November 6, 2003
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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
Sediment Sampling
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 sediment sampling performed at the base of Slip 2 at the Astoria Area-Wide Petroleum Site in Astoria, Oregon, during June 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), collectively potentially responsible parties (PRPs), are identified in the Order and have agreed to comply with its requirements.

BACKGROUND

The Astoria Area-Wide site includes facilities and properties located at and near the Port of Astoria in Astoria, Oregon, as shown on Figure 1. The regional study area (RSA) includes the Astoria Area-Wide site and the surrounding areas. The RSA is located in Section 7, Township 8 North, Range 9 West, and Section 12, Township 8 North, Range 10 West, Willamette Base and Meridian. The Astoria Area-Wide site includes property bounded by Portway to the northeast, the Columbia River to the northwest, Hamburg Street (including the former McCall bulk plant) to the southwest, and Marine Drive to the southeast.

The topography of the area consists of a prominent hill overlooking the RSA from the southeast. West Marine Drive (US Highways 26, 30, and 101) is located on a topographic bench, at the base of the prominent hill, approximately 15 feet above the level of the Port facilities. The Columbia River flows to the west on the northwest side of the RSA. Youngs Bay lies to the southwest.

The area around the Port has been used for petroleum storage and distribution since the 1920s. Aboveground storage tanks (ASTs), underground storage tanks (USTs), and pipelines are present on several of the facilities subject to this investigation. Historically, the area was home to at least four bulk petroleum storage facilities and five vehicle fueling or service stations between West Marine Drive and the Columbia River in the RSA. Inactive pipelines associated with several of the former bulk fuel storage facilities extend onto Pier 2. A complete site history and a summary of remedial actions completed at the Astoria Area-Wide site are presented in the RI/FS Work Plan (*EnviroLogic Resources*, July 2002) and subsequent addenda.

The occurrence of free product or light non-aqueous phase liquids (LNAPL) has been documented at several locations within the Astoria Area-Wide site. Currently LNAPL is only known to be present in monitoring wells located near the Port office in the vicinity of a 1993 diesel release from a McCall Oil pipeline. Historically LNAPL was also present in two monitoring wells situated between the Niemi Oil Cardlock and the Harris/Van West properties in the vicinity of a 1990 release from Harris/Van West and in a trench between the Youngs Bay Texaco and Qwest properties in the vicinity of a 1997 gasoline release at Youngs Bay Texaco.

During the course of activities conducted in association with the 1993 diesel release, a petroleum sheen was observed on ground water seeping to the Columbia River from the shoreline in the southeast corner of Slip 2. In 1995, a total fluids (product/ground-water) recovery system was installed upland of Slip 2 to capture free phase product on the water table and mitigate the ground-water seep containing a petroleum sheen. The ground-water treatment system had operational difficulties due to water level fluctuations and biological/iron fouling and operation of the system was terminated in 1996. Subsequently, an absorbent boom was placed across the southeast corner of Slip 2 to mitigate the migration of the free phase hydrocarbons on the water surface in Slip 2.

SEDIMENT SAMPLING METHODS AND PROCEDURES

On June 19, 2003, two sediment samples were collected from the southeast corner of Slip 2. The sample locations are shown on Figure 2. The sediment surface in the sample locations were accessed during low tide when the intertidal surface sediments were exposed. Sediment sample SD-701(P) was collected outside of the containment boom area, while SD-700(P) was collected within the boom area, relatively close to the bank of the slip. The boom extends from the eastern side of Slip 2 to the southern

bank creating a corner area to contain the petroleum sheen. When the tide is out, the boom rests on sediment exposed at the corner of the slip. A petroleum sheen is visible within the containment boom during both high and low tide. The sediment samples were collected from the surface to 0.25 feet below ground surface by pushing a 2.5" by 3" brass sleeve directly into the sediment. Once the sleeve was fully submerged, the area directly surrounding the sleeve was cleared enough to pull the sleeve out while minimizing the disturbance to the sample. Plastic end caps were placed on the ends of the sleeve. The sleeve was then placed in a plastic bag, sealed, and stored in a cooler with blue ice until the samples were hand delivered to the laboratory.

Two samples were collected at each location – one to be analyzed at North Creek Analytical , Inc., (NCA) of Beaverton, Oregon, and one to be analyzed at Battelle of Duxbury, Massachusetts. The sedmient samples were analyzed for TPH-Gx, TPH-Dx, volatile organic compounds (VOCs), and polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270-SIM at NCA. The samples were only analyzed for PAHs (8270M) at Battelle. The PAH analyses performed at the two laboratories were different. PAH analysis from NCA included the RBDM compounds. PAH analysis from Battelle included an extended list of compounds (the alkylated PAHs) to help identify the types of potential sources that may have caused detections of PAHs in the sediment.

