DRAFT DATA REPORT

BACKGROUND WATER QUALITY MONITORING RESULTS FOR TERMINAL 4 PHASE I REMOVAL ACTION PRECONSTRUCTION SAMPLING

PORT OF PORTLAND, PORTLAND, OREGON

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Comment [BMH1]: Attachments are not provided for draft review. Attachments will be included with the final document.

1 INTRODUCTION

In 2000, the U.S. Environmental Protection Agency (USEPA) added the Portland Harbor Superfund Site to the National Priorities List. In fall 2001, the USEPA and 10 of the Superfund Site's potentially responsible parties entered into an Administrative Order on Consent (AOC) for a Remedial Investigation/Feasibility Study (RI/FS) of the Superfund Site. The AOC allows Early Actions to be conducted to address known contamination at specific locations within the Superfund Site. Contaminants found in Terminal 4 sediment samples during a remedial investigation directed by the Oregon Department of Environmental Quality (DEQ) led to a determination that a Removal Action at Terminal 4 is warranted. Accordingly, the Port of Portland (Port) is conducting a Non-Time-Critical Removal Action (NTCRA) under an AOC for Removal Action executed by the Port and USEPA in October 2003.

The Port completed an engineering evaluation and cost analysis (EE/CA; BBL 2005) in which various Removal Action alternatives were identified, compared, and ranked for their relative performance at meeting specific objectives associated with the evaluation criteria of effectiveness, implementability, and cost. Based on the alternatives evaluated in the EE/CA, the USEPA issued an Action Memorandum (Action Memo) on May 11, 2006 (USEPA 2006) that documented the selection of the Removal Action. The selected Removal Action includes dredging of most of Slip 3 and disposing of the dredged material in a confined disposal facility (CDF) in Slip 1. The AOC requires the Port to complete a conceptual remedial design of the selected Removal Action.

The Port is a port district of the State of Oregon, which owns the Terminal 4 uplands between River Miles 4.1 and 4.5 on the Lower Willamette River. The Port also owns a portion of the submersible and submerged lands in Slip 1 and Slip 3 located within the Removal Action Area (RAA; as defined in the AOC). The remainder of the submersible or submerged land is owned by the State of Oregon and managed by the State of Oregon Department of State Lands (DSL). Figure 1 is a vicinity map and site plan locating Terminal 4 and the RAA.

The Port recently prepared a Design Analysis Report (DAR) for Phase I of the Terminal 4 Removal Action (Anchor 2008). The Water Quality Monitoring Plan (WQMP) provided as Appendix B to the DAR included pre-construction water quality monitoring to provide data related to the ambient background conditions for conventional and laboratory parameters in the

vicinity of Terminal 4 prior to the start of over-water and in-water work. This data report presents the preconstruction background water quality results from water samples collected after USEPA approval of the DAR and before the beginning of the Phase I Removal Action. In addition, the results were used to calculate and establish background criteria, to the extent possible, for use in evaluating compliance monitoring data during the project.

2 PRECONSTRUCTION WATER QUALITY MONITORING

The Port of Portland performed preconstruction water quality monitoring to establish initial characterization of ambient background conditions for conventional and laboratory parameters in the vicinity of Terminal 4 prior to the start of over-water and in-water work. The objectives of the background survey were:

- To provide baseline conditions for evaluating monitoring data (in particular, turbidity and dissolved oxygen [DO]) that are based on maintaining acceptably small changes to background conditions in the river
- To establish ambient background concentrations of metals and organic compounds in the river caused by natural enrichments in regional volcanic soils or upstream urban and agricultural inputs

The pre-construction background survey consisted of three sampling events completed in the vicinity of Terminal 4 on June 26, June 30, and July 2, 2008. Four monitoring stations were sampled during each of the background events, as shown on Figure 2. Coordinates for the target and actual locations for each event are provided in Table 1.

