	U
Surrogate: Fluorene-d10	*54.7 %*		*25-150*			"	"	"	"	
Surrogate: Pyrene-d10	*65.3 %*		*23-150*			"	"	"	"	
Surrogate: Benzo (a) pyrene-d12	*59.7 %*		*10-150*			"	"	"	"	

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Conventional Chemistry Parameters per APHA/EPA Methods
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Outfall #2 (P3K0784-01) Water	**Sampled: 11/25/03 09:00**		**Received: 11/26/03 08:47**							
pH	**6.18**			pH Units	1	3110896	11/26/03	11/26/03	150.1/9040	I-02
Total Suspended Solids	**3.00**	1.68	10.0	mg/l	"	3120091	12/02/03	12/02/03	EPA 160.2	J
Outfall #6 (P3K0784-02) Water	**Sampled: 11/25/03 08:15**		**Received: 11/26/03 08:47**							
pH	**6.74**			pH Units	1	3110896	11/26/03	11/26/03	150.1/9040	I-02
Total Suspended Solids	**51.0**	1.68	10.0	mg/l	"	3120091	12/02/03	12/02/03	EPA 160.2	

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Oil and Grease Analysis per EPA Method 1664 - Quality Control
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3120115: Prepared 12/03/03 Using EPA 1664											
Blank (3120115-BLK1)											
Oil & Grease	ND	3.24	5.00	mg/l							U
Oil & Grease (non-polar)	ND	1.14	5.00	"							U
Oil & Grease (polar)	0.00		5.00	"							
LCS (3120115-BS1)											
Oil & Grease	76.9	3.24	5.00	mg/l	80.0		96.1	73-109			
Oil & Grease (non-polar)	29.5	1.14	5.00	"	40.0		73.8	57-113			

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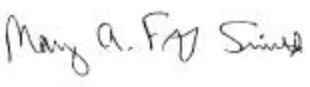
EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Total Metals per EPA 200 Series Methods - Quality Control
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3120352: Prepared 12/09/03 Using EPA 200/3005											
Blank (3120352-BLK1)											
Copper	0.000300	0.000259	0.00200	mg/l							J
Lead	ND	0.0000870	0.00100	"							U
Zinc	ND	0.00102	0.00500	"							U
LCS (3120352-BS1)											
Copper	0.105	0.000259	0.00200	mg/l	0.100		105	85-115			
Lead	0.112	0.0000870	0.00100	"	0.100		112	85-115			
Zinc	0.0970	0.00102	0.00500	"	0.100		97.0	85-115			
Duplicate (3120352-DUP1)						**Source: P3K0785-42**					
Copper	0.00442	0.000259	0.00200	mg/l		0.00415			6.30	20	
Lead	ND	0.0000870	0.00100	"		ND				20	U
Zinc	0.00867	0.00102	0.00500	"		0.00872			0.575	20	
Matrix Spike (3120352-MS1)						**Source: P3K0785-42**					
Copper	0.108	0.000259	0.00200	mg/l	0.100	0.00415	104	70-130			
Lead	0.105	0.0000870	0.00100	"	0.100	ND	105	70-130			
Zinc	0.108	0.00102	0.00500	"	0.100	0.00872	99.3	70-130			
Matrix Spike (3120352-MS2)						**Source: P3K0785-43**					
Copper	0.115	0.000259	0.00200	mg/l	0.100	0.0184	96.6	70-130			
Lead	0.103	0.0000870	0.00100	"	0.100	0.00186	101	70-130			
Zinc	0.156	0.00102	0.00500	"	0.100	0.0626	93.4	70-130			



