



State of Oregon
Department of
Environmental
Quality

Application for a Solid Waste Beneficial Use Determination

DEQ USE ONLY - BUSINESS OFFICE	
Date Received:	_____
Amount Received:	_____
Check No.:	_____
Deposit No.:	_____
Forward confirmation of fee payment for: Eastern Region to DEQ, The Dalles Northwestern Region to DEQ-NWR, Portland Western Region to DEQ, Salem	

A. REFERENCE INFORMATION *(Please type or print clearly.)*

Port of Portland		Business name of applicant if different	
Legal name of applicant		_____	
7200 NE Airport Way, PO Box 3529		Portland	Oregon 97218
Mailing address		City	State Zip
503-415-6833		maria.harrison@portofportland.com	
Phone	Mobile	E-mail	Fax

Port of Portland		Generator of solid waste (may be same as applicant)	
7200 NE Airport Way, PO Box 3529		Portland	Oregon 97218
Mailing address		City	State Zip
503-415-6833		maria.harrison@portofportland.com	
Phone	Mobile	E-mail	Fax

B. TYPE OF BENEFICIAL USE DETERMINATION REQUESTED Beneficial Use Determination applications are categorized based on the type of information and potential amount of work required by DEQ staff to review application materials and render a decision. A tiered review and fee system has been established in rule. The tiers are:

- Tier 1 For a beneficial use of a solid waste that does not contain hazardous substances significantly exceeding the concentration in a comparable raw material or commercial product and that will be used in a manufactured product;
- Tier 2 For a beneficial use of a solid waste that contains hazardous substances significantly exceeding the concentration in a comparable raw material or commercial product, or involves application on the land;
- Tier 3 For a beneficial use of a solid waste that requires research, such as a literature review or risk assessment, or for a demonstration project to demonstrate compliance with this rule.

I am applying for a Tier 1 Tier 2 Tier 3 determination.

C. DOES THIS PROPOSED BENEFICIAL USE INVOLVE LAND APPLICATION OF ANY MATERIAL?

Yes No

D. SIGNATURE I hereby certify by my signature below that the information contained in this application, and the documents I have attached, are true and correct to the best of my knowledge and belief.

Marla Harrison

Marla Harrison

Environmental
Planning
Manager

3/15/12

Marla J Harrison
Signature of legally authorized representative

Marla Harrison
Print name

Title

Date

E. REQUIRED ATTACHMENTS TO THIS APPLICATION *(For an application to be complete, it must provide the required information for each listed item of the tier which is being applied for.)*

Tier 1

- A description of the material, manner of generation, and estimated quantity to be used each year;
- A description of the proposed use;
- A comparison of the chemical and physical characteristics of the material proposed for use with the material it will replace;
- A demonstration of compliance with the performance criteria in OAR 340-093-0280 based on knowledge of the process that generated the material, properties of the finished product, or testing; and
- Any other information that DEQ may require to evaluate the proposal.

Tier 2

- The information required for a Tier 1 application;
- Sampling and analysis that provides chemical, physical, and biological characterization of the material and that identifies potential contaminants in the material or the end product, as applicable;
- A risk screening comparing the concentration of hazardous substances in the material to existing, DEQ approved, risk-based screening level values, and demonstrating compliance with acceptable risk levels;
- Location or type of land use where the material will be applied, consistent with the risk scenarios used to evaluate risk;
- Contact information of property owner(s) if this is a site-specific land application proposal, including name, address, phone number, e-mail, site address and site coordinates (latitude and longitude); and
- A description of how the material will be managed to minimize potential adverse impacts to public health, safety, welfare, or the environment.

Tier 3

- The information required for a Tier 1 & 2 application;
- A discussion of the justification for the proposal;
- An estimate of the expected length of time that would be required to complete the project, if it is a demonstration; and
- If it is a demonstration project, the methods proposed to ensure safe and proper management of the material.

F. PERFORMANCE CRITERIA *(For all tiers - An application for a beneficial use determination must demonstrate satisfactory compliance with the following performance criteria.)*

The use is productive, including:

- ◆ There is an identified or reasonably likely use for the material that is not speculative;
- ◆ The use is a valuable part of a manufacturing process, an effective substitute for a valuable raw material or commercial product, or otherwise authorized by DEQ, and does not constitute disposal; and
- ◆ The use is in accordance with applicable engineering standards, commercial standards, and agricultural or horticultural practices.

The use will not create an adverse impact to public health, safety, welfare, or the environment, including:

- ◆ The material is not a hazardous waste under ORS 466.005;
- ◆ Until the time the material is used in accordance with a beneficial use determination, the material will be managed, including any storage, transportation, or processing, to prevent releases to the environment or nuisance conditions;
- ◆ Hazardous substances in the material do not significantly exceed the concentration in a comparable raw material or commercial product, or do not exceed naturally occurring background concentrations, or do not exceed acceptable risk levels, including evaluation of persistence and potential bioaccumulation, when the material is managed according to a beneficial use determination.

The use will not result in the increase of a hazardous substance in a sensitive environment.

The use will not create objectionable odors, dust, unsightliness, fire, or other nuisance conditions.

The use will comply with all applicable federal, state, and local regulations.

G. FEES (Must accompany the application for it to be considered complete)

<input type="checkbox"/>	Tier 1 beneficial use determination	\$1,000
<input checked="" type="checkbox"/>	Tier 2 beneficial use determination	\$2,000
<input type="checkbox"/>	Tier 3 beneficial use determination	\$5,000

Make checks out to: **Oregon DEQ**

Total fees included: \$2,000

H. APPLICATION PROCEDURE

Step 1

Contact a DEQ staff person for assistance with the preparation of the application. DEQ staff will help with: 1) Determination of the eligibility for a beneficial use determination of a particular waste or process; and, 2) If eligible, establish the tier of beneficial use determination review required and associated fee to submit with the application.

Step 2

Mail the original signed application, all attachments, including the fee payment plus one extra copy to the appropriate regional office (see listing below.) Note that DEQ review work will not begin until a complete application packet is received. Incomplete applications may be returned. DEQ recommends the applicant keep a full copy of all application materials to guard against possible loss in transit.

Step 3

DEQ will contact the applicant, acknowledging receipt of the application, and will identify the staff person assigned to carryout the review. This staff person will contact the applicant if any additional information is needed.

Region	Counties Served	Address & Phone
Eastern Region	Baker, Crook, Deschutes, Gilliam, Grant, Harney, Hood River, Jefferson, Klamath, Lake, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco, and Wheeler	Eastern Region Department of Environmental Quality 400 E Scenic Drive, Ste 2.307 The Dalles, OR 97058 (541) 298-7255 ext. 221
Northwest Region	Clatsop, Clackamas, Columbia, Multnomah, Tillamook, and Washington	Northwest Region DEQ Solid Waste Programs 2020 SW Fourth Ave. Ste 400 Portland, OR 97201 (503) 229-5353
Western Region	Benton, Coos, Curry, Douglas, Jackson, Josephine, Lane, Lincoln, Linn, Marion, Polk, and Yamhill	Western Region DEQ Solid Waste Programs 750 Front St. NE Suite 120 Salem, OR 97301 (503) 378-5047

Information for Tier 2 BUD Application

The proposed beneficial use of dredged material from the Port of Portland's dredging operation of Berths 205 and 206 at Marine Terminal 2 would involve "application on the land," placing it in the Tier 2 category. This is the case even though the dredged material does not contain hazardous substances "significantly exceeding the concentration in a comparable raw material or commercial product." Provided below is the required information for a Tier 2 application.

1. *A description of the material, manner of generation, and estimated quantity to be used each year.*

The Port is planning to dredge from 10,000 to 40,000 cubic yards of sandy, clayey silt from the Willamette River at Port of Portland's Marine Terminal 2, Berths 205 and 206. Actual volumes will be determined by pre-dredge bathymetric surveys

2. *A description of the proposed use.*

The material will be placed at an existing dredged material placement site (the West Hayden Island Placement Site) that is designated for future marine commercial and industrial development, and may be used as fill in connection with that or another future development. The proposed use is identical to the use described in previous Beneficial Use Determination (BUD) applications for dredged material from Terminals 5 and 6 and the Post Office Bar and in Oregon Department of Environmental Quality's (DEQ's) recent Beneficial Use for Solid Waste Determination Evaluation Forms and approval letters for the Post Office Bar and Terminal 6 (DEQ, 2011a,b).

3. *A comparison of the chemical and physical characteristics of the material proposed for use with the material it will replace.*

The dredged material proposed for placement has similar characteristics to soil fill, except for very low concentrations of several detected chemical constituents (see attached Table 1 and item 7 below which details how the material meets DEQ regulations). The material is similar to material which has historically been placed at the West Hayden Island Placement Site, and which has more recently been approved for placement under the DEQ's beneficial use rules.

4. *A demonstration of compliance with the performance criteria in OAR 340-093-0280 based on knowledge of the process that generated the material, properties of the finished product, or testing.*

The use is productive as the material is equivalent to soil fill that would be needed to raise the grade for future development. The use will not create an adverse impact to public health, safety, welfare or the environment. The material is not a hazardous waste. Dredging will occur in accordance with an existing U.S. Army Corps of Engineers (Corps) permit (NWP-2007-204). The dredged material will be transported to West Hayden Island by barge and off-loaded into a

placement cell on the island. No return water to the Columbia River will occur. Chemical analysis for hazardous substances has been performed (Table 1), and evaluation of the chemical data (see Item 7 below; Tables 1 and 2) indicates that the material does not pose an unacceptable risk to people or ecological species.

5. *Any other information that DEQ may require to evaluate the proposal.*

No additional information is necessary. However, as noted above, the material described here is similar to material historically placed at this site, which has come from dredging projects on the Columbia and Willamette Rivers. DEQ's BUD determinations for dredged material from the Corps' Post Office Bar project and the Port's Terminal 6 project also contain relevant information for DEQ's determination in this case (DEQ, 2011a,b).

6. *Sampling and analysis that provides chemical, physical, and biological characterization of the material and that identifies potential contaminants in the material or the end product, as applicable.*

Tables 1 and 3 provide the chemical and physical data, respectively, associated with sediments to be dredged. Very low concentrations of several detected chemical constituents have been identified (Table 1), and physical analysis indicates fine-grained sediments. No biological data on the material is available.

7. *A risk screening comparing the concentration of hazardous substances in the material to existing, DEQ approved, risk-based screening level values, and demonstrating compliance with acceptable risk levels.*

Chemical data were screened against risk-based screening levels (RBSLs) for upland ecological and human receptors in Table 1. For terrestrial species, we used available EPA ecological soil screening levels (SSLs) derived from evaluation of numerous toxicological studies (EPA, 2005a - 2008). In 2001, the DEQ also compiled screening level values (SLVs) for assessing risks to ecological receptors (DEQ, 2001); these were used to fill in gaps where no SSLs were available. Non-threatened and endangered (non-T&E) species of birds and mammals were derived by multiplying T&E SLVs by a factor of 5 for protection of a population basis (per DEQ [2001]). For human health, the most stringent DEQ risk-based concentrations (RBCs) for residential and occupational use were used (DEQ, 2011). If no DEQ RBCs were available, EPA regional screening levels were used (EPA, 2011). Because metals are naturally occurring, only those metal detections above background concentrations were screened (DEQ, 2010). The initial screening shows only three compounds (zinc, benzo(a)pyrene, and dibenzofuran) exceed RBSLs at least once, warranting further evaluation.

The material will be placed upland at the West Hayden Island Placement Site. Currently, the West Hayden Island Placement Site is not developed and consists of approximately 100 acres of West Hayden Island. This placement site has been configured to accommodate and

appropriately manage dredge material, and has been an approved placement site for at least 75 years. Terrestrial species occupying the upland portions of the island consist of non-T&E species (previously bald eagles were a state-listed threatened bird; they were removed from the state list on March 9, 2012 [ODFW, 2012]). The primary and future human health risk scenario is occupational, which is protective for commercial/industrial, recreational and other uses. No residential use of the property is planned.

In the process of dredging the Terminal 2 berths and hydraulic placement of the sediment upland, the dredged material will undergo substantial mixing. We calculated the resulting weighted concentrations of the material based on the minimum, average, and maximum anticipated dredge volumes. Table 2 presents the weighted concentrations for zinc, benzo(a)pyrene, and dibenzofuran. The highest of these concentrations was then screened against applicable RBSLs for non-T&E terrestrial species, and future occupational workers. As shown in Table 2, all three compounds are below RBSLs, indicating these compounds do not pose an unacceptable risk to people and terrestrial species.

In summary, very low concentrations of several chemical compounds have been detected in the sediment to be dredged. Screening of chemical data against ecological and human health screening levels indicates that the dredge material, after placement, will be in compliance with acceptable risk levels and not pose a risk to human health or the environment.

8. Location or type of land use where the material will be applied, consistent with the risk scenarios used to evaluate risk.

The land use is zoned MUF19 (Multiple Use Forrest, 19 Acre Minimum). This is a low density land use designation within Multnomah County. The West Hayden Island Placement Site is used exclusively for dredged material placement and has no other land use associated with the site. The Port of Portland is presently engaged in a land use proceeding to annex the subject property, to fulfill long-term plans for marine terminal development. We note, however, that the material will not eliminate the possibility of other types of uses (including recreation and open space). The risk screening assumed these uses.

9. Contact information of property owner(s) if this is a site-specific land application proposal, including name, address, phone number, e-mail, site address and site coordinates (latitude and longitude).

Marla Harrison
Port of Portland
7200 NE Airport Way, PO Box 3529
Portland, Oregon 97218
marla.harrison@portofportland.com
503-415-6833

Site Address: West Hayden Island Placement Site
Approximate Coordinates: 45° 37' 25" N, 122° 42' 9" W

10. *A description of how the material will be managed to minimize potential adverse impacts to public health, safety, welfare, or the environment.*

Upland placement involves pumping dredge material directly from the transport barge to a diked area created on West Hayden Island. The dikes are constructed to contain and direct the slurry of dredge material as it is pumped from the barge. Excess water is held in settling ponds controlled by one or more weirs; no surface water would be released back into the adjacent Columbia River. After dewatering, the dredged sediment may be graded. The West Hayden Island Placement Site is not readily accessible to the general public. As demonstrated in Item 7 above, the material does not pose a risk to human health and the environment.

References:

DEQ, 2001. *Guidance for Ecological Risk Assessment. Level II – Screening.* December 2001.

DEQ, 2011. Excel® Spreadsheet for Risk Based Concentrations for Individual Chemicals. November 15, 2011.

DEQ, 2010. *Human Health Risk Assessment Guidance.* Table 1. October 2010.

DEQ, 2011a. *Beneficial Use Determination BUD20100708 (Reconsidered) – Use of Post Office Bar Dredged Sediments as Fill Material at West Hayden Island Placement Facility.* Approval letter dated May 9, 2011, with attached May 6, 2011, evaluation form.

DEQ, 2011b. *Beneficial Use Determination Approval, BUD20110803, Port of Portland, T-6 Dredge Sediment, Multnomah County.* Approval letter dated November 1, 2011, with attached September 30, 2011, evaluation form.

EPA, 2005a. *Ecological Soil Screening Levels for Arsenic – Interim Final.* OSWER Directive 9285.7-62. March 2005.

EPA, 2005b. *Ecological Soil Screening Levels for Cadmium – Interim Final.* OSWER Directive 9285.7-65. March 2005.

EPA, 2005c. *Ecological Soil Screening Levels for Lead – Interim Final.* OSWER Directive 9285.7-70. March 2005.

EPA, 2006. *Ecological Soil Screening Levels for Silver – Interim Final.* OSWER Directive 9285.7-77. September 2006.

EPA, 2007a. *Ecological Soil Screening Levels for Copper – Interim Final*. OSWER Directive 9285.7-68. Issued July 2006, Revised February 2007.

EPA, 2007b. *Ecological Soil Screening Levels for Nickel – Interim Final*. OSWER Directive 9285.7-76. March 2007.

EPA, 2007c. *Ecological Soil Screening Levels for Dieldrin – Interim Final*. OSWER Directive 9285.7-56. Issued March 2005, Revised April 2007.

EPA, 2007d. *Ecological Soil Screening Levels for DDT and Metabolites*. OSWER Directive 9285.7-57. April 2007.

EPA, 2007e. *Ecological Soil Screening Levels for Pentachlorophenol – Interim Final*. OSWER Directive 9285.7-58. Issued March 2005, Revised April 2007.

EPA, 2007f. *Ecological Soil Screening Levels for Zinc – Interim Final*. OSWER Directive 9285.7-73. June 2007.

EPA, 2007g. *Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs) – Interim Final*. OSWER Directive 9285.7-78. June 2007.

EPA, 2008. *Ecological Soil Screening Levels for Chromium – Interim Final*. OSWER Directive 9285.7-76. Issued March 2005, Revised April 2008.

EPA, 2011. *Regional Screening Levels*. November 2011.

Oregon Department of Fish and Wildlife (ODFW), 2012. Bald Eagle Soars Off Oregon's Endangered Species List. Accessed on March 12, 2012. <http://www.dfw.state.or.us/news/2012/March/030912.asp>.

Washington State Department of Ecology, 1994. *Natural Background Soil Metals Concentrations in Washington State*. October 1994.

Table 1 - Sediment Chemical Analyses Results
Terminal 2 Beneficial Use Determination
Portland, Oregon

Berth Sample Lab ID Date	205		206		Natural Background	Ecological SLs				Human RBCs		
	C3/4-DP UH13B 2-Feb-12	C1/2-DP UH13A 2-Feb-12	Plants	Invert.		T&E Bird	Non-T&E Bird	T&E Mammal	Non-T&E Mammal	Residential	Occupational	Critical Pathway
Conventional Parameters												
Total Solids (%)	47.2	48.5	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (%)	2.21	2.40	-	-	-	-	-	-	-	-	-	-
Ammonia (mg/kg)	311	206	-	-	-	-	-	-	-	-	-	-
Total Sulfides (mg/kg)	27.9	14.3	-	-	-	-	-	-	-	-	-	-
TPH in mg/kg												
Diesel-Range	2.7 U	2.8 U	-	-	-	-	-	-	-	-	-	-
Oil-Range	24	3.4 U	-	-	-	-	-	-	-	-	-	-
Total TPH	24	3.4 U	-	-	-	-	-	-	-	-	-	-
Metals in mg/kg												
Antimony	0.69 U	0.60 U	4	5	78*	-	-	0.27*	1.35*	31	410	EPA
Arsenic	4.1	3.9	7	18*	60	43*	215*	46*	230*	0.39	1.7	Direct
Cadmium	0.6	0.6	1	32*	140*	0.77*	3.9*	0.36*	1.8*	39	500	Direct
Chromium	38	37.8	42	1	0.4	26*	130*	34*	170*	120,000	1,500,000	Direct (III)
Copper	47.6	46.3	36	70*	80*	28*	140*	49*	245*	3,100	41,000	Direct
Lead	13	13	17	120*	1,700*	11*	55*	56*	280*	30	30	Leaching
Mercury	0.07	0.06	0.07	0.3	0.1	1.5	7.5	73	365	23	310	Direct
Nickel	29	28	38	38*	280*	210*	1,050*	130*	650*	1,500	20,000	Direct
Silver	0.065 U	0.057 U	1	560*	50	4.2*	21*	14*	70*	390	5,100	Direct
Zinc	107	104	86	160*	120*	46*	230*	79*	395*	23,000	310,000	EPA
Tributyltin (TBT)												
TBT in Bulk Sediment (µg/kg)	1.0 U	1.0 U	-	-	-	-	-	-	-	18,000	180,000	EPA
PAHs in µg/kg												
<u>LPAHs</u>												
Naphthalene	21	13	-	10,000	-	-	-	390,000	1,950,000	3,800	15,000	Leaching
Acenaphthylene	14 J	3.2 J	-	-	-	-	-	-	-	-	-	-
Acenaphthene	12	3.1 J	-	20,000	-	-	-	-	-	2,900,000	41,000,000	Direct
Fluorene	15 J	4.1 J	-	-	30,000	-	-	-	-	2,600,000	35,000,000	Direct
Phenanthrene	46	25	-	-	-	-	-	-	-	-	-	-
Anthracene	17 J	4.9	-	-	-	-	-	-	-	21,000,000	-	Direct
2-Methylnaphthalene	13 J	4.2 J	-	-	-	-	-	-	-	-	-	-
Total LPAHs	147	66	-	-	29,000*	-	-	100,000*	500,000*	-	-	-
<u>HPAHs</u>												
Fluoranthene	52	40	-	-	-	-	-	-	-	2,300,000	29,000,000	Direct
Pyrene	45	32	-	-	-	-	-	-	-	1,700,000	21,000,000	Direct
Benz(a)anthracene	20	12 J	-	-	-	-	-	-	-	150	2,700	Direct
Chrysene	30	21	-	-	-	-	-	-	-	15,000	270,000	Direct
Benzo(b)fluoranthene	-	-	-	-	-	-	-	-	-	150	2,700	Direct
Benzo(k)fluoranthene	-	-	-	-	-	-	-	-	-	1,500	27,000	Direct
Benzo(b+k)fluoranthenes	44	26	-	-	-	-	-	-	-	150	2,700	Direct
Benzo(a)pyrene	20	13	-	-	-	-	-	125,000	625,000	15	270	Direct
Indeno(1,2,3-cd)pyrene	16 J	8.1	-	-	-	-	-	-	-	150	2,700	Direct
Dibenz(a,h)anthracene	2.7 J	2.7 J	-	-	-	-	-	-	-	15	270	Direct
Benzo(g,h,i)perylene	18	9.5	-	-	-	-	-	-	-	-	-	-
Total HPAHs	248	164	-	-	18,000*	-	-	1,100*	5,500*	-	-	-
SVOCs in µg/kg												
<u>Chlorinated Hydrocarbons</u>												
1,4-Dichlorobenzene	2.8 U	2.7 U	-	-	-	-	-	-	-	81	410	Leaching
1,2-Dichlorobenzene	2.4 U	2.9 U	-	-	20,000	-	-	-	-	70,000	290,000	Leaching
1,2,4-Trichlorobenzene	11 J	3.8 U	-	-	20,000	-	-	-	-	22,000	99,000	EPA
Hexachlorobenzene	4.2 U	3.3 U	-	-	1,000,000	-	-	-	-	260	1,200	Direct

Please refer to notes on the last page of this table.

**Table 1 - Sediment Chemical Analyses Results
Terminal 2 Beneficial Use Determination
Portland, Oregon**

Berth Sample Lab ID Date	205		206		Natural Background	Ecological SLVs				Human RBCs		
	C3/4-DP UH13B 2-Feb-12	C1/2-DP UH13A 2-Feb-12	Plants	Invert.		T&E Bird	Non-T&E Bird	T&E Mammal	Non-T&E Mammal	Residential	Occupational	Critical Pathway
SVOCs in µg/kg (Continued)												
<i>Phthalates</i>												
Dimethyl Phthalate	16 J	2.8 U	-	-	200,000	-	-	-	-	--	--	--
Diethyl Phthalate	36 U	35 U	-	100,000	-	-	-	-	-	49,000,000	490,000,000	EPA
Di-n-butyl Phthalate	14 J	7.8 U	-	200,000	-	450	2,250	30,000,000	150,000,000	6,100,000	62,000,000	EPA
Butyl Benzyl Phthalate	17 J	5.8 U	-	-	-	-	-	-	-	260,000	910,000	EPA
Bis (2-ethylhexyl) Phthalate	78 B	56 B	-	-	-	4,500	22,500	1,020,000	5,100,000	35,000	150,000	Direct
Di-n-octyl Phthalate	5.7 U	21	-	-	-	-	-	-	-	-	-	-
<i>Phenols</i>												
2,4-Dimethylphenol	41 J	5.0 U	-	20,000	-	-	-	-	-	1,200,000	12,000,000	EPA
2-Methylphenol	12 J	5.3 U	-	50,000	-	-	-	16,000,000	80,000,000	3,100,000	31,000,000	EPA
4-Methylphenol	53 J	37 J	-	-	-	-	-	-	-	310,000	3,100,000	EPA
Pentachlorophenol	50 J	46 U	-	5,000*	31,000*	2,100*	10,500*	2,800*	14,000*	140	1,000	Leaching
Phenol	460	290	-	70,000	30,000	-	-	-	-	18,000,000	180,000,000	EPA
<i>Miscellaneous Extractables</i>												
Benzoic Acid	120 J	120 J	-	-	-	-	-	-	-	240,000,000	2,500,000,000	EPA
Benzyl Alcohol	170 Q	90 Q	-	-	-	-	-	-	-	6,100,000	62,000,000	EPA
Dibenzofuran	13	3.5 J	-	-	-	-	-	2	10	78,000	1,000,000	EPA
Hexachlorobutadiene	4.3 U	4.3 U	-	-	-	-	-	-	-	6,200	22,000	EPA
n-Nitrosodiphenylamine	5.1 U	5.1 U	-	-	-	-	-	-	-	99,000	350,000	EPA
Pesticides in µg/kg												
4,4'-DDD	0.13 Y	0.13 Y	-	-	-	10	50	100,000	500,000	2,400	11,000	Direct
4,4'-DDE	1.9	1.9	-	-	-	10	50	100,000	500,000	1,700	7,600	Direct
4,4'-DDT	0.18 Y	0.19 Y	-	-	-	10	50	100,000	500,000	1,700	7,700	Direct
Total DDx	1.9	1.9	-	-	-	93*	465*	21*	105*	-	-	-
Aldrin	0.053 U	0.053 U	-	-	-	-	-	25,000	125,000	25	110	Direct
alpha-Chlordane	0.049 U	0.049 U	-	-	-	9,000	45,000	250,000	1,250,000	1,600	7,000	Direct
Dieldrin	0.096 U	0.097 U	-	-	-	22*	110*	4.9*	24.5*	5	28	Leaching
Heptachlor	0.13 U	0.13 U	-	-	-	-	-	15,000	75,000	100	460	Direct
gamma-BHC (Lindane)	0.046 U	0.047 U	-	-	-	8,000	40,000	1,000,000	5,000,000	3.9	21	Leaching
PCBs in µg/kg												
Aroclor 1016	0.98 U	0.99 U	-	-	-	-	-	100,000	500,000	-	-	-
Aroclor 1221	1.3 U	1.3 U	-	-	-	-	-	-	-	-	-	-
Aroclor 1232	1.3 U	1.3 U	-	-	-	-	-	-	-	-	-	-
Aroclor 1242	1.3 U	1.3 U	-	-	-	1,500	7,500	5,000	25,000	-	-	-
Aroclor 1248	1.3 U	1.3 Y	-	-	-	-	-	-	-	-	-	-
Aroclor 1254	5.1	10	-	-	-	700	3,500	4,000	20,000	-	-	-
Aroclor 1260	5.3	7.5	-	-	-	-	-	-	-	-	-	-
Aroclor 1262	1.3 U	1.3 Y	-	-	-	-	-	-	-	-	-	-
Aroclor 1268	1.3 U	1.3 U	-	-	-	-	-	-	-	-	-	-
Total PCBs	10.4	18	-	40,000	-	-	-	4,000	20,000	200	700	Direct

Notes:

- Screening levels (SLs) are Freshwater Screening Levels 1 (no adverse effects) from the Sediment Evaluation Framework (SEF) (Corps, et al., 2006; Table 7-1, revised 10/20/06). If a freshwater value was not present, marine SLs from corrected Table 6-3 of the Final SEF (Corps, et al., 2009) are listed and flagged with an ^a. Gamma-BHC does not have a SEF SL; the values are flagged with a ^b and are from Table 8-1 of the Dredge Material Evaluation Framework (Corps, et al., 1998).
- PAH and dibenzofuran concentrations are the higher of the EPA Method 8270D-SIM and EPA Method 8270D analyses.
- Bolded values are detected concentrations.
- Background and screening levels are from the following sources:
 - Background metals concentrations from Table 1 of the DEQ's Human Health Risk Assessment guidance (DEQ, 2010).
 - *Ecological SLs are based on SSLs EPA (2005a - 2008). If no SSL was available, then the SLV from DEQ (2001) is listed. Per DEQ (2001), the ecological SL was multiplied by 5 times to derive a non-T&E terrestrial SL for birds and mammals.
 - Lowest risk-based concentration (RBC) for resident and occupational worker pathways from DEQ (2011), where available.
 - EPA Regional Screening Level for residential and industrial soil from EPA (2011).
- Shaded value is a concentration exceeding its respective SL (exceeded SL is also shaded). For metals, the background level must be exceeded first.
- For undetected compounds, method detection limits (MDLs) are shown.
- = Not analyzed or not available.
- J = Estimated concentration between MDL and method reporting limit (MRL).
- Q = initial or continuing calibration outside control limits (>20%). Data could be biased high.
- U = Not detected at the indicated MDL.
- Y = Not detected at the indicated MDL. MRL, not shown, was raised due to interference.

**Table 2 - Risk Screening of Estimated Post-Dredge Concentrations
Terminal 2 Beneficial Use Determination
Portland, Oregon**

Berth:	205	206	Resulting Weighted Concentration		
Volumes (cy)			Volume (cy)		
Minimum	6,000	5,000	Min	Average	Max
Average	16,000	11,500	11,000	27,500	44,000
Maximum	26,000	18,000			
Metals in mg/kg					
Zinc	107	104	106	106	106
SVOCs in µg/kg					
Benzo(a)pyrene	20	13	17	17	17
Dibenzofuran	13	3.5	8.7	9.0	9.1

Chemical of Concern	Highest Weighted Conc.	Natural Background	Ecological SLs				Human RBCs
			Plant	Invertebrate	Non-T&E Bird	Non-T&E Mammal	Occupational
Metals in mg/kg							
Zinc	106	86	160*	120*	230*	395	31,000 [†]
SVOCs in µg/kg							
Benzo(a)pyrene	17	-	-	18,000* [§]	-	5,500* [§]	270
Dibenzofuran	9.1	-	-	-	-	10	1,000,000 [†]

Notes:

- This table only lists compounds exceeding screening levels from Table 1.
- Bolded values are detected and calculated concentrations.
- Background and screening levels are from the following sources:
 - Background zinc concentration from Table 1 of the DEQ's Human Health Risk Assessment guidance (DEQ, 2010).
 - *Ecological SLs based on SSLs EPA (2005a - 2008). If no SSL was available, then the SLV from DEQ (2001) is listed. Per DEQ (2001), the ecological SL was multiplied by 5 times to derive a non-T&E terrestrial SL for birds and mammals. [§]SLV is for total HPAHs as no value for benzo(a)pyrene is available or value is higher.
 - Lowest risk-based concentration (RBC) for occupational worker pathways from DEQ (2011), where available.
- [†]EPA Regional Screening Level for industrial soil from EPA (2011).
4. Shaded value is a SL that was exceeded by the highest weighted concentration.
5. - = Not available.

**Table 3 - Grain Size Distributions
Terminal 2 Beneficial Use Determination
Portland, Oregon**

Berth	205	206
Sample ID	C3/4-DP	C1/2-DP
Lab ID	UH13B	UH13A
Date	2-Feb-12	2-Feb-12
Grain Size in %		
Gravel	0.0	0.0
Very Coarse Sand	1.0	1.0
Coarse Sand	1.0	0.8
Medium Sand	0.8	1.1
Fine Sand	4.0	3.8
Very Fine Sand	12.0	12.5
Coarse Silt	25.3	24.1
Medium Silt	21.1	21.2
Fine Silt	12.2	10.9
Very Fine Silt	8.4	7.5
8-9 Phi Clay	4.3	5.4
9-10 Phi Clay	3.9	4.6
> 10 Phi Clay	5.9	7.0
Total Fines	81.1	80.7
Material Description	Sandy, clayey SILT	Sandy, clayey SILT