2.1 Sample Collection, Processing, and Handling Procedures

The field operations, equipment, sample handling, and analysis were performed using the previously approved procedures specified in the *Water Quality Monitoring Plan* (WQMP; DAR Appendix B, Anchor 2008), the *Sampling and Analysis Plan* (SAP; DAR Appendix H, Anchor 2008) and the *Quality Assurance Project Plan* (QAPP; DAR Appendix I, Anchor 2008). These procedures were developed in accordance with USEPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (USEPA 1988) and USEPA's *Methods for Collection, Storage, and Maintenance of Sediments for Chemical and Toxicological Analyses* (USEPA 2001).

Conventional field parameters (turbidity, DO, temperature, and pH) were measured at each sampling station at three different depths (surface, middle, and bottom). In addition, a sample was collected from the depth with the highest turbidity reading and submitted for laboratory analysis of project chemicals of concern (COCs; i.e., total suspended solids [TSS], polycyclic aromatic hydrocarbon [PAHs], cadmium, lead, and zinc). With three events and four monitoring stations, the pre-construction background survey generated 36

measurements of field parameters and 13 analyses of water samples (one duplicate sample was collected and analyzed) for project COCs. Anchor Environmental, L.L.C. (Anchor) conducted the field events, collected the field parameter data, and collected the water quality samples for submittal to the analytical laboratory. Water quality field collection forms that were used to record the data are provided as Attachment A.

2.2 Field Parameters and Chemical and Conventional Laboratory Analysis

2.2.1 Field Parameters

The list of field parameters included:

- Turbidity (in nephelometric turbidity units [NTU])
- DO (in milligrams per liter [mg/L])
- Temperature (in degrees centigrade)
- pH (in standard units)

2.2.2 Conventional and Chemical Laboratory Analytes

Laboratory analysis of conventional and chemical analysis was performed by Analytical Resources Incorporated (ARI), located in Tukwila, Washington. The list of conventional and chemical laboratory analytes included:

- TSS (in mg/L)
- Dissolved metals (cadmium, lead, and zinc; in micrograms per liter [µg/L])
- PAHs (priority pollutant list; in µg/L)

2.2.3 Laboratory Quality Assurance/Quality Control Summary

Laboratory quality assurance and quality control (QA/QC) was performed by ARI. A third-party validator (Laboratory Data Consultants, Inc., Carlsbad, CA) performed additional QA/QC and prepared validation reports for the analytical data. All of the analytical laboratory test measurements were found acceptable for use. Analytical laboratory case narratives, chain-of-custody forms, and validation reports are provided in Attachment B.

2.2.4 Field Parameter Results

Field parameters including turbidity, pH, water temperature, and DO were taken during three sampling events. The results of the field parameter monitoring are summarized in Table 2. Results are presented by event, station and depth.

2.2.5 Conventional and Chemical Analytical Laboratory Results

The conventional and chemical analytical laboratory results for background water quality monitoring are provided in Table 3.

2.2.6 Deviations from the QAPP and SAP

Analytical methodologies set forth in the referenced WQMP, SAP, and QAPP were followed. Based on the data validation, all of the data were determined to be acceptable for use as qualified. Field activities related to sample collection and handling were also completed in accordance with the referenced WQMP, SAP, and QAPP.

3 USE OF DATA TO ESTABLISH 90TH PERCENTILE CONCENTRATIONS FOR USE DURING PHASE I

3.1 Methodology for Calculation of 90th Percentile Concentrations

Per Section 2.2.2 of the DAR WQMP, the background criteria for use during Phase I will be established at the 90th percentile concentration of the background dataset. The 90th percentile concentration is calculated from the following equation:

Rank of Sample that corresponds to 90th percentile = (N+1) x 0.9

90th percentile background concentrations for temperature, turbidity, dissolved oxygen, and pH were calculated with data provided by U.S. Geological Survey (USGS) monitoring station No. 14211720 (Willamette River at Portland) and pre-construction survey data. The calculation was performed with the historical 10-year dataset, the historical 1-year dataset, as well as the pre-construction background monitoring results alone. A summary of the 90th percentile water quality levels for field parameters is summarized in Table 4.

