

Memorandum for: U.S. Army Corps of Engineers (Corps), Portland District, Operations Division, Regulatory Branch (Taylor), Regulatory File No. NWP-2007-204.

Subject: Portland Sediment Evaluation Team (PSET) Technical Memorandum Re: review of the Port of Portland's (Port's) December 12, 2011 Level 2 *Sediment Characterization Report, Terminal 2 Berths 205 and 206, NW Front Ave., Portland, Oregon* (SCR), located on the Willamette River (River Mile [RM] 10) in Portland, Multnomah County, Oregon.

Reviewers: The Portland Sediment Evaluation Team (PSET) includes the US Army Corps of Engineers (Corps), Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife (USFWS), Washington Department of Ecology (Ecology), and Oregon Department of Environmental Quality (ODEQ). The reviewers for this project included James McMillan (Corps), Pete Anderson (ODEQ), Laura Inouye (Ecology), Jeffrey Lockwood (NMFS), Jonathan Freedman (EPA), and Bridgette Lohrman (EPA). USFWS did not review the document. This memorandum documents the consensus of the reviewing agencies regarding the suitability of the dredged material for unconfined, aquatic placement and the suitability of the new surface material (NSM) for unconfined, aquatic exposure.

These determinations were made in accordance with the 2009 *Final Sediment Evaluation Framework for the Pacific Northwest* (2009 SEF). Until the revisions to the freshwater SLs are complete and accepted by the Northwestern Regional Sediment Evaluation Team (RSET), the Port's sediment chemistry results will be compared to the freshwater SLs found in the 2006 SEF (Table 7-1), available at: <http://www.nwp.usace.army.mil/environment/sediment.asp>.

Applicable Authorities Governing the Project: Section 10 of the Rivers and Harbors Act; Section 401 of the Clean Water Act; Section 7 of the Endangered Species Act; Section 305 of the Magnuson-Stevens Act, et al.

Project Description: The project is located on the Willamette River (River Mile [RM] 10) in Portland, Multnomah County, Oregon (Figure 1). Terminal 2 has four berths (Berths 203, 204, 205, and 206) and is used as a breakbulk and container general cargo facility (Figure 2). This facility handles many types of cargo, including lumber and forest products, steel, machinery, and packaged goods. The Port needs to dredge Berths 205 and 206, and so the subject SAP covers only these two berths.

Berths 205 and 206 are contiguous and together comprise an area of 1,550 feet long by 125 feet wide. Sediment in both berths was homogeneous and fine-grained (sandy, clayey silt), based on this current sediment characterization. A description of the berths follows:

Berth 205: This berth is approximately 700 feet long. Based on the survey, the river bottom within the berthing area varies from approximately -27 to -37.5 feet, Columbia River Datum (CRD). The design depth of Berth 205 is -40 feet CRD, but during this maintenance dredging event, the Port intends to dredge Berth 205 to a depth of -36 feet CRD plus 2 feet overdepth allowance (estimated volume = 6,000 to 18,000 cubic yards [cy]). However, the Port may elect to dredge to -38 feet CRD plus 2 feet overdepth allowance, depending on available resources and sediment chemistry results (estimated volume = 13,000 to 25,000 cy).

Berth 206: This berth is approximately 850 feet long. Based on the survey, the river bottom within the berthing area varies from approximately -31 to -41 feet CRD. The design depth of Berth 206 is -40 feet CRD, but during this maintenance dredging event, the Port intends to dredge Berth 206 to a depth of -38 feet CRD plus 2 feet overdepth allowance (estimated volume = 5,000 to 10,000 cy). However, the Port

may elect to dredge to -40 feet CRD plus 2 feet overdepth allowance, depending on available resources and sediment chemistry results (estimated volume = 10,000 to 18,000 cy).

Dredging Methods: A clamshell dredge will remove sediments using a close-lipped bucket operated either from the dock or from a floating crane. The depth and position of the bucket and dredge would be monitored by visual and positioning computer systems, including a global positioning system.

Dredged Material Transport and Placement: The dredged material will be placed in a barge for transport and placement at an in-water placement site, an upland placement facility (West Hayden Island Placement Facility or Suttle Road Rehandling Facility), or another approved beneficial use site. The Port does not anticipate that placement of the Terminal 2 dredged material at the upland placement facilities will generate return water. In-water placement is not proposed.