The PAH analysis with a more complete compound list allows for a comparison of pyrogenic PAHs and petrogenic PAHs. Pyrogenic PAHs are derived from combustion (i.e. has been burned) and petrogenic PAHs are generally from a noncombusted petroleum product. Typically, the primary potential source of pyrogenic PAHs is vehicle exhaust (marine engine or vehicle). Pyrogenic PAH contamination is also commonly associated with manufactured gas plants. In the case of the Slip 2, the presence of pyrogenic PAHs may be associated with the fire in 1985 that destroyed a portion of Pier 2 immediately east of the containment boom and sampling locations. The primary potential source of petrogenic PAHs would be a petroleum release.

SUMMARY OF SEDIMENT ANALYTICAL RESULTS

The laboratory analytical reports are included in Appendix A attached to this technical memorandum. Tables 1 and 2 summarize the laboratory analytical results. A validation of the data has been performed and the data are considered of an acceptable quality. The data validation report is included in Appendix A.

Table 1 presents the alkylated PAH results from Battelle and Table 2 presents the TPH and PAH results from NCA. The Lower Columbia Dredged Material Evaluation Framework Screening Levels (LCRMA SLs) and DEQ Level II Screening Level Values (SLVs) for Marine Sediments are also presented on these tables for a preliminary screening of the analytical results. The constituents that have

detected concentrations exceeding the LCRMA SLs are presented in Bold on Tables 1 and 2 and the constituents detected above DEQ SLVs are highlighted on Tables 1 and 2.

No VOCs were detected by NCA in either of the sediment samples and these results are not included in Table 2. No Gasoline Range Hydrocarbons were detected in either sample and Diesel Range and Oil Range Organics were detected in both SD-700(P) and SD-701(P). The sample taken closest to the bank, inside of the boom area (SD-700(P); Diesel Range Organics at 8,090 mg/kg and Oil Range Organics at 800 mg/kg) contained a much higher concentration of the hydrocarbons than the sediment sample collected just outside the contaiment boom (SD-701(P); Diesel Range Organics at 150 mg/kg and Oil Range Organics at 143 mg/kg).

Similar to the TPH results, the PAHs detected in the surface sediment samples from within the boom area (Sample SD-700(P)) contained much higher concentrations than the sample collected outside the boom (Sample SD-701(P)). The preliminary risk screening of the sediment indicates that a total of thirteen constituents exceeded their respective DEQ SLV in Sample SD-700 based on sample results from NCA and/or Battelle and a total nine constituents exceeded their respective DEQ SLV in Sample SD-701(P). The level of exceedence or the enrichment ratios for the constituents detected inside the boom were much greater than those for constituents detected outside the boom. The Battelle analytical data set achieved lower detection limits than the NCA dataset and therefore, was able to detect additional PAHs at concentrations exceeding DEQ SLVs. The detection limit from NCA for several of the PAHs exceeded their respective SLVs making the determination of whether these constituents were present at regulatory levels of concern impossible.

The only sediment sample that contained detected concentrations of PAHs exceeding LCRMA SLs were found inside the boom area (SD-700(P)). All of the detected concentrations of constituents found in SD-700(P) were much greater than those found outside the boom area in SD-701(P) indicating that the boom has been successful in limiting petroleum hydrocarbon migration inside the slip.

PRELIMINARY ANALYSIS OF PETROGENIC AND PYROGENIC PAHs IN SEDIMENT SAMPLES

The alkylated PAH data from Battelle was evaluated to provide preliminary evidence of whether the PAH signatures were representative of pyrogenic or petrogenic sources. Both Battelle (Andrew Smith, Research Chemist; Battelle, personal communication, September 2003) and Shell Oil (Ileana Rhodes; Shell Oil, personal communication September 2003) provided similar conclusions with regards to the potential sources of PAHs in the two sediment samples collected at Slip 2. Sample SD-700 (collected from within the boom area) has a larger relative contribution of petrogenic PAHs with abundance of alkylated PAHs than the heavier molecular weight PAHs which are of pyrogenic origin, shown on

Figure 3. Sample SD-701 (collected outside the boom area) contains little petrogenic PAHs with relation to the much larger contribution of heavier pyrogenic PAHs, as shown on Figure 4. Therefore, the general conclusion is that sample SD-700 is dominated by petrogenic PAHs and SD-701 is dominated by pyrogenic PAHs.

CLOSING COMMENTS

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

Hart Crowser, Inc.

Taku Fuji, PhD
Senior Associate Toxicologist

Attachments:
Table 1 Analytical Results of Sediment Samples (Alkylated PAHs)
Table 2 Analytical Results of Sediment Samples (PAHs)
Figure 1 Site Plan
Figure 2 Sediment Sampling Locations
Figure 3 PAH Signature for Sample SD-700(P)
Figure 4 PAH Signature for Sample SD-701(P)
Appendix A 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
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1 Taku Fuji, Hart Crowser, Inc., Consultant for AAW PRP Group
1 Max Miller, Tonkon Torp, Attorney for McCall Oil and Chemical Corporation
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