
APPENDIX R

**WATER QUALITY MONITORING AND COMPLIANCE CONDITIONS
PLAN DOCUMENTATION**

Water Quality Monitoring and Compliance Conditions Plan for Port of Portland Terminal 4 Non-Time Critical Removal Action Abatement Measures, Phase I

**(Substantive Compliance with Clean Water Act §401 and
ORS 468 B .035 and .048 and OAR Ch. 340, Division 41)**

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ACRONYMS

AOC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
BMPs	Best Management Practices
CDF	confined disposal facility
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
COCs	chemicals of concern
CQAP	Construction Quality Assurance Plan
DAR	Design Analysis Report
DO	dissolved oxygen
EE/CA	Engineering Evaluation and Cost Analysis
EPA	U.S. Environmental Protection Agency
fps	foot per second
NMFS	National Marine Fisheries Service
NTCRA	Non-Time-Critical Removal Action
NTU	nephelometric turbidity units
ODEQ	Oregon Department of Environmental Quality
PAHs	polynuclear aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PEC	probable effect concentrations
Port	Port of Portland
QAO	Quality Assurance Official
RAA	Removal Action Area
RAOs	Removal Action Objectives
RAWP	Removal Action Work Plan
RI/FS	Remedial Investigation/Feasibility Study
RPM	Remedial Project Manager
Site	Terminal 4 Site
TMDLs	total daily maximum load allocations
WQMCCP	Water Quality Monitoring and Compliance Conditions Plan
WQS	Water Quality Specialist
WSMP	Water and Sediment Monitoring Plan

1. INTRODUCTION

This Water Quality Monitoring and Compliance Conditions Plan (WQMCCP) is prepared in support of removal activities, monitoring, and compliance conditions being conducted under the Administrative Order on Consent (AOC) with the U.S. Environmental Protection Agency (EPA) in October 2003 to conduct a Non-Time-Critical Removal Action (NTCRA) at the Terminal 4 Site (Site) (USEPA 2003), under the authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended. The WQMCCP, together with relevant portions of the final approved Design Analysis Report (DAR), especially Appendix B, is intended to meet the substantive requirements of Section 401 of the Clean Water Act, including the applicable provisions of Sections 301, 302, 303, 306, and 307 of the Clean Water Act, as amended, and Oregon's water quality law and regulations and applicable water quality standards.

The Port of Portland (Port) owns the Terminal 4 uplands located between River Miles 4.1 and 4.5 on the Lower Willamette River, extending west from the ordinary high water line on the northeast bank of the Lower Willamette River to the edge of the navigation channel, and extending south from the downstream end of Berth 414 to the downstream end of Berth 401, including Slip 1, Slip 3, and Wheeler Bay. The remainder of submersible or submerged land within the Removal Action Area (RAA) is owned by the State of Oregon Department of State Lands. Terminal 4 is currently used as an operating marine facility with a variety of tenants and operations, including automobile importing, exporting of soda ash, import and export of dry and liquid bulk cargo, associated rail intermodal facilities, and associated petroleum storage. Historically, activities at Slip 3 included loading and unloading dry and liquid bulk cargo such as Bunker C, diesel, pencil pitch, and metal ores. Slip 1 has been used for bulk and break-bulk cargo loading and unloading operations handling liquid fertilizer, lead and zinc concentrates, cured meats, agricultural produce, flour, vegetable oils, molasses, tallow, caustic soda, and a variety of general cargoes.

The Port is working under the state's voluntary cleanup program to address source control issues to prevent recontamination of the early action area. Potential contaminant sources include, but are not limited to, pencil pitch handling procedures and spills, petroleum handling and storage, contaminated groundwater seeps from petroleum spills and an abandoned pipeline, metal ores spilling from bulk handling practices, and stormwater runoff. Contaminated sediment also may have migrated to the RAA from other areas of the Willamette River.

Contaminants at the RAA include polynuclear aromatic hydrocarbons (PAHs) [fluoranthene, pyrene, benzo(a)anthracene, chrysene, and anthracene], metals (mercury, cadmium, lead, and zinc), pesticides (DDT, DDD), and polychlorinated biphenyls (PCBs). Many of these contaminants are known or suspected human carcinogens. In addition, pencil pitch (coal tar), a source of contamination in sediments, contains chemicals that are known or are suspected carcinogens in humans through skin contact, inhalation, or ingestion. The contaminated sediments represent a potential continuing source of releases to the river and have the potential to impact human health and/or ecological receptors.

An Engineering Evaluation and Cost Analysis (EE/CA) Report (BBL 2005) presented the Site conceptual model, identified Removal Action Objectives (RAOs) and Applicable or Relevant and Appropriate Requirements (ARARs), screened remedial action technologies, and evaluated and ranked removal action alternatives. As part of the collaborative resolution process, it was determined that many of the design issues are linked to the overall harbor-wide remedial investigation/feasibility study (RI/FS) process. For this reason, the Parties agreed to revise the schedule for implementation of the T4 Removal Action to realign the project with the harbor-wide RI/FS schedule. As a condition of the approval of the schedule realignment, USEPA is requiring the Port to implement an abatement action during the 2008 in-water work window to reduce risks present at the T4 site (USEPA 2007). Essentially, this action results in the division of the Removal Action project into two phases. Phase I (the abatement action) is planned for the 2008 in-water work window and encompasses abatement measures that could be initiated in the near term

to reduce risk at T4. Phase II (including construction of the confined disposal facility [CDF]) will commence once the project is realigned with the harbor-wide RI/FS process. The Port submitted an Abatement Measures Proposal (Phase I remedy) in October 2007 (Anchor 2007a) which was accepted by EPA. The description of activities to be undertaken, which are subject to this WQMCCP, is included in Section 3.

The objectives of this Phase 1 of the Removal Action include reducing ecological and human health risks associated with sediment contamination within the RAA pending the completion of the Removal Action selected in the Action Memorandum (USEPA 2006). However, because the Phase 1 Removal Action is not the complete Removal Action and there will be long-term Remedial Action for the Portland Harbor Superfund Site, neither this Phase 1 nor the selected Removal Action is intended to address all exposure pathways and environmental media within the RAA.

EPA is responsible for review of this project to oversee compliance with the Action Memorandum, ARARS, and, in particular, substantive requirements of the Clean Water Act §401. EPA has determined that this work constitutes "... essential dredging, construction or other legitimate activities ..." under Oregon's water quality law and regulations and applicable water quality standards (340-041-0036). Monitoring methods (including parameters, locations/depths, frequency/ schedule, background surveys, visual monitoring, and equipment) will be consistent with the substantive requirements of the Water Quality Standards, Beneficial Uses, Policies, and Criteria for Oregon (OAR, Chapter 340, Division 041). Likewise, monitoring methods are required to prevent or minimize the release or threat of a release of hazardous substances during the Phase 1 Removal Action. This WQMCCP describes water quality protections for components of the Phase 1 Removal Action that could potentially impact water quality. The requirements for water quality protections and monitoring described in this WQMCCP may be modified by EPA if new information is learned or unanticipated impacts occur.

A copy of the final WQMCCP and any amendments will be placed in the Site File. In addition, copies of the final WQMCCP and any amendments shall be kept on the jobsite and made readily available for reference by EPA; the contractor; and any other appropriate federal, tribal, and state inspectors.

2. WILLAMETTE RIVER WATER QUALITY

The project site is located on the Lower Willamette River, a water body currently listed under the Clean Water Act §303(d) as water quality limited due in part to man-made chemicals that have been discharged to the river and reside in bottom sediments. The removal of contaminated sediments in some areas of the project site and capping contaminated sediments in other areas are cleanup actions that will remove and isolate existing contaminants in the river and improve sediment and water quality, and reduce potential exposures to these chemicals. Best management practices (BMPs) are to be implemented during all phases of the project to minimize the potential redistribution of contaminated sediment back into the Willamette River.

Beneficial uses designated (OAR 340-41-442) for this reach of the Willamette River include:

- Public Domestic Water Supply
- Private Domestic Water Supply
- Industrial Water Supply
- Irrigation
- Livestock Watering
- Anadromous Fish Passage
- Salmonid Fish Rearing
- Resident Fish and Aquatic Life
- Wildlife and Hunting
- Fishing
- Boating
- Water Contact Recreation
- Aesthetic Quality
- Hydro Power
- Commercial Navigation and Transportation

The project is located at approximately River Mile 5 of the Willamette River. The 303(d) list identifies a reach of the Willamette River between River Miles 0 to 24 that is impaired for the parameters listed in Table 2-1.

Table 2-1. 2002 303(d) List/Impacted Beneficial Uses

Parameter	Season	Criteria	Beneficial Uses	Assessment Year	Status	T4 Early Action COC List
Aldrin	Year-Round	Where no published EPA criteria exist for a toxic substance, public health advisories and other published scientific literature may be considered and used, if appropriate, to set guidance values.	Fishing	2002	303(d).	
Ammonia	Year-Round	Table 20 Toxic Substances.	Aquatic Life	2002	Cat 2: Attaining some criteria/uses.	
Arsenic	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	2002	Potential concern.	
Benzo(A)anthracene	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	2002	Potential concern.	Slip 3, Berth 414
Benzo(A)pyrene	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident fish and Aquatic Life	2002	Potential concern.	Slip 3, Berth 414
Biological Criteria	Undefined	Biocriteria: Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.	Resident Fish and Aquatic Life	1998	Cat 5: Water quality limited, 303(d) list, TMDL needed.	
Chlorophyll a	Summer	Reservoir, river, estuary, non-thermally stratified lake: 0.015 mg/l.	Aesthetics Fishing Livestock Watering Water Contact Recreation Water Supply	1998	Cat 2: Attaining some criteria/uses.	

(Table Continues)

Table 2-1. 2002 303(d) List/Impacted Beneficial Uses (Continued)

Parameter	Season	Criteria	Beneficial Uses	Assessment Year	Status	T4 Early Action COC List
Chromium (hex)	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Aquatic Life Human Health Salmonid Fish Rearing	2002	Cat 2: Attaining some criteria/uses.	
Chromium (hex)	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	1998	Potential concern.	
Chrysene	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	2002	Potential concern.	Slip 3, Berth 414
Copper	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Aquatic Life Drinking Water Resident Fish and Aquatic Life	2004	Cat 2: Attaining some criteria/uses.	
Copper	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	2004	Potential concern.	
DDT	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	2004	303(d).	Slip 3
DDT	Year-Round	Where no published EPA criteria exist for a toxic substance, public health advisories and other published scientific literature may be considered and used, if appropriate, to set guidance values.	Fishing	2004	303(d).	Slip 3
DDT Metabolite (DDE)	Year-Round	Where no published EPA criteria exist for a toxic substance, public health advisories and other published scientific literature may be considered and used, if appropriate, to set guidance values.	Fishing	2004	303(d).	

(Table Continues)

Table 2-1. 2002 303(d) List/Impacted Beneficial Uses (Continued)

Parameter	Season	Criteria	Beneficial Uses	Assessment Year	Status	T4 Early Action COC List
DDT Metabolite (DDE)	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish And Aquatic Life	2004	Potential concern.	
Dieldrin	Year-Round	Where no published EPA criteria exist for a toxic substance, public health advisories and other published scientific literature may be considered and used, if appropriate, to set guidance values.	Fishing	2004	303(d).	
Dioxins/Furans	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	2004	Potential concern.	
Dioxin (2,3,7,8-TCDD)	Undefined	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	1998	TMDL approved.	
Dissolved Oxygen	Year-Round (Non-spawning)	Cool water: Not less than 6.5 mg/l.	Cool-Water Aquatic Life	2004	Cat 2: Attaining some criteria/uses.	
E Coli	Summer	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml.	Water Contact Recreation	2004	Cat 2: Attaining some criteria/uses.	
E Coli	Fall/Winter/ Spring	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml.	Water Contact Recreation	2004	Cat 5: Water quality limited, 303(d) list, TMDL needed.	
Fecal Coliform	Fall/Winter/ Spring	Fecal coliform log mean of 200 organisms per 100 ml; no more than 10% > 400 per 100 ml.	Water Contact Recreation	2004	303(d).	

(Table Continues)

Table 2-1. 2002 303(d) List/Impacted Beneficial Uses (Continued)

Parameter	Season	Criteria	Beneficial Uses	Assessment Year	Status	T4 Early Action COC List
Fluoranthene	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	2004	Potential concern.	Slip 3, Berth 414
Iron	Year-Round	Table 20 Toxic Substances.	Aquatic Life Drinking Water Fishing Human Health	2004	Cat 5: Water quality limited, 303(d) list, TMDL needed.	
Lead	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Aquatic Life Drinking Water Human Health Resident Fish and Aquatic Life	2004	Cat 2: Attaining some criteria/uses.	Slip 3, Berth 414
Lead	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	2004	Potential concern.	Slip 3, Berth 414
Malathion	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	1998	Potential concern.	
Manganese	Year-Round	Table 20 Toxic Substances.	Drinking Water Fishing Human Health	1998	Cat 5: Water quality limited, 303(d) list, TMDL needed.	
Manganese	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	1998	Potential concern.	
Mercury	Year-Round	Where no published EPA criteria exist for a toxic substance, public health advisories and other published scientific literature may be considered and used, if appropriate, to set guidance values.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	1998	303(d).	

(Table Continues)

Table 2-1. 2002 303(d) List/Impacted Beneficial Uses (Continued)

Parameter	Season	Criteria	Beneficial Uses	Assessment Year	Status	T4 Early Action COC List
Nickel	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Aquatic Life Drinking Water Human Health Resident Fish and Aquatic Life	1998	Cat 2: Attaining some criteria/uses.	
Nickel	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	1998	Potential concern.	
p,p` DDD	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	1998	Potential concern.	Slip 3
Parathion	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	1998	Potential concern.	
PCB	Year-Round	Where no published EPA criteria exist for a toxic substance, public health advisories and other published scientific literature may be considered and used, if appropriate, to set guidance values.	Fishing	1998	303(d).	Slip 3
Pentachlorophenol	Undefined	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish And Aquatic Life	1998	303(d).	
pH	Fall/Winter/ Spring	pH 6.5 to 8.5.	Anadromous Fish Passage Resident Fish and Aquatic Life Salmonid Fish Rearing Salmonid Fish Spawning Water Contact Recreation	1998	Cat 2: Attaining some criteria/uses.	

(Table Continues)

Table 2-1. 2002 303(d) List/Impacted Beneficial Uses (Continued)

Parameter	Season	Criteria	Beneficial Uses	Assessment Year	Status	T4 Early Action COC List
pH	Summer	pH 6.5 to 8.5.	Anadromous Fish Passage Resident Fish and Aquatic Life Salmonid Fish Rearing Salmonid Fish Spawning Water Contact Recreation	1998	Cat 2: Attaining some criteria/uses.	
Polynuclear Aromatic Hydrocarbons	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	1998	303(d).	Slip 3, Berth 414
Selenium	Year-Round	Table 20 Toxic Substances.	Aquatic Life Drinking Water Fishing Human Health	1998	Cat 2: Attaining some criteria/uses.	
Temperature	Year-Round (Non-spawning)	Salmon and steelhead migration corridors: 20.0 degrees Celsius 7-day-average maximum.	Salmon and Steelhead Migration Corridor	1998	Cat 5: Water quality limited, 303(d) list, TMDL needed.	
Zinc	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Aquatic Life Drinking Water Resident Fish and Aquatic Life	1998	Cat 2: Attaining some criteria/uses.	Slip 3, Berth 414
Zinc	Year-Round	Table 20 Toxic Substances.	Anadromous Fish Passage Drinking Water Resident Fish and Aquatic Life	1998	Potential concern.	Slip 3, Berth 414

In September 2006, Oregon Department of Environmental Quality submitted total daily maximum load allocations (TMDLs) to EPA for bacteria, temperature, and mercury. The scope of 2006 TMDL work is based upon the 1998 303(d) list of impaired waterbodies. The primary reason that other pollutant listings are not addressed is because the pollutants were not listed until the release of the 2002 303(d) list. Prior to current TMDL development activities, TMDL allocations for this reach of the Willamette River were developed for dioxin (2,3,7,8-TCDD) in 1991.

For mercury, the TMDL has determined that an overall loading reduction of 26 percent from both point sources and nonpoint sources would reduce annual mercury inputs to 94 kg/year, which would reduce mercury-related bioaccumulation risks to acceptable levels. The primary source (approximately 50 percent) of mercury in the Lower Willamette River is erosion of native soils. The estimated load of total mercury from all known and currently quantified point sources (5 kg/yr) represents approximately 4 percent of the total load of mercury in the mainstem Willamette River system. Due to the fact that the impairment of the Willamette River is due primarily to nonpoint sources associated with atmospheric deposition and the erosion of mercury containing soils and sediments, the complete elimination or significant reduction of mercury from water point source discharges would not be enough to attain the water column target. In other words, even if the TMDL were to allocate none of the calculated allowable load to NPDES point sources (i.e., a waste-load allocation of zero), the applicable water column targets for mercury would not be attained because of the very high mercury loadings from nonpoint sources.

Issuance of Section 401 water quality certifications is a component of DEQ's TMDL implementation strategy. This WQMCCP is being issued to meet the substantive requirements that would be contained in a Section 401 Water Quality Certification for a non-CERCLA project having similar activities. The mercury TMDL is being phased in from 2006 to 2011. Completion of the T4 early action (i.e., Phase 1 and subsequent phases) can be expected to result in long-term reductions to mercury loadings to the Willamette River by removing mercury-contaminated sediments from the river and confining them in the CDF. Therefore, the T4 early action is in alignment with the mercury TMDL goal of addressing nonpoint sources and reducing mercury loadings to the river due to erosion of mercury-containing sediments.

TMDLs for dioxin, bacteria, and temperature will not be impacted by the T4 early action project because dioxin, bacteria, and temperature are not COCs for the T4 early action.

Chemicals of concern (COCs) for potential risk for the removal action include PAHs [fluoranthene, pyrene, benzo(a)anthracene, chryene, and anthracene], metals (mercury, cadmium, lead, and zinc), pesticides (DDT, DDD), and PCBs (BBL 2005). This WQMCCP specifies COCs for water quality monitoring during this Phase 1 removal action (Table 4-1).

3. REMOVAL ACTIONS

USEPA is requiring the Port of Portland to implement an abatement action to reduce risks present at the T4 site (USEPA 2007). This action results in the division of the Removal Action project into two phases. Phase I (the abatement action) encompasses abatement measures that could be initiated in the near term to reduce risk at T4. Phase II (including construction of the CDF) will commence once the project is realigned with the harbor-wide RI/FS process. The Port submitted an Abatement Measures Proposal (Phase I remedy) in October 2007 (Anchor 2007a) which was accepted by EPA. The Port of Portland will implement the Phase 1 Removal Action to help achieve the objectives of the AOC and Action Memorandum. The major components of the Removal Action and the required notifications and reports are detailed in the Removal Action Work Plan (RAWP), approved by EPA. The activities within the Terminal 4 Site associated with the Phase 1 Removal Action include the following components:

- Dredging and off-site disposal of sediment exhibiting the highest chemical concentration providing a permanent solution of contaminant mass removal.
- Placement of a sand layer on a portion of the dredge footprint where full removal is not feasible due to concern over slopes and waterfront structures.
- Construction of a nearshore cap to isolate petroleum contaminated sediments from aquatic receptors and control a potential ongoing source to nearby areas.
- Stabilization of the Wheeler Bay bank to minimize contaminant migration to the river.
- Dredging and off-site disposal of contaminated sediments in Slip 3 at Berth 410 to support water-dependent maritime use in a manner consistent with the Action Memo and in support of overall risk reduction in the Removal Action Area.

Phase I Abatement Measures will be implemented in late Summer and Fall 2008. Major removal activities and approximate sequences are summarized below (see also Table 3-1).

- **Contaminated Sediment Dredging in Slip 3 at Berth 411 (Head of Slip 3), Adjacent to Pier 5, and North of Berth 414.** This activity includes dredging with a clamshell bucket approximately 5,200 to 7,300 cubic yards of the most highly contaminated sediments over 1.3 acres in Slip 3. The material will be disposed at an upland facility (see below). A portion of the dredge footprint will not have full removal down to a probable effect concentrations (PEC) exceedance ratio of 10 due to the concern over slopes and waterfront structures. After dredging is completed these select areas will have a sand layer placed. The specifications require the Contractor to place the 600 tons evenly over the 13,300 square foot target area. The specifications require the Contractor to place the material from the slope toe upward and in a manner to minimize mixing with underlying sediments. The sand material will be a gravelly sand to sandy gravel—this gradation will allow the material to be more stable on the 3 horizontal to 1 vertical (3H:1V) slope.
- **Sediment Dredging at Berth 410 (North Side of Slip 3).** This activity includes dredging with a clamshell bucket approximately 3,700 to 9,200 cubic yards of additional sediment covering 1.9 acres alongside Berth 410 within Slip 3 for navigation maintenance. These sediments are less highly contaminated than at the head of the slip. No direct placement of any sand layer or cap will occur. The material will be disposed at an upland facility (see below).