Note that in Table 4 the upper 90th percentile concentrations are provided for temperature, turbidity, and pH. There are regulatory triggers for these parameters if results at compliance sampling locations *exceed* regulatory values. In addition, the lower 10th percentile concentrations are provided for dissolved oxygen and pH. There are regulatory triggers for these parameters if results at compliance sampling locations *are less than* regulatory values.

90th percentile background concentrations for PAHs, TSS, and metals were calculated with data provided by USGS monitoring station No. 14211720 (Willamette River at Portland) and pre-construction survey data. The calculation was performed with the historical 10-year dataset, the historical 1-year dataset, as well as the pre-construction background monitoring results alone. A summary of the 90th percentile water quality levels for analytical parameters is summarized in Table 5.

Note that there was no USGS historical data available for PAHs and Cadmium and very little data was available for Lead and Zinc. In addition, due to the lack of detectable results

from the preconstruction background sampling events, the 90th percentile concentrations could only be calculated for TSS and Zinc.

3.2 90th Percentile Concentrations Proposed for Use During Phase I

For field parameters, the results summarized in the background monitoring portion of Table 4 are proposed for use during Phase I. In the case of turbidity, for instance, a value of 4.7 NTUs will be used as the background value unless background turbidity results on a particular day exceed 4.7 NTUs. The historical 10 year and historical 1 year values are based on data collected year round, which provides a good approximation of the 90th percentile concentrations biota are exposed to. However, for the purposes of this project, use of the results of the recent background monitoring events is more applicable given the temporal nature of the pertinent parameters.

For laboratory parameters, the results summarized in the background monitoring portion of Table 5 are proposed for use during Phase I. Use of the results generated from the background data only is proposed due to the lack of historical data as well as the temporal nature of the pertinent parameters. Values were calculated for TSS and Zinc. TSS does not have a regulatory standard, but will nevertheless be analyzed to aid in the understanding of water quality impacts if turbidity is found to be elevated.

Note that the proposed 90th percentile background concentration (37 ug/L) for Zinc exceeds both the acute and chronic trigger values (36 ug/L and 36 ug/L, respectively). Hence, a value of 37 ug/L will be used as the background value unless background values for Zinc on a particular day exceed 37 ug/L.

4 CONCLUSION

Given concurrence by USEPA, the 90th percentile concentrations proposed for use in Section 3 will be used during Phase I of the Removal Action. Field and analytical data from background locations that are collected during Phase I will be used to re-calculate the background values used in Phase II. Finally, due to the fact the proposed background value for zinc already exceeds both the acute and chronic trigger values, the Port and USEPA will need to agree on a realistic value *in excess* of the background value of 37 ug/L that will be used to trigger an operational response. Using the narrative turbidity standard as an example, the Port proposes

that a value 10 percent over the background value be used as the trigger value for zinc (41 ug/L).

5 REFERENCES

Anchor. 2008. Final Design Analysis Report: Terminal 4 Phase I Removal Action. Prepared for the Port of Portland by Anchor Environmental, L.L.C. June 2008.

BBL. 2005. Terminal 4 Early Action Engineering Evaluation/Cost Analysis, Public Review Draft, Appendix Q—Draft Clean Water Act Section 404(b)(1) Analysis Memorandum, Port of Portland, Portland Oregon.

U.S. Environmental Protection Agency (USEPA). 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA.

USEPA. 2001. Methods for Collection, Storage, and Maintenance of Sediments for Chemical and Toxicological Analyses.

USEPA. 2006. Action Memorandum for Removal Action at the Port of Portland Terminal 4 Site within the Portland Harbor Superfund Site, Portland, Multnomah County, Oregon. May 11.

TABLES

FIGURES

ATTACHMENT A

WATER QUALITY FIELD COLLECTION FORMS

ATTACHMENT B

ANALYTICAL LABORATORY CASE NARRATIVES, CHAIN-OF-CUSTODY FORMS, AND VALIDATION REPORTS