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.

				Trigger[a,c,g]		
Parameter	Activity	Unit	Location	Aquatic Chronic[e]	Aquatic Acute[e]	Action Triggered
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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7-18-08
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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.

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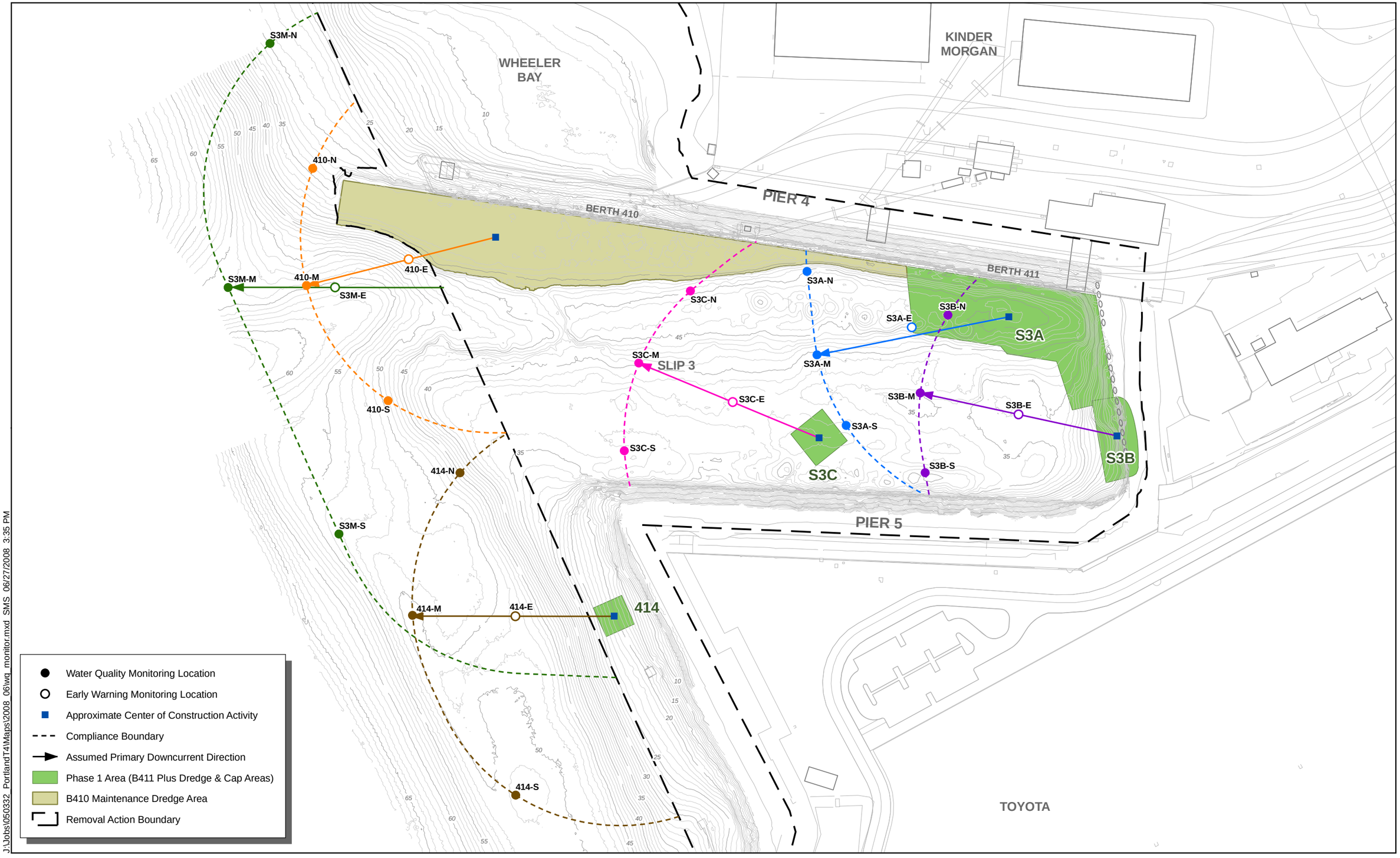
USEPA. 2003. Administrative order on consent for non-time-critical removal action between Port of Portland and the U.S. Environmental Protection Agency. October, 2003.

APPENDIX A

Figure 3 (from RAWP)



J:\Jobs\050332_PortlandT4\Maps\2008_06\wq_monitor.mxd SMS 06/27/2008 3:35 PM

ANCHOR ENVIRONMENTAL, L.L.C.

0 150
Scale in Feet

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