Table 2.1-4
Numeric Standards Associated with Chemical-Specific ARARs
Portland Harbor Superfund Site
Portland, Oregon

		Surface Water										Surface Water & Groundwater
	Statute/Regulation:	Clean Water Act, 33 USC 1313 and1314, Section 304(a) List						Oregon Water Pollution Control Act ORS 468B.048				Safe Drinking Water Act 42 USC 300f, 40 CFR Part 141, 143
		Aquatic Life		Human Health				Aquatic Life		Human Health		Human Health
	Receptor:	CMC (acute)	CCC (chronic)	Current (water + organism)	Current (oganism only)	2014 Update (water + oganism)	2014 Update (organism only)	CMC (acute)	CCC (chronic)	Current (water + organism)	Current (oganism only)	MCL
	Consumption Rate:			17 g/day	17 g/day	22 g/day	22 g/day			175 g/day	175 g/day	
Contaminant	CAS #	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Acenaphthene	83-32-9	NA	NA	670	990	200	400	NA	NA	95	99	NA
Acenaphthylene	208-96-8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	309-00-2	3.0[1]	NA	0.000049[7]	0.00005[7]	0.0000010	0.0000010	3[1]	NA	0.0000050	0.0000050	NA
Anthracene	120-12-7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	340[2]	150[2]	0.018[7,8]	0.14[7,8]	Note 10	Note 10	340[7]	150[2]	2.1[8,12]	2.1[8,13]	10
Benzene	71-43-2	NA	NA	2.2[7]	51[7]	0.45-1.6	6.2-23	NA	NA	0.44	1.4	5
Benzo(a)anthracene	56-55-3	NA	NA	0.0038[7]	0.018[7]	0.011	0.013	NA	NA	0.0013	0.0018	NA
Benzo(a)pyrene	50-32-8	NA	NA	0.0038[7]	0.018[7]	0.00077	0.00088	NA	NA	0.0013	0.0018	0.2
Benzo(b)fluoranthene	205-99-2	NA	NA	0.0038[7]	0.018[7]	0.00037	0.00038	NA	NA	0.0013	0.0018	NA
Benzo(g,h,i)perylene	191-24-2	NA	NA	NA	NA	NA	NA	NA	NA	0.0013	0.0018	NA
Benzo(k)fluoranthene	207-08-9	NA	NA	0.0038[7]	0.018[7]	0.011	0.012	NA	NA	0.0013	0.0018	NA
Bis(2-ethylhexyl) phthalate (BEHP)	117-81-7	NA	NA	1.2[7]	2.2[7]	0.028	0.029	NA	NA	0.2	0.22	6
Cadmium	7440-43-9	0.52[2,3,14]	0.094[2,3,14]	5	NA	Note 10	Note 10	0.8[3,11]	0.9[2,3,11]	NA	NA	5
Chlordanes	57-74-9	2.4[1]	0.0043	0.00080[7]	0.00081[7]	0.0000068	0.0000068	2.4[1]	0.0043	0.000081	0.000081	2
Chlorobenzene	108-90-7	NA	NA	100	1,600	90	600	NA	NA	74	160	100
Chromium	7440-47-3	NA	NA	100	NA	Note 10	NA	NA	NA	NA	NA	100
Chromium (III)	16065-83-1	183[2,3,14]	24[2,3,14]	NA	NA	NA	NA	183[2,3,11]	24[2,3,11]	NA	NA	NA
Chromium (VI)	18540-29-9	16[2]	11[2]	NA	NA	NA	NA	16[2]	11[2]	NA	NA	NA
Chrysene	218-01-9	NA	NA	0.0038[7]	0.018[7]	0.022	0.022	NA	NA	0.0013	0.0018	NA
Copper	7440-50-8	5[2,3,14]	4[2,3,14]	1,300	NA	Note 10	Note 10	5[3,11]	4[3,11]	1,300	NA	1,300
Cyanide	57-12-5	22[4]	5.2[4]	140	140	3	400	22[4]	5.2[4]	130	130	200
DDx		1.1[1,6]	0.001[1,6]	NA	NA	NA	NA	1.1[1,6]	0.001[1,6]	NA	NA	NA
DDD (2,4'- and 4,4-DDD)	72-54-8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4'-DDD	53-19-0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDD	72-54-8	NA	NA	0.00031[7]	0.00031[7]	0.000019	0.000019	NA	NA	0.000031	0.000031	NA
DDE (2,4- and 4,4-DDE)	72-55-9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	72-55-9	NA	NA	0.00022[7]	0.00022[7]	0.000038	0.000038	NA	NA	0.000022	0.000022	NA
DDT (2,4'- and 4,4'-DDT)	50-29-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	50-29-3	NA	NA	0.00022[7]	0.00022[7]	0.0000072	0.0000072	NA	NA	0.000022	0.000022	NA
Dibenz(a,h)anthracene	53-70-3	NA	NA	0.0038[7]	0.018[7]	0.000063	0.000063	NA	NA	0.0013	0.0018	NA
1,1-Dichloroethene (1,1-DCE)	75-35-4	NA	NA	330	7,100	200	4,000	NA	NA	230	710	7
cis-1,2-Dichloroethene (cis-1,2-DCE)	107-06-2	NA	NA	0.38[7]	37[7]	0.29	13	NA	NA	NA	NA	70
Dieldrin	60-57-1	0.24	0.056	0.000052[7]	0.000054[7]	0.000010	0.000010	0.24	0.056	0.0000053	0.0000054	NA
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	70
Ethylbenzene	100-41-4	NA	NA	530	2,100	400	1,000	NA	NA	160	210	700
Fluoranthene	206-44-0	NA	NA	130	140	40	50	NA	NA	14	14	NA
Fluorene	7782-41-4	NA	NA	1,100	5,300	30	40	NA	NA	390	530	NA
Hexachlorobenzene	118-74-1	NA	NA	0.00028[7]	0.00029[7]	0.0000064	0.0000064	NA	NA	0.000029	0.000029	1
gamma-Hexachlorocyclohexane (γ-BHC, or Lindane)	58-89-9	0.095	NA	0.98	1.8	2.5	2.8	0.95	0.08	0.17	0.18	0.2
1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	70648-26-9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	193-39-5	NA	NA	0.0038[7]	0.018[7]	0.0045	0.0046	NA	NA	0.0013	0.0018	NA
Lead	7439-92-1	14[2,3,14]	0.54[2,3,14]	NA	NA	NA	NA	14[2,3,11]	0.54[2,3,11]	NA	NA	15
Manganese	7439-96-5	NA	NA	50[9]	100	Note 10	Note 10	NA	NA	NA	NA	NA
Methylchlorophenoxypropionic acid (MCPP)	7085-19-0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	7439-97-6	1.4[2]	0.77[2]	NA	NA	NA	NA	2.4	0.012	NA	NA	2
2-Methylnaphthalene	91-57-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	118-96-7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	40321-76-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	57117-31-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	87-86-5	11[5]	8[5]	0.27[7]	3.0[7]	0.02	0.02	11[5]	8[5]	0.15	0.30	1.0
Perchlorate	14797-73-0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
Phenanthrene	85-01-8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polybrominated diphenyl ethers (PBDE)	67774-32-7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)	1336-36-3	NA	0.014	0.000064[7]	0.000064[7]	Note 10	Note 10	2	0.014	0.0000064	0.0000064	0.5
Polycyclic Aromatic Hydrocarbons (PAHs)	130498-29-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	129-00-0	NA	NA	830	4,000	20	20	NA	NA	290	400	NA
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	51207-31-9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	1746-01-6	NA	NA	0.000000005[7]	0.0000000051[7]	Note 10	Note 10	NA	NA	0.00000000051	0.00000000051	0.00003
Tetrachloroethene (PCE)	127-18-4	NA	NA	0.69[7]	3.3[7]	10	40	NA	NA	0.24	0.33	5
Toluene	108-88-3	NA	NA	1,000	1,500	300	2,000	NA	NA	720	1,500	1,000
Total Petroleum Hydrocarbons (TPH) C10-C12 Aliphatic		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tributyltin (TBT)	688-73-3	0.46	0.072	NA	NA	NA	NA	0.46	0.063	NA	NA	NA
Trichloroethene (TCE)	79-01-6	NA	NA	2.5[7]	30[7]	0.5	4	NA	NA	1.4	3.0	5
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	93-72-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50
Vanadium	7440-62-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	75-01-04	NA	NA	0.025[7]	2.4[7]	0.018	0.68	NA	NA	0.023	0.24	2
Xylenes	1330-20-7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10,000
Zinc	7440-66-6	36[2,3,14]	36[2,3,14]	7,400	26,000	Note 10	Note 10	36[2,3,11]	35[2,3,11]	2,100	2,600	NA

Notes:
1 - If evaluation is to be done using an averaging period, the acute criteria values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.
2 - Expressed in terms of dissolved metal in the water column.
3 - Expressed as a function of hardness (mg/L) in the water column. The value given corresponds to a hardness of 25 mg/kg.
4 - Expressed as free cyanide.
5 - Expressed as a function of pH. Value corresponds to a pH of 7.2.
6 - This criterion applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).
7 - This criterion is based on carcinogenicity at a 10^{-6} risk.
8 - This criterion for arsenic refers to the inorganic form only.
9 - This criterion for manganese is not based on toxic effects, but rather is intended to minimize objectionable qualities such as laundry stains and objectionable tastes in beverages.
10 - EPA is not updating criteria for this chemical pollutant at this time; thus, the current criterion apply.
11 - Critieria are calculated using the following table:

Chemical	mA	bA	mC	bC	CMC	CCC
Cadmium	1.128	-3.828	0.7409	-4.719	0.8	0.09
Chromium (III)	0.819	3.7256	0.819	0.6848	183	24
Copper	0.9422	-1.464	0.8545	-1.465	5	4
Lead	1.273	-1.460	1.273	-4.705	14	0.54
Pentachlorophenol					11	8
Zinc	0.8473	0.884	0.8473	0.884	36	35

12 - This criterion is based on carcinogenicity of 10-4 risk.
13 - This criterion is based on carcinogenicity of 10-5 risk.
14 - Critieria are calculated using the following table:

Chemical	mA	bA	mC	bC	CMC	CCC
Cadmium	1.0166	-3.924	0.7409	-4.719	0.52	0.094
Chromium (III)	0.819	3.7256	0.819	0.6848	183	24
Copper	0.9422	-1.700	0.8545	-1.702	3.6	2.7
Lead	1.273	-1.46	1.273	-4.705	14	0.54
Zinc	0.8473	0.884	0.8473	0.884	36	36

ARARs - Applicable or relevant and appropriate requirements
CCC - Criterion Continous Concentration
CMC - Criteria Maximum Concentration
MCL - Maximum Contaminant Level
NA - not available
µg/L - micrograms per liter
µg/kg -micrograms per kilogram

Table 2.1-4
Numeric Standards Associated with Chemical-Specific ARARs
Portland Harbor Superfund Site
Portland, Oregon

	1	2	3	4	5	6	7	8	9	10	11	12	13					
			Surface Water										Surface Water & Groundwater					
		Statute/Regulation:	Clean Water Act, 33 USC 1313 and1314, Section 304(a) List						Oregon Water Pollution Control Act ORS 468B.048				Safe Drinking Water Act 42 USC 300f, 40 CFR Part 141, 143	Federal	State	Federal	State	min
		Receptor:	Aquatic Life		Human Health				Aquatic Life		Human Health		Human Health					
			CMC (acute)	CCC (chronic)	Current (water + organism)	Current (oganism only)	2014 Update (water + oganism)	2014 Update (organism only)	CMC (acute)	CCC (chronic)	Current (water + organism)	Current (oganism only)	MCL					
		Consumption Rate:			17 g/day	17 g/day	22 g/day	22 g/day			175 g/day	175 g/day						
Contaminant		CAS #	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L					
Acenaphthene	Acenaphthene	83-32-9	NA	NA	670	990	200	400	NA	NA	95	99	NA	670	95	670	95	95
Acenaphthylene	Acenaphthylene	208-96-8	NA	NA					NA	NA			NA	NA	NA			NA
Aldrin	Aldrin	309-00-2	3.0	NA	0.000049	0.00005	0.0000010	0.0000010	3	NA	0.0000050	0.0000050	NA	0.000049	0.000005	0.000049	0.000005	0.000005
Anthracene	Anthracene	120-12-7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			NA
Arsenic	Arsenic	7440-38-2	340	150	0.018	0.14	Note 10	Note 10	340	150	2.1	2.1	10	0.018	2.1	0.018	2.1	0.018
Benzene	Benzene	71-43-2	NA	NA	2.2	51	0.45-1.6	6.2-23	NA	NA	0.44	1.4	5	2.2	0.44	2.2	0.44	0.44
Benzo(a)anthracene	Benzo(a)anthracene	56-55-3	NA	NA	0.0038	0.018	0.011	0.013	NA	NA	0.0013	0.0018	NA	0.0038	0.0013	0.0038	0.0013	0.0013
Benzo(a)pyrene	Benzo(a)pyrene	50-32-8	NA	NA	0.0038	0.018	0.00077	0.00088	NA	NA	0.0013	0.0018	0.2	0.0038	0.0013	0.0038	0.0013	0.0013
Benzo(b)fluoranthene	Benzo(b)fluoranthene	205-99-2	NA	NA	0.0038	0.018	0.00037	0.00038	NA	NA	0.0013	0.0018	NA	0.0038	0.0013	0.0038	0.0013	0.0013
Benzo(g,h,i)perylene	Benzo(g,h,i)perylene	191-24-2	NA	NA					NA	NA	0.0013	0.0018	NA	NA	0.0013		0.0013	0.0013
Benzo(k)fluoranthene	Benzo(k)fluoranthene	207-08-9	NA	NA	0.0038	0.018	0.011	0.012	NA	NA	0.0013	0.0018	NA	0.0038	0.0013	0.0038	0.0013	0.0013
Bis(2-ethylhexyl) phthalate (BEHP)	BEHP	117-81-7	NA	NA	1.2	2.2	0.028	0.029	NA	NA	0.2	0.22	6	1.2	0.2	1.2	0.2	0.2
Cadmium	Cadmium	7440-43-9	0.52	0.094	5	NA	Note 10	Note 10	0.8	0.9	NA	NA	5	5	NA	5		5
Chlordanes	Chlordanes	57-74-9	2.4	0.0043	0.0008	0.00081	0.0000068	0.0000068	2.4	0.0043	0.000081	0.000081	2	0.0008	0.000081	0.0008	0.000081	0.000081
Chlorobenzene	Chlorobenzene	108-90-7	NA	NA	100	1,600	90	600	NA	NA	74	160	100	100	74	100	74	74
Chromium	Chromium	7440-47-3	NA	NA	100	NA	Note 10	NA	NA	NA	NA	NA	100	100	NA	100		100
Chromium (III)		16065-83-1	183	24					183	24		NA	NA	#N/A	#N/A	#N/A	#N/A	#N/A
Chromium (VI)		18540-29-9	16	11					16	11		NA	NA	#N/A	#N/A	#N/A	#N/A	#N/A
Chrysene	Chrysene	218-01-9	NA	NA	0.0038	0.018	0.022	0.022	NA	NA	0.0013	0.0018	NA	0.0038	0.0013	0.0038	0.0013	0.0013
Copper	Copper	7440-50-8	5	4	1.300	NA	Note 10	Note 10	5	4	1.300	NA	1,300	1300	1300	1300	1300	1300
Cyanide	Cyanide	57-12-5	22	5.2	140	140	3	400	22	5.2	130	130	200	140	130	140	130	130
DDx	DDx		1.1	0.001					1.1	0.001		NA	NA	NA	NA			NA
DDD (2,4' - and 4,4-DDD)	DDD	72-54-8	NA	NA	0.00031	0.00031	0.000019	0.000019	NA	NA	0.000031	0.000031	NA	0.00031	0.000031	0.00031	0.000031	0.000031
2,4'-DDD	DDD	53-19-0	NA	NA	0.00031	0.00031	0.000019	0.000019	NA	NA	0.000031	0.000031	NA	0.00031	0.000031	0.00031	0.000031	0.000031
4,4'-DDD	DDD	72-54-8	NA	NA	0.00031	0.00031	0.000019	0.000019	NA	NA	0.000031	0.000031	NA	0.00031	0.000031	0.00031	0.000031	0.000031
DDE (2,4- and 4,4-DDE)	DDE	72-55-9	NA	NA	0.00031	0.00031	0.000019	0.000019	NA	NA	0.000031	0.000031	NA	0.00031	0.000031	0.00031	0.000031	0.000031
4,4'-DDE	DDE	72-55-9	NA	NA	0.00031	0.00031	0.000019	0.000019	NA	NA	0.000031	0.000031	NA	0.00031	0.000031	0.00031	0.000031	0.000031
DDT (2,4'- and 4,4'-DDT)	DDT	50-29-3	NA	NA	0.00022	0.00022	0.0000072	0.0000072	NA	NA	0.000022	0.000022	NA	0.00022	0.000022	0.00022	0.000022	0.000022
4,4'-DDT	DDT	50-29-3	NA	NA	0.00022	0.00022	0.0000072	0.0000072	NA	NA	0.000022	0.000022	NA	0.00022	0.000022	0.00022	0.000022	0.000022
Dibenz[a,h]anthracene	Dibenz[a,h]anthracene	53-70-3	NA	NA	0.0038	0.018	0.000063	0.000063	NA	NA	0.0013	0.0018	NA	0.0038	0.0013	0.0038	0.0013	0.0013
1,1-Dichloroethene (1,1-DCE)	1,1-DCE	75-35-4	NA	NA	330	7,100	200	4,000	NA	NA	230	710	7	330	230	330	230	230
cis-1,2-Dichloroethene (cis-1,2-DCE)	cis-1,2-DCE	107-06-2	NA	NA	0.38	37	0.29	13	NA	NA	NA	NA	70	0.38	NA	0.38		0.38
Dieldrin	Dieldrin	60-57-1	0.24	0.056	0.000052	0.000054	0.000010	0.000010	0.24	0.056	0.0000053	0.0000054	NA	0.000052	0.0000053	0.000052	0.0000053	0.0000053
2,4-Dichlorophenoxyacetic acid (2,4-D)	2,4-D	94-75-7	NA	NA					NA	NA		NA	70	NA	NA			NA
Ethylbenzene	Ethylbenzene	100-41-4	NA	NA	530	2,100	400	1,000	NA	NA	160	210	700	530	160	530	160	160
Fluoranthene	Fluoranthene	206-44-0	NA	NA	130	140	40	50	NA	NA	14	14	NA	130	14	130	14	14
Fluorene	Fluorene	7782-41-4	NA	NA	1,100	5,300	30	40	NA	NA	390	530	NA	1100	390	1100	390	390
Hexachlorobenzene	Hexachlorobenzene	118-74-1	NA	NA	0.00028	0.00029	0.0000064	0.0000064	NA	NA	0.000029	0.000029	1	0.00028	0.000029	0.00028	0.000029	0.000029
gamma-Hexachlorocyclohexane (γ-BHC, or Lindane)	Lindane	58-89-9	0.095	NA	0.98	1.8	2.5	2.8	0.95	0.08	0.17	0.18	0.2	0.98	0.17	0.98	0.17	0.17
1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	1,2,3,4,7,8-HxCDF	70648-26-9	NA	NA					NA	NA		NA	NA	NA	NA			NA
Indeno(1,2,3-c,d)pyrene	Indeno(1,2,3-c,d)pyrene	193-39-5	NA	NA	0.0038	0.018	0.0045	0.0046	NA	NA	0.0013	0.0018	NA	0.0038	0.0013	0.0038	0.0013	0.0013
Lead	Lead	7439-92-1	14	0.54					14	0.54		NA	15	NA	NA			NA
Manganese	Manganese	7439-96-5	NA	NA	50	100	Note 10	Note 10	NA	NA		NA	NA	50	NA	50		50
Methylchlorophenoxypropionic acid (MCPP)	MCPP	7085-19-0	NA	NA					NA	NA		NA	NA	NA	NA			NA
Mercury	Mercury	7439-97-6	1.4	0.77					2.4	0.012		NA	2	NA	NA			NA
2-Methylnaphthalene	2-Methylnaphthalene	91-57-6	NA	NA					NA	NA		NA	NA	NA	NA			NA
Naphthalene	Naphthalene	118-96-7	NA	NA					NA	NA		NA	NA	NA	NA			NA
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	1,2,3,7,8-PeCDD	40321-76-4	NA	NA					NA	NA		NA	NA	NA	NA			NA
2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	2,3,4,7,8-PeCDF	57117-31-4	NA	NA					NA	NA		NA	NA	NA	NA			NA
Pentachlorophenol	Pentachlorophenol	87-86-5	11	8	0.27	3	0.02	0.02	11	8	0.15	0.30	1.0	0.27	0.15	0.27	0.15	0.15
Perchlorate	Perchlorate	14797-73-0	NA	NA					NA	NA		NA	15	NA	NA			NA
Phenanthrene	Phenanthrene	85-01-8	NA	NA					NA	NA		NA	NA	NA	NA			NA
Polybrominated diphenyl ethers (PBDE)	PBDE	67774-32-7	NA	NA					NA	NA		NA	NA	NA	NA			NA
Polychlorinated Biphenyls (PCBs)	PCBs	1336-36-3	NA	0.014	0.000064	0.000064	Note 10	Note 10	2	0.014	0.0000064	0.0000064	0.5	0.000064	0.0000064	0.000064	0.0000064	0.000064
Polycyclic Aromatic Hydrocarbons (PAHs)	PAHs	130498-29-2	NA	NA					NA	NA		NA	NA	NA	NA			NA
Pyrene	Pyrene	129-00-0	NA	NA	830	4,000	20	20	NA	NA	290	400	NA	830	290	830	290	290
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	2,3,7,8-TCDF	51207-31-9	NA	NA					NA	NA		NA	NA	NA	NA			NA
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	2,3,7,8-TCDD	1746-01-6	NA	NA	0.000000005	0.000000005	Note 10	Note 10	NA	NA	0.00000000051	0.00000000051	0.00003	###########	###########	0.000000005	###########	###########
Tetrachloroethene (PCE)	PCE	127-18-4	NA	NA	0.69	3.3	10	40	NA	NA	0.24	0.33	5	0.69	0.24	0.69	0.24	0.24
Toluene	Toluene	108-88-3	NA	NA	1,000	1,500	300	2,000	NA	NA	720	1,500	1,000	1000	720	1000	720	720
Total Petroleum Hydrocarbons (TPH) C10-C12 Aliphatic	TPH C10-C12 Aliphatic		NA	NA					NA	NA		NA	NA	NA	NA			NA
Tributyltin (TBT)	TBT	688-73-3	0.46	0.072					0.46	0.063		NA	NA	NA	NA			NA
Trichloroethene (TCE)	TCE	79-01-6	NA	NA	2.5	30	0.5	4	NA	NA	1.4	3.0	5	2.5	1.4	2.5	1.4	1.4
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	2,4,5-TP	93-72-1	NA	NA					NA	NA		NA	50	NA	NA			NA
Vanadium	Vanadium	7440-62-2	NA	NA					NA	NA		NA	NA	NA	NA			NA
Vinyl Chloride	Vinyl Chloride	75-01-04	NA	NA	0.025	2.4	0.018	0.68	NA	NA	0.023	0.24	2	0.025	0.023	0.025	0.023	0.023
Xylenes	Xylenes	1330-20-7	NA	NA					NA	NA		NA	10,000	NA	NA			NA
Zinc	Zinc	7440-66-6	36	36	7,400	26,000	Note 10	Note 10	36	35	2,100	2,600	NA	7400	2100	7400	2100	2100
	Dioxins/Furans (2,3,7,8-TCDD eq)		NA	NA	0.000000005	0.000000005	Note 10	Note 10	NA	NA	0.0000000005	0.0000000005	0.00003	0.000000005	###########	0.000000005	###########	###########
	cPAHs (BaP eq)		NA	NA	0.0038	0.018	0.00077	0.00088	NA	NA	0.0013	0.0018	0.2	0.0038	0.0013	0.0038	0.0013	0.0013

Table 2.2-1
Summary of Portland Harbor PRGs by RAO and Media
Portland Harbor Superfund Site
Portland, Oregon

	HUMAN HEALTH									ECOLOGICAL								HUMAN HEALTH & ECOLOGICAL	
	RAO 1			RAO 2		RAO 3		RAO 4		RAO 5		RAO 6		RAO 7		RAO 8		RAO 9	
	Ingestion/Direct Contact			Fish/Shellfish Consumption		Protected Water Uses		Migration of Contaminated Groundwater		Direct Contact/Ingestion		Biota (Predator) Ingestion		Direct Contact/Ingestion		Direct Contact/Ingestion Migration of Contaminated Groundwater		Migration of Contaminants	
Contaminant	Units	Beach	Sediment	Units	Tissue	Sediment	Units	Surface Water	Units	Groundwater	Units	Sediment	Units	Sediment	Units	Surface Water	Units	Pore Water	Units	River Bank Soil/Sediment
Aldrin				µg/kg	0.06	2	µg/L	0.000005											µg/kg	2
Arsenic	mg/kg	3	3	mg/kg	0.001		µg/L	0.018	µg/L	0.018							µg/L	150	mg/kg	3
Benzene									µg/L	0.44							µg/L	130		
BEHP				µg/kg	72		µg/L	0.2			µg/kg	135			µg/L	3			µg/kg	135
Cadmium											mg/kg	5					µg/L	0.091	mg/kg	5
Chlordanes				µg/kg	3	1.5	µg/L	0.000081			µg/kg	18							µg/kg	1.5
Chlorobenzene									µg/L	74							µg/L	64		
Chromium							µg/L	100	µg/L	100							µg/L	11[3,4]		
Copper									µg/L	1300	mg/kg	149	mg/kg		µg/L	2.74	µg/L	2.74[3]	mg/kg	149
Cyanide									µg/L	130							µg/L	5.2		
ODx				µg/kg	3	6.1					µg/kg	63	µg/kg	2849	µg/L	0.0111	µg/L	0.001	µg/kg	6.1
DDD							µg/L	0.000031	µg/L	0.000031										
DDE							µg/L	0.000031	µg/L	0.000031	µg/kg	31	µg/kg							
DDT							µg/L	0.000022	µg/L	0.000022							µg/L	0.001		
1,1-DCE									µg/L	7							µg/L	25		
cis-1,2-DCE									µg/L	0.38							µg/L	590		
Dieldrin				µg/kg	0.06	0.07					µg/kg	62							µg/kg	0.07
2,4-D									µg/L	70										
Ethylbenzene									µg/L	160					µg/L	7.3	µg/L	7.3		
Hexachlorobenzene				µg/kg	0.6	0.3	µg/L	0.000029											µg/kg	0.3
Lindane											µg/kg	5							µg/kg	5
Lead											mg/kg	128					µg/L	0.54	mg/kg	128
Manganese									µg/L	50							µg/L	1,4334		
MCPP							µg/L	16												
Mercury				mg/kg	0.031						mg/kg	1.1	mg/kg	NA					mg/kg	1.1
Pentachlorophenol				µg/kg	130		µg/L	0.15	µg/L	0.15										
Perchlorate									µg/L	15							µg/L	9300		
PBDE				µg/kg																
PCBs	µg/kg		6	µg/kg	0.25	6	µg/L	0.0000064			µg/kg	64	µg/kg	36	µg/L	0.191	µg/L	0.014	µg/kg	6
PAHs											µg/kg	23000	µg/kg						µg/kg	23000
cPAHs (BaP eq)	mg/kg	12	12	µg/kg	7.1	3950	µg/L	0.0013	µg/L	0.0013									µg/kg	12
Acenaphthene																	µg/L	23		
Acenaphthylene																				
Anthracene																	µg/L	0.73		
Benzo(a)anthracene							µg/L	0.0013	µg/L	0.0013					µg/L	0.027	µg/L	0.027		
Benzo(a)pyrene							µg/L	0.0013	µg/L	0.0013					µg/L	0.014	µg/L	0.014		
Benzo(b)fluoranthene							µg/L	0.0013	µg/L	0.0013							µg/L	0.68		
Benzo(g,h,i)perylene																	µg/L	0.44		
Benzo(k)fluoranthene							µg/L	0.0013	µg/L	0.0013							µg/L	0.64		
Chrysene							µg/L	0.0013	µg/L	0.0013							µg/L	2		
Dibenz(a,h)anthracene							µg/L	0.0013	µg/L	0.0013							µg/L	0.28		
Fluoranthene																	µg/L	6.2		
Fluorene																	µg/L	3.9		
Indeno(1,2,3-c,d)pyrene							µg/L	0.0013	µg/L	0.0013							µg/L	0.28		
2-Methylnaphthalene																	µg/L	2.1		
Naphthalene															µg/L	12	µg/L	12		
Phenanthrene																	µg/L	6.3		
Pyrene																	µg/L	10		
Dioxins/Furans (2,3,7,8-TCDD eq)							µg/L	0.0000000005					µg/kg							
1,2,3,4,7,8-HxCDF				µg/kg	0.00006	2.27533E-06							µg/kg	0.02982692					µg/kg	2.27533E-06
1,2,3,7,8-PeCDD				µg/kg	0.000006	0.00001							µg/kg	0.000961877					µg/kg	0.00013
2,3,4,7,8-PeCDF				µg/kg	0.00002	0.00019							µg/kg	0.003689922					µg/kg	0.00019
2,3,7,8-TCDF				µg/kg	0.00006	0.000406581							µg/kg	0.004278005					µg/kg	0.000406581
2,3,7,8-TCDD				µg/kg	0.000006	0.000005							µg/kg	0.000771357					µg/kg	0.00014
PCE									µg/L	0.24										
Toluene									µg/L	720							µg/L	9.8		
TPH C10-C12 Aliphatic																	µg/L	2.6		
TBT											mg/kg	24	mg/kg		µg/L	0.063			mg/kg	24
TCE									µg/L	1.4							µg/L	47		
2,4,5-TP									µg/L	50										
Vanadium																	µg/L	20		
Vinyl Chloride									µg/L	0.023							µg/L			
Xylenes									µg/L	10000							µg/L	13		
Zinc											mg/kg	459			µg/L	36.5[3]	µg/L	36.5	mg/kg	459

Notes:

NA - Not available
1 - Tissue values are for methyl mercury.
2 - The PRG is less than the achievable detection limit; thus, the PRG is evaluated at the established detection limit from the background data set.
3 - This value is for the dissolved fraction.
4 - Criterion is applied as hexavalent chromium.

Table 2.2-2
Summary of COC Selection Process
Portland Harbor Superfund Site
Portland, Oregon

Contaminant	CAS RN	BERA	BHHRA	ARAR	Identified as a COC	Rationale for Including/Eliminating
Acenaphthene	83-32-9	X			Y	Evaluate as PAH
Acenaphthylene	208-96-8	X			Y	Evaluate as PAH
Aldrin	309-00-2	X	X	X	Y	Human health: shellfish
Aluminum	7429-90-5	X			N	Not ecologically significant
Ammonia	7664-41-7	X			N	Ammonia only has an HQ=3 based on FPM, which does not reliably predict sediment toxicity for individual contaminants.
Anthracene	120-12-7	X		X	Y	Evaluate as PAH
Antimony	7440-36-0	X	X		N	Infrequent and/or anomalous detections in fish
Aroclor 1254	11097-69-1	X			N	Evaluate as PCBs
Arsenic	7440-38-2	X	X	X	Y	Human health: beach, sediment, water, fish/shellfish Known groundwater plumes at site.
Barium	7440-39-3	X			N	Not ecologically significant
Benzene	71-43-2	X		X	Y	Known groundwater plume at site.
Benzo(a)anthracene	56-55-3	X	X	X	Y	Human health: beach, sediment, water, fish/shellfish Evaluate as cPAH and PAH
Benzo(a)pyrene	50-32-8	X	X	X	Y	Human health: beach, sediment, water, fish/shellfish Evaluate as cPAH and PAH
Benzo(b)fluoranthene	205-99-2	X	X	x	Y	Human health: beach, sediment, water, fish/shellfish Evaluate as cPAH and PAH
Benzo(g,h,i)perylene	191-24-2	X		X	Y	Evaluate as PAH
Benzo(k)fluoranthene	207-08-9	X	X	X	Y	Human health: beach, sediment, water, fish/shellfish Evaluate as cPAH and PAH
Benzyl alcohol	100-51-6	X			N	Not ecologically significant
Beryllium	7440-41-7	X			N	Not ecologically significant
Bis(2-ethylhexyl) phthalate (BEHP)	117-81-7	X	X	X	Y	Human health: fish Ecologically significant contaminant
Cadmium	7440-43-9	X		X	Y	Ecologically significant contaminant
Carbazole	86-74-8	X			N	Not ecologically significant
Carbon disulfide	75-15-0	X			N	Not ecologically significant
Chlordane	57-74-9	X	X	X	Y	Human health: fish Ecologically significant contaminant
cis-Chlordane	5103-71-9	X			N	Evaluate as Chlordane
Chlorobenzene	108-90-7	X		X	Y	Known groundwater plume extending to river and mobilizing DDx. Potential NAPL.
Chloroethane	75-00-3	X			N	Not ecologically significant
Chloroform	67-66-3	X			N	Not ecologically significant
Chromium	7440-47-3	X	X	X	Y	Human health: surface water Known groundwater plumes at site.
Chrysene	218-01-9	X	X	X	Y	Human health: beach, sediment, water, fish/shellfish Evaluate as cPAH and PAH
Cobalt	7440-48-4	X			N	Not ecologically significant
Copper	7440-50-8	X		X	Y	Ecologically significant contaminant Known groundwater plumes at site
Cyanide	57-12-5	X		X	Y	Ecologically significant contaminant Known groundwater plumes at site
1,2-Dichlorobenzene	95-50-1	X			N	Not ecologicially significant
1,4-Dichlorobenzene	106-46-7	X			N	Not ecologicially significant
DDD (2,4´- and 4,4-DDD)	72-54-8	X	X	X	Y	Human health: fish/shellfish Ecologically significant contaminant Evaluate as DDx
2,4'-DDD	53-19-0	X			Y	Evaluate as DDx
4,4'-DDD	72-54-8	X			Y	Evaluate as DDx
DDE (2,4- and 4,4-DDE)	72-55-9	X	X	X	Y	Human Health: fish/shellfish Ecologically significant contaminant Evaluate as DDE and DDx
4,4'-DDE	72-55-9	X			Y	Evaluate as sum DDE and DDx
DDT (2,4´- and 4,4´-DDT)	50-29-3	X	X	X	Y	Human health: fish/shellfish Ecologically significant contaminant Evaluate as DDx
4,4'-DDT	50-29-3	X			Y	Evaluate as DDx
Dibenz(a,h)anthracene	53-70-3	X	X	X	Y	Human health: beach, sediment, water, fish/shellfish Evaluate as cPAH and PAH
Dibenzofuran	132-64-9	X			N	Not ecologically significant
1,1-Dichloroethene (1,1-DCE)	75-35-4	X		X	Y	PCE/TCE plumes identified at site. DCE is a breakdown product of PCE/TCE.

cis-1,2-Dichloroethene (cis-1,2-DCE)	107-06-2	X		X	Y	PCE/TCE plumes identified at site. DCE is a breakdown product of PCE/TCE.
Dieldrin	60-57-1	X	X	X	Y	Human health: fish/shellfish Ecologically significant contaminant
Di-n-butyl phthalate	84-74-2	X			N	Not ecologically significant
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7			X	Y	Known groundwater plume.
Endosulfan	115-29-7	X			N	Not ecologically significant
Endrin	72-20-8	X			N	Not ecologically significant
Endrin ketone	53494-70-5	X			N	Not ecologically significant
Ethylbenzene	100-41-4	X		X	Y	Ecologically significant contaminant Known groundwater plumes at site
Fluoranthene	206-44-0	X		X	Y	Evaluate as PAH
Fluorene	7782-41-4	X		X	Y	Evaluate as PAH
Heptachlor epoxide	1024-57-3	X			N	Not ecologically significant
Hexachlorobenzene	118-74-1		X	X	Y	Human health: fish
beta-Hexachlorocyclohexane (β-BHC)	319-85-7	X			N	beta-Hexachlorocyclohexane only has an HQ=1.9 based on FPM, which does not reliably predict sediment toxicity for individual contaminants.
delta-Hexachlorocyclohexane (δ-BHC)	608-73-1	X			N	Not ecologically significant
gamma-Hexachlorocyclohexane (γ-BHC, or Lindane)	58-89-9	X		X	Y	Ecologically significant contaminant
1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCDF)	70648-26-9			X	Y	Dioxin/Furan congener contributing most to 2,3,7,8-TCDD risk
Indeno(1,2,3-c,d)pyrene	193-39-5	X	X	X	Y	Human health: beach, sediment, water, fish/shellfish Evaluate as PAH
Iron	7439-89-6	X			N	Not a hazardous substance
Isopropylbenzene	98-82-8	X			N	Not a hazardous substance
Lead	7439-92-1	X	X	X	Y	Human health: Infrequent and/or anomalous detections in fish Ecologically significant contaminant. Eliminated for dietary pathway due to infrequent and/or anomalous detections in fish.
Magnesium	7439-95-4	X			N	Not ecologically significant
Manganese	7439-96-5	X		X	Y	Ecologically significant contaminant Known groundwater plumes at site
Methylchlorophenoxypropionic acid (MCPP)	7085-19-0		X	X	Y	Human health: surface water
Mercury	7439-97-6	X	X	X	Y	Human health: fish tissue Ecologically significant contaminant.
2-Methylnaphthalene	91-57-6	X			Y	Evaluate as PAH
4-Methylphenol (p-Cresol)	106-44-5	X			N	Not ecologically significant
Monobutyltin		X			N	Not a hazardous substance
Naphthalene	118-96-7	X		X	Y	Evaluate as PAH
Nickel	7440-02-0	X			N	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-PeCDD)	40321-76-4			X	Y	Dioxin/Furan congener contributing most to 2,3,7,8-TCDD risk
2,3,4,7,8-Pentachlorodibenzofuran (2,3,4,7,8-PeCDF)	57117-31-4			X	Y	Dioxin/Furan congener contributing most to 2,3,7,8-TCDD risk
Pentachlorophenol	87-86-5		X	X	Y	Human health: shellfish Known groundwater plumes
Perchlorate	14797-73-0	X			Y	Ecologically significant contaminant
Phenanthrene	85-01-8	X			Y	Evaluate as PAH
Phenol	108-95-2	X			N	Not ecologically significant
Polybrominated diphenyl ethers (PBDE)	67774-32-7		X		Y	Human health: fish
Polychlorinated Biphenyls (PCBs)	1336-36-3	X	X	X	Y	Human health: sediment, fish/shellfish Ecologically significant contaminant.
Polycyclic Aromatic Hydrocarbons (PAHs)	130498-29-2	X	X	X	Y	Human health: beach, sediment, water, fish/shellfish Ecologically significant contaminant
Potassium	7440-09-7	X			N	Not ecologically significant
Pyrene	129-00-0	X			Y	Evaluate as PAH
Silver	7440-22-4	X			N	Not ecologically significant
Sodium	7440-23-5	X			N	Not ecologically significant
Sulfide	18496-25-8	X			N	Not ecologically significant
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	51207-31-9			X	Y	Dioxin/Furan congener contributing most to 2,3,7,8-TCDD risk
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	1746-01-6	X	X	X	Y	Human health: sediment, fish/shellfish Ecologically significant contaminant.
Tetrachloroethene (PCE)	127-18-4			X	Y	PCE plumes identified at site.
Toluene	108-88-3	X		X	Y	Known groundwater plume at site.
Total Petroleum Hydrocarbons (TPH) C10-C12 Aliphatic		X			Y	Not a hazardous substance; co-mingled with other hazardous substances Ecologially significant contaminant Known TPH plumes at site
Total Petroleum Hydrocarbons (TPH) C4 - C6 Aliphatic		X			N	Not a hazardous substance; co-mingled with other hazardous substances
Total Petroleum Hydrocarbons (TPH) C6 - C8 Aliphatic		X			N	Not a hazardous substance; co-mingled with other hazardous substances
Total Petroleum Hydrocarbons (TPH) C8 - C10 Aromatic		X			N	Not a hazardous substance; co-mingled with other hazardous substances

Total Petroleum Hydrocarbons (TPH), diesel range		X			N	Not a hazardous substance; co-mingled with other hazardous substances
Total Petroleum Hydrocarbons (TPH), gasoline-range		X			N	Not a hazardous substance; co-mingled with other hazardous substances
Total Petroleum Hydrocarbons (TPH), residual-range		X			N	Not a hazardous substance; co-mingled with other hazardous substances
Tributyltin (TBT)	688-73-3	X		X	Y	Ecologically significant contaminant
Trichloroethene (TCE)	79-01-6	X		X	Y	Known groundwater plume extending to river. Potential for others.
1,2,4-Trimethylbenzene	95-63-6	X			N	Not ecologically significant
1,3,5-Trimethylbenzene	108-67-8	X			N	Not ecologically significant
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	93-72-1			X	Y	Known groundwater plume
Vanadium	7440-62-2	X		X	Y	Ecologically significant contaminant
Vinyl Chloride	75-01-04			X	Y	PCE/TCE plumes identified at site. Vinyl chloride is a breakdown product of PCE/TCE.
m-Xylene	108-38-3	X			N	Not ecologically significant
o-Xylene	95-47-6	X			N	Not ecologically significant
p-Xylene	106-42-3	X			N	Not ecologically significant
Xylenes	1330-20-7	X		X	Y	Known groundwater plume at site.
Zinc	7440-66-6	X		X	Y	Ecologically significant contaminant Known groundwater plumes at site

Notes:

BERA - baseline ecological risk assessment

BHHRA - baseline human health risk assessment

COC - contaminant of concern

Table 2.2-3
Basis for Portland Harbor COC Selection by RAO and Media
Portland Harbor Superfund Site
Portland, Oregon

	HUMAN HEALTH						ECOLOGICAL				
	RAO 1		RAO 2		RAO 3	RAO 4	RAO 5	RAO 6	RAO 7	RAO 8	RAO 9
	Human Health Ingestion/Direct Contact		Human Health Fish/Shellfish Consumption		Human Health Protected Water Uses	Human Health Migration of Contaminated Groundwater	Ecological Direct Contact/Ingestion	Ecological Biota (Predator) Ingestion	Ecological Direct Contact/Ingestion	Ecological Direct Contact/Ingestion	Human Health & Ecological Migration of Contaminants
Contaminant	**Beach**	**Sediment**	**Tissue**	**Sediment**	**Surface Water**	**Groundwater**	**Sediment**	**Sediment**	**Surface Water**	**Pore Water**	**River Bank Soil/Sediment**
Aldrin			R	R	A						R
Arsenic	R	R	R	R	A	A				A	R
Benzene						A				R	
BEHP			R	R	A		R		R		R
Cadmium							R			R	R
Chlordane			R	R	A		R				R
Chlorobenzene						A				R	
Chromium					A	A				A	
Copper						A	R	R	R	R	R
Cyanide						A				R	
DDx			R	R			R	R	R	R	R
DDD (2,4- and 4,4-DDD)					R	R					
4,4'-DDD					A	A					
DDE (2,4- and 4,4-DDE)								R			
4,4'-DDE					A	A					
DDT (2,4- and 4,4-DDT)					R	R					
4,4'-DDT					A	A				R	
1,1-DCE						A				R	
cis-1,2-DCE						A				R	
Dieldrin			R	R			R				R
2,4-D acid						A					
Ethylbenzene						A			R	R	
Hexachlorobenzene			R	R	A						R
Lindane							R				R
Lead							R			R	R
Manganese						R				R	
MCPP					R						
Mercury			R	R			R	R			R
Pentachlorophenol			R	R	A	A					
Perchlorate						A				R	
PBDE			R	R							
PCBs		R	R	R	A		R	R	R	R	R
PAHs	R	R	R	R	A	A	R	R		R	R
Acenaphthene										R	
Acenaphthylene											
Anthracene										R	
Benzo(a)anthracene									R	R	
Benzo(a)pyrene									R	R	
Benzo(b)fluoranthene										R	
Benzo(g,h,i)perylene										R	
Benzo(k)fluoranthene										R	
Chrysene										R	
Dibenz(a,h)anthracene										R	
Fluoranthene										R	
Fluorene										R	
Indeno(1,2,3-c,d)pyrene										R	
2-Methylnaphthalene										R	
Naphthalene									R	R	
Phenanthrene										R	
Pyrene										R	
2,3,7,8-TCDD Eq		R			A			R			R
1,2,3,4,7,8-HxCDF			R	R				R			R
1,2,3,7,8-PeCDD			R	R				R			R
2,3,4,7,8-PeCDF			R	R				R			R
2,3,7,8-TCDF			R	R				R			R
2,3,7,8-TCDD			R	R				R			R
PCE						A					
Toluene						A				R	
TPH C10-C12 Aliphatic										R	
TBT							R	R	R		R
TCE						A				R	
2,4,5-TP acid						A					
Vanadium										R	
Vinyl Chloride						A				R	
Xylenes						A				R	
Zinc							R		R	R	R

Notes:

R - Conclusion from Baseline Risk Assessment
A - ARAR

Table 2.2-4
RAO 1 PRG Derivation
Portland Harbor Superfund Site
Portland, Oregon

	RAO 1 **Reduce cancer and noncancer risks to people from incidental ingestion of and dermal contact with COCs in sediments and beaches to exposure levels that are acceptable for fishing, occupational, recreational, and ceremonial uses.**											
	Beach Sediment						**Sediment**					
Contaminant	**Units**	**Risk-based PRG (10^{-6})**	**Risk-based PRG (HQ=1)**	**ARAR**	**Background**	**PRG**	**Units**	**Risk-based PRG (10^{-6})**	**Risk-based PRG (HQ=1)**	**ARAR**	**Background**	**PRG**
Arsenic	mg/kg	0.4	37	NA	3	3	mg/kg	1	435	NA	3	3
PCBs	µg/kg			NA			µg/kg	370	14,760	NA	6	370
cPAHs (BaP Eq)	µg/kg	12		NA	12	12	µg/kg	106		NA	12	106
Dioxins/Furans (2,3,7,8-TCDD eq)	µg/kg			NA			µg/kg	0.01	1.0	NA		0.01

Notes:

ARAR - Applicable or relevant and appropriate requirement
NA - Not applicable
PRG - Preliminary Remediation Goal
RAO - Remedial Action Objective
HQ - Hazard Quotient

Table 2.2-5
RAO 2 PRG Derivation
Portland Harbor Superfund Site
Portland, Oregon

	RAO 2										
	Reduce cancer and noncancer risks to acceptable exposure levels (direct and indirect) for human consumption of COCs in fish and shellfish.										
	Tissue (fillet)					**Sediment**					
Contaminant	**Units**	**Risk-based PRGs (10-6)**	**Risk-based PRGs (HQ=1)**	**ARAR**	**Target Level**	**Units**	**Risk-based PRG (10-6)**	**Risk-based PRG (HQ=1)**	**ARAR**	**Background**	**PRG**
Aldrin	µg/kg	0.06	8	NA	0.06	µg/kg	2	260	NA		2
Arsenic	mg/kg	0.001	0.08	NA	0.001	mg/kg			NA	3	
BEHP	µg/kg	72	5,246	NA	72	µg/kg			NA	61	
Chlordanes	µg/kg	3	131	NA	3	µg/kg	1.5	181	NA	0.6	1.5
DDx	µg/kg	3	94	NA	3	µg/kg	6.1	307	NA	3	6.1
Dieldrin	µg/kg	0.06	13	NA	0.06	µg/kg	0.07	40	NA		0.07
Hexachlorobenzene	µg/kg	0.6	210	NA	0.6	µg/kg	0.2	63	NA	0.3	0.3
Mercury	mg/kg	--	26[1]	0.03[1]	0.03[1]	mg/kg			NA	0.034	
Pentachlorophenol	µg/kg	130		NA	130	µg/kg			NA		
PBDEs	µg/kg		26	NA	26	µg/kg			NA		
PCBs	µg/kg	0.5	0.25	NA	0.25	µg/kg	0.2	0.1	NA	6	6
cPAHs (BaP Eq)	µg/kg	7.1[2]		NA	7.1	µg/kg	3,950		NA	12	3,950
1,2,3,4,7,8-HxCDF	µg/kg	0.00008	0.00006	NA	0.00006	µg/kg	0.00001	0.000002	NA		0.000002
1,2,3,7,8-PeCDD	µg/kg	0.000008	0.000006	NA	0.000006	µg/kg	0.00001	0.00001	NA	0.0001	0.0001
2,3,4,7,8-PeCDF	µg/kg	0.00003	0.00002	NA	0.00002	µg/kg	0.0001	0.0001	NA	0.0002	0.0002
2,3,7,8-TCDD	µg/kg	0.000008	0.000006	NA	0.000006	µg/kg	0.00001	0.00001	NA	0.0001	0.0001
2,3,7,8-TCDF	µg/kg	0.00008	0.00006	NA	0.00006	µg/kg	0.0005	0.0004	NA	0.0002	0.0004

Notes:

ARAR - Appropriate, relavent and applicable requirement
NA - Not available
ND - Not determined or detected
BaP Eq - benzo(a)pyrene equivalent
1 - Tissue values are for methyl mercury.
2 - Tissue concentration is for shellfish assuming a consumption rate of 3.3 g/day

Table 2.2-6
RAO 3 PRG Derivation
Portland Harbor Superfund Site
Portland, Oregon

Contaminant	RAO 3 Reduce cancer and noncancer risks to people from direct contact (ingestion, inhalation, and dermal contact) with COCs in surface water to exposure levels that are acceptable for fishing, occupational, recreational, and potential drinking water supply.				
	Surface Water				
	Units	Risk (RSL 10^{-6})	MCL	ARAR (AWQC)	PRG
Aldrin	µg/L	0.0046	NA	0.000005	0.000005
Arsenic	µg/L	0.052	10	0.018	0.018
BEHP	µg/L	5.6	6	0.2	0.2
Chlordanes	µg/L	0.22	2	0.000081	0.000081
Chromium	µg/L	NA	100	100	100
DDD	µg/L	0.031	NA	0.000031	0.000031
DDE	µg/L	0.23	NA	0.000031	0.000031
DDT	µg/L	0.23	NA	0.000022	0.000022
Hexachlorobenzene	µg/L	0.49	1	0.000029	0.000029
MCPP	µg/L	16	NA	NA	16
Pentachlorophenol	µg/L	0.04	1	0.15	0.15
PCBs	µg/L	0.039	0.5	0.0000064	0.0000064
cPAHs (BaP Eq)	µg/L	0.0034	0.2	0.0013	0.0013
Benzo(a)anthracene	µg/L	0.034	NA	0.0013	0.0013
Benzo(a)pyrene	µg/L	0.0034	0.2	0.0013	0.0013
Benzo(b)fluoranthene	µg/L	0.034	NA	0.0013	0.0013
Benzo(k)fluoranthene	µg/L	0.34	NA	0.0013	0.0013
Chrysene	µg/L	3.4	NA	0.0013	0.0013
Dibenz(a,h)anthracene	µg/L	0.0034	NA	0.0013	0.0013
Indeno(1,2,3-c,d)pyrene	µg/L	0.034	NA	0.0013	0.0013
Dioxins/Furans (2,3,7,8-TCDD Eq)	µg/L	0.0000006	0.00003	0.0000000005	0.0000000005

Notes:
NA - Not available

Table 2.2-7
RAO 4 PRG Derivation
Portland Harbor Superfund Site
Portland, Oregon

Contaminant	Units	RAO 4 Reduce migration of COCs in groundwater to sediment and surface water such that levels are acceptable in sediment and surface water for human exposure. Groundwater Risk (RSL 10^{-6})	MCL	ARAR (AWQC)	PRG
Arsenic	µg/L	0.05	10	0.018	0.018
Benzene	µg/L	0.5	5	0.44	0.44
Chlorobenzene	µg/L	78	100	74	74
Chromium	µg/L	NA	100	100	100
Copper	µg/L	800	1,300	1,300	1300
Cyanide	µg/L	1.5	200	130	130
DDD	µg/L	0.031	NA	0.00003	0.00003
DDE	µg/L	0.23	NA	0.00003	0.00003
DDT	µg/L	0.23	NA	0.00002	0.00002
1,1-DCE	µg/L	280	7	230	7
cis-1,2-DCE	µg/L	36	70	0.38	0.38
2,4-D	µg/L	170	70	NA	70
Ethylbenzene	µg/L	1.5	700	160	160
Manganese	µg/L	430	NA	50	50
Pentachlorophenol	µg/L	0.04	1.0	0.15	0.15
Perchlorate	µg/L	14	15	NA	15
cPAHs (BaP Eq)	µg/L	0.0034	0.2	0.0013	0.0013
Benzo(a)anthracene	µg/L	0.03	NA	0.0013	0.0013
Benzo(a)pyrene	µg/L	0.00	0.2	0.0013	0.0013
Benzo(b)fluoranthene	µg/L	0.03	NA	0.0013	0.0013
Benzo(k)fluoranthene	µg/L	0.34	NA	0.0013	0.0013
Chrysene	µg/L	3.40	NA	0.0013	0.0013
Dibenz(a,h)anthracene	µg/L	0.00	NA	0.0013	0.0013
Indeno(1,2,3-c,d)pyrene	µg/L	0.03	NA	0.0013	0.0013
PCE	µg/L	11	5	0.24	0.24
Toluene	µg/L	1,100	1,000	720	720
TCE	µg/L	0.49	5	1.4	1.4
2,4,5-TP	µg/L	110	50	NA	50
Vinyl chloride	µg/L	0.019	2.0	0.023	0.023
Xylenes	µg/L	190	10,000	NA	10000

Notes:
NA - Not available

Table 2.2-8
RAO 5 PRG Derivation
Portland Harbor Superfund Site
Portland, Oregon

Contaminant	Units	Risk-based PRG (HQ=1)	ARAR	Background	PRG
	RAO 5 **Reduce risk to ecological receptors from ingestions of and direct contact with COCs in sediment and riverbank soils to acceptable exposure levels.**				
	Sediment				
BEHP	µg/kg	135	NA	61	135
Cadmium	mg/kg	5	NA	0.12	5
Chlordanes	µg/kg	18	NA	0.4	18
Copper	mg/kg	149	NA	26	149
DDx	µg/kg	63	NA	3	63
DDE	µg/kg	31	NA		31
Dieldrin	µg/kg	62	NA		62
Lindane	µg/kg	5	NA		5
Lead	mg/kg	128	NA	7.7	128
Mercury	mg/kg	1.1	NA	0.034	1.1
PCBs	µg/kg	64	NA	6	64
PAHs	µg/kg	23,000	NA	73	23,000
TBT	mg/kg	24	NA		24
Zinc	mg/kg	459	NA	77	459

Notes:
NA - Not available

Table 2.2-9
RAO 6 PRG Derivation
Portland Harbor Superfund Site
Portland, Oregon

Contaminant	RAO 6 Reduce risks to ecological receptors that consume COCs in prey to acceptable exposure levels.				
	Sediment				
	Units	Risk-based PRG (HQ=1)	ARAR	Background	PRG
Copper	mg/kg		NA	26	
DDx	µg/kg	2,849	NA	2	2,849
4,4´-DDE	µg/kg	2.8	NA		2.8
Total DDE	µg/kg	144			144
Mercury	mg/kg	NA	NA	0.034	NA
PCBs	µg/kg	36	NA	6	36
PAHs	µg/kg		NA	73	
1,2,3,4,7,8-HxCDF	µg/kg	0.03	NA		0.03
1,2,3,7,8-PeCDD	µg/kg	0.001	NA	0.00013	0.001
2,3,4,7,8-PeCDF	µg/kg	0.004	NA	0.00019	0.004
2,3,7,8-TCDD	µg/kg	0.0008	NA	0.00014	0.0008
2,3,7,8-TCDF	µg/kg	0.004	NA	0.00021	0.004
Tributyltin	mg/kg		NA		

Notes:
NA - Not available.

Table 2.2-10
RAO 7 PRG Derivation
Portland Harbor Superfund Site
Portland, Oregon

	RAO 7 **Reduce risks to ecological receptors from ingestion of and direct contact COCs in surface water to acceptable exposure levels.**			
	Surface Water			
Contaminant	**Units**	**Risk TRV from BERA**	**ARAR (AWQC)**	**PRG**
BEHP	µg/L	3	NA	3
Copper	µg/L	2.74	4	2.74
DDx	µg/L	0.011	0.001	0.011[1]
Ethylbenzene	µg/L	7.3	NA	7.3
PCBs	µg/L	0.19	0.014	0.19[1]
PAHs				
Benzo(a)anthracene	µg/L	0.027	NA	0.027
Benzo(a)pyrene	µg/L	0.014	NA	0.014
Naphthalene	µg/L	12	NA	12
TBT	µg/L	NA	0.063	0.063
Zinc	µg/L	36.5	35	36.5[2,3]

Notes:

NA - Not available

1 - ARAR is more conservative but TRV was selected because of the receptor assumptions in the value.

2 - This value is for the dissolved fraction.

Table 2.2-11
RAO 8 PRG Derivation
Portland Harbor Superfund Site
Portland, Oregon

Contaminant	RAO 8 Reduce migration of COCs in groundwater to sediment and surface water such that levels are acceptable in sediment and surface water for ecological exposure.			
	Pore Water			
	Units	TRV from BERA	ARAR	PRG
Arsenic	µg/L		150	150
Benzene	µg/L	130	NA	130
Cadmium	µg/L	0.09[1]	0.094	0.09[1]
Chlorobenzene	µg/L	64	NA	64
Chromium	µg/L		11[1,2]	11[1,2]
Copper	µg/L	2.74[1]	4	2.74[1]
Cyanide	µg/L	5.2	5.2	5.2
DDx	µg/L	0.011	0.001	0.001
DDT	µg/L	0.001	NA	0.001
1,1-DCE	µg/L	25	NA	25
cis-1,2-DCE	µg/L	590	NA	590
Ethylbenzene	µg/L	7.3	NA	7.3
Lead	µg/L	0.54	0.54	0.54
Manganese	µg/L	120	1,433[4]	1,433[4]
Perchlorate	µg/L	9,300	NA	9,300
PCBs	µg/L	0.014	0.014	0.014
PAHs	µg/L		NA	
Acenaphthene	µg/L	23	NA	23
Acenaphthylene	µg/L		NA	
Anthracene	µg/L	0.73	NA	0.73
Benzo(a)anthracene	µg/L	0.027	NA	0.027
Benzo(a)pyrene	µg/L	0.014	NA	0.014
Benzo(b)fluoranthene	µg/L	0.68	NA	0.68
Benzo(g,h,i)perylene	µg/L	0.44	NA	0.44
Benzo(k)fluoranthene	µg/L	0.64	NA	0.64
Chrysene	µg/L	2.0	NA	2
Dibenz(a,h)anthracene	µg/L	0.28	NA	0.28
Fluoranthene	µg/L	6.2	NA	6.2
Fluorene	µg/L	3.9	NA	3.9
Indeno(1,2,3-c,d)pyrene	µg/L	0.28	NA	0.28
2-Methylnaphthalene	µg/L	2.1	NA	2.1
Naphthalene	µg/L	12	NA	12
Phenanthrene	µg/L	6.3	NA	6.3
Pyrene	µg/L	10	NA	10
Toluene	µg/L	9.8	NA	9.8
TPH C10-C12 aliphatic	µg/L	2.6	NA	2.6
TCE	µg/L	47	NA	47
Vanadium	µg/L	20	NA	20
Vinyl chloride	µg/L		NA	
Xylenes	µg/L	13	NA	13
Zinc	µg/L	36.5	NA	36.5

Notes:

NA - Not available

1 - Criterion is expressed in terms of "dissolved" concentrations in the water column.

2 - Criterion is applied as hexavalent chromium.

3 - This criterion is expressed as µg free cyanide (CN)/L.

5 - This criterion is based on evaluation in Attachment 1 to Appendix B.

Table 2.2-12
RAO 9 PRG Derivation
Portland Harbor Superfund Site
Portland, Oregon

	RAO 9 **Reduce migration of COCs in river banks to sediment and surface water such that levels are acceptable in sediment and surface water for human health and ecological exposures.**							
	Sediment							
Contaminant	**Units**	**RAO 1 Beach PRG**	**RAO 1 Sediment PRG**	**RAO 2 Sediment PRG**	**RAO 5 Sediment PRG**	**RAO 6 Sediment PRG**	**Background**	**PRG**
Aldrin	µg/kg			2				2
Arsenic	mg/kg	3	3				3	3
BEHP	µg/kg				135		61	135
Cadmium	mg/kg				5			5
Chlordanes	µg/kg			1.5	18		0.6	1.5
Copper	mg/kg				149		26	149
DDx	µg/kg			6.1	63	2,849	3	6.1
Dieldrin	µg/kg			0.07	62			0.07
Hexachlorobenzene	µg/kg			0.3			0.3	0.3
Lindane	µg/kg				5			5
Lead	mg/kg				128			128
Mercury	mg/kg				1.1	NA	0.034	1.1
PCBs	µg/kg		370	6	64	36	6	6
PAHs	µg/kg				23,000		73	23,000
cPAHs (BaP Eq)	µg/kg	12	106	3,950			12	12
1,2,3,4,7,8-HxCDF	µg/kg			0.000002		0.03		0.000002
1,2,3,7,8-PeCDD	µg/kg			0.0001		0.001	0.0001	0.0001
2,3,4,7,8-PeCDF	µg/kg			0.0002		0.004	0.0002	0.0002
2,3,7,8-TCDD	µg/kg		0.01	0.0001		0.0008	0.0001	0.0001
2,3,7,8-TCDF	µg/kg			0.0004		0.004		0.0004
TBT	mg/kg				24			24
Zinc	mg/kg				459		0.0002	459

Notes:

NA - Not applicable

BaP Eq - benzo(a)pyrene equivalent