Mary A. Fritzmann Smith For Joy D. Chang, Project Manager

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Selected Volatile Organic Compounds per EPA Method 8260B - Quality Control
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3120073: Prepared 12/02/03 Using EPA 5030B											
Blank (3120073-BLK1)											
1,2-Dibromoethane	ND	0.187	0.500	ug/l							U
1,2-Dichloroethane	ND	0.142	0.500	"							U
Benzene	ND	0.147	0.500	"							U
Toluene	ND	0.155	0.500	"							U
Ethylbenzene	ND	0.110	0.500	"							U
Xylenes (total)	ND	0.262	1.00	"							U
Methyl tert-butyl ether	ND	0.0865	2.00	"							U
Naphthalene	ND	0.0989	2.00	"							U
1,2,4-Trimethylbenzene	ND	0.0884	1.00	"							U
1,3,5-Trimethylbenzene	ND	0.157	0.500	"							U
Isopropylbenzene	ND	0.107	2.00	"							U
n-Propylbenzene	ND	0.138	0.500	"							U
Surrogate: 4-BFB	*17.0*			"	*20.0*		*85.0*	*75-120*			
Surrogate: 1,2-DCA-d4	*19.5*			"	*20.0*		*97.5*	*77-129*			
Surrogate: Dibromofluoromethane	*20.7*			"	*20.0*		*104*	*80-121*			
Surrogate: Toluene-d8	*20.9*			"	*20.0*		*104*	*80-120*			
LCS (3120073-BS1)											
Benzene	21.6	0.147	0.500	ug/l	20.0		108	80-120			
Toluene	21.0	0.155	0.500	"	20.0		105	80-124			
Ethylbenzene	19.7	0.110	0.500	"	20.0		98.5	80-120			
Xylenes (total)	55.2	0.262	1.00	"	60.0		92.0	73-124			
Methyl tert-butyl ether	22.0	0.0865	2.00	"	20.0		110	80-129			
Naphthalene	18.8	0.0989	2.00	"	20.0		94.0	72-149			
Surrogate: 4-BFB	*19.8*			"	*20.0*		*99.0*	*75-120*			
Surrogate: 1,2-DCA-d4	*20.3*			"	*20.0*		*102*	*77-129*			
Surrogate: Dibromofluoromethane	*21.3*			"	*20.0*		*106*	*80-121*			
Surrogate: Toluene-d8	*21.4*			"	*20.0*		*107*	*80-120*			

North Creek Analytical - Portland

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Mary A. Fritzmann Smith For Joy D. Chang, Project Manager

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Selected Volatile Organic Compounds per EPA Method 8260B - Quality Control
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3120073: Prepared 12/02/03 Using EPA 5030B											
Matrix Spike (3120073-MS1)						**Source: P3K0784-01**					
Benzene	20.8	0.147	0.500	ug/l	20.0	ND	104	80-124			
Toluene	18.9	0.155	0.500	"	20.0	ND	94.5	79.7-131			
Ethylbenzene	18.3	0.110	0.500	"	20.0	ND	91.5	80-124			
Xylenes (total)	42.8	0.262	1.00	"	60.0	ND	71.3	44.6-154			
Methyl tert-butyl ether	21.3	0.0865	2.00	"	20.0	ND	106	80-130			
Naphthalene	15.2	0.0989	2.00	"	20.0	ND	76.0	69-163			
Surrogate: 4-BFB	*19.2*			"	*20.0*		*96.0*	*75-120*			
Surrogate: 1,2-DCA-d4	*19.2*			"	*20.0*		*96.0*	*77-129*			
Surrogate: Dibromofluoromethane	*21.4*			"	*20.0*		*107*	*80-121*			
Surrogate: Toluene-d8	*20.8*			"	*20.0*		*104*	*80-120*			
Matrix Spike Dup (3120073-MSD1)						**Source: P3K0784-01**					
Benzene	21.4	0.147	0.500	ug/l	20.0	ND	107	80-124	2.84	25	
Toluene	19.2	0.155	0.500	"	20.0	ND	96.0	79.7-131	1.57	25	
Ethylbenzene	18.3	0.110	0.500	"	20.0	ND	91.5	80-124	0.00	25	
Xylenes (total)	53.0	0.262	1.00	"	60.0	ND	88.3	44.6-154	21.3	25	
Methyl tert-butyl ether	21.6	0.0865	2.00	"	20.0	ND	108	80-130	1.40	25	
Naphthalene	16.0	0.0989	2.00	"	20.0	ND	80.0	69-163	5.13	25	
Surrogate: 4-BFB	*18.8*			"	*20.0*		*94.0*	*75-120*			
Surrogate: 1,2-DCA-d4	*20.1*			"	*20.0*		*100*	*77-129*			
Surrogate: Dibromofluoromethane	*21.6*			"	*20.0*		*108*	*80-121*			
Surrogate: Toluene-d8	*20.5*			"	*20.0*		*102*	*80-120*			