- **Transfer of Contaminated Sediments from Slip 3 to the Disposal Site.** All sediments dredged from Slip 3 will be loaded onto haul barges for transporting and disposal at an upland landfill. Primary dewatering will occur as barges are filled on-site and the free water will be pumped to a lash barge with 450,000 gallons to total liquid capacity. Once filled, the lash barge will be hauled to Berth 408 and offloaded (pumped) to a designated upland sanitary sewer manhole at T4. The Port has obtained a permit from the City of Portland (Batch Discharge Number 2008-027) for up to 2 million gallons. The dewatered dredged material will be hauled by barge to the offload site at the Port of The Dalles. At the offload site, construction equipment will transfer the sediment to trucks or rail cars for transport to the landfill. No direct discharge of sediment or effluent to waters of the United States during transfers is authorized.
- **Sediment Capping at Head of Slip 3.** Oily and PAH-contaminated sediments adjacent to the BEBRA excavation area at the head of Slip 3 will be capped with sand and gravel, organoclay, and riprap. The cap consists of two components. Below the timber bulkhead, the cap consists of approximately 12 inches of fine/medium sand or gravel with low fines content and free of large organic or other debris. Cap materials will be placed mechanically from a barge. A riprap wedge will be placed on top of the sand or gravel and against the timber bulkhead for stability. The second component of the cap is above the timber bulkhead. A sand and gravel material mixed with organoclay will be placed below an armor layer. A majority of the work above the timber bulkhead should occur above the water surface. Sorbent booms will be deployed around the area under construction when work is taking place in water. A small zone of riprap along the toe of the slope will be temporarily removed using a clamshell bucket to expose the underlying material for capping.
- **Shoreline Stabilization in Wheeler Bay.** As a source control measure, eroding contaminated soils and sediments along the Wheeler Bay shoreline will be regraded to a more stabile configuration. Once the slope is graded to the design grade, a final surface treatment of riprap, jute mat, or other materials will be constructed to prevent erosion. Most of the work will be performed above elevation 10 feet NGVD and not in or over water. The requirements of this WQMCCP are applicable if construction activities affect (e.g., erosion, fallback, runoff) water quality.

Table 3-1. Summary of Removal Action Activities and Impacts to Water Quality

Removal Action	Activity	Potential Water Quality Impacts
Dredging Slip 3 and Berth 410	Dredging contaminated sediments.	Dispersal of sediment and contaminants into the water column. Bucket lowering, closing, raising, and overwater bucket movement may contribute to releases. Sediment sloughing at cut lines may also cause releases.
	Barge overflow.	Minimal – Barge hulls will be sealed and barge overflow is not allowed..
Sediment Transport to Offloading Facility	Barge movement.	Minimal – Barge hulls will be sealed and barge overflow is not allowed.
	Barge offloading.	Minimal – Sediment handling from barge to shore by construction equipment, and effluent water pumping from barge to shore by pipes, will be contained.
Thin Sand Capping in Slip 3 Dredging Area	Placement of sand on contaminated sediments.	Release of construction materials through the water column. Dispersal of sediment and contaminants into the water column from placement.
Capping at BEBRA Area at Head of Slip 3	Removal of existing armor materials for cap placement.	Dispersal of sediment and contaminants, including oil, into the water column.
	Placement of sand, gravel, and armor stone on contaminated sediments.	Release of construction materials through the water column. Dispersal of sediment and contaminants, including oil, into the water column.
Shoreline Stabilization in Wheeler Bay	Shoreline excavation and grading.	Dispersal of soil, sediment, and contaminants into the water column.
	Placement of sand, gravel, and armor stone on contaminated sediments.	Release of construction materials through the water column. Dispersal of sediment and contaminants into the water column from placement.
	Construction activities, placement of topsoil and erosion control materials, and installing plantings on shoreline bank.	Release of construction materials through the water column. Dispersal of sediment and contaminants into the water column from placement. Erosion or runoff from construction actions.

4. WATER QUALITY TERMS AND CONDITIONS

4.1 GENERAL CONDITIONS

4.1.1 Final Plans and Documents

Final project plans (Design Analysis Report [Anchor Environmental 2008]), Removal Action Work Plan and Appendices including Construction Quality Assurance Plan and Water Quality Monitoring Plan have been reviewed and approved by EPA. Contractor quality control plans will also be provided to EPA for review and comment. EPA will review Contractor plans to verify that the plans are adequate and consistent with the RAWP. The plans shall be consistent with and implemented in accordance with the terms and conditions of this WQMCCP. The WQMCCP shall be considered the controlling document. Any significant additions, changes, modifications, and revisions to the plans by the Contractor shall require prior notification to and approval by EPA. If necessary, an amended or new WQMCCP will be issued by EPA.

4.1.2 Fish Timing Window

In order to minimize potential chemical and physical impacts from construction activities and suspended sediments to out-migrating juvenile salmonids utilizing the nearshore environment for migration and feeding, project in-water construction activities in Portland Harbor are limited to the periods from July 1 to October 31 (OFDW 2000 as modified by National Marine Fisheries Service), unless timing extensions are specifically coordinated and approved by EPA after coordination with the appropriate resource agency. NMFS has provided Conservation Measures for this action, which include a Fish Deterrent System.¹

4.1.3 Spills Prevention

Reasonable precautions and controls must be used to prevent incidental and accidental discharges of petroleum products or other deleterious or toxic materials from entering the water as a result of any in-water activities. Materials such as sorbent pads and booms must be available on-site and must be used to contain and clean up petroleum products spilled as a result of the in-water activities. If oil sheen is observed, then both EPA and U.S. Coast Guard must be notified and immediate corrective actions must be taken to modify the operation to prevent further degradation, or the activity must cease. If such conditions are observed, then monitoring for field and laboratory parameters following the above procedures will be conducted and procedures for protective measures to be described by EPA will be followed.

¹ “The fish deterrent mesh panels shall be at least 20 feet deep, and shall extend into the Willamette River to the harbor line to greater encourage fish movement past the dock at Berth 410 (as depicted in Figure 15 in the Biological Assessment, as opposed to figures in the Design Analysis Report (2008). Filter fabric is the preferred material for the mesh panels; however, the mesh opening must be no bigger than 0.25 inches.”

4.1.4 Material for Sand Capping

Clean, sandy material must be used as cap material. This material shall be suitable for in-water disposal, shall be free from fines and suspendable material to the extent practicable, and shall be free from contamination by petroleum products or toxic substances in toxic amounts. Cap material may be from an approved upland source or from an approved, permitted maintenance dredging operation. Prior to placement of the cap material, the EPA Remedial Project Manager must be provided with information regarding the location/source of the material and detailed specifications of the material, including chemistry and grain size information, to determine its suitability as a clean cap material.

4.1.5 Debris Control

Floatable debris introduced into the river as a result of any construction activity will be collected and suitably disposed at an upland location. Buried or partially-buried debris encountered by the dredge will be removed from the waterway, separated from the dredged material (if necessary), and suitably disposed at an upland location.

4.1.6 Best Management Practices

The Removal Action design documents and RAWP and Appendices discuss design and operational best management practices. The Construction Quality Assurance Plan (CQAP) will define inspection, verification, monitoring, and corrective actions and contingencies associated with each element of the project. The Contractor's Quality Control Plan will detail the inspection, testing, and documentation procedures that will be implemented to document that construction conforms to the requirements of the Contract Documents, including technical specifications. EPA retains the right to further inspect anything concerning the construction. Additionally, the Contractor's Quality Control Plan should address whether BMPs or potential contingencies and corrective actions are being revised because of equipment specifics. Contingencies, as defined in the CQAP, are options that can be implemented should water quality monitoring indicate the need for operational changes. These options might include alterations to dredging (e.g., equipment, cycle time, pausing in the water column, targeting tidal cycles, etc.) and dewatering (e.g., changes in filter fabric and its deployment or implementation of an active treatment system, etc.) that could be implemented, if necessary.

The CQAP and other construction documents shall describe requirements for the management of dredged, fill, or capping material that will prevent sediment and contaminants from entering the water column in return flows. Sealed barges (without return flow) are required. Special attention is directed to material removal and capping at the head of Slip 3. Sorbent booms or nearshore isolation measures shall be employed as contingencies, if necessary, to reduce water quality impacts from sloughing sediments or to control sheens and releases of oil and PAHs. For capping activities, the Contract Documents and CQAP shall define methods and contingencies to be used that will provide for accurate and low impact/velocity placement. The Contractor's Quality Control Plan shall define inspection, testing, and documentation procedures that will be implemented to demonstrate that the requirements of this WQMCCP are met. This will include the implementation of a Water Quality Monitoring Plan. These two plans (Contractor's Quality Control Plan and Water Quality Monitoring Plan) shall be reviewed and approved by EPA in order to be compliant with this certification. Construction activities shall be modified if monitoring results indicate that water quality criteria are not met.

The Port is encouraged to provide contractual incentives to the construction contractor to meet specific performance measures related to protection of water quality as listed in this WQMCCP.

4.2 WATER QUALITY MONITORING AND STANDARDS

4.2.1 Visual Monitoring

Visual monitoring for water quality impacts generated by the construction activities will take place whenever construction is actively underway. Monitoring will be conducted by the Water Quality Monitoring Field Leader when present on-site and by the Construction Quality Assurance Official at all other times. Observations will be made as to the presence of any of the following occurring outside containment barriers (where present):

- High turbidity that might reasonably result in exceedance of chemical compliance triggers.
- Sheens or other visible contamination in the water.
- Distressed or dying fish.

During in-water activities, if a large silt plume is observed in the vicinity of construction operations at any time, then a description of the color, source, and size of the plume must be recorded, and potentially additional water quality measurements collected. EPA must be notified to coordinate response decisions. In addition to qualitative observations and turbidity monitoring, the cause of any observed silt plume generated by construction activities will be assessed and appropriate measures (e.g., change production rates, modify work schedule, perform work on a slower flow, etc.) will be taken to correct an identified problem if project operations are determined to be the source (see Section 4-3).

The head of Slip 3 is known to be an area of former diesel/oil contamination. Monitoring for oil/sheens shall occur during all phases of the work, but particularly when dredging at the head of Slip 3.

Additional water quality measurements will be taken at the discretion of the Quality Assurance Official and EPA, and are intended to define the area of impact and assess the situation to allow informed decisions.

4.2.2 Water Quality Standards and Point of Compliance

The water quality standards to be complied with for this Phase 1 removal action (except as noted below) are the freshwater acute water quality standards cited in OAR, Chapter 340, Division 041; however, freshwater chronic water quality standards cited in OAR, Chapter 340, Division 041, will be used as action levels for implementing additional BMPs to protect water quality (see Section 4.3).

In addition to the specific water quality standards defined in this WQMCCP, all Removal Action operations shall observe Oregon's Statewide Narrative Criteria, OAR 340-041-0007(1):

“Notwithstanding the water quality standards contained in this Division, the highest and best practicable treatment and/or control of wastes, activities, and flows must in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor, and other deleterious factors at the lowest possible levels.”

EPA expects that short-term exceedances of water quality standards, if any, will be outweighed by the long-term benefit of completing the Removal Action; however, all water quality standards will be met at the following points of compliance:

For this project, the outer boundary of the water area a distance of 100 meters from the approximate center of the Removal Action activity is defined as the point of compliance for all field parameters other than turbidity. The compliance point for turbidity is 100 meters beyond the inner harbor line.

The zone of compliance is defined as the entire water area within the point of compliance. Figure 3 from the RAWP has been reproduced as an attachment to this WQMCCP to illustrate the different zones of compliance for each activity associated with the Phase I Removal Action.

Specific water quality standards in effect for the duration of this Removal Action include:

- **Dissolved Oxygen.** At the point of compliance, dissolved oxygen (DO) shall exceed 6.5 mg/L. At no time should dissolved oxygen drop below 6.0 mg/L at any station. Should this occur, then all in-water activities shall cease immediately, and EPA shall be notified. Work shall not resume until dissolved oxygen levels have returned to compliant levels and approval has been given by EPA.
- **pH.** At the point of compliance, pH will remain between 6.5 and 8.5 (standard units).
- **Temperature.** The lower mainstem Willamette River has been designated as a salmonid migration corridor. At the point of compliance, 7-day average temperature shall not exceed 18.0°C. When ambient conditions exceed 18.0°C, no temperature increases will be allowed which will raise the receiving water temperature greater than 0.3°C. Should this occur, then all in-water activities shall cease immediately, and EPA shall be notified. Work shall not resume until temperature levels have returned to compliant levels and approval has been given by EPA.
- **Turbidity.** At the point of compliance, turbidity shall not exceed 5 nephelometric turbidity units (NTU) over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU. At no time should turbidity exceed 50 NTU over background. Should this occur, then all in-water activities shall cease immediately, and EPA shall be notified. Work shall not resume until turbidity levels have returned to compliant levels and approval has been given by EPA.
- **Chemicals of Concern (COCs).** At the point of compliance, the values identified in Table 4-1 shall apply.

If a water quality standard is exceeded at point of compliance, the steps outlined in Section 4.3 Operational Response must be followed.

Within the compliance zone, short duration exceedances of the standards, including acute criteria applicable to any identified COCs, are allowed provided that monitoring at the point of compliance confirms that these exceedances are limited in distance, duration, and magnitude (i.e., water quality standards as identified herein are achieved at the point of compliance). The compliance distances outlined above are not an authorization to exceed those criteria concentrations for the entire duration of construction, but to allow the project to be implemented while using appropriate measures (BMPs) to reduce any potential exceedances of water quality criteria and/or negative impacts to beneficial uses. In no case does this WQMCCP authorize degradation of water quality that significantly interferes with or becomes injurious to characteristic water uses, causes long-term harm, or impairs beneficial uses.

4.2.3 Water Quality Monitoring

Water quality monitoring will be conducted in accordance with the Construction Water and Sediment Monitoring Plan (WSMP) appendix of the RAWP. The WSMP shall describe the water quality measurements, monitoring methods, and data collected that will be used in compliance assessment. The WSMP will comply with the terms and conditions of this WQMCCP. Any significant additions, changes, modifications, or revisions to the plan of field operations by the contractor selected to do the work requires prior notification and approval by EPA. EPA may approve lower or higher frequencies and numbers of required samples, depending on sample results received during the Removal Action implementation.

At least 2 weeks prior to the project start date, the Port must identify a QAO or the individual that will perform on-site oversight and coordination functions. The water quality monitoring field team should be prepared to obtain and process temperature, DO, pH, COC, TSS, and turbidity samples on any day they are in the field.

4.2.3.1 Water Quality Monitoring Activities Parameters

Table 4-1 summarizes the groups of COC analyses that will be required within during this Abatement Measures Removal Action construction activity.

Sections 4.3 and 4.4.1 address the need to provide the rapid turnaround times for laboratory analysis and quality assurance that are critical to operational response to possible criteria exceedances.

4.2.3.2 Water Quality Monitoring Locations

Monitoring will take place at the points of compliance associated with each of the following operations:

- Dredging contaminated sediments (bucket location).
- Barge overflow (dredging/dewatering), if allowed.
- Barge unloading, sediment transfer.
- Cap material placement.

For the removal activities listed above, water quality monitoring for field parameters will occur at one upstream location and three downstream locations in accordance with the points of compliance listed in Section 4.2.4. The three downstream stations will be monitored in an arc. Water quality monitoring for laboratory parameters via depth-specific whole water samples (number of samples determined per Section 4.2.5.2) will occur at the downstream station having the highest turbidity reading. As the river is tidally influenced in the vicinity of the site, if flow reversal is observed to occur during monitoring, then the sampling stations will be reversed to continue the down-current arc and up-current (for background conditions) pattern as appropriate. Measurements of current velocities and/or turbidity plumes will be required to confirm field observations and decisions on monitoring locations relative to tidal influence. Additionally, water quality monitoring within the slips may encounter weak or variable flow conditions. If so, the upstream station shall be located near the slip mouth and the three downstream stations located in an arc around the remedial activity.

All sampling station locations will be determined using a laser range finder, which is accurate to within ± 1 meter. Water quality samples shall be collected within ± 5 meters horizontal distance of designated sampling station locations.

4.2.3.3 Water Quality Monitoring Depths

Sampling depths for both the field and laboratory parameters (see Table 4-1) will be located at the approximate top, middle, and bottom of the water column if the water depth permits collecting samples from three intervals separated by at least 5 feet from each other. Top and bottom samples will be taken 1 foot below the surface of the water and above the mud line, respectively. Thus, for water depths less than 7 feet, two samples will be collected and for water depths less than 2 feet, one sample will be collected.

Samples shall be collected at the water depths indicated above, accurate to within ± 1 foot.

4.2.3.4 Water Quality Monitoring Frequency

Field parameters will be measured at the start of each operation at least once every hour during active in-water work. On any day active in-water work occurs, the first sample will be taken 1 hour after the initiation of the activity, and once at each 1-hour interval thereafter. This frequency of monitoring for field parameters will continue until four consecutive hourly events indicate no exceedance of any trigger levels. If no exceedance is identified following four consecutive hourly events, the sampling frequency will be reduced to every 4 hours. If results exceed the triggers, these same parameters will be measured again within 30 minutes of determination of the exceedance. If the exceedance continues, then procedures discussed in Section 4.3 will be followed. Hourly frequency will resume if any visible decline in water quality is observed or if an exceedance has been confirmed.

Water samples for analysis of laboratory parameters will be collected once a day in subareas with active dredging and capping operations.

4.2.3.5 Background Water Quality Monitoring

For field parameters only, initial background conditions for the Site will be established prior to the start of any active in-water work. For field parameters only, a minimum of seven independent measurements at all applicable water depths will be made at least 100 meters upstream of the expected location of the center of the remedial activity over the course of a two-day period just prior to construction initiation. For laboratory parameters for the first sampling event, depth-specific whole water samples (number of samples determined per Section 4.2.5.2) will be taken at one upstream sampling station. The upstream distance for monitoring background conditions should target a relatively undisturbed and unimpacted area upcurrent from the work area, considering tidal influence. For each parameter, the 90th percentile upper confidence limit on the mean will be used to represent initial background conditions.

The background sampling for laboratory parameters will consist of one upstream event (with samples taken at the depths noted above) during the first sampling day. Additional background samples may be collected if different upstream conditions are observed during the construction period.

Table 4-1. Water Quality Triggers for Additional Environmental Controls

Parameter	Activity	Unit	Location	Trigger ^{a,c,g}	Action Triggered
Turbidity	All	NTU	100 meters from the inner harbor line. ^b	1. >5 NTU over background (where background <50 NTU) or >10% over background (where background >50 NTU) ^c 2. >50 NTU over background, cease operations. Reference: OAR 340-041-0036	1. Collect TSS and evaluate contaminant transport and mass balance loss; consider additional control(s) that focuses on cause of exceedance. 2. Cease operations until measures have returned to compliant levels and approval has been given to EPA.
TSS	All	mg/L	100 meters from the center of the remedial activity. ^b	No trigger.	No trigger.
Dissolved Oxygen (DO)	All	mg/L	100 meters from the center of the remedial activity. ^b	<6.5 modify operations <6.0 cease operations ^d Reference: OAR 340-041-0016	Inspect construction and select additional control(s) that focuses on cause of exceedance
pH	All	Standard Units	100 meters from the center of the remedial activity. ^b	<6.5 or >8.5 Reference: OAR 340-041-0021	Inspect construction and select additional control(s) that focuses on cause of exceedance
Oil/Sheen	All, but particularly during dredging at head of Slip 3.	Visual Observation	Outside of containment barrier.	Any visible oil/sheen present outside the containment barrier.	Inspect construction and select targeted additional sheen control(s) from Section 3.1.

Parameter	Activity	Unit	Location	Trigger ^{a,c,g}		Action Triggered
				Aquatic Chronic ^e	Aquatic Acute ^e	
Anthracene	All	µg/L	100 meters from the center of the remedial activity. ^b	21	87	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.

(Table Continues)

Table 4-1. Water Quality Triggers for Additional Environmental Controls (Continued)

Parameter	Activity	Unit	Location	Trigger ^{a,c,g}		Action Triggered
				Aquatic Chronic ^e	Aquatic Acute ^e	
Benzo(a)anthracene	All	µg/L	100 meters from the center of the remedial activity. ^b	2.2	9.2	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Chrysene	All	µg/L	100 meters from the center of the remedial activity. ^b	2.0	8.3	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Benzo(b)fluoranthene	All	µg/L	100 meters from the center of the remedial activity. ^b	0.68	2.8	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Benzo(k)fluoranthene	All	µg/L	100 meters from the center of the remedial activity. ^b	0.64	2.7	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.

(Table Continues)

Table 4-1. Water Quality Triggers for Additional Environmental Controls (Continued)

Parameter	Activity	Unit	Location	Trigger ^{a,c,g}		Action Triggered
				Aquatic Chronic ^e	Aquatic Acute ^e	
Benzo(a)pyrene	All	µg/L	100 meters from the center of the remedial activity. ^b	0.96	4.0	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Indeno(1,2,3-cd)pyrene	All	µg/L	100 meters from the center of the remedial activity. ^b	0.28	1.2	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Dibenzo(a,h)anthracene	All	µg/L	100 meters from the center of the remedial activity. ^b	0.28	1.2	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Benzo(g,h,i)perylene	All	µg/L	100 meters from the center of the remedial activity. ^b	0.44	1.8	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.

(Table Continues)

Table 4-1. Water Quality Triggers for Additional Environmental Controls (Continued)

Parameter	Activity	Unit	Location	Trigger ^{a,c,g}		Action Triggered
				Aquatic Chronic ^e	Aquatic Acute ^e	
Fluoranthene	All	µg/L	100 meters from the center of the remedial activity. ^b	7.1	30	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Pyrene	All	µg/L	100 meters from the center of the remedial activity. ^b	10	42	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Fluorene	All	µg/L	100 meters from the center of the remedial activity. ^b	39	162	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Phenanthrene	All	µg/L	100 meters from the center of the remedial activity. ^b	19	79	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.

(Table Continues)

Table 4-1. Water Quality Triggers for Additional Environmental Controls (Continued)

Parameter	Activity	Unit	Location	Trigger ^{a,c,g}		Action Triggered
				Aquatic Chronic ^e	Aquatic Acute ^e	
Naphthalene	All	µg/L	100 meters from the center of the remedial activity. ^b	194	807	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Acenaphthylene	All	µg/L	100 meters from the center of the remedial activity. ^b	307	1277	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Acenaphthene	All	µg/L	100 meters from the center of the remedial activity. ^b	56	233	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Cadmium	All	µg/L	100 meters from the center of the remedial activity. ^b	0.09 ^f	0.5 ^f	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.

(Table Continues)

Table 4-1. Water Quality Triggers for Additional Environmental Controls (Continued)

Parameter	Activity	Unit	Location	Trigger ^{a,c,g}		Action Triggered
				Aquatic Chronic ^e	Aquatic Acute ^e	
Lead	All	µg/L	100 meters from the center of the remedial activity. ^b	0.54 ^f	14 ^f	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Zinc	All	µg/L	100 meters from the center of the remedial activity. ^b	36 ^f	36 ^f	For chronic, confirm standard controls and increase monitoring to once per day. For acute, stop operations, inspect construction and select additional control(s) that focuses on cause of exceedance.
Water Velocity	All	Fps	Upstream and immediately in line with operation.	1.0 fps		Stop operations and secure silt curtains and other containment barriers.
Distressed or Dead Fish	All	Visual Observation	Anywhere in proximity to site.	Any distressed, dying, or dead fish		Stop all operation, collect fish, determine species, notify services if listed species present, apply controls required by Biological Opinion and/or additional controls for nonlisted species (see Section 4.5 for handling of distressed or dead fish).

^a If field parameter monitoring results exceed trigger, then the same field parameter will be remeasured immediately to confirm the exceedance. If the exceedance is confirmed, the additional controls discussed in Section 4.5 will be implemented.

^b Sampling will occur at the specified distance as shown on figure . Although flow reversals due to tidal fluctuations are rare in some seasons on this part of the river, if such reversals are observed, sampling will be conducted up current (background) and down current for field parameters, as appropriate.

^c Trigger is exceeded where downstream conditions exceed the specified amounts relative to the event-specific background or the preconstruction background survey.

^d If DO levels fall below 6.5 mg/l, additional controls will be implemented. If DO levels fall below 6.0 mg/L, operations will cease until DO levels rise above 6.0 mg/L and additional controls will be implemented before resumption of work.

^e Oregon Administrative Rules 340-041-0033 (except PAHs, see ^g).

^f These values are hardness-dependent numbers based on Willamette River hardness of 25 mg/l.

^g The PAH values will be used as decision threshold values during the monitoring program to determine the use of and effectiveness of construction BMPs for controlling the releases of PAHs. USEPA, 2003. Procedures for Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. Office of Research and Development. USEPA-600-R-02-013.

4.3 OPERATIONAL RESPONSE

Construction BMPs are expected to be fully understood and followed during all construction operations. If construction operations are found not to be in compliance with the provisions of this certification (through monitoring results or direct observation by EPA-approved inspectors), or result in conditions causing distressed or dying fish, then the operator shall immediately take the following actions:

1. Cease operations at the location of the violation.
2. Assess the cause of the water quality problem and take appropriate measures to correct the problem and/or prevent further environmental damage. This may include decreasing dredging speed, checking the equipment, or adjustment of other construction BMPs by the operator. EPA expects that when water quality problems with the field parameters (e.g., turbidity, dissolved oxygen) are identified during monitoring, new samples will be collected immediately using recalibrated instruments or more precise measurement methods to confirm the initial indication. Regardless of whether the second sample confirms the initial exceedance, EPA will be notified of the instance via the weekly report. If the second sample does not confirm the initial exceedance, then construction may recommence with a third set of samples collected within 45 minutes of restart. Indications of a water quality problem in this third series will immediately trigger construction shutdown and notification to EPA. Construction will not be recommenced until specifically approved by EPA. It is strongly recommended that additional monitoring be initiated to determine the recovery time.
3. In the event of finding distressed or dying fish, the operator shall collect fish specimens and water samples in the affected area and, within the first hour of such conditions, notify EPA and National Marine Fisheries Service (NMFS) and have the water samples analyzed for dissolved oxygen and total sulfides. For distressed or dying fish, the following, at a minimum, will be noted:
 - Condition of fish (dead, dying, decaying, erratic, or unusual behavior).
 - Number, species, and size of fish in each condition.
 - Location of fish relative to operations.
 - Presence of any apparently healthy fish in the area at the same time.
 - Whether the species is a listed species.

EPA may require further sampling and analyses before allowing construction to resume. Additional requirements may be imposed by NMFS if sick, injured, or dead specimen of a threatened or endangered species is found in the project area.

In the event the water quality monitoring field staff/coordinator detects a water quality exceedance at any compliance monitoring station, the following sequence must be followed:

1. Immediately alert the QAO.
2. Immediately repeat monitoring all depths at the station.

3. If passes, retake samples within 45 minutes of construction restart to confirm the pass. If confirmed as a pass, QAO informs the EPA Remedial Project Manager (RPM) and the EPA Water Quality Specialist (WQS) of the violation and resolution. Work may continue; however, this monitoring location should be evaluated carefully in subsequent monitoring efforts.
4. If fails again, construction will be shut down and the QAO will inform the EPA (RPM and WQS) of ongoing violation and proposed actions to define and resolve the water quality problem.

In the event water quality monitoring COC results detect a chemistry water quality above the chronic criteria at any compliance monitoring site, then BMPs must be reassessed to address the occurrence. All BMPs employed in response results above the chronic water quality criteria must be recorded and an effectiveness determination must be made after the results from the subsequent monitoring are received. These actions must occur to reduce the likelihood of an exceedance of chronic water quality criteria. If results indicate that water quality impacts greater than chronic water quality standards occur for a duration of more than three days, then the sequence of actions listed below for an exceedance of an acute water quality criteria shall be followed.

In the event water quality monitoring COC results detect a chemistry water quality exceedance of water quality criteria (as defined in Section 4.2.2.) at any compliance monitoring site, then the following sequence must be followed:

1. Immediately stop construction work and alert the QAO and EPA (RPM and WQS) following receipt of lab results.
2. Compliance boundary concentrations will be compared with those at the upstream ambient station to evaluate whether concentrations may be elevated as a result of the Removal Action, or may reflect area-wide water quality conditions. Removal Action operations may not continue during this review.
3. Follow-up water quality samples will be collected within 12 hours at the compliance boundary and the upstream ambient station, and submitted for analysis with a maximum 72-hour turnaround time. Additional water quality in situ measurements and chemistry grab samples may be taken at the discretion of the QAO and EPA to gain additional information about the size and location of any identifiable plume or potential source. Depending on the discussions/results of the deliberation in (2) above, Removal Action operations may resume, may be altered, or may continue to be suspended pending the results of the additional testing. Pending receipt of the follow-up testing results, the Port will list recommendations for addressing the exceedance if it persists.
4. The QAO and EPA will be notified of follow-up testing results. If concentrations in the follow-up monitoring indicate continuing exceedances of water quality criteria caused by the Removal Action, the Port and EPA will confer concerning additional sampling, implementation of operational controls, and/or re-evaluation of the compliance boundary for water quality chemical criteria.

In addition to turbidity monitoring, the cause of any observed silt plume generated by construction activities will be assessed, and appropriate measures (e.g., change production rates, modify work schedule, perform work on a slower flow, etc.) should be taken to correct an identified problem if project operations are determined to be the source.

4.4 NOTIFICATION AND REPORTING

EPA must be notified upon exceedance of any water quality criteria defined in this WQMCCP, and of any failure to comply with conditions of this WQMCCP as soon as possible, and no later than specified below. Reporting frequencies are detailed below. Notify both the EPA RPM and WQS.

RPM: The EPA contact person for amendments, modifications, approvals, or any other changes to the WQMCCP is Mr. Sean Sheldrake, telephone: (206) 553-1220, fax: (206) 553-0124, email: sheldrake.sean@epa.gov. Correspondence should be addressed by surface mail to:

Mr. Sean Sheldrake
USEPA, Region 10
Environmental Cleanup Office
1200 Sixth Avenue
Mailstop: ECL-110
Seattle, WA 98101-1128

WQS: The EPA contact person for specific issues related to this Water Quality Monitoring and Compliance Conditions is Mr. Jonathan Freedman, telephone: (206) 553-0266, fax: (206) 553-1775, email: Freedman.jonathan@epa.gov. Correspondence should be addressed by surface mail to:

Mr. Jonathan Freedman
USEPA, Region 10
Aquatic Resources Unit
1200 Sixth Avenue
Mailstop: ETPA-083
Seattle, WA 98101-1128

4.4.1 Daily Reporting

Any water quality exceedances of triggers specified in the RAWP will be reported verbally or by email to EPA (Sean Sheldrake and Jonathan Freedman) on a daily basis. Water quality exceedances for field parameters (i.e., dissolved oxygen, pH, temperature, turbidity, distressed or dead fish) will be reported as soon as possible on the day of measurement.

For laboratory analyses of COCs, water quality testing results shall be reported to EPA as soon as possible, but no more than 3 days (72 hours) after receipt of the sample at the lab. Samples shall be delivered to the laboratory within 14 hours of collection. In all cases, the laboratory shall prioritize analyses to ensure the timely return of those results most relevant to changes in daily operational practices during Removal Action implementation. The Port will prepare a sampling handling/transport plan to address sample transport to the laboratory.

These reporting timelines shall apply to samples collected on both weekdays and weekends (i.e., a sample collected Friday shall be reported to EPA by Monday). Data reported to EPA must have received a preliminary data quality review by the laboratory and the Quality Assurance Official (QAO), and shall be transmitted in electronic format approved by EPA showing a comparison of all measurements to date to Table 4-1 triggers.

Achieving these reporting requirements during construction may require laboratory coordination beyond that required for routine compliance monitoring. This may require arrangements with the laboratory to receive samples and perform some analyses on weekends or work 24 hours per day. It may be necessary to negotiate higher rates to ensure that samples are analyzed and results reported to the QAO within 48 to 72 hours or less.

Arrange in advance for a backup laboratory to be used in the event the primary laboratory experiences delays or difficulties.

The laboratory will complete specific QA/QC procedures (to be determined) prior to releasing data. At a minimum, the laboratory quality manager must review and approve all results prior to their distribution. Completing external data quality review and reporting water quality monitoring data to EPA within 3 days of sample receipt at the laboratory may require the QAO to be available to review and report laboratory results within 24 hours of receipt from the laboratory.

If analytical complications arise, which would prevent the Port from meeting the 72-hour reporting time requirement, an explanation will be provided to EPA's WQS as soon as the Port is made aware of the complication. The lab will report such complications to the Port as soon as they are detected.

If samples need to be reanalyzed, this shall be communicated to EPA within 24 hours of the determination that reanalysis is needed. Any required reanalyses should extend the total elapsed days between sample collection and reporting to EPA by no more than 3 days (72 hours).

The Port will report to EPA when detections have been made as well as information on calibrations that have been exceeded. This information can be useful in approximating a chemistry "hit" that can be used to begin to trigger BMPs while awaiting quantitative laboratory confirmation. The laboratory must notify the Port at the earliest possible time of identification of significant high concentration results in water quality samples that are expected to be clean. The Port must provide a copy of the Water Quality Monitoring and Compliance Conditions Plan to the lab to aid in their understanding of the actions thresholds for the project, and to aid in their early reporting regarding whether sample concentrations are above these thresholds.

The laboratories will notify the Port as soon as possible of any change between preliminary results and final results.

Failure to meet these data reporting schedule criteria shall be deemed a failure to comply with this WQMCCP.

4.4.2 Weekly Reporting

Results from each week's Water Quality Monitoring Forms will be compiled into a summary table with a comparison to Table 4-1 triggers and provided to EPA with the Weekly Progress Report described in the RAWP. A week shall be defined to begin on Monday and end on Sunday. Weekly reporting summary tables are due to the EPA Water Quality Specialist no later than noon on the Wednesday immediately following the previous week's end. This leaves 2.5 days to compile the previous week's Water Quality Monitoring Forms for transmittal to EPA.

4.4.3 Water Quality Exceedance Reporting

If at any time construction operations are found not to be in compliance with the provisions of this certification (through monitoring results or direct observation by EPA-approved inspectors), or result in conditions causing distressed or dying fish, then the operator shall immediately take the actions described in Section 4.3, Operational Response, and notify either the EPA Water Quality Specialist or EPA Remedial Project Manager within 12 hours or less.

4.4.4 Final Construction Report

Once all construction is complete, results for the entire construction period will be compiled and reported to EPA along with supporting documentation in a Removal Action construction completion report. At a minimum, the report must include the following information:

- A description of field sampling activities and a plan view of monitoring locations relative to the location of removal actions.
- Any deviations from the Monitoring Plan and reasons for the deviations.
- Tabular summaries of all water quality monitoring data with comparisons to Table 4-1 triggers.
- A summary of field observations, including sampling times, weather conditions, water conditions, silt plumes, distressed/dying fish, and any relevant anecdotal or unusual observations.
- Tabular summaries of all post-removal sediment characterization results.
- Narrative text on results of water quality monitoring related to each operation (e.g., dredging, transport/disposal, cover/cap placement, etc.).
- Discussion of water quality trigger exceedances and any additional monitoring that may have resulted.
- Data quality review results based on calibration and precision/accuracy information, including any data qualifiers and reasons for those qualifiers.
- An appendix containing all completed water quality monitoring and surface sediment sample forms.
- An appendix containing all calibration information.
- A list of all of the BMPs employed during the project implementation, when and why the BMPs were used, and an assessment of the effectiveness of those BMPs.

4.4.5 Spill Reporting

In addition to notification of the EPA (RPM and WQS) named above, the Port shall notify EPA and the U.S. Coast Guard of spills as required by law. At a minimum, spills shall be reported to the following:

- EPA Region 10 24-Hour Spill Reporting Number: (206) 553-1263
- National Response Center: (202) 267-2100 or (800) 424-8802

In addition, EPA directs the Port to also notify:

- Oregon Emergency Response System (OERS): (503) 452-0311

Reviewed and Approved by:

Sean Sheldrake, RPM
Environmental Cleanup Office

Date

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- Tabular summaries of all post-removal sediment characterization results.
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Environmental Cleanup Office

7-18-08

Date

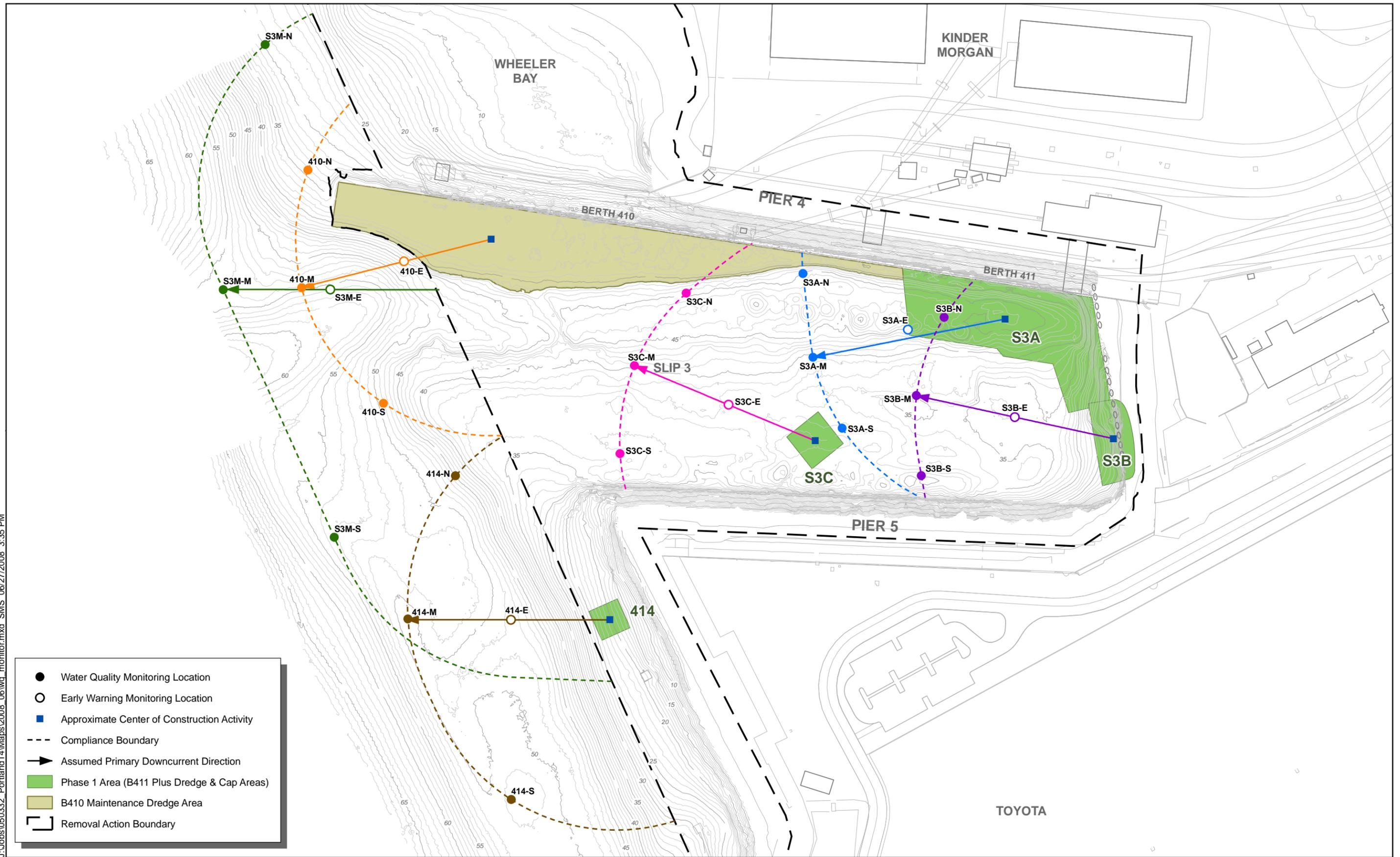
5. REFERENCES

- Anchor Environmental, L.L.C. 2008. Final design analysis report, Terminal 4 phase 1 removal action. Prepared for Port of Portland for submittal to US Environmental Protection Agency, Region 10. July 2008.
- Anchor Environmental, L.L.C. 2008. Removal action work plan, Terminal 4 phase 1 removal action. Prepared for Port of Portland for submittal to US Environmental Protection Agency, Region 10. July 2008.
- Anchor Environmental, L.L.C. 2008. Supplemental analysis and rationale for the proposed turbidity point of compliance (100 meters from the mouth of Slip 3), Port of Portland—Terminal 4 phase I removal action. Prepared for Port of Portland for submittal to US Environmental Protection Agency, Region 10. March 2008.
- BBL. 2005. Terminal 4 early action, engineering evaluation/cost analysis report, public review draft, dated May 31, 2005. Prepared by Blasland, Bouck and Lee, Inc. for Port of Portland for submittal to US Environmental Protection Agency, Region 10.
- BBL. 2004. Terminal 4 early action, characterization report, dated September 17, 2004. Prepared by Blasland, Bouck and Lee, Inc. for Port of Portland for submittal to US Environmental Protection Agency, Region 10.
- ODEQ. Willamette Basin TMDLs. Retrieved information October 2006, from <http://www.deq.state.or.us/wq/TMDLs/willamettebasin.htm>
- ODEQ. 2001. Antidegradation policy implementation internal management directive for NPDES permits and section 401 water quality certifications. Oregon Department of Environmental Quality, Water Quality Division. Portland, Oregon. March 2001.
- ODFW. 2000. Oregon guidelines for timing of in-water work to protect fish and wildlife resources. Oregon Department of Fish and Wildlife. June, 2000.
- USEPA. 2006 Action memorandum for a removal action at the Portland Terminal 4 site within the Portland Harbor superfund site, Portland, Multnomah County, Oregon. U.S. Environmental Protection Agency. From Sean Sheldrake, Remedial Project Manager, to Daniel D. Opalski, Office of Environmental Cleanup. May 11, 2006.
- USEPA. 2003. Administrative order on consent for non-time-critical removal action between Port of Portland and the U.S. Environmental Protection Agency. October, 2003.

APPENDIX A

Figure 3 (from RAWP)

J:\Jobs\050332_Portland\T4\Maps\2008_06\wg_monitor.mxd SMS 06/27/2008 3:35 PM



- Water Quality Monitoring Location
- Early Warning Monitoring Location
- Approximate Center of Construction Activity
- - - Compliance Boundary
- ➔ Assumed Primary Downcurrent Direction
- Phase 1 Area (B411 Plus Dredge & Cap Areas)
- B410 Maintenance Dredge Area
- Removal Action Boundary



Notes:
 Slip 3 water quality monitoring (except for turbidity) will occur 100 meters from the actual location of construction activities. Compliance boundaries shown may not be representative of the actual location.

Bathymetry and base map from Port of Portland, 2007.
 Bathymetric elevations in feet NGVD.

Figure 3
 Proposed Water Quality Monitoring Stations
 Terminal 4 Phase I Removal Action
 Portland, Oregon



Anchor Environmental, L.L.C.
6650 SW Redwood Lane, Suite 333
Portland, OR 97224
Phone 503.670.1108
Fax 503.670.1128

Memorandum

To: Sean Sheldrake – USEPA
From: Ben Hung - Anchor Environmental, L.L.C.
CC: Ken Fellows – Parametrix; Nicole LaFranchise and Krista Koehl - Port of Portland; Tom Schadt, John Verduin and Elizabeth Appy- Anchor Environmental, L.L.C.
Date: August 5, 2008
Re: *Water Quality Monitoring and Compliance Conditions Plan for Port of Portland Terminal 4 Non-Time Critical Removal Action Abatement Measures, Phase I: Comments*

On July 18, 2008, the Water Quality Monitoring and Compliance Conditions Plan for Port of Portland Terminal 4 Non-Time Critical Removal Action Abatement Measures, Phase I (WQMCCP) dated July 2, 2008, was provided to the Port of Portland (Port) by USEPA. Prior to July 18, 2008, the USEPA approved the Water Quality Monitoring Plan (WQMP) provided by the Port as Appendix B of the DAR (Anchor 2008a), as well as the WQMP provided by the Port as Appendix H of the RAWP (Anchor 2008b). Some terms and conditions specified in the approved Appendix B and Appendix H WQMPs differ from what is specified in the WQMCCP. Because the WQMCCP is the controlling document for the project and there are terms and conditions that differ from the already approved WQMPs, the Port is providing this memorandum to document the discrepancies and propose a protocol to perform during construction.

The intent of this document is to clarify what procedures will be followed in the field by:

- Identifying where the WQMCCP differs from the already approved WQMPs; and,
- Summarizing the water quality monitoring protocols the Port proposes to perform in each instance.

The remainder of this memorandum details comparisons of the requirements in both documents, as well as a summary of what protocols the Port proposes to perform during construction.

Water Quality Monitoring Depths

Section 4.2.3.3 of the WQMCCP specifies that top and bottom samples will be taken 1 foot below the surface and above the mudline, respectively. The approved WQMP specifies that top and bottom samples will be taken 3 feet below the surface and above the mudline, respectively.

Proposed Protocol: Take top and bottom samples 3 feet below the surface and 3 feet above the mudline, respectively. The 3-foot offset specification has already been used during the pre-construction background water quality monitoring events.

Water Quality Frequency

Section 4.2.3.4 of the WQMCCP specifies a water quality monitoring frequency that is consistent with what is described as the Tier I schedule in the WQMP. The WQMCCP does not describe the Tier II schedule. Section 2.5 and Table 3 of the WQMP describe a Tier 2 schedule of reduced monitoring that, with EPA approval, would occur if results indicate no exceedances of chronic or acute criteria for 3 consecutive days. According to the Tier II schedule, field parameter measurements may be reduced to once per day, and chemistry samples may be reduced to once per week. In addition, according to the Tier II schedule a single chemistry sample will be composited from the surface, middle, and bottom depths at the selected station.

Proposed Protocols: The requirements in the WQMP are followed such that monitoring will be reduced to a Tier II schedule (with EPA approval) as described in the WQMP.

Background Water Quality Monitoring

Section 4.2.3.5 of the WQMCCP specifies background monitoring requirements that differ from the WQMP. The specifications include a minimum of seven independent measurements over the course of a two-day period just prior to construction initiation. For each parameter the 90th percentile upper confidence limit on the mean will be used to represent the initial background conditions. During construction, background sampling will consist of one upstream event during the first sampling day. Additional samples may be collected if different upstream conditions are observed during the construction period.

Section 2.2.1 of the WQMP specifies a much more comprehensive background survey consisting of three sampling events prior to the start of in-water work. Water samples for analytical parameters are specified in addition to the collection of field parameter data. With three events

and four monitoring stations, the background survey was intended to generate 36 measurements of field parameters and 12 analysis of water samples for project COPCs. The three background water quality events have already occurred and will be reported in the *Terminal 4 Phase I Removal Action Background Water Quality Monitoring Report*.

Proposed Protocol: The requirements in the WQMP are followed such that background monitoring that has already been performed will be adequate with respect to the WQMCCP.

Section 2.4 of the WQMP specifies the collection of surface, middle, and bottom chemistry samples at the background location during each daily sampling event under the Tier I schedule. It all specifies that given USEPA approval, under the Tier II schedule a single chemistry sample will be composited from the surface, middle and bottom depths. The WQMCCP specifies the collection of water samples at all three depths during the first sampling day only with additional background samples being collected if different upstream conditions are observed during the construction period.

Proposed Protocol: The Port proposes to collect samples at the surface, middle, and bottom on the first day of monitoring. After the first day of monitoring, the Port will collect one sample at the depth with the highest turbidity reading for chemistry analysis at the background station each day monitoring occurs.

Water Quality Monitoring Locations

Section 4.2.3.2 of the WQMCCP specifies that water quality monitoring locations will occur at one upstream location and three downstream locations in accordance with the points of compliance listed in Section 4.2.4, however there is no Section 4.2.4. The section further specifies that if flow reversal occurs, the sampling stations will be reversed to continue the down-current and up-current (for background conditions) pattern as appropriate. The WQMP (and the figure attached to the WQMCCP) shows monitoring locations at Terminal 4 in an arc around the compliance boundary as shown on Figure 3 of the WQMP and the attached figure in the WQMCCP. These stations are configured to capture flow reversals when they occur. A background location is specified approximately 300 meters upstream of all construction activities.

Proposed Protocol: Use the monitoring station locations shown on Figure 3 of the WQMP and in Appendix A of the WQMCCP at Terminal 4, which occur in an arc around the compliance boundary configured to capture flow reversals when they occur.

Please note that in the second paragraph of Section 4.2.3.2 (Water Quality Monitoring Locations), there is another referenced Section (4.2.5.2) that is missing in the PDF version that was transmitted to the Port. In addition, in the first paragraph of Section 4.2.3.5 (Background Water Quality Monitoring) there is a reference to Section 4.2.5.2 which is also missing.

References

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

Anchor Environmental, LLC (Anchor). 2008b. Draft Removal Action Work Plan, Terminal 4 Phase I Removal Action, Port of Portland, Oregon. Prepared by Anchor Environmental for the Port of Portland. July 2008.

Water Quality Calibration Procedure and Documentation

Water quality meters used to collect water quality data at the Terminal 4 dredge and cap locations as well as The Dalles transloading facility were calibrated daily to ensure consistent, accurate results. Calibration documentation and procedures for each site are described below.

Terminal 4 Location:

The primary water quality meter used at T4 was a Hydrolab MS 5 equipped to collect real time pH, dissolved oxygen, temperature and turbidity data. Water quality meters were calibrated for pH, turbidity and dissolved oxygen daily prior to the collection of water quality parameter data. Calibration was performed at the marina before motoring to the Site and documented in the daily field notes (attached).

The calibration method and procedure used for the Hydrolab was consistent throughout the project. The method is described below:

pH

- A two point calibration technique was employed. Hach buffered pH 4, 7 and/or 10 standard solution were used as the calibration points.
 - Calibration cup was rinsed first with tap water, emptied, then rinsed with the first calibration point solution and emptied. The cup was then re-filled with the calibration solution. Once stable, initial pH and temperature were recorded.
 - The pH was then calibrated to the appropriate temperature adjusted pH and the final pH reading was recorded. A “Calibration Successful!” message would appear on the data logger when done successfully. If the message did not appear, or if the final pH reading did not stabilize at the specific temperature adjusted pH, calibration was repeated with the same pH standard.
 - This procedure was repeated using a second pH standard for the second calibration point.

Turbidity

- A two point calibration technique was employed. Hach StablCal® 40.0 NTU stabilized formazin turbidity standard in addition to 0.1 NTU 40 micron filtered distilled water were used as the calibration points.
 - Calibration cup was rinsed first with tap water, emptied, then rinsed with the <0.1 NTU calibration solution and emptied. The cup was then re-filled with the <0.1 NTU calibration solution. Once stable, the initial turbidity was recorded.
 - Turbidity was then calibrated to 0.1 NTU. A “Calibration Successful!” message would appear on the data logger when done successfully. If the message did

not appear, or if the final turbidity reading did not stabilize at the correct turbidity, calibration was repeated with the same turbidity standard.

- This procedure was then repeated but instead using the 40.0 NTU standard for the second calibration point.

Dissolved Oxygen

- A single point, open air - barometric pressure depended calibration technique was employed.
 - Calibration cup was emptied then filled with a small volume of water so that the oxygen sensor was above water level. The lid was then set on top of the calibration cup to prevent rapid changes in air pressure.
 - Initial dissolved oxygen and temperatures readings were recorded in addition to the ambient barometric pressure in mm Hg.
 - Dissolved oxygen was then calibrated by imputing the ambient barometric pressure. A final dissolved oxygen reading was recorded and checked against a temperature/dissolved oxygen chart for accuracy.
 - A “Calibration Successful!” message would appear on the data logger when done successfully. If the message did not appear, or if the final dissolved oxygen reading did not stabilize at the correct level, calibration was repeated.

Successful calibration using the above method was recorded in the field notes by writing *calibration ok*, *calibration successful*, *calibrate meters*, *calibrated hydrolab* etc.

The Dalles Transloading Facility

The primary water quality meters used at The Dalles transloading facility were a Hach 2100p portable turbidimeter and a YSI meter equipped to collect real time pH, dissolved oxygen and temperature data. Water quality meters were calibrated for pH, turbidity and dissolved oxygen daily prior to the collection of water quality parameter data. Calibration was performed in the field.

The calibration method and procedure used for the YSI and Hach 2100p portable turbidimeter was consistent throughout the project. The method is described below:

YSI pH

- A two point calibration technique was employed. Hach buffered pH 4, 7 and/or 10 standard solution were used as the calibration points.
 - Calibration cup was rinsed first with tap water, emptied, then rinsed with the first calibration point solution and emptied. The cup was then re-filled with the calibration solution. Once stable, initial pH and temperature were recorded.

- The pH was then calibrated to the appropriate temperature adjusted pH and the final pH reading was recorded. If the final pH reading did not stabilize at the specific temperature adjusted pH, calibration was repeated with the same pH standard.
- This procedure was repeated using a second pH standard for the second calibration point.

YSI Dissolved Oxygen

- A single point, open air - barometric pressure depended calibration technique was employed.
 - Calibration cup was emptied then filled with a small volume of water so that the oxygen sensor was above water level. The lid was then set on top of the calibration cup to prevent rapid changes in air pressure.
 - Initial dissolved oxygen and temperatures readings were recorded in addition to the ambient barometric pressure in mm Hg.
 - Dissolved oxygen was then calibrated by imputing the ambient barometric pressure. A final dissolved oxygen reading was recorded and checked against a temperature/dissolved oxygen chart for accuracy.
 - If the final dissolved oxygen reading did not stabilize at the correct level, calibration was repeated.

Hach 2100p Turbidimeter

- A four point calibration technique was employed. <0.1, 20, 100 and 800 NTU Hach StablCal® stabilized formazin turbidity standards were used as the calibration points. Factory calibration protocols were used to calibrate the turbidimeter using the four standards.

6/26/08 T4

0730 arrive launch
calibrated pH, DO, Turb.
HydroLab checked out - see
calibration log.

0815 Ben Hung
Matt Wilson
D Gillingham

using Anchor Portland vessel.

0815-0830 discussed HSP
hazards, lifting, stability
on vessel and finger
pinch points

weather is overcast and calm.

0845 launched

0922 Began WQ measurements

0930 collected water samples
at 3 ft below surface

- BG-53A-080626 -

- BG-53D-080626 - duplicate

Tide Board +9.4

T4 6/30/08

0900 Arrive vessel - Anchor
D. Gillingham
M. Wilson

0930 Arrive launch
weather sunny, slight breeze

1020 Arrive site BG-S3

7/2/08 T4 Background monitoring

0930 Arrive Boat launch

0945-1010 calibrate
M. Wilson Background monitoring
D. Gillingham

Anchor Boat
Weather - overcast, slight breeze

1025 Arrive BG-S3
BG-S3A-080702 @ 1045

move to BG-HL

BG-HLC-080702 @ 1105
data point within 9% of target

1115 Arrive BG-2
river ripples slight breeze
hazy

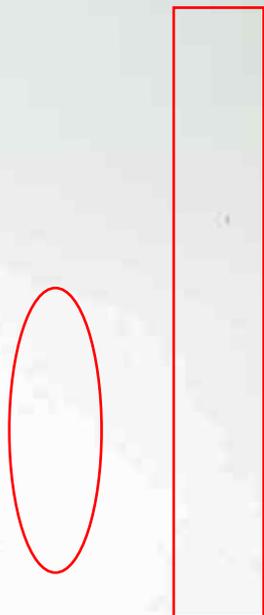
Data point 11 ft off target
although readings are
sample collected within
approx. 5'
slight breeze and opposing
currents

Sample from Bottom 3
off Bottom
BG2C-080702 @

move to BG-1 1130

Sampled from Bottom
depth 46.2'
BG1C-080702

finished sampling 1145
depart site
1155 Arrive dock



TY
 d of Day calibration
 eck
 with 7 std = 6.99 ✓
 8.07 Temp 25.7 ✓
 19.6 with old 20 ✓

8/11/08 TY

Hydrolab calibration
 0730
 Temp 19.39
 initial 7.2 = final = 7.01
 initial 10.0 = 10.08 Final = 10.07
 check with 4 = 3.92

D.O calibration
 initial 9.99 BP = 763
 Final 9.2 Temp = 19.37
 Turb. initial Final Temp
 0.0 -0.02 0.1 19.43
 100 99.8 100.2 20.12

8/12 TY
 Hydrolab calibration
 1123

Temp 21.4
 pH [Initial pH = 7.03 final = 7.01
 initial 10.04 ✓ final = 10.04
 turb Initial Final Temp
 0.0 0.0 0.1 21.89
 100 99.4 100.7 21.8

DO Calibration

BP = 763 Temp 22.26

Initial 8.2 Final 8.7

Calibration Successful!

8/13 Hydrolab Calibration (T4)

	Initial	Final	Temp
pH	7.11	7.02	18.81
	10.06	10.09	18.66
Turb	0.1	0.1	18.76
	40.0 39.5	39.9	18.30
DO	8.69	9.52	18.02, 763.0SP

Calibration successful!

1800 replaced turbidity

wiper sponge.

end of Day calibration check

0.0 std = 0.0

40.0 std = 40.7

7.0 std = 7.03 26.25

replaced internal Batteries.

8/14

pH	Initial	Final	Temp
	7.08	7.01	21.27
	10.13	10.04	22.2

turb	Initial	Final	Temp
	2.2 0.0	0.0	21.72
	44.2	39.7	21.4

DO ——— 8.82 21.53 BP

Calibration successful!

0.0	0.0	0.1	✓ 25.0
40.0	41.6	40.0	✓ 25.0

8/18/08 Hydrolab Calibration 0740

	initial	Final	temp
pH	7.07	7.00 ✓	20.89
758	10.04	10.04 ✓	21.50
DO	8.10	8.82 ✓	21.60
turb	0.0	0.0	21.11
40	38.7	39.9	20.92

calibration successful.

7.11	7.02	18.81
10.06	10.09	18.66
0.1	0.1	18.76
39.5	39.9	18.30
8.69	9.52	18.02, 763.088

Calibration successful.

replaced turbidity wiper sponge.

Calibration check

0.0 std	=	0.0
0.0 std	=	40.7
0 std	=	7.03 26.25

placed internal Batteries.

8/16/08 Hydrolab calibration check 1615

PH	initial	Final	temp
stable	7.09	6.99 ✓	26.75
stable	9.87	10.00 ✓	26.61
DO	initial	Final	Temp
BP: 753.4	1101	88.39 ✓	23.52
NTU			

0.0	initial	Final	Temp
0.0	0.0	0.1 ✓	25.40
40.0	41.6	40.0 ✓	25.67

8/18/08 Hydrolab Calibration 0740

PH	initial	Final	temp
	7.07	7.00 ✓	20.89
758	10.04	10.04 ✓	21.50
DO	8.10	8.82 ✓	21.60
tur 0	0.0	0.0	21.11
40	38.7	39.9	20.92

calibration successful.

8/18/08 T4
Post calibration check

PH		Temp
7 std	= 6.98	20.19
10 std	= 10.08	20.70
4 std	= 3.91	20.39
DO	9.22	BP 757 temp 20.21

Tur	0.0 std = 0.0 ✓	20.36
	40.0 std = 40.2 ✓	20.63

8/19/08 calibration

PH	initial	Final	Temp
7	6.96	7.02	19.1
10	10.09	10.08	18.7

DO	initial	Final	BP	Temp
	9.24	9.24 ✓	758	18.71

Turb.	initial	Final	Temp
0.0	0.1	0.1	18.90
40.0	40.0	40.0	18.50

8/19/08 T4

0600 arrive marina
m. Wilson
Jo Fox

overcast, drizzle, SW w
D. Gillingham to help se

JF 0630 - calibrated hydro lab
Turb

0650 Arrived at background sta
~~0600 Arrived at~~ BG-01

Measuring velocity, water qua
parameters, and background wat

0720 Arrived at T-4. Dredgers ha
trouble with their eqpt. Haven
starting dredging yet. Standing b

0815 - Still standing-by. Measured di
from back of crane to the buche
= 45 yards or 40 meters. Will
then measure distance from back
crane and add 40 meters to f
our water quality locations

0840 Began dredging on S3A

0925 Began taking measurements

1145 Finished first 2 rounds

2015 S3M-M

713425

7618987

windy less rain

2025 S3M-N

713836

7619072

2030 S3M-S

713021

7619185

8/20/08

0700 Arrived at Fred's Marina - Calibrated Hydrolab - weather - overcast, cool, light rain

0805 Departed Marina.

0810 Arrive @ Wheeler Bay to inspect for plumes, etc.
- no sheen, discoloration or plumes visible

0820 Arrive @ fish diversion nets to inspect status.
- Net in good condition, placement is stable & no rips or tears visible, all buoys afloat.

0053 - velocity meter code

8/19/08 Post

Calibration check

PH	initial	temp
7.0	7.10	19.19
0.0	10.17	19.26

DO 9.94 752 22.27

NTU

0.0 = 0.0
40.0 = 39.4

8/20/08 Calibration Hydrolab

PH	initial	final	Temp
7.01	7.09	7.02	18.32
10.00	9.98	10.09	18.28

DO 9.54 754.8 9.33 18.38

Turbidity

0.1	0.0	0.0	18.32
40.0	40.3	39.9	18.61

checked velocity meter - 0.2 fps functioning!

S3M-N 2115

713 836

7619 058

In compliance

Post Calibration

8/20/08 2350

	initial	temp	final
pH	7.0	6.53 st. 19.25	7.02 st.
DO	10.0	10.35 st. 14.60	10.07 st.
BP	755	initial	Final
	21.72	9.86	8.77
0.0 std	= 0.05 ^{DK}		0.5
0.0 std	= 40.1		

Changed Turb. Sponge.
Washed probes with simple green.

8/21/08

HydroLab Calibration

pH	initial	final	Temp
7	7.00	7.02	17.51
10	10.03	10.10	17.28
DO	8.28	9.61	BP Temp
		757.1	17.08

Turbidity

0.0	0.0	0.1	16.97
40.0	40.0	40.0	16.77

0600 Arrived at Freds Marina.
Calibrated hydroLab

0700 Arrived at Background station
BG-01. Collected Background
Sample BG-01-B-WS-080823

0755 Began 1st round of water
quality parameters. Will collect
water samples this round. Began
dredging ^{33A} at 0630. We had to
wait 45 minutes to begin ^{measur.} _{collec.}
parameters & collect 1 sample
in the 1st hour of dredging

0715 - 0815 1st hour

0715 - 1115 - 1st 4 hours

1115 - 1515 - 2nd 4 hours

53A-E	1925
713442	7619178
53M-M	1930
713427	7619002
53M-S	1940
713014	7619199
53M-N	1950
713854	7619047

8/22/08 calibration

Ph	initial	Final	Temp
7 std	7.01	7.02	16.85
10 std	10.07	10.10	16.67
DO	2.93	10.37	13.22
BP 761			
turb			
0.0 st	0.0	0.1	13.56
40.0 st	40.0	40.0	15.26

Calibration successful

0600 Arrived at Fred's Marina
Calibrated Hydrolab

0656 Leaving Marina.

0715 Arrived at BG-OIR. This
BG location has been moved
to 100 m from the edge of
the shore (or dock) which is equal
to the mouth of the harbor

0720 Tried to measure flow with
velocitymeter not working.

0745 Van Dorn not working. Won't
close properly. Not enough tension
on the rubber surgical tubing

100' offset
 80m to mid + offset
 250' from target

8/23/08 Calibration

	Initial	Final	Temp
PH 7std.	7.06	7.03	16.58
10std.	10.12	10.12	16.37
DO	11.01	9.94	16.04
BP 760.3			
Turb			
0.0 st	0.1	0.1	16.47
40.0 st	35.7	39.8	17.01

Calibration Successful!

8/23/08

T4

Jrenda
E. Antonaguei

0530 At marina, meet w/ D Laffoon,
-transfer equipment.

0600 Calibrate meters

0715 Head to T4

0730 Set up at 36-01R

0800 Set up at S3AE early morning station
Barge getting ready to move for survey
Head to 36-01R for background clarity
Single

0930 Collect 31-36-01R-C-080823
71369 7619987

0940 Dredging resumed

1000 Set up at S3A-E
713340 7620135

1015 Set up at S3A-S
713261 7619994

1020 S3A-M 713353 7619986

1040 S3A-N 713486 762055

S3A-MA 713353 7619987

1115 S3A-MB 713357 762001

1130 S3A-MC 713382 7619975

Samples Collected



8/24/08

T4

A. GREGORY

D. LAFOON

0645 - ARRIVE @ MARINA, LOAD BOAT.

0715 - CALIBRATE HYDRO LABS, FOR PH, DO, TURBIDITY

CALIBRATION SUCCESSFUL!

0737 - UNDERWAY FOR T4

0806 711423.7N 7619970.09E

~~T4~~ BG-01R

0830 BACK TO FRED'S TO PICK UP TRASH BAGS

0845 DREDGING BEGINS

0900 BACK @ T4

0908 OS @ S3A-E

713361.78'N 7620246.41'E

0917 FOUND PEA SIZED BALL OF GREASE W/ SMALL (41ft²) SHEEN FLOATING ON WATER. REMOVED W/ RAG.

0940 OS @ S3A-N

~~713~~ 713415.74'N 7620079.53'E

0945 OS @ S3A-M

713295.42'N 7620090.43'E

0955 OS @ S3A-S

713185.03'N 7620156.51R+E

8/24/08

T4

1006 OS @ S3A-E

713374.16N 7620236.8

1019 OS @ S3A-M

713433.30N 7620088.1'

1020 to NOTICED DO READING LOWER 4'

1115 normal, RECAL sample 3 times FOR DO.

1120 OS @ S3A-M

713302.03N 7620046.88

1125 713195.49N 7620118.64

OS @ S3A-S 1125

1130 OS @ S3A-E

RE-CAL DO.

WE HAVE RE-CALIBRATED D 41-5 TIMES, DO SEEMS TO DROPPING EACH TIME. EVEN THE BUCKET WATER ON DECK WHERE WE ARE STORING THE METER IS READING LOWER THAN THIS MORNING. OPEN AIR READINGS ARE 8.5, SHOULD BE B/W 10-12

T-4

- SSA-E 713386.89'N 7620257.03'E
- SSA-N 7134130.60'N 7620062.14'E
- SSA-M 713304.86'N 7620083.88'E
- SSA-S ~~71330.27'N 76~~
713232.57'N 7620092.58'E

- OS@ SSA-N

To TAKE WATER SAMPLES

- Collected "A"
- Collected "B"
- Collected "C"

- BG-SSA-01R-C

711447.56'N 7619961.11'E

- ARRIVE@ FRED'S TO MEET
COURIER

OPEN AIR DO Reading = 8.37

- COURIER PICKUP
- UNDERWAY

- SSA-E 713406.00'N 7620116.41'E
- SSA-N 713430.39'N 7619906.99'E
- SSA-M 713344.45'N 7619977.97'E
- SSA-S 713289.26'N 7620009.01'E

Exceedence IN TURBIDITY @ SSA-N-C
HEADED OUT TO COMPLIANCE STATION

8/24/08

T4

- 1557 SSM E 713438.07'N 7619188.89'E
- 1607 SSM N 713856.00'N 7619072.00'E
- 1615 SSM M 7134270.00'N 7619002.00'E
- 1620 SSM S 713034.00'N 7619188.00'E
- 1620 - DREDGING OPS COMPLETE
- 1700 - Tied up @ FRED'S

8/25/08

T4

A. GREGORY

759-48968

D. PETERSON

0545 ARRIVE @ BOAT

CALIBRATE EQUIPMENT

PH - CAL Successful

TURB - CAL Successful

0640 DREDGING Began

0710 - UNDERWAY

98µ Turb 8.82

Temp 22.35°

PTLY CUDY WIND NW @ 5kts

8/26/08

J. Renda
D. Peterson0530 Onsite
Calibrating meters0640 Head to BG-01R
Dredging started at 0630 (411)0705 Anchor at BG-01R
711408 7617984

0740 Dredging at (410)

0730 Collect chemistry sample
BG-01R-C-080826

0815 At early warning location

S3A-E 713467N 7619820E

0825 S3A-S 713253N 7619767E

0835 S3A-M 713354N 7619734E

0845 S3A-N 713530N 7619718E

0900 Collect Chemistry Samples

T4-S3A-NA-080826 w/MS/MSD

0910 T4-S3A-NB-080826

0915 T4-S3A-NC-080826

* Note: Sample names should be 410 instead of S3A. Judge to call 666.

9:30 Package up samples and
to Fred's Mann to meet courier

1145 Pass off samples to courier

12:30 Setup at 410-E

713462N 7619719E

410-S (inside silt curtain)

1240 713209N 7619722E

1250 410-M (Outside edge of silt curtain)

713296N 7619632E

1300 410-N (Outside of silt curtain)

713530N 7619630E

1330 Receive call end of dredging
the day. Surveyors surveying area

1400 at manner

Unbond equipment

1430 Head to T4 office

D LAFFLOW
D Peterson

8/27/08

0830 - onsite, calibrated meters

0900 - Head out to B6-01R

0920 At B6-01R

711436.01 N 7619981.15 E

0945 - Drilling started @ 630 ft. off d on dredging this morning.

At 410-E

713467.48 N 7619683.53 E

1000 - At 410-N

713508.32 N 7619519.49 E

Barge movement between North and mid samples

1010 - At 410-M

713376.71 N 7619472.74 E

1015 - At 410-S

713268.58 N 7619584.15 E

1020 Only one round of monitoring is required now - complete for the day - head for marina

1320 Returned to marina to go to T-4 on plot pile points and check floor around piles

1500 - All noted pile IAD then 5 ft where located by GPS, tagged soil around piled felt with tape measure for rock/prop breaking for marina

1520 - Arrived at marina - unles

1530 - Leaving for T4 office

8/28/08

D LAFFLOW
G Nagl

0815 - @ Marina - calibrate meter

0950 - At B6-01R

711433.45 N 7619984.92 E

1010 - At 410-E

713492.08 N 7619488.01 E

1018 - At 410-N

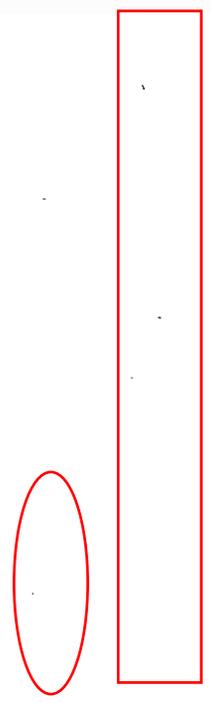
713536.14 N 7619316.44 E

1025 - At 410-M

713452-N 7619328.94 E

1030 - At 410-S

713307.25 N 7619333.87 E



8/28/08 D. LAFFOON
G. NAGLER

1130 AT MARINA

1145 Arrived at T-4, maneuvered to
get close to Piles SA 15B

1155 Took composite sample @ 5A

1207 Took composite sample @ 5B

1217 Took composite sample @ 4A

1223 Took composite sample @ 4B

1233 Took composite sample @ 3A

1241 Took composite sample @ 3B

1251 Took composite sample @ 2A

1259 Took composite sample @ 2B

1310 Took composite sample @ 1A

1317 Took composite sample @ 1B

1331 Arrived @ MARINA & offloaded
Note: all samples above where
wood from piles at 53B

8/29/08 D. LAFFOON
G. NAGLER

1130 AT MARINA, bad equipment

1150 Leave MARINA, calibration done

1204 AT 86-01R
711418.14 N 7619984.18 E

1215 Picked up Andrew. Some of EPA
@ Wheeler Bay

1219 AT 410 E (Southerly)
713417.35 N 7619331.49 E

1220 - Completed dredging for the day

1223 AT 410-N
713093.54 N 7619617.00 E

1227 AT 410-M
713423.85 N 7619190.11 E

1235 AT 410-S
713202.07 N 7619315.13 E

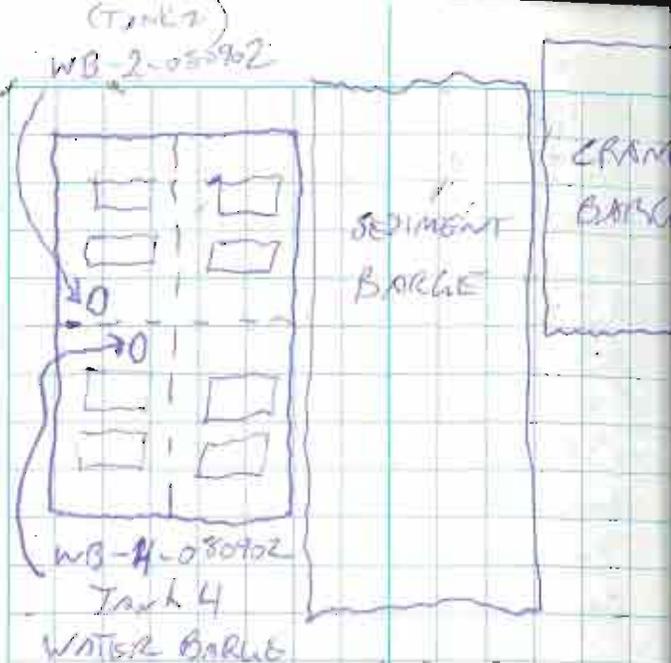
1245 Dropped off Andrew Some
at Wheeler Bay

9/2/08

D LAFTOON
A MAGLER

- 1015 At Marina, local equipment on boat. Loaded additional material purchased at Safeway (bag, ice, distilled water.)
- 1045 Calibration complete - OK, left Marina.
- 1109 At BG-01R (waiting out sample bottles) - @ anchor
711416.45 N 7620005.28 E
- 1120 Task meter readings @ BG-01R
- 1130 Took lab samples @ BG-01R - C
- 1135 Dredging stopped - will restart @ ~ 1300 - will take 410 data then.
- 1300 Got sample bottles to pull lab samples from Water Barge
- 1330 Sampled water barge Tank 4
- 1400 Sampled water barge Tank 2

see sketch next page



- 1500 @ 410E
713561.83 N 7619169.20 E
- 1510 @ 410 N
713735.04 N 7619039.80 E
- 1515 @ 410 M
713616.77 N 7618992.97 E
- 1520 @ 410 S
713346.08 N 7618989.59 E
- 1530 @ BG-01R to recheck
711435.50 N 7619993.56 E

@ 53M-S

712995.38 N 7619173.77 E

713435.16 N 7618978 E

@ 53M-M

@ 53M-N

713835.16 N 7619073.94 E

@ 410 M for lab samples

713567.04 N 7618968.17 E

Arrived @ Marina, gassed up boat^{DEL}

Transferred casework of lab

samples to APBX

Unloaded boat of equipment

D. LAPPON
in NAGLER

9/3/08

0915 - At Marina - loaded boat -
calibrated meter - OK

0950 - At BC-DIR

711414.00 N 7619987.92 E

1000 - Meet Brett of Portland BES
at Cathedral Park

1010 - Arrived at the T-4 water bridge
to take samples for Portland BES

1100 - Left water bridge w/samples

1115 - Dropped off Brett of Portland
BES with his samples at
Cathedral Park

1130 - At 410 E

713560.36 N 7619059.17 E

1140 - At 410 N

713758.67 N 7618930.19 E

1145 - At 410 M

713568.72 N 7618899.83 E

1150 - At 410 S

713321.38 N 7618966.87 E

1205 - Arrived at Marina, put gas in
boat, unloaded equipment

9/4/08

D. LAFFOON
G. NAGLER

0920 - Arrived at Marina, loaded boat, calibrated meter - OK

0955 At BG - OIR

711418.14 N 7619984.18 E

Height turbidity 9.0 - going with 90% percentile calc of 10.3

1100 At 410 E

713500.72 N 7619457.48 E

1110 At 410 M

713537.02 N 7619289.11 E

1115 At 410 N

713609.11 N 7619280.21 E

1120 At 410 S

713447.00 N 7619284.05 E

1125 Monitoring piling removal operations at the head of slip 3.

12:00 Pile removal complete

12:15 Arrived at Fred's Marina

9/5/08

D. LAFFOON

A. GREEN

0900 At Marina - loaded boat calibrated meter - OK

1010 At BG - OIR

711422.85 N 7619982.7

Highest background turbidity, ISS = Compliance limit.

1025 At 410 - E

713474.23 N 7619320.00

1035 At 410 - N

713678.77 N 7619176.50

1045 At 410 - M

713493.97 N 7619130.87 E

1055 At 410 - S

713191.02 - N 7619273.59 E

1100 At 53M - S

713011.59 N 7619193.02

1110 At 53M - M

713429.59 N 7618989.20 E

1120 At 53M - N

713833.68 N 7619067.20 E

1150 At Marina to go to lunch

1240 Back at boat - leaving Marina

1255 At Slip 3 head to take pile of sediment samples

1545 At Marina - unload boat

9/12/98

D. LATTOON

M. WILSON

- 0800 - Matt at Marina, Dory at T-4 office getting equipment.
- 0900 - Barge arriving at slip
- 0920 - Dory arrived at MARINA.
- 0955 - Left Marina & arrived at slip. Barge just started plowing sand. Calibrated water - OK.
- 1015 AT BG-01R
711424.84 N 7619986.72 E
- 1030 Took lab samples at BG-01R
- 1100 AT S3B-E
713367.82 N 7620233.86 E
- 1125 AT S3B-S
713136.02 N 7620133.80 E
- 1130 AT S3B-M
713273.85 N 7620060.42 E
- 1135 AT S3B-N
713463.64 N 7620068.41 E
- 1145 AT S3B-E
713367.95 N 7620219.49 E
- 1155 AT S3B-S
713148.18 N 7620137.31 E

9/13/08

D LAFFOON
G Naylor

- 555 - Grab of Drog at Mrawn -
loaded equipment. Calibrated
meter - OK
- 640 - Arrived at T-4, no work
going on yet.
- 700 - Commenced capping @ 53B
- 705 - At 53B-01R
~~71416.41 N 7619980.55 E~~
71417.70 N 7619991.53 E
Took lab samples
- 745 - At 53B-E
713257.34 N 762020.59 E
- 755 - At 53B-S
713119.91 N 7620150.41 E
- 800 - At 53B-M
~~713133.41 N 7620~~
713254.47 N 7620102.40 E
- 805 - At 53B-N
713454.62 N 7620151.99 E
- 815 - At 53B-E
713257.64 N 7620282.67 E
- 825 - At 53B-S
713117.00 N 7620173.00 E
- 830 - At 53B-M
713258.84 N 7620098.96 E

0833

- ~~0835~~ - Ross Island tug & barge
arrived and had to move from
53B-M location before lower
reading was made
- 0837 - Back at 53B-M to complete reading
713262.13 N 7620087.72 E
- 0845 - Waiting for tug to relocate nose
of 53B-N, went to get ice
for samples
- 0915 - returned to T-4, noticed no
inactivity on barge
- 0915 - At 53B-N
713441.28 N 7620158.29 E
- 0930 - At 53M-E
713435.07 N 7619173.13 E
- 0935 - At 53M-M
713423.86 N 7619004.65 E
- 0940 - At 53M-S
713000.96 N 7619172.92 E
- 0945 - At 53M-N
713832.96 N 7619056.51 E
- 0950 - At 53B-E, no capping activity
713238.49 N 7620271.74 E
- 1025 - Resumed capping activity

10 At 53B-E
713198.47N 7620308.64E

15 At 53B-S
713107.67N 7620176.05E

20 At 53B-M
713242.23N 7620109.46E

25 At 53B-N
713447.00N 7620159.48E

30 At 53B-M to take lab samples.

35 At 53M-E
713431.38N 7619196.25E

40 At 53M-M
713437.77N 7618989.36E

45 At 53M-S
713022.23N 7619188.24E

50 At 53M-N
713836.90N 7619066.32E

520 Arrived at Fred's Marina

522 & Transferred custody
of samples to Apex counter.

545 Unload equipment from boat and
transported to storage locker

D. LAFFOON
G. WAGLER

9/15/08

0700 - MEET AT FRED'S MARINA.
CALIBRATED HYDROLAB - OK

0805 - 711419.85N 7619982.10E

0810 - Took lab samples at BG-01R-C

0830 - At 53B-E
713116.99N 7620321.98E

0835 - At 53B-S
713098.06N 7620125.58E

0840 - At 53B-M
713253.08N 7620144.51E

0845 - At 53B-N
713398.93N 7620205.35E

0855 - Back at 53B-M for lab sampling

0925 - At 53M-E
713437.77N 7619171.65E

0930 - At 53M-M
713429.81N 7619006.34E

0935 - At 53M-S
713018.60N 7619186.08E

0940 - At 53M-N
713832.94N 7619066.34E

0942 Seal horse repositioning
w/ Husky assist. Capping
suspended for surveying & maint.

9/16/08

D LATTOON

G WALKER

0630 - met at Marina, loaded boat
calibrated meter - OK

0710 - Arrived at T4 - no work going
on

0735 - Seahorse started, bucket moving
material on barge

0745 - started S3B capping

0755 - At BG-01R

711413.74 N, 7619982.94 E

0815 - At S3B-E

713367 N, 7620250 E

0830 - At S3B-~~A~~ S

713191 N, 7620135 E

0835 - At S3B-M

713346 N, 7620072 E

0840 - At S3B-N

713452 N, 7620055 E

0850 - At S3M-E

713437 N, 7619164 E

0855 - At S3M-M

713427 N, 7618991 E

0900 - At S3M-S

713016 N, 7619193 E

0905 At S3M-N

713844 N, 7619078 E

1010 At MARINA, replaced by
hydro fail.

1145 Received new slip location

1205 At T-4, no activity going

1310 At head of slip, found dead
Salmon - looked dead for
last a few days

1320 Location of dead salmon
lab samples, equal lab results

713095 N, 7620474 E

1340 - to reading but delayed lab so

1355 - At BG-01R

711404 N, 7619969 E

Started a prep capping

1510 - Got lab samples at dead fish so

1515 - At S3B-E

713153 N, 7620327 E

1525 - At S3B-S

713091 N, 7620149 E

1530 - At S3B-M

713239 N, 7620113 E

3:35 At 53B-N
713391 N, 7620212 E
5:35 Capping complete
For claw
5:45 Chem samples taken at
53B-N
6:15 Arrived back at Marina, exchanged
custody of samples to APEX
unloaded all gear
4:5 Left marina Friday

9/17/08

D. LAFFOON

G. MAGLER

0720 - Arrived at Marina, loaded gear
0830 - Hydrolab calibrated - OK
0840 - Arrived at T-4 to GPS pilings
0910 - Commenced Rip Rap capping 53B
0930 - At BG-01R
711418 N, 7619990 E
0940 - Took lab samples @ BG-01R-C
1000 - At 53B-E (Tier 1, Round 1)
713108 N, 7620322 E
1010 - 713088 N, 7620142 E
At 53B-S
1015 - At 53B-M
713199 N, 7620143 E
1020 - At 53B-N
713425 N, 7620307 E
1030 - At 53B-E (Starting Round 2)
713092 N, 7620339 E
1035 - At 53B-S
713088 N, 7620137 E
1040 - At 53B-M
713186 N, 7620149 E
1045 - At 53B-N
713428 N, 7620295 E

44
9/18/08

0630 - At Marina, loaded equipment
calibrated meter - OK
0730 - At BG-01R
711404 N, 7619987 E
0750 - Took lab samples @ BG-01R
0825 - At 53B-E
713180 N, 7620287 E
0830 At 53B-S
713098 N, 7620127 E
0838 Area capping has stopped
0845 At 53B-M
713251 N, 7620103 E
0900 At 53B-N
713451 N, 762,0244
0910 Restricted 53B capping
0920 At 53B-E
713143 N, 7620331 E
0940 At 53B-S
713085 N, 7620135
0953 At 53B-M
713221 N, 762.0098 E
1010 At 53B-N
713436 N, 7620253 E

1115 At 53B-E
713126 N, 7620334
1125 At 53B-S
713081 N, 7620138
1135 At 53B-M
713213 N, 7620101
1150 At 53B-N
No satellite geometry
1200 At 53B-M to take lab
1225 At 53M-E
713465 N, 7619177 E
1235 At 53M-M
713442 N, 7619000
1240 At 53M-S
713031 N, 7619201
1250 At 53M-N
713839 N, 7619052 E
1300 Meet APEX COURIER AT FRED
MARINA & transferred contents
of lab samples
1430 At ~~25B~~ 53B-E
713113 N, 7620345
1450 At 53B-S
713079 N, 7620138

1/19/08

D. LAFFOON
G. NAGLER

00 At MARINA - loaded gear on boat
 20 At BG-OIR
 711430 N, 7620006 E
 (late entry) start work at
 the head of slip, S3B using
 spider hoe
 00 At S3B-E
 713118 N, 7620353 E
 10 At S3B-S
 713071 N, 7620209 E
 20 At S3B-M
 713206 N, 7620179 E
 0 At S3B-N
 713418-N, 7620370 E
 0 At MARINA, off loaded gear
 end of day.

20/08

D. LAFFOON
G. NAGLER

0 At MARINA - loaded gear
 calibrated equipment - OK
 5 At BG-OIR
 711413 N, 7619977 E

1045 At S3B-E,
 713130 N, 7620357 E
 Work commenced w/ spider
 hoe at head of slip @ 073
 1100 At S3B-S
 713080 N, 7620203 E
 1110 At S3B-M
 713233 N, 7620173 E
 1120 At S3B-N
 713440 N, 7620310 E
 1145 At MARINA - unloaded gear

9/22/08

D. LAFFOON
G. NAGLER

0800 - At MARINA - loaded gear
 calibrated equipment
 0830 - At BG-OIR
 711398 N, 7619995 E
 0950 - At S3B-E
 713126 7620351
 1000 - At S3B-S
 713085 N 7620206 E
 1010 - At S3B-M
 713198 N, 7620174



At S3B-N

713431 N, 7620288 E

Installed additional buoy along
net line to help keep net at
water surface

Arrived at Fred's Marina

7/23 T4

09:30 Arrived @ Fred's Marina

09:35 Boarded anchor boat
(Cabe Nagler + Doug LaFoon)

09:40 Calibrated HydroLab!

	Initial	Final	Temp
pH	6.95	7.01	13.62
	0.07	10.02	11.06
Turb	10.42	0.0	—
	8.2	39.5	—
DO	11.09	11.03	11.78

BP = 766.5

1115 A BG-01R

711415 N, 7619972 E

Had problems w/ HydroLab

1150 At Marina to get YSI

1330 Back at BG-01R

1350 At S3B-E

713128 N, 7620336 E

1355 At S3B-S

713085 N, 7620168 E

- 05 AT S3B-M
713178 N, 7620184 E
- 10 AT S3B-N
713221 N, 7620353 E
- 07 (late entry) recommended S3B capping
- 15 Back at S3B-S to take lab samples
- 40 Back at Marina, transferred
custody of lab samples to courier.
removed equipment from boat



9/24/08

D. LAFFOON
G. NAGLER

- 0900 - At Marina, calibrated all
equipment
- 1005 - At BG-01R
711421 N, 7619994 E
- 1035 - At S3B-E
713127 N, 7620338 E
- 1045 At S3B-S
713087 N, 7620191 E
- 1055 At S3B-M
713234 N, 7620121 E
- 1105 At S3B-N
713443 N, 7620216 E
- 1145 At Marina -
unloaded equipment

125/08

D. LAFFON
G. NAGLER

- 900 At Marina - loaded boat
calibrated equipment
- 005 At BG-01R
711405 N, 7619942 E
- 120 At 53B-E
713126 N, 7620344 E
- 130 At 53B-S
713089 N, 7620185 E
- 135 At 53B-M
713230 N, 7620138 E
- 140 Van Dorn's elastic mechanism
dislocated from terminal
restoring int. Prepared
to retrieve alternate
dihydrogen monoxide retriever,
vertical isolator.
- 120 Back at 53B-M with van (DMVIR)
Van Dorn
- 145 At 53B-N
713419 N, 7620273 E
- 150 Arrived at Fred's Marina

9/30/08

D. LAFFON
G. NAGLER

- 1145 At Marina - loaded boat &
calibrated all equipment - OK
- 1240 At BG-01R
711419 N, 7619990 E
- 1330 At 53B-E
713130 N, 7620290 E
- 1345 At 53B-S
713101 N, 7620158 E
- 1355 At 53B-M
713163 N, 7620135 E
- 1400 At 53B-N
713492 N, 7620283 E
- 15:00 Arrived at Fred's Marina



10/1/08

D. LATTOUN
S. NABLER

10:30 At Marina, loaded boat,
calibrated equipment - OK

11:10 At BG-01R
711434 N, 7619986 E

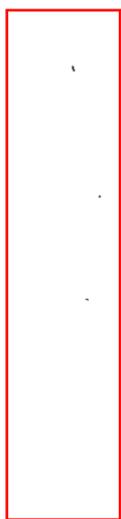
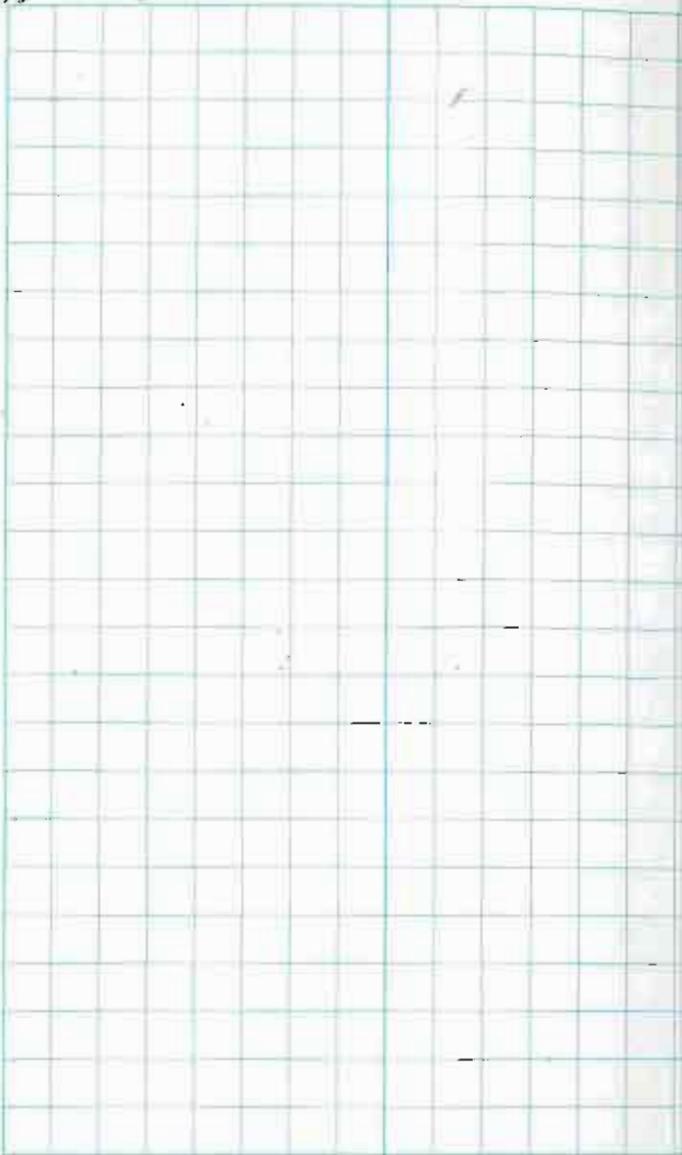
11:40 At 538-E
713150 N, 7620279 E

11:45 At 538-S
713092 N, 7620135 E

11:55 At 538-M
713240 N, 7620119 E

12:05 At 538-N
713424 N, 7620298 E

13:00 Arrived at Fred's Marina



-----Original Message-----

From: Sheldrake.Sean@epamail.epa.gov [mailto:Sheldrake.Sean@epamail.epa.gov]
Sent: Friday, August 15, 2008 11:10 PM
To: Tom Schadt
Cc: Ben Hung; Elizabeth Appy; John Verduin; krista.koehl@portofportland.com;
nicole.lafranchise@portofportland.com; sheila.david@portofportland.com
Subject: RE: T4 Water Quality Monitoring, Chemistry Monitoring Timing
Requirement

Tom, Nicole,

The Port's proposal is approved. Thank you for the quick turnaround on this.

S

Sean Sheldrake
USEPA, Region 10
Environmental Cleanup Office
1200 Sixth Avenue, Suite 900, ECL-110
Seattle WA 98101-3140
sheldrake.sean@epa.gov
Phone: 206/553-1220 / Fax: 206/553-0124
Region 10 Dive Team:
<http://yosemite.epa.gov/r10/oea.nsf/webpage/dive+team>
Portland Harbor Cleanup:
<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
Deliveries: 9th floor mailroom
Visitors: Check-in @ PERC / Service Center on 12th floor:
<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"Tom Schadt"
<tschadt@anchorenv.com>

08/15/08 05:17
PM

To
Sean Sheldrake/R10/USEPA/US@EPA,
<krista.koehl@portofportland.com>
,
<nicole.lafranchise@portofportland.com>,
<sheila.david@portofportland.com>
cc
"Ben Hung" <bhung@anchorenv.com>,
"John Verduin"
<jverduin@anchorenv.com>,
"Elizabeth Appy"
<eappy@anchorenv.com>

Subject
RE: T4 Water Quality Monitoring,
Chemistry Monitoring Timing
Requirement

Sean.

We have discussed this with the Port and we understand the concern of an apparent bias towards conditions when turbidity may be relatively low as compared to the rest of the day's activities; and agree that some sort of random selection of when the sample is collected will be more representative. We think this can be implemented most efficiently if just one sample per day is pulled because there is quite a bit of effort involved in processing the chemistry sample while in the field, and the monitoring crew has a lot of other tasks to keep up with as well. We recommend adopting a plan whereby the sampling round that is selected is moved back one round for each subsequent day of dredging. Once the sample has been pulled from the last round (typically the fourth round), the rotation would move back to Round 1 for pulling the chemistry sample. the following schedule provides an example of which Round will be used for the first seven days of dredging.

Day 1: Collect the chemistry samples during the first round of sampling

Day 2: Collect the chemistry samples during the second round of sampling

Day 3: Collect the chemistry samples during the third round of sampling

Day 4: Collect the chemistry samples during the fourth round of sampling

Day 5: Collect the chemistry samples during the first round of sampling

Day 6: Collect the chemistry samples during the second round of sampling

Day 7: Collect the chemistry samples during the third round of sampling

This type of rotation would continue for the life of the project, and the samples would consist of the 3 depth intervals from the station where the highest turbidity reading was recorded during that particular round of sampling. We also understand from your comment that these randomly selected times may also be adjusted subjectively to occur when elevated turbidity occurs. Again, while we recognize the need for that, we would like to be in a position where we collectively make these decisions in an effort to minimize the sampling crews time processing field samples that may not be submitted to the laboratory for analyses. Please confirm that this type of an approach will work for you. Obviously we will be coordinating the implementation of this with your on-site representative throughout the field program. Tom

-----Original Message-----

From: Sheldrake.Sean@epamail.epa.gov

[mailto:Sheldrake.Sean@epamail.epa.gov]

Sent: Thursday, August 14, 2008 6:17 PM

To: Betsy Yanasak; krista.koehl@portofportland.com;

nicole.lafranchise@portofportland.com; sheila.david@portofportland.com;

Tom Schadt
Subject: T4 Water Quality Monitoring, Chemistry Monitoring Timing
Requirement

Nicole,

EPA is directing the Port to complete WQ monitoring for chemistry at a variety of sampling times during the 4-hour interval of hourly sampling events each day. The actual time for the WQ monitoring for chemistry should be selected randomly, but could also be adjusted subjectively to occur when elevated turbidity (e.g., a turbidity exceedance at the POC) is observed during one of the hourly sampling events. Collecting all chemistry samples during the first hour's sampling event does not meet the intent and spirit of the various plans and agreements. WQ monitoring is being completed to obtain "representative" data to document environmental protection, and should not be completed in a manner that has the potential to appear biased. Section 6.3.4 of the QAPP defines representativeness as "the degree to which sampling data accurately and precisely represent conditions in, for this project, the Removal Action area." EPA considers "time" to be an element of representativeness. The Port's WQMP and Lab Communication Plan both state that the samples for chemistry will be collected at "the station with the highest turbidity readings". Neither documents state that samples for chemistry will occur consistently "at the first hour's sampling event at the station with the highest turbidity readings." Additionally, the WQMCCP did not specify a time based on the EPA's expectation that WQ monitoring for chemistry would occur in a manner that would generate representative results. The basis for this change is the WQMCCP, "Additional water quality measurements will be taken at the discretion of the Quality Assurance Official and EPA, and are intended to define the area of impact and assess the situation to allow informed decisions." See also: Section 4.2.3, "EPA may approve lower or higher frequencies and numbers of required samples, depending on the sample results received during the Removal Action implementation."

Let me know if you have any questions or concerns. Thank you.

S

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sheldrake.sean@epa.gov
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Portland Harbor Cleanup:
<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
Deliveries: 9th floor mailroom
Visitors: Check-in @ PERC / Service Center on 12th floor:
<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

-----Original Message-----

From: Shelldrake.Sean@epamail.epa.gov [mailto:Shelldrake.Sean@epamail.epa.gov]

Sent: Tuesday, August 19, 2008 2:29 PM

To: Ben Hung

Cc: Amanda Shellenberger; ASomes@parametrix.com; Elizabeth Appy; JMalek@parametrix.com; Durst, John; John Verduin; Ken Fellows; Koehl, Krista; Lori Russo; Hermans, Marcel; Green, Mary; LaFranchise, Nicole; Anderson, Roger; Rick Schwarz; David, Sheila; Tom Schadt; Tim Stone
Subject: RE: Port of Portland T4: Additional clarifications related to WQMCCP, Monitoring, and Reporting

Thanks Ben; that's a good summary. Please proceed according to this new plan and we'll adjust if there are any new hits. S

Sean Shelldrake

USEPA, Region 10

Environmental Cleanup Office

1200 Sixth Avenue, Suite 900, ECL-110

Seattle WA 98101-3140

shelldrake.sean@epa.gov

Phone: 206/553-1220 / Fax: 206/553-0124

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Portland Harbor Cleanup:

<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>

Deliveries: 9th floor mailroom

Visitors: Check-in @ PERC / Service Center on 12th floor:

<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"Ben Hung"
<bhung@anchorenv.com>

08/19/2008 11:28 AM

To
Sean Shelldrake/R10/USEPA/US@EPA

cc
"Amanda Shellenberger"
<ashellenberger@anchorenv.com>,
<ASomes@parametrix.com>,
"Elizabeth Appy"
<eapp@anchorenv.com>,
<JMalek@parametrix.com>, "Durst,
John"
<John.Durst@portofportland.com>,
"John Verduin"
<jverduin@anchorenv.com>, "Ken
Fellows"
<kfellows@parametrix.com>,
"Koehl, Krista"
<Krista.Koehl@portofportland.com>
, "Lori Russo"
<lrusso@anchorenv.com>, "Hermans,
Marcel"
<Marcel.Hermans@portofportland.com>,
"Green, Mary"

<Mary.Green@portofportland.com>, "Anderson, Roger"
<Roger.Anderson@portofportland.com>, "Rick Schwarz"
<rschwarz@anchorenv.com>, "David, Sheila"
<Sheila.David@portofportland.com>, "Tom Schadt"
<tschadt@anchorenv.com>, "Tim Stone" <tstone@anchorenv.com>, "LaFranchise, Nicole"
<Nicole.LaFranchise@portofportland.com>

Subject

RE: Port of Portland T4:
Additional clarifications related to WQMCCP, Monitoring, and Reporting

Sean,

Nicole requested that I further clarify a few points in your response so that we are on the same page.

Today at T4 we will perform 3 field parameter rounds. We'll collect the chemistry samples in the third round today per our earlier agreement. If there are no exceedances in the first 3 rounds we will back off to one round per four hours.

Tomorrow morning (unless there is an exceedance) we will continue to conduct one field parameter round for every 4 hours of activity. This frequency will be maintained unless there is an exceedance or until the start of a new construction activity; or, if the current activity changes significantly (e.g. a different dredging bucket is used); or, if a shutdown occurs (not including normal nightly shutdowns). The chemistry sample will be collected in the 4th hour during the morning tomorrow. Consistent with your desire for us to collect the chemistry sample at various times and per our earlier agreement, we will collect the chemistry sample during the 1st hour on Wednesday, 2nd hour on Thursday, and so on.

Finally, with respect to the time it takes to conduct each round of field parameter monitoring, I understand from your response that the requirement has been reduced to 3 rounds rather than 4 rounds of field parameters at the start of any new activity (or if an exceedance occurs).

With your concurrence, we will consider these matters resolved.

Thanks again,

Ben Hung
Anchor Environmental, L.L.C.
6650 SW Redwood Lane, Suite 333
Portland, OR 97224
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503.670.1128 (F)
971.678.2100 (C)
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Please consider the environment before printing this message.

-----Original Message-----

From: Sheldrake.Sean@epamail.epa.gov
[mailto:Sheldrake.Sean@epamail.epa.gov]
Sent: Tuesday, August 19, 2008 9:02 AM
To: LaFranchise, Nicole
Cc: Amanda Shellenberger; ASomes@parametrix.com; Ben Hung; Elizabeth Appy; JMalek@parametrix.com; Durst, John; John Verduin; Ken Fellows; Koehl, Krista; Lori Russo; Hermans, Marcel; Green, Mary; Anderson, Roger; Rick Schwarz; David, Sheila; Tom Schadt; Tim Stone
Subject: Re: Port of Portland T4: Additional clarifications related to WQMCCP, Monitoring, and Reporting

Nicole,

No I'm not around--I'm booked pretty much all day today thru Thursday, then gone. Please write down your questions and send them to us asap, as we may not be able to get back to you instantly.

We'll get back to you as soon as we can.

Thanks

S

Sean Sheldrake
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sheldrake.sean@epa.gov
Phone: 206/553-1220 / Fax: 206/553-0124
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Portland Harbor Cleanup:
<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
Deliveries: 9th floor mailroom
Visitors: Check-in @ PERC / Service Center on 12th floor:
<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"LaFranchise,
Nicole"

<Nicole.LaFranchise@portofportland.com>

08/19/2008 08:40
AM

To
Sean Sheldrake/R10/USEPA/US@EPA,
<bhung@anchorenv.com>

cc
<ashellenberger@anchorenv.com>,
<ASomes@parametrix.com>,
<eappy@anchorenv.com>,
<JMalek@parametrix.com>, "Durst,
John"
<John.Durst@portofportland.com>,
<jverduin@anchorenv.com>,
<Kfellows@parametrix.com>,
"Koehl, Krista"
<Krista.Koehl@portofportland.com>
, <lrusso@anchorenv.com>,
"Hermans, Marcel"
<Marcel.Hermans@portofportland.com>,
"Green, Mary"
<Mary.Green@portofportland.com>,
"Anderson, Roger"
<Roger.Anderson@portofportland.com>,
<rschwarz@anchorenv.com>,
"David, Sheila"
<Sheila.David@portofportland.com>
, <tschadt@anchorenv.com>,
<tstone@anchorenv.com>

Subject
Re: Port of Portland T4:
Additional clarifications related
to WQMCCP, Monitoring, and
Reporting

Sean,

we would like a call to clarify a few points on the T4 sampling plan; we are fine with 3 rounds today at T4 but have some other clarifying questions. Are you available around 10:00? We would like to sample once

in the Dalles today and if no exceedances are noted, drop down to once every four hours.

----- Original Message -----

From: Sheldrake.Sean@epamail.epa.gov <Sheldrake.Sean@epamail.epa.gov>
To: Ben Hung <bhung@anchorenv.com>
Cc: Amanda Shellenberger <ashellenberger@anchorenv.com>; Andrew Somes <ASomes@parametrix.com>; Elizabeth Appy <eappy@anchorenv.com>; John Malek <JMalek@parametrix.com>; Durst, John; John Verduin <jverduin@anchorenv.com>; Ken Fellows <kfellows@parametrix.com>; Koehl, Krista; Lori Russo <lrusso@anchorenv.com>; Hermans, Marcel; Green, Mary; LaFranchise, Nicole; Anderson, Roger; Rick Schwarz <rschwarz@anchorenv.com>; David, Sheila; Tom Schadt <tschadt@anchorenv.com>; Tim Stone <tstone@anchorenv.com>
Sent: Tue Aug 19 08:28:46 2008
Subject: RE: Port of Portland T4: Additional clarifications related to WQMCCP, Monitoring, and Reporting

Ben,

I would like 3 field parameters this morning due to all the changing background issue from yesterday. If no exceedances are found, you can back off to once per four hours at that point. The sample is to be taken randomly during the 4 hour window, not always during the four hour interval. For any shutdowns or start of any new activity, this must be restarted again at 3 for every 4 hours.

Let me know if you have any questions.

S

Sean Sheldrake
USEPA, Region 10
Environmental Cleanup Office
1200 Sixth Avenue, Suite 900, ECL-110
Seattle WA 98101-3140
sheldrake.sean@epa.gov
Phone: 206/553-1220 / Fax: 206/553-0124
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Portland Harbor Cleanup:
<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
Deliveries: 9th floor mailroom
Visitors: Check-in @ PERC / Service Center on 12th floor:
<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"Ben Hung"
<bhung@anchorenv.com>

08/19/2008 08:26 AM

To
Sean Sheldrake/R10/USEPA/US@EPA
cc
"Ken Fellows"
<kfellows@parametrix.com>,
"LaFranchise, Nicole"
<Nicole.LaFranchise@portofportlan

d.com>, "Koehl, Krista"
<Krista.Koehl@portofportland.com>
, "Anderson, Roger"
<Roger.Anderson@portofportland.co
m>, "Tom Schadt"
<tschadt@anchorenv.com>, "John
Verduin"
<jverduin@anchorenv.com>,
"Elizabeth Appy"
<eappy@anchorenv.com>, "Lori
Russo" <lrusso@anchorenv.com>,
"David, Sheila"
<Sheila.David@portofportland.com>
, "Green, Mary"
<Mary.Green@portofportland.com>,
"Durst, John"
<John.Durst@portofportland.com>,
"Rick Schwarz"
<rschwarz@anchorenv.com>, "Amanda
Shellenberger"
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"Tim Stone"
<tstone@anchorenv.com>, "Andrew
Somes" <ASomes@parametrix.com>,
"John Malek"
<JMalek@parametrix.com>,
"Hermans, Marcel"
<Marcel.Hermans@portofportland.co
m>

Subject

RE: Port of Portland T4:
Additional clarifications related
to WQMCCP, Monitoring, and
Reporting

Sean,

One more issue has come up related to the water quality work being performed during Phase I. According to our WQMP, and based on negotiations with USEPA, during Tier I (intensive) monitoring, field parameters are measured at the start of each new activity at least once beginning 1 hour after in-water work begins. The rationale being that when start in a new area or construction activities change we will perform hourly sampling at the start, but then if no exceedances are observed, monitoring can be reduced to once per four hours for the duration of that activity, even if that activity continues for more than one day. This protocol was discussed at length and is consistent with

other water quality certifications and similar past projects in Anchor's experience.

However, WQMCCP Section 4.2.3.4 specifies that on any day when active in-water work occurs, the first sample will be taken 1 hour after the initiation of activity, and once at each 1-hour interval thereafter. This frequency of monitoring for field parameters will continue until four consecutive hourly events indicate no exceedance of any trigger values. If no exceedance is identified following four consecutive hourly events, the sampling frequency will be reduced to every four hours.

Proposed protocol: The Port proposes that the protocol negotiated with USEPA and described in the WQMP be followed. That is, if no exceedance is identified following four consecutive hourly events, the sampling frequency will be reduced to every four hours. If the same construction activity occurs the next day, the sampling frequency will be maintained at once every four hours.

In addition to this email, I left a message for you regarding the Port's request for timely feedback on this point. I also discussed in more detail with Andrew Somes this morning.

We are currently preparing the field parameter report from yesterday. Laboratory analytical results for yesterday's samples will be reported on Thursday. No exceedances were reported yesterday in Portland or at The Dalles.

Thanks!

Ben Hung

Anchor Environmental, L.L.C.

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Please consider the environment before printing this message.

From: Ben Hung
Sent: Monday, August 18, 2008 4:49 PM
To: 'Sheldrake.Sean@epamail.epa.gov'
Cc: Ken Fellows; 'LaFranchise, Nicole'; 'Koehl, Krista'; 'Anderson, Roger'; Tom Schadt; John Verduin; Elizabeth Appy; Lori Russo; 'David, Sheila'; 'Green, Mary'; 'Durst, John'; Rick Schwarz; Amanda Shellenberger; Tim Stone; 'Andrew Somes'; 'John Malek'
Subject: RE: Port of Portland T4: Additional clarifications related to WQMCCP, Monitoring, and Reporting
Importance: High

Sean,

Three additional issues have come up related to the water quality work being performed during Phase I. We would like to resolve the first two items as soon as possible because they are related to ongoing activities.

- The duration of each round of field parameter sampling;
- The daily field parameter reporting timeframe; and
- Metals sampling in Berth 414 and the Berth 410 dredge area.

Field Sampling Round Duration and Intensity

As discussed during the weekly meeting with EPA last Wednesday, the

field sampling rounds at T4 are generally taking longer than one hour to complete. Monitoring rounds are taking even longer when a chemistry sample is taken. Due to field conditions in the Dalles (sampling depths of almost 90 feet), the field sampling rounds are taking even longer there. The approved DAR and RAWP plans, as well as the WQMCCP specify 4 rounds of sampling, estimated at 1 hour for each round.

All plans allow for a drop in intensity from 1 round/per hour to 1 round/per four hours if there are no exceedances at the respective compliance boundaries during the first four rounds. However, because monitoring rounds are taking longer than expected, the duration of the initial intensive sampling rounds are extending longer than planned. In practice, the monitoring crews are monitoring continuously throughout the first four rounds without a break, and the time it takes to perform this work may be much more than four hours.

Proposed protocol: The Port proposes that monitoring will begin as planned after the start of construction operations. However, transition to lower intensity sampling would be based on completion of 4 continuous hours of monitoring with no exceedances at the respective compliance boundaries. At that point in time the monitoring round underway would be completed. Then, the next round would need to take place in the next four hours according to the less intensive schedule.

Field Parameter Reporting Timeframe

The Port has been reporting field parameters at the end of each workday. However with the onset of work in The Dalles, as well as second shift work at T4 (extending at least until 10 PM) it is not feasible to provide each day's results by midnight the same day.

Proposed protocol: The Port will verbally report exceedances at the respective compliance boundaries according to the contingency response protocols specified in the plan. However, if no exceedances occur the Port will pull together the field parameter report and forward to EPA as soon as possible the next day.

Metals Sampling

Metals sampling was not included during water quality monitoring for work occurring in Berth 414 and Berth 410 in the specifications of the agency-approved DAR or RAWP. There were extensive discussions with USEPA with respect to the parameter list for each project subarea. The parameters selected for each subarea were based on the extent of exceedances of the PEC criteria in the sediment at each subarea. Concentrations in the Berth 414 and Berth 410 were lower than in the other subareas. While the DAR and RAWP provided specific parameter lists for each sub-area, the WQMCCP did not distinguish between any of the subareas, regardless of the earlier negotiations that had taken place.

Proposed protocol: The Port proposes that metals analyses will not be required for work occurring the Berth 410 dredge area. TSS and PAH analyses will still be required. Work has already been completed in Berth 414 and the samples were analyzed for metals per the WQMCCP.

Your timely response to these requests are very much appreciated.

Thanks,

Ben Hung

Anchor Environmental, L.L.C.

6650 SW Redwood Lane, Suite 333

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Please consider the environment before printing this message.

From: Ben Hung
Sent: Tuesday, August 05, 2008 5:47 PM
To: Sheldrake.Sean@epamail.epa.gov
Cc: Ken Fellows; LaFranchise, Nicole; Koehl, Krista; Anderson, Roger;
Tom Schadt; John Verduin; Elizabeth Appy; Lori Russo; David, Sheila
Subject: Port of Portland T4:

Sean,

Some of the terms and conditions specified in the DAR and RAWP Water Quality Monitoring Plans (Appendix B and Appendix H, respectively) differ from what is specified in the WQMCCP. Because the WQMCCP is the controlling document for the project, and there are terms and conditions that differ from the already approved WQMPs, the Port is providing this memorandum to document the discrepancies and propose protocols to perform during construction.

Please let me know if you have any questions or comments related to this memorandum. Given concurrence by USEPA, the protocols proposed in this document will be used during Phase I.

<< File: WQMCCP Memo 080508.pdf >>

Regards,

Ben Hung

Anchor Environmental, L.L.C.

6650 SW Redwood Lane, Suite 333

Portland, OR 97224

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Please consider the environment before printing this message.

-----Original Message-----

From: Sheldrake.Sean@epamail.epa.gov [mailto:Sheldrake.Sean@epamail.epa.gov]

Sent: Tuesday, August 19, 2008 9:40 AM

To: Ben Hung

Cc: Amanda Shellenberger; ASomes@parametrix.com; Elizabeth Appy; JMalek@parametrix.com; Durst, John; John Verduin; Ken Fellows; Koehl, Krista; Lori Russo; Hermans, Marcel; Green, Mary; LaFranchise, Nicole; Anderson, Roger; Rick Schwarz; David, Sheila; Tom Schadt; Tim Stone
Subject: RE: Port of Portland T4: Additional clarifications related to WQMCCP, Monitoring, and Reporting

Ben,

Your transload proposal is approved contingent on regular BMP checks (ie. with daily checks on all the BMPs, including the apron).

The Port is also approved to drop metals sampling in Berth 414 and the Berth 410 dredge area after one no hit round (I believe you already have this).

Let me know if you have additional questions.

S

Sean Sheldrake
USEPA, Region 10
Environmental Cleanup Office
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Seattle WA 98101-3140
sheldrake.sean@epa.gov
Phone: 206/553-1220 / Fax: 206/553-0124
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<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
Deliveries: 9th floor mailroom
Visitors: Check-in @ PERC / Service Center on 12th floor:
<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"Ben Hung"
<bhung@anchorenv.com>

08/19/2008 09:29 AM

To
Sean Sheldrake/R10/USEPA/US@EPA
cc

"Amanda Shellenberger"
<ashellenberger@anchorenv.com>,
<ASomes@parametrix.com>,
"Elizabeth Appy"
<eappy@anchorenv.com>,
<JMalek@parametrix.com>, "Durst,
John"
<John.Durst@portofportland.com>,
"John Verduin"

<jverduin@anchorenv.com>, "Ken
Fellows"
<kfellows@parametrix.com>,
"Koehl, Krista"
<Krista.Koehl@portofportland.com>
, "Lori Russo"
<lrusso@anchorenv.com>, "Hermans,
Marcel"
<Marcel.Hermans@portofportland.co
m>, "Green, Mary"
<Mary.Green@portofportland.com>,
"Anderson, Roger"
<Roger.Anderson@portofportland.co
m>, "Rick Schwarz"
<rschwarz@anchorenv.com>, "David,
Sheila"
<Sheila.David@portofportland.com>
, "Tom Schadt"
<tschadt@anchorenv.com>, "Tim
Stone" <tstone@anchorenv.com>,
"LaFranchise, Nicole"
<Nicole.LaFranchise@portofportlan
d.com>

Subject

RE: Port of Portland T4:
Additional clarifications related
to WQMCCP, Monitoring, and
Reporting

Sean,

We will get back to you with specific questions shortly.

Specific to WQ sampling in The Dalles: The first round of sampling has been completed today and no exceedances were reported. In fact, the highest Turbidity result reported yesterday was from the background station.

All of the work at The Dalles is occurring outside of the water. Due to the BMPs that have been employed (drip aprons, spill plates, etc.) there is very little chance, if any-- of material getting into the water.

Given the above, we would like to drop down to one field parameter round every four hours until further notice, unless an exceedance is observed.

Thanks,

Ben Hung

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Please consider the environment before printing this message.

-----Original Message-----

From: Sheldrake.Sean@epamail.epa.gov
[mailto:Sheldrake.Sean@epamail.epa.gov]
Sent: Tuesday, August 19, 2008 9:02 AM
To: LaFranchise, Nicole
Cc: Amanda Shellenberger; ASomes@parametrix.com; Ben Hung; Elizabeth Appy; JMalek@parametrix.com; Durst, John; John Verduin; Ken Fellows; Koehl, Krista; Lori Russo; Hermans, Marcel; Green, Mary; Anderson, Roger; Rick Schwarz; David, Sheila; Tom Schadt; Tim Stone
Subject: Re: Port of Portland T4: Additional clarifications related to WQMCCP, Monitoring, and Reporting

Nicole,

No I'm not around--I'm booked pretty much all day today thru Thursday, then gone. Please write down your questions and send them to us asap, as we may not be able to get back to you instantly.

We'll get back to you as soon as we can.

Thanks

S

Sean Sheldrake
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1200 Sixth Avenue, Suite 900, ECL-110
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sheldrake.sean@epa.gov
Phone: 206/553-1220 / Fax: 206/553-0124
Region 10 Dive Team:
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Portland Harbor Cleanup:
<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
Deliveries: 9th floor mailroom
Visitors: Check-in @ PERC / Service Center on 12th floor:

<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"LaFranchise,
Nicole"
<Nicole.LaFranchise@portofportland.com>

08/19/2008 08:40 AM

To
Sean Sheldrake/R10/USEPA/US@EPA,
<bhung@anchorenv.com>

cc
<ashellenberger@anchorenv.com>,
<ASomes@parametrix.com>,
<eappy@anchorenv.com>,
<JMalek@parametrix.com>, "Durst,
John"
<John.Durst@portofportland.com>,
<jverduin@anchorenv.com>,
<Kfellows@parametrix.com>,
"Koehl, Krista"
<Krista.Koehl@portofportland.com>
, <lrusso@anchorenv.com>,
"Hermans, Marcel"
<Marcel.Hermans@portofportland.com>,
"Green, Mary"
<Mary.Green@portofportland.com>,
"Anderson, Roger"
<Roger.Anderson@portofportland.com>,
<rschwarz@anchorenv.com>,
"David, Sheila"
<Sheila.David@portofportland.com>
, <tschadt@anchorenv.com>,
<tstone@anchorenv.com>

Subject
Re: Port of Portland T4:
Additional clarifications related
to WQMCCP, Monitoring, and
Reporting

Sean,

we would like a call to clarify a few points on the T4 sampling plan; we are fine with 3 rounds today at T4 but have some other clarifying questions. Are you available around 10:00? We would like to sample once in the Dalles today and if no exceedances are noted, drop down to once every four hours.

----- Original Message -----

From: Sheldrake.Sean@epamail.epa.gov <Sheldrake.Sean@epamail.epa.gov>

To: Ben Hung <bhung@anchorenv.com>
Cc: Amanda Shellenberger <ashellenberger@anchorenv.com>; Andrew Somes <ASomes@parametrix.com>; Elizabeth Appy <eappy@anchorenv.com>; John Malek <JMalek@parametrix.com>; Durst, John; John Verduin <jverduin@anchorenv.com>; Ken Fellows <kfellows@parametrix.com>; Koehl, Krista; Lori Russo <lrusso@anchorenv.com>; Hermans, Marcel; Green, Mary; LaFranchise, Nicole; Anderson, Roger; Rick Schwarz <rschwarz@anchorenv.com>; David, Sheila; Tom Schadt <tschadt@anchorenv.com>; Tim Stone <tstone@anchorenv.com>
Sent: Tue Aug 19 08:28:46 2008
Subject: RE: Port of Portland T4: Additional clarifications related to WQMCCP, Monitoring, and Reporting

Ben,

I would like 3 field parameters this morning due to all the changing background issue from yesterday. If no exceedances are found, you can back off to once per four hours at that point. The sample is to be taken randomly during the 4 hour window, not always during the four hour interval. For any shutdowns or start of any new activity, this must be restarted again at 3 for every 4 hours.

Let me know if you have any questions.

S

Sean Sheldrake
USEPA, Region 10
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1200 Sixth Avenue, Suite 900, ECL-110
Seattle WA 98101-3140
sheldrake.sean@epa.gov
Phone: 206/553-1220 / Fax: 206/553-0124
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<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"Ben Hung"
<bhung@anchorenv.com>

08/19/2008 08:26
AM

To
Sean Sheldrake/R10/USEPA/US@EPA
cc

"Ken Fellows"
<kfellows@parametrix.com>,
"LaFranchise, Nicole"
<Nicole.LaFranchise@portofportland.com>,
"Koehl, Krista"
<Krista.Koehl@portofportland.com>,
"Anderson, Roger"
<Roger.Anderson@portofportland.com>,
"Tom Schadt"

<tschadt@anchorenv.com>, "John Verduin"
<jverduin@anchorenv.com>,
"Elizabeth Appy"
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"David, Sheila"
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, "Green, Mary"
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"Rick Schwarz"
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"Tim Stone"
<tstone@anchorenv.com>, "Andrew Somes" <ASomes@parametrix.com>,
"John Malek"
<JMalek@parametrix.com>,
"Hermans, Marcel"
<Marcel.Hermans@portofportland.com>

Subject

RE: Port of Portland T4:
Additional clarifications related
to WQMCCP, Monitoring, and
Reporting

Sean,

One more issue has come up related to the water quality work being performed during Phase I. According to our WQMP, and based on negotiations with USEPA, during Tier I (intensive) monitoring, field parameters are measured at the start of each new activity at least once beginning 1 hour after in-water work begins. The rationale being that when start in a new area or construction activities change we will perform hourly sampling at the start, but then if no exceedances are observed, monitoring can be reduced to once per four hours for the duration of that activity, even if that activity continues for more than one day. This protocol was discussed at length and is consistent with other water quality certifications and similar past projects in Anchor's experience.

However, WQMCCP Section 4.2.3.4 specifies that on any day when active

in-water work occurs, the first sample will be taken 1 hour after the initiation of activity, and once at each 1-hour interval thereafter. This frequency of monitoring for field parameters will continue until four consecutive hourly events indicate no exceedance of any trigger values. If no exceedance is identified following four consecutive hourly events, the sampling frequency will be reduced to every four hours.

Proposed protocol: The Port proposes that the protocol negotiated with USEPA and described in the WQMP be followed. That is, if no exceedance is identified following four consecutive hourly events, the sampling frequency will be reduced to every four hours. If the same construction activity occurs the next day, the sampling frequency will be maintained at once every four hours.

In addition to this email, I left a message for you regarding the Port's request for timely feedback on this point. I also discussed in more detail with Andrew Somes this morning.

We are currently preparing the field parameter report from yesterday. Laboratory analytical results for yesterday's samples will be reported on Thursday. No exceedances were reported yesterday in Portland or at The Dalles.

Thanks!

Ben Hung

Anchor Environmental, L.L.C.

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Please consider the environment before printing this message.

From: Ben Hung
Sent: Monday, August 18, 2008 4:49 PM
To: 'Sheldrake.Sean@epamail.epa.gov'
Cc: Ken Fellows; 'LaFranchise, Nicole'; 'Koehl, Krista'; 'Anderson, Roger'; Tom Schadt; John Verduin; Elizabeth Appy; Lori Russo; 'David, Sheila'; 'Green, Mary'; 'Durst, John'; Rick Schwarz; Amanda Shellenberger; Tim Stone; 'Andrew Somes'; 'John Malek'
Subject: RE: Port of Portland T4: Additional clarifications related to WQMCCP, Monitoring, and Reporting
Importance: High

Sean,

Three additional issues have come up related to the water quality work being performed during Phase I. We would like to resolve the first two items as soon as possible because they are related to ongoing activities.

- The duration of each round of field parameter sampling;
- The daily field parameter reporting timeframe; and
- Metals sampling in Berth 414 and the Berth 410 dredge area.

Field Sampling Round Duration and Intensity

As discussed during the weekly meeting with EPA last Wednesday, the field sampling rounds at T4 are generally taking longer than one hour to complete. Monitoring rounds are taking even longer when a chemistry sample is taken. Due to field conditions in the Dalles (sampling depths of almost 90 feet), the field sampling rounds are taking even longer there. The approved DAR and RAWP plans, as well as the WQMCCP

specify 4 rounds of sampling, estimated at 1 hour for each round.

All plans allow for a drop in intensity from 1 round/per hour to 1 round/per four hours if there are no exceedances at the respective compliance boundaries during the first four rounds. However, because monitoring rounds are taking longer than expected, the duration of the initial intensive sampling rounds are extending longer than planned. In practice, the monitoring crews are monitoring continuously throughout the first four rounds without a break, and the time it takes to perform this work may be much more than four hours.

Proposed protocol: The Port proposes that monitoring will begin as planned after the start of construction operations. However, transition to lower intensity sampling would be based on completion of 4 continuous hours of monitoring with no exceedances at the respective compliance boundaries. At that point in time the monitoring round underway would be completed. Then, the next round would need to take place in the next four hours according to the less intensive schedule.

Field Parameter Reporting Timeframe

The Port has been reporting field parameters at the end of each workday. However with the onset of work in The Dalles, as well as second shift work at T4 (extending at least until 10 PM) it is not feasible to provide each day's results by midnight the same day.

Proposed protocol: The Port will verbally report exceedances at the respective compliance boundaries according to the contingency response protocols specified in the plan. However, if no exceedances occur the Port will pull together the field parameter report and forward to EPA as soon as possible the next day.

Metals Sampling

Metals sampling was not included during water quality monitoring for work occurring in Berth 414 and Berth 410 in the specifications of the agency-approved DAR or RAWP. There were extensive discussions with USEPA with respect to the parameter list for each project subarea. The parameters selected for each subarea were based on the extent of exceedances of the PEC criteria in the sediment at each subarea. Concentrations in the Berth 414 and Berth 410 were lower than in the other subareas. While the DAR and RAWP provided specific parameter lists for each sub-area, the WQMCCP did not distinguish between any of the subareas, regardless of the earlier negotiations that had taken place.

Proposed protocol: The Port proposes that metals analyses will not be required for work occurring the Berth 410 dredge area. TSS and PAH analyses will still be required. Work has already been completed in

Berth 414 and the samples were analyzed for metals per the WQMCCP.

Your timely response to these requests are very much appreciated.

Thanks,

Ben Hung

Anchor Environmental, L.L.C.

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Please consider the environment before printing this message.

From: Ben Hung
Sent: Tuesday, August 05, 2008 5:47 PM
To: Shel Drake.Sean@epamail.epa.gov
Cc: Ken Fellows; LaFranchise, Nicole; Koehl, Krista; Anderson, Roger;

Tom Schadt; John Verduin; Elizabeth Appy; Lori Russo; David, Sheila
Subject: Port of Portland T4:

Sean,

Some of the terms and conditions specified in the DAR and RAWP Water Quality Monitoring Plans (Appendix B and Appendix H, respectively) differ from what is specified in the WQMCCP. Because the WQMCCP is the controlling document for the project, and there are terms and conditions that differ from the already approved WQMPs, the Port is providing this memorandum to document the discrepancies and propose protocols to perform during construction.

Please let me know if you have any questions or comments related to this memorandum. Given concurrence by USEPA, the protocols proposed in this document will be used during Phase I.

<< File: WQMCCP Memo 080508.pdf >>

Regards,

Ben Hung

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Please consider the environment before printing this message.

-----Original Message-----

From: Sheldrake.Sean@epamail.epa.gov [mailto:Sheldrake.Sean@epamail.epa.gov]

Sent: Thursday, August 21, 2008 5:57 AM

To: Ben Hung

Cc: Amanda Shellenberger; ASomes@parametrix.com; Elizabeth Appy; JMalek@parametrix.com; Durst, John; John Verduin; Ken Fellows; Koehl, Krista; Hermans, Marcel; Green, Mary; LaFranchise, Nicole; Anderson, Roger; Rick Schwarz; David, Sheila; Tom Schadt; Tim Stone

Subject: Re: Port of Portland T4: Transloading Facility - Proposal to Reduce Water Quality Monitoring to "Tier II" Intensity

Ben,

The Port's proposal is approved.

S

Sean Sheldrake

USEPA, Region 10

Environmental Cleanup Office

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Seattle WA 98101-3140

sheldrake.sean@epa.gov

Phone: 206/553-1220 / Fax: 206/553-0124

Region 10 Dive Team: <http://yosemite.epa.gov/r10/oea.nsf/webpage/dive+team>

Portland Harbor Cleanup:

<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>

Deliveries: 9th floor mailroom

Visitors: Check-in @ PERC / Service Center on 12th floor:

<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"Ben Hung"
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08/20/08 09:07
PM

To
Sean Sheldrake/R10/USEPA/US@EPA
cc
"Amanda Shellenberger"
<ashellenberger@anchorenv.com>,
<ASomes@parametrix.com>,
"Elizabeth Appy"
<eappy@anchorenv.com>,
<JMalek@parametrix.com>, "Durst,
John"
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"John Verduin"
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, "Hermans, Marcel"
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m>, "Green, Mary"
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"David, Sheila"
<Sheila.David@portofportland.com>,
"Tom Schadt"
<tschadt@anchorenv.com>,
"Tim Stone" <tstone@anchorenv.com>

Subject
Port of Portland T4: Transloading
Facility - Proposal to Reduce
Water Quality Monitoring to "Tier
II" Intensity

Sean,

After three days of field parameter sampling in The Dalles, the results clearly demonstrate that there have been no adverse impacts to water quality due to transloading activities. The data from the downstream compliance locations are indistinguishable from the data from the background station.

Based on the data collected over the last three days, as well as the expectation that no adverse impacts are likely to occur, the Port requests that water quality monitoring requirements be reduced to one (1) round of field parameter monitoring per day (described as Tier II sampling in the WQMP). This reduced level of monitoring, in addition to visual monitoring, will continue to meet the objectives of the water quality program.

We would like to implement this change as soon as tomorrow, pending USEPA acceptance.

Thanks!

Ben Hung
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Please consider the environment before printing this message.

-----Original Message-----

From: Sheldrake.Sean@epamail.epa.gov [mailto:Sheldrake.Sean@epamail.epa.gov]
Sent: Thursday, August 21, 2008 8:57 PM
To: John Verduin
Cc: ASomes@parametrix.com; Ben Hung; Elizabeth Appy; JMalek@parametrix.com;
Ken Fellows; Nicole LaFranchise
Subject: Re: T4 Background Water Quality Location

John, Nicole, The changes below are approved. S

Sean Sheldrake
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Portland Harbor Cleanup:
<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
Deliveries: 9th floor mailroom
Visitors: Check-in @ PERC / Service Center on 12th floor:
<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"John Verduin"
<jverduin@anchorenv.com>

08/21/2008 06:01
PM

To
Sean Sheldrake/R10/USEPA/US@EPA,
<ASomes@parametrix.com>,
<JMalek@parametrix.com>

cc

"Ken Fellows"
<kfellows@parametrix.com>,
"Nicole LaFranchise"
<nicole.lafranchise@portofportland.com>,
"Ben Hung"
<bhung@anchorenv.com>,
"Elizabeth Appy" <eappy@anchorenv.com>

Subject
Background Water Quality Location

Sean/Andrew/John - I feel we need to think about the location of our daily background sample, BG-1. Our first measurement today at the

upstream compliance location (S3M-S) was again right at the compliance criteria. This morning BG-1 was at 4.9 NTU and the 90th percentile was at 6.0 NTU. S3M-S was at 11.0 NTU. So S3M-S (which is upstream with the tide going out) was just compliant. As with last night we don't feel the reading is indicative of the dredging operations. We did some additional water depth measurements at the background location BG-1 and the S3M series locations. Here's the info:

S3M-S - water is 58' deep
S3M-M - water is 59' deep
S3M-N - water is 36' deep
BG-1 - water is 43' deep

So we asked the WQ crew to go offshore a little further at BG-1. BG-1 is 10 meters from the berth 414 dock face (also the Harbor line). Here's what they found:

BG-1 - 10 meters from pier has a water depth of 43' and had a 4.9 NTU
50 meters from pier has a water depth of 60' and had a 7.8 NTU
100 meters from pier has a water depth of 60' and had a 9.5 NTU

I look at this new information and feel that our background location is too close to shore (the S3M series are 100 meters from harbor line which is the pier face at berth 414) and is too shallow of water compared to our S3M series locations. So I don't feel our background is representative of the S3M series.

The Port recommends that BG-1 be reestablished as 100 meters from the harbor line moving forward to generate a more representative background value. Let us know if you agree with this recommendation.

Thanks
John

John R. Verduin, III, PE
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-----Original Message-----

From: Sheldrake.Sean@epamail.epa.gov [mailto:Sheldrake.Sean@epamail.epa.gov]

Sent: Tuesday, August 26, 2008 1:34 PM

To: Ben Hung

Cc: ASomes@parametrix.com; Elizabeth Appy; Julie Fox; JMalek@parametrix.com; Durst, John; John Verduin; Ken Fellows; Koehl, Krista; Hermans, Marcel; Green, Mary; LaFranchise, Nicole; Anderson, Roger; David, Sheila; Tom Schadt; Tim Stone; cyril.alex@deq.state.or.us; Humphrey.Chip@epamail.epa.gov; cora.lori@epa.gov; cyril.young@dsl.state.or.us; davoli.dana@epa.gov; Blischke.Eric@epamail.epa.gov; fuentes.rene@epa.gov; Greg.Gervais@noaa.gov; jeremy_buck@fws.gov; Freedman.Jonathan@epamail.epa.gov; peterson.jennifer@deq.state.or.us; ANDERSON.Jim@deq.state.or.us; Ken Fellows; asomes@parametrix.com; Koch.Kristine@epamail.epa.gov; Cora.Lori@epamail.epa.gov; poulsen.mike@deq.state.or.us; Nancy.Munn@noaa.gov; audiehuber@ctuir.com; JD Williams; BBarquin@hk-law.com; jweis@hk-law.com; cunninghame@gorge.net; erin.madden@gmail.com; Lisa.Bluelake@grandronde.org; Michael Karnosh; raygivens@givenslaw.com; rose@yakama.com; sheila@ridolfi.com; suzanne.miller@eilttd.net; tom@ctsi.nsn.us; Jennifer Peers; dallen@stratusconsulting.com; reopn@mindspring.com; rick.j.kepler@state.or.us; Robert.Neely@noaa.gov; Rodriguez.Socorro@epamail.epa.gov; shephard.burt@epa.gov; smith.judy@epa.gov; Steve.PURCHASE@state.or.us; gainer.tom@deq.state.or.us
Subject: Re: Port of Portland T4: Berth 410 Dredging - Proposal to Reduce Water Quality Monitoring to "Tier II" Intensity

Ben, The Port's proposal is approved--you may step down to tier II intensity.

S

Sean Sheldrake
USEPA, Region 10
Environmental Cleanup Office
1200 Sixth Avenue, Suite 900, ECL-110
Seattle WA 98101-3140
sheldrake.sean@epa.gov
Phone: 206/553-1220 / Fax: 206/553-0124
Region 10 Dive Team: <http://yosemite.epa.gov/r10/oea.nsf/webpage/dive+team>
Portland Harbor Cleanup:
<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
Deliveries: 9th floor mailroom
Visitors: Check-in @ PERC / Service Center on 12th floor:
<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"Ben Hung"
<bhung@anchorenv.com>

08/26/2008 10:19 AM

To
Sean Sheldrake/R10/USEPA/US@EPA
cc
<ASomes@parametrix.com>,
"Elizabeth Appy"

<eappy@anchorenv.com>,
<JMalek@parametrix.com>, "Durst,
John"
<John.Durst@portofportland.com>,
"John Verduin"
<jverduin@anchorenv.com>, "Ken
Fellows"
<kfellows@parametrix.com>,
"Koehl, Krista"
<Krista.Koehl@portofportland.com>
, "Hermans, Marcel"
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m>, "Green, Mary"
<Mary.Green@portofportland.com>,
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<Nicole.LaFranchise@portofportlan
d.com>, "Anderson, Roger"
<Roger.Anderson@portofportland.co
m>, "David, Sheila"
<Sheila.David@portofportland.com>
, "Tom Schadt"
<tschadt@anchorenv.com>, "Tim
Stone" <tstone@anchorenv.com>,
"Julie Fox" <jfox@anchorenv.com>
Subject
Port of Portland T4: Berth 410
Dredging - Proposal to Reduce
Water Quality Monitoring to "Tier
II" Intensity

Sean-

The Port proposes a reduction in water quality monitoring to the Tier II level as described in the USEPA approved Water Quality Monitoring Plans provided in the DAR and RAWP. Tier II intensity includes continued visual monitoring, field parameter collection once per day, and grab samples for chemical analysis once per week. This proposal is based on:

- 5 consecutive days of no exceedances of chemistry, and an overall total of 8 days with no exceedances;
- 10 days of field parameter monitoring with no exceedances; and,
- work is beginning in Berth 410 which has concentrations that are orders of magnitude less than in Berth 411.

The Port understands that the Berth 411 and Berth 410 areas are identified as separate areas, primarily for the purposes of the design. Per the WQMP, monitoring intensity is specified to revert to Tier I "at the start of each new activity". However, these are contiguous areas

and the construction activity that will be performed is exactly the same. Dredging in Berth 410 is essentially a continuation of the activity performed in Berth 411. In addition, the water quality results provide evidence that, when used as necessary, the "digging bucket" appears to perform at least as good as the "cable-arm" environmental bucket.

This reduced level of monitoring will continue to meet the objectives of the water quality program. We would like to implement this change as soon as tomorrow, pending USEPA acceptance.

Thanks!

Ben Hung
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Please consider the environment before printing this message.

-----Original Message-----

From: Shelldrake.Sean@epamail.epa.gov [mailto:Shelldrake.Sean@epamail.epa.gov]

Sent: Tuesday, August 26, 2008 4:31 PM

To: Ben Hung

Cc: ANDERSON.Jim@deq.state.or.us; ASomes@parametrix.com;
audiehuber@ctuir.com; BBarquin@hk-law.com; Shephard.Burt@epamail.epa.gov;
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gainer.tom@deq.state.or.us; Greg.Gervais@noaa.gov; jeremy_buck@fws.gov;
Julie Fox; JMalek@parametrix.com; Durst, John;
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suzanne.miller@eiltd.net; tomd@ctsi.nsn.us; JD Williams; Tom Schadt; Tim
Stone

Subject: RE: Port of Portland T4: Berth 410 Dredging - Proposal to Reduce
Water Quality Monitoring to "Tier II" Intensity

Ben, This Port proposal is approved. S

Sean Shelldrake

USEPA, Region 10

Environmental Cleanup Office

1200 Sixth Avenue, Suite 900, ECL-110

Seattle WA 98101-3140

shelldrake.sean@epa.gov

Phone: 206/553-1220 / Fax: 206/553-0124

Region 10 Dive Team: <http://yosemite.epa.gov/r10/oea.nsf/webpage/dive+team>

Portland Harbor Cleanup:

<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>

Deliveries: 9th floor mailroom

Visitors: Check-in @ PERC / Service Center on 12th floor:

<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"Ben Hung"
<bhung@anchorenv.com>

08/26/2008 03:20
PM

To
Sean Shelldrake/R10/USEPA/US@EPA
cc
<ASomes@parametrix.com>,
"Elizabeth Appy"
<eappy@anchorenv.com>, "Julie
Fox" <jfox@anchorenv.com>,

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<asomes@parametrix.com>, Kristine
Koch/R10/USEPA/US@EPA, Lori
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Shephard/R10/USEPA/US@EPA, Judy
Smith/R10/USEPA/US@EPA,
<Steve.PURCHASE@state.or.us>,
<gainer.tom@deq.state.or.us>

Subject

RE: Port of Portland T4: Berth
410 Dredging - Proposal to Reduce
Water Quality Monitoring to "Tier
II" Intensity

Sean,

Thank you very much for approval of this proposal for the work at T4 in
Portland.

As you know, we are continuing to perform daily field parameter
monitoring in The Dalles according to the Tier II schedule for the
Transloading facility. Now, after eight days of field parameter
sampling in The Dalles, the results clearly demonstrate that there have
been no adverse impacts to water quality due to transloading activities.

Based on this data, as well as the expectation that no adverse impacts
are likely to occur, the Port requests that water quality monitoring
requirements be reduced to one (1) round of field parameter monitoring
per week (See WQMP Table 3, Footnote 3). This reduced level of
monitoring, in addition to visual monitoring, will continue to meet the
objectives of the water quality program.

We would like to implement this change as soon as tomorrow, pending
USEPA acceptance.

Thanks,

Ben Hung
Anchor Environmental, L.L.C.
6650 SW Redwood Lane, Suite 333
Portland, OR 97224
503.670.1108 x21 (V)
503.670.1128 (F)
971.678.2100 (C)
bhung@anchorenv.com

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Please consider the environment before printing this message.

-----Original Message-----

From: Sheldrake.Sean@epamail.epa.gov
[<mailto:Sheldrake.Sean@epamail.epa.gov>]
Sent: Tuesday, August 26, 2008 1:34 PM
To: Ben Hung
Cc: ASomes@parametrix.com; Elizabeth Appy; Julie Fox;
JMalek@parametrix.com; Durst, John; John Verduin; Ken Fellows; Koehl,
Krista; Hermans, Marcel; Green, Mary; LaFranchise, Nicole; Anderson,
Roger; David, Sheila; Tom Schadt; Tim Stone; cyril.alex@deq.state.or.us;
Humphrey.Chip@epamail.epa.gov; cora.lori@epa.gov;
cyril.young@dsl.state.or.us; davoli.dana@epa.gov;
Blischke.Eric@epamail.epa.gov; fuentes.rene@epa.gov;
Greg.Gervais@noaa.gov; jeremy_buck@fws.gov;
Freedman.Jonathan@epamail.epa.gov; peterson.jennifer@deq.state.or.us;
ANDERSON.Jim@deq.state.or.us; Ken Fellows; asomes@parametrix.com;
Koch.Kristine@epamail.epa.gov; Cora.Lori@epamail.epa.gov;
poulsen.mike@deq.state.or.us; Nancy.Munn@noaa.gov; audiehuber@ctuir.com;
JD Williams; BBarquin@hk-law.com; jweis@hk-law.com;
cunninghame@gorge.net; erin.madden@gmail.com;
Lisa.Bluelake@grandronde.org; Michael Karnosh; raygivens@givenslaw.com;
rose@yakama.com; sheila@ridolfi.com; suzanne.miller@eiltd.net;
tomd@ctsi.nsn.us; Jennifer Peers; dallen@stratusconsulting.com;
reopn@mindspring.com; rick.j.kepler@state.or.us; Robert.Neely@noaa.gov;
Rodriguez.Socorro@epamail.epa.gov; shephard.burt@epa.gov;
smith.judy@epa.gov; Steve.PURCHASE@state.or.us;
gainer.tom@deq.state.or.us
Subject: Re: Port of Portland T4: Berth 410 Dredging - Proposal to
Reduce Water Quality Monitoring to "Tier II" Intensity

Ben, The Port's proposal is approved--you may step down to tier II intensity.

S

Sean Sheldrake
USEPA, Region 10
Environmental Cleanup Office
1200 Sixth Avenue, Suite 900, ECL-110
Seattle WA 98101-3140
sheldrake.sean@epa.gov
Phone: 206/553-1220 / Fax: 206/553-0124
Region 10 Dive Team: <http://yosemite.epa.gov/r10/oea.nsf/webpage/dive+team>

Portland Harbor Cleanup:
<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
Deliveries: 9th floor mailroom
Visitors: Check-in @ PERC / Service Center on 12th floor:
<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"Ben Hung"
<bhung@anchorenv.com>

08/26/2008 10:19 AM

To
Sean Sheldrake/R10/USEPA/US@EPA cc

<ASomes@parametrix.com>,
"Elizabeth Appy"
<eappy@anchorenv.com>,
<JMalek@parametrix.com>, "Durst,
John"
<John.Durst@portofportland.com>,
"John Verduin"
<jverduin@anchorenv.com>, "Ken
Fellows"
<kfellows@parametrix.com>,
"Koehl, Krista"
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, "Hermans, Marcel"
<Marcel.Hermans@portofportland.com>,
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<Mary.Green@portofportland.com>,
"LaFranchise, Nicole"
<Nicole.LaFranchise@portofportland.com>,
"Anderson, Roger"
<Roger.Anderson@portofportland.com>,
"David, Sheila"
<Sheila.David@portofportland.com>
, "Tom Schadt"
<tschadt@anchorenv.com>, "Tim
Stone" <tstone@anchorenv.com>,
"Julie Fox" <jfox@anchorenv.com>

Subject
Port of Portland T4: Berth 410
Dredging - Proposal to Reduce
Water Quality Monitoring to "Tier
II" Intensity

Sean-

The Port proposes a reduction in water quality monitoring to the Tier II

level as described in the USEPA approved Water Quality Monitoring Plans provided in the DAR and RAWP. Tier II intensity includes continued visual monitoring, field parameter collection once per day, and grab samples for chemical analysis once per week. This proposal is based on:

- 5 consecutive days of no exceedances of chemistry, and an overall total of 8 days with no exceedances;
- 10 days of field parameter monitoring with no exceedances; and,
- work is beginning in Berth 410 which has concentrations that are orders of magnitude less than in Berth 411.

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This reduced level of monitoring will continue to meet the objectives of the water quality program. We would like to implement this change as soon as tomorrow, pending USEPA acceptance.

Thanks!

Ben Hung
Anchor Environmental, L.L.C.
6650 SW Redwood Lane, Suite 333
Portland, OR 97224
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503.670.1128 (F)
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Please consider the environment before printing this message.

-----Original Message-----

From: Sheldrake.Sean@epamail.epa.gov [mailto:Sheldrake.Sean@epamail.epa.gov]
Sent: Thursday, September 18, 2008 1:44 PM
To: Elizabeth Appy
Cc: Andrew Somes; Ben Hung; cmcriem@gmail.com; David Gillingham;
djamiesonhme@comcast.net; Delaney Peterson; Elizabeth Appy; Gabe Nagler;
Greg Speyer; Julie Fox; John Malek; Durst, John; John Verduin; Ken Fellows;
Green, Mary; LaFranchise, Nicole; Bales, Philipp; Anderson, Roger; Rick
Schwarz; David, Sheila; Tom Schadt; Tim Stone
Subject: Re: T4 Capping: Water Quality Chemistry Results from Monday 9-15-08
and Proposal to Reduce Monitoring to Tier II

Elizabeth, Nicole,

This request is approved.

Thank you.

S

Sean Sheldrake
USEPA, Region 10
Environmental Cleanup Office
1200 Sixth Avenue, Suite 900, ECL-110
Seattle WA 98101-3140
sheldrake.sean@epa.gov
Phone: 206/553-1220 / Fax: 206/553-0124
Region 10 Dive Team: <http://yosemite.epa.gov/r10/oea.nsf/webpage/dive+team>
Portland Harbor Cleanup:
<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
Deliveries: 9th floor mailroom
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<http://yosemite.epa.gov/r10/extaff.nsf/PERC/Visiting+Seattle>

"Elizabeth Appy"
<eappy@anchorenv.com>

09/18/2008 12:55
PM

To
Sean Sheldrake/R10/USEPA/US@EPA
cc
"Ken Fellows"
<kfellows@parametrix.com>,
"Andrew Somes"
<ASomes@parametrix.com>, "John
Malek" <JMalek@parametrix.com>,
"LaFranchise, Nicole"
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d.com>, "Anderson, Roger"
<Roger.Anderson@portofportland.com>,
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Fox" <jfox@anchorenv.com>, "David
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"Gabe Nagler"
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, "Tim Stone"
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"Rick Schwarz"
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Mary"
<Mary.Green@portofportland.com>,
"Tom Schadt"
<tschadt@anchorenv.com>, "Ben
Hung" <bhung@anchorenv.com>,
"Elizabeth Appy"
<eappy@anchorenv.com>

Subject

T4 Capping: Water Quality
Chemistry Results from Monday
9-15-08 and Proposal to Reduce
Monitoring to Tier II

Hi Sean,

Attached are the water quality monitoring analytical results from Monday, September 15th collected during capping activities. No exceedances were detected at any of the monitoring compliance locations. These results represent our third round of analytical results with no exceedances for the same capping activity.

Based on the three analytical results received to date and no identified exceedances of project criteria for the capping activities, the Port proposes a reduction in water quality monitoring to the Tier II level as described in the USEPA approved Water Quality Monitoring Plans provided in the DAR and RAWP. Tier II intensity includes continued visual monitoring, field parameter collection once per day, and grab samples for chemical analysis once per week. This reduced level of monitoring will continue to meet the objectives of the water quality program. Let us know if you approve this proposal.

Thanks,

Elizabeth

Elizabeth Appy
Anchor Environmental, LLC
6650 SW Redwood Lane, Ste. 333 (Note Change in Ste #)
Portland, OR 97224

eappy@anchorenv.com
503-670-1108 X 22 (direct line)
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(See attached file: For EPA_T4 Phase I Analytical Results for 9-15-08.pdf)

Daily Reporting Template for Laboratory Parameters

Date:		09/18/08											
Time:		12:45:00 PM											
On-Time Result or Update:		On Time											
Construction Activity:		Capping at the Head of Slip 3				Apex # A809135							
Round of Sampling for Day (eg., 1st of 3 events):		1st of 3 events											
Additional Comments:		Samples collected on 9/15/08				Sample I.D.:							
No exceedances detected						BG 01R C WS 080915 (Time collected: 8:10)		T4 S3B M A WS 080915 (Time collected: 8:55)		T4 S3B M B WS 080915 (Time collected: 9:00)		T4 S3B M C WS 080915 (Time collected: 9:05)	
Parameter	Units	Acute Criterion	Chronic Criterion	Highest Background*	Background Location			Construction Location					
					Top	Middle	Bottom	Top	Middle	Bottom			
Conventional Parameters													
Total Suspended Solids (TSS)	mg/L	--	--	TBD			12.2	6.00	11.4	33.2			
Metals^[6]													
Cadmium	µg/L	0.5	0.09	TBD			ND>0.200	ND>0.200	ND>0.200	ND>0.200			
Lead	µg/L	14	0.54	TBD			ND>1	ND>1	ND>1	ND>1			
Zinc	µg/L	36	36	TBD			9.42	11.8	8.89	9.54			
Polycyclic Aromatic Hydrocarbons (PAHs)													
Naphthalene	µg/L	807	194	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Acenaphthylene	µg/L	1277	307	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Acenaphthene	µg/L	233	56	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Fluorene	µg/L	162	39	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Phenanthrene	µg/L	79	19	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Anthracene	µg/L	87	21	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Fluoranthene	µg/L	30	7.1	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Pyrene	µg/L	42	10	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Benz(a)anthracene	µg/L	9.2	2.2	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Chrysene	µg/L	8.3	2.0	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Benzo(b)fluoranthene	µg/L	2.8	0.68	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Benzo(k)fluoranthene	µg/L	2.7	0.64	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Benzo(a)pyrene	µg/L	4.0	0.96	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Indeno(1,2,3-cd)pyrene	µg/L	1.2	0.28	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Dibenzo(a,h)anthracene	µg/L	1.2	0.28	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			
Benzo(g,h,i)perylene	µg/L	1.8	0.44	TBD			ND>0.0393	ND>0.0385	ND>0.0386	ND>0.0377			

Notes:

N/AV - Result not yet available

ND - Non Detect

J - Not within quality control limits, estimated data

 Above chronic criterion and background (and data not yet qualified)

 Above acute criterion and background (and data not yet qualified)

* Value is the 90th percentile background value calculated during pre-construction, or the value of the highest background sample taken on the same day (whichever is higher).