Sampling and Analysis Description: Sediment sampling and analysis was conducted in accordance with the Port's *Sampling and Analysis Plan: Sediment Characterization, Terminal 2 Berths 205 and [2]06, NW Front Ave., Portland, Oregon* ([SAP] Hart-Crowser, 2011). The project was sampled on January 31 and February 1, 2012, and the Port's sediment sampling locations appear in Figure 2. Because dredging depths are different between the two berths, two dredged material management units (DMMUs) were designated for the dredging project: the Berth 205 DMMU and the Berth 206 DMMU. Each DMMU is less than 20,000 cy. Two sediment cores were obtained from each DMMU.

The Port's coring contractor used a vibrocore sampler staged from a small vessel positioned over each sample location. Since the Port was considering two possible dredging depths, sediment cores were advanced to 4 feet below the dredge prism to collect three sample intervals (Figure 3):

1. dredge prism interval (mudline to -37 feet CRD in Berth 205; mudline to -39 feet CRD in Berth 206)
2. shallow NSM interval (NSM1) (0 to 2 feet below the dredge prism)
3. deep NSM interval (NSM2) (2 to 4 feet below the dredge prism).

Dredge Prism Sampling: Dredge prism samples were composited within each DMMU. Each composite sample was submitted to a contract laboratory for SEF conventional analyses (total solids, total organic carbon, total sulfides, ammonia, and particle size analysis) and analysis of the following SEF sediment chemical of concern (CoCs):

- Metals (Ag, As, Cd, Cr, Cu, Ni, Pb, Sb, Zn & Hg) (EPA method 6020 & 7471 series)
- Semi-volatile organic compounds (SVOCs) (EPA method 8270D or 8270D SIM)
 - Polynuclear aromatic hydrocarbons (PAHs)
 - Phenols
 - Phthalates
 - Chlorinated organic compounds
 - Misc. extractables
- Pesticides/polychlorinated biphenyls (PCBs) (EPA method 8081A/8082)
- Tri-n-butyltin (dry weight) (Krone method)
- Total petroleum hydrocarbons (TPH) as diesel and oil (NWTPH method)

NSM Sampling: NSM samples were collected from each core and archived individually, for a total of 4 archived NSM samples per berth (2 NSM1 samples and 2 NSM2 samples per berth). Additional material from the NSM1 interval samples was composited into a single sample for laboratory analysis (one NSM1 sample from Berth 205 and one from Berth 206). The NSM2 samples were composited and analyzed similar to the NSM1 samples.

Based on prior sediment sampling data (summarized in the Port's SAP), and the PSET's January 26, 2012 technical memorandum regarding the SAP, the following groups of chemicals were analyzed in the NSM composite samples:

- Conventional Parameters:
 - Total solids
 - Ammonia
 - Total sulfides
- Chemical Parameters:
 - Phthalates
 - Phenols
 - Miscellaneous extractable compounds
 - Pesticides
 - PCBs

Evaluation of Sediment Quality Data: The Port's sediment chemistry results were compared to the freshwater SLs found in the 2006 SEF (Table 7-1). Marine pesticide SLs are being used in the absence of freshwater SLs, and these are available at <http://www.nwp.usace.army.mil/environment/sediment.asp>.

Biological Testing: Biological testing was not performed.

Results: Dredged material grain size for Berths 205 and 206 is summarized in Table 2 of the SCR; dredged material was determined to be fine-grained (~81% fines). Sediment conventional and chemical parameters for Berths 205 and 206 (dredge prism, NSM1, and NSM2) are summarized in Table 3 of the SCR.

Berth 205: In the dredge prism, bulk sediment concentrations for the full suite of SEF CoCs (plus tributyltin) were below the 2006 SEF SLs. 4,4'-DDE and total PCBs were detected in the dredge prism material at low concentrations (1.9 ppb and 10.4 ppb, respectively).

Concentrations of phthalates, phenols, and miscellaneous extractable compounds in the NSM1 and NSM2 samples were below the SEF SLs. Pesticides were detected in the NSM1 sample (4,4'-DDD = 0.97J¹ ppb; 4,4'-DDE = 1.5JP² ppb) and the NSM2 sample (4,4'-DDD = 1.0 ppb; 4,4'-DDE = 1.7JP ppb). Total PCBs were not detected in the NSM1 sample and detected in the NSM2 sample at a concentration of 4.6 ppb.

Berth 206: In the dredge prism, bulk sediment concentrations for the full suite of SEF CoCs (plus tributyltin) were below the 2006 SEF SLs. 4,4'-DDE and total PCBs were detected in the dredge prism material at low concentrations (1.9 ppb and 18 ppb, respectively).

Concentrations of phthalates, phenols, and miscellaneous extractable compounds in the NSM1 and NSM2 samples were below the SEF SLs. Pesticides were detected in the NSM1 sample (4,4'-DDD = 0.97J ppb; 4,4'-DDE = 1.8 ppb) and the NSM2 sample (4,4'-DDD = 1.4 ppb; 4,4'-DDE = 2.0JP ppb). Total PCBs were detected in the both the NSM1 sample and the NSM2 sample at a concentrations of 21.5 and 23.1 ppb, respectively.

¹ "J"-flagged value indicates an estimated concentration between the method detection limit and the method reporting limit.

² "P"-flagged value indicates the analyte was detected on both chromatographic columns, but the RPD was greater than 40%.

Discussion: Contaminants detected in the both the dredge prism material and NSM, including 4,4'-DDD, 4,4'-DDE, and total PCBs, were well below their respective benthic toxicity screening levels across both DMMUs. When detected, concentrations of DDD and DDE were below or slightly above the contract laboratory's method reporting limits.

Additionally, concentrations of contaminants in the dredge prism material were comparable to NSM concentrations, and did not increase with depth. Total PCBs displayed a slight decrease with depth in Berth 205, from 10.4 ppb in the dredge prism material to 4.6 ppb in the NSM2 interval. A slight increase in total PCBs was observed in Berth 206 between the dredge prism material (18 ppb) and the NSM intervals (NSM1 = 21.5 ppb; NSM2 = 23.1 ppb), but the difference in concentration between the dredge prism material and either of the NSM intervals is negligible.

Suitability Determination:

Dredge Prism Material (Berths 205 and 206): Per the SEF guidance, dredge prism material at Terminal 2, Berths 205 and 206, is suitable for unconfined, aquatic placement without additional characterization. However, the Port proposes to place the dredged material at one of their upland sites.

New Surface Material (Berth 205): Per the SEF guidance, both the NSM1 and NSM 2 intervals are suitable for unconfined, aquatic exposure.

New Surface Material (Berth 206): Per the SEF guidance, both the NSM1 and NSM 2 intervals are suitable for unconfined, aquatic exposure.

Management Area Ranking/ Recency: Berth 205 is moderate-ranked; the SEF recency guidelines require that the need to retest the dredge area be evaluated 5 years from the date of sample collection, unless site conditions change (e.g., if a chemical spill is documented in or upstream of the project area). Per the 2009 SEF (Section 4.2.5), two consecutive rounds of sampling are required to confirm a new management area ranking. Another round of sampling is necessary to down-rank Berth 205.

Based on SEF management area ranking guidance, maintenance material in Berth 206 is down-ranked to "low." Two consecutive rounds of sediment sampling (including this round) have indicated that the material dredged from this berth is suitable for unconfined, aquatic placement.

Contact: This memorandum was prepared by James McMillan and reviewed by the participating PSET agencies, identified above. Questions regarding this memorandum should be directed to James McMillan (Lead – Portland Sediment Evaluation Team) at (503) 808-4376 or e-mail to: james.m.mcmillan@usace.army.mil.

References:

Hart Crowser. 2011. Sampling and Analysis Plan: Sediment Characterization, Terminal 2 Berths 205 and [2]06, NW Front Ave., Portland, Oregon. December 12, 2011.

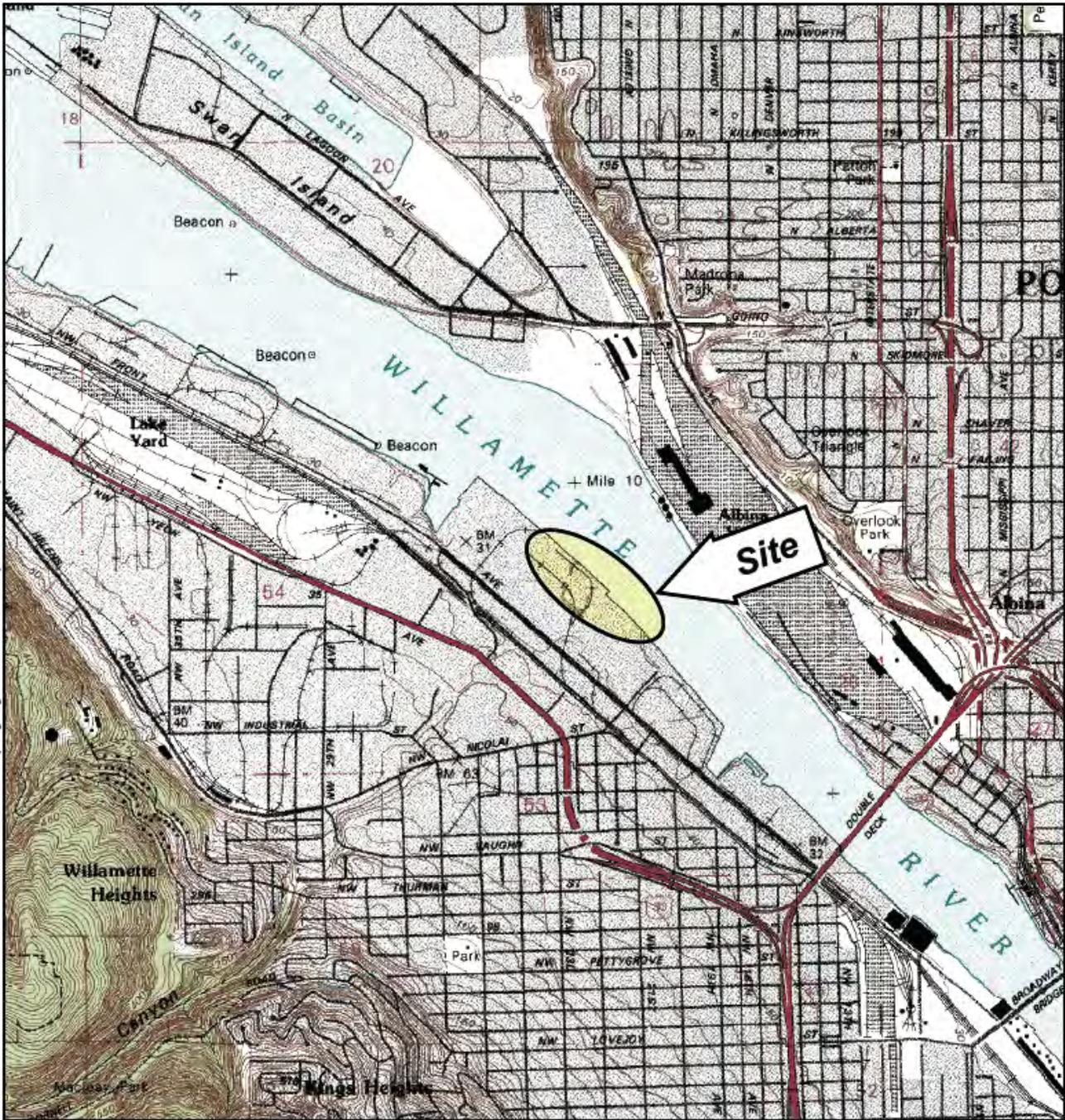
Hart Crowser. 2012. Sediment Characterization Report, Terminal 2 Berths 205 and 206, NW Front Ave., Portland, Oregon. April 10, 2012.

U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Washington Department of Ecology, Oregon Department of Environmental Quality, and Washington Department of Natural Resources. 1998. Dredged Material Evaluation Framework – Lower Columbia River Management Area. *Published* November 1998, by the U.S. Army Corps of Engineers, Northwestern Division.

U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Washington Department of Ecology, Washington Department of Natural Resources, Oregon Department of Environmental Quality, Idaho Department of Environmental Quality, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. 2006. *Interim Final Sediment Evaluation Framework for the Pacific Northwest*. Published September 30, 2006, by the U.S. Army Corps of Engineers, Northwestern Division, 194 pp + Appendices.

U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Washington Department of Ecology, Washington Department of Natural Resources, Oregon Department of Environmental Quality, Idaho Department of Environmental Quality, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. 2009. *Sediment Evaluation Framework for the Pacific Northwest*. Published May 2009, by the U.S. Army Corps of Engineers, Northwestern Division, 128 pp + Appendices.

**Terminal 2 Sediment Characterization SAP
NW Front Avenue, Portland, Oregon**



Source: Base map prepared from the USGS 7.5-minute quadrangle of Portland, Oregon, dated 1990.



Figure 1. Site location map, Port of Portland, Terminal 2, Portland, Multnomah County, Oregon.

Figure 2. Port of Portland, Terminal 2, Berths 205 and 206. Dredge area in red (pink) denotes the minimum dredge depth. The purple (lavender dredge area) indicates the additional area to be dredged if the Port decides to dredge to the maximum depth.

Figure 3. Dredge area sediment sampling schematic diagram, Port of Portland, Terminal 2, Berths 205 and 206.