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Polynuclear Aromatic Compounds per EPA 8270M-SIM - Quality Control
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3120019: Prepared 12/01/03 Using EPA 3520/600 Series											
Blank (3120019-BLK1)											
Acenaphthene	ND	0.0500	0.0500	ug/l							U
Acenaphthylene	ND	0.0500	0.0500	"							U
Anthracene	ND	0.0500	0.0500	"							U
Benzo (a) anthracene	ND	0.0100	0.0100	"							U
Benzo (a) pyrene	ND	0.0100	0.0100	"							U
Benzo (b) fluoranthene	ND	0.0100	0.0100	"							U
Benzo (ghi) perylene	ND	0.0500	0.0500	"							U
Benzo (k) fluoranthene	ND	0.0100	0.0100	"							U
Chrysene	ND	0.0100	0.0100	"							U
Dibenzo (a,h) anthracene	ND	0.0100	0.0100	"							U
Fluoranthene	ND	0.0500	0.0500	"							U
Fluorene	ND	0.0500	0.0500	"							U
Indeno (1,2,3-cd) pyrene	ND	0.0100	0.0100	"							U
Naphthalene	ND	0.0500	0.0500	"							U
Phenanthrene	ND	0.0500	0.0500	"							U
Pyrene	ND	0.0500	0.0500	"							U
Surrogate: Fluorene-d10	*1.52*			"	*2.50*		*60.8*	*25-150*			
Surrogate: Pyrene-d10	*1.81*			"	*2.50*		*72.4*	*23-150*			
Surrogate: Benzo (a) pyrene-d12	*1.90*			"	*2.50*		*76.0*	*10-150*			
LCS (3120019-BS1)											
Acenaphthene	1.79	0.0500	0.0500	ug/l	2.50		71.6	26-150			
Benzo (a) pyrene	2.03	0.0100	0.0100	"	2.50		81.2	38-150			
Pyrene	1.90	0.0500	0.0500	"	2.50		76.0	33-150			
Surrogate: Fluorene-d10	*1.50*			"	*2.50*		*60.0*	*25-150*			
Surrogate: Pyrene-d10	*1.95*			"	*2.50*		*78.0*	*23-150*			
Surrogate: Benzo (a) pyrene-d12	*2.05*			"	*2.50*		*82.0*	*10-150*			

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Polynuclear Aromatic Compounds per EPA 8270M-SIM - Quality Control
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3120019: Prepared 12/01/03 Using EPA 3520/600 Series											
LCS Dup (3120019-BSD1)											
Acenaphthene	1.92	0.0500	0.0500	ug/l	2.50		76.8	26-150	7.01	60	
Benzo (a) pyrene	2.06	0.0100	0.0100	"	2.50		82.4	38-150	1.47	60	
Pyrene	1.95	0.0500	0.0500	"	2.50		78.0	33-150	2.60	60	
Surrogate: Fluorene-d10	*1.57*			"	*2.50*		*62.8*	*25-150*			
Surrogate: Pyrene-d10	*1.94*			"	*2.50*		*77.6*	*23-150*			
Surrogate: Benzo (a) pyrene-d12	*2.03*			"	*2.50*		*81.2*	*10-150*			

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Conventional Chemistry Parameters per APHA/EPA Methods - Quality Control
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3110896: Prepared 11/26/03 Using Wet Chem											
Duplicate (3110896-DUP1)						**Source: P3K0783-01**					
pH	7.90			pH Units		7.78			1.53	25	
Batch 3120091: Prepared 12/02/03 Using Wet Chem											
Blank (3120091-BLK1)											
Total Suspended Solids	ND	1.68	10.0	mg/l							U
LCS (3120091-BS1)											
Total Suspended Solids	50.0	1.68	10.0	mg/l	50.0		100	80-120			
Duplicate (3120091-DUP1)						**Source: P3K0745-01**					
Total Suspended Solids	58.0	1.68	10.0	mg/l		58.0			0.00	20	
Duplicate (3120091-DUP2)						**Source: P3K0784-02**					
Total Suspended Solids	51.0	1.68	10.0	mg/l		51.0			0.00	20	

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EnviroLogic Resources, Inc.	Project: Astoria Area-Wide Petroleum Site RI-1	
P.O. Box 80762	Project Number: 10077.005	**Reported:**
Portland OR, 97280-0762	Project Manager: Tom Calabrese	12/12/03 15:46

Notes and Definitions

F-02	Since Total Oil & Grease was ND for sample, Non-polar hydrocarbon analysis was not performed.
I-02	This sample was analyzed outside of the EPA recommended holding time.
J	Estimated value.
U	Analyte included in the analysis but not detected.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference