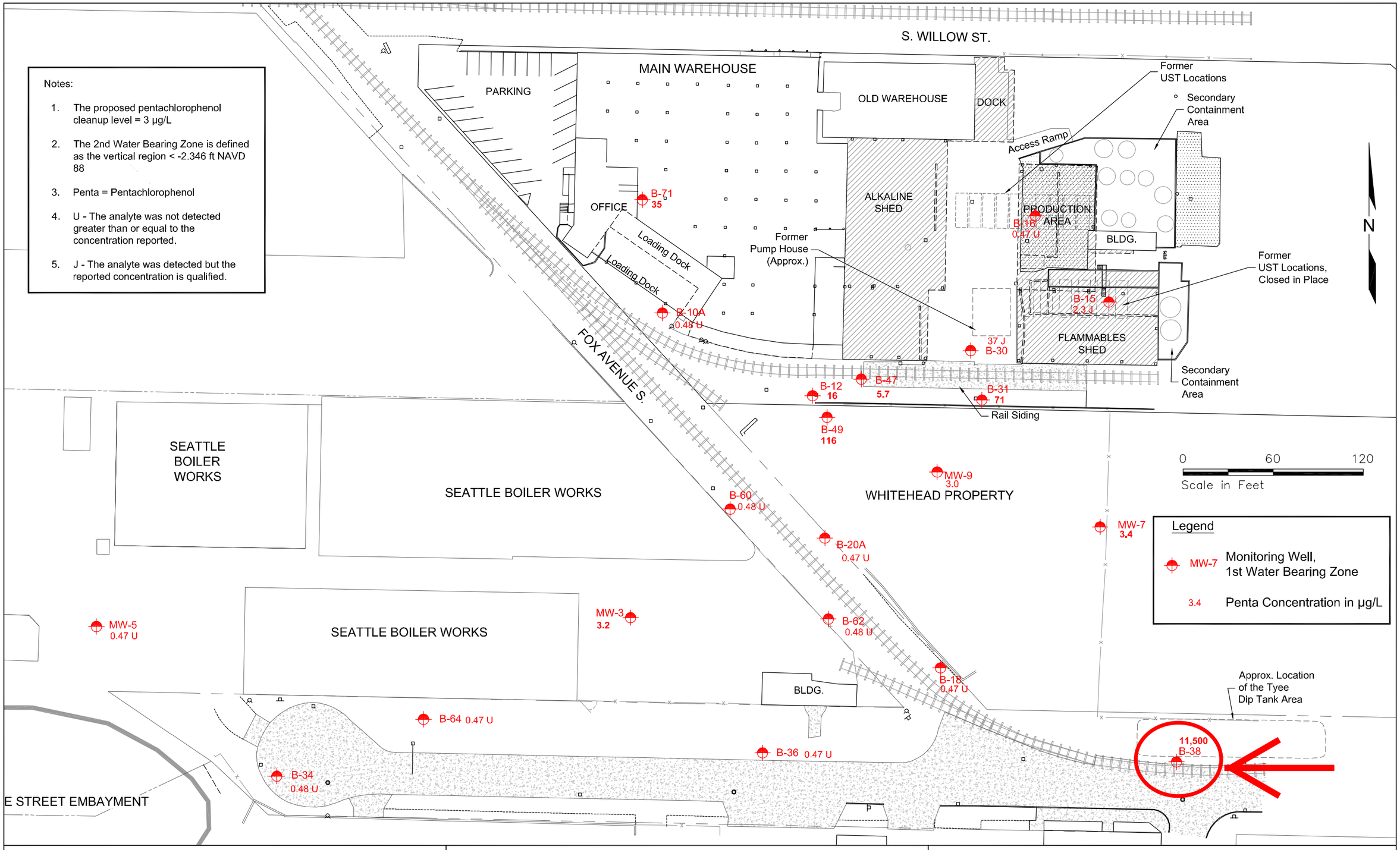
Notes:

1. The proposed pentachlorophenol cleanup level = 3 µg/L
2. The 2nd Water Bearing Zone is defined as the vertical region < -2.346 ft NAVD 88
3. Penta = Pentachlorophenol
4. U - The analyte was not detected greater than or equal to the concentration reported.
5. J - The analyte was detected but the reported concentration is qualified.



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Fox Avenue Site
Seattle, Washington

Figure 5.14
Pentachlorophenol Concentrations in Groundwater in the 1st WBZ (2007)

DWG NAME: G:\project\Clients\Floyd and Snider\Fox Ave 2010\CAD\FoxAve2010_015.dwg
DATE: 2/8/2011 12:26 PM

Legend

Maximum Total PCE, TCE, cis-1,2-DCE, and Vinyl Chloride Conc. in µg/L

- 0 - 1
- 1.01 - 10
- 10.01 - 100
- 100.01 - 1,000
- 1,000.01 - 10,000
- 10,000.01 - 100,000
- Sample Not Detected at Method Detection Limit
- Total CVOCs Conc. Contour in µg/L

MW-10 *30,000* — Sample Location; Total CVOCs Concentration

S. WILLOW ST.

E. MARGINAL WAY S.

MAIN WAREHOUSE

OLD WAREHOUSE

DOCK

SECONDARY CONTAINMENT AREA

ACCESS RAMP

FOX AVENUE BUILDING

PARKING

OFFICE

LOADING DOCK

COVERED PARKING AREA

FOX AVENUE

BLDG.

DAWN FOOD PRODUCTS DISTRIBUTION WAREHOUSE

SEATTLE BOILER WORKS

WHITEHEAD PROPERTY

MYRTLE STREET

MYRTLE STREET EMBAYMENT

GP-101 *1 U*
GP-101 *1.4 J*
NW 2-1 *1 U*
NW 2-2 *1 U*
B-23 *21*
GP-102 *780 J*
GP-74A *1,500*
B-09 *55*
R1-IW1 *14,000*
R1-IW2 *980*
GP-46 *5,800*
R1-IW3B *580*
B-59 *390*
GP-51 *2,100 J*
B-45 *5,100*
GP-53 *4,100*
R1-IW4B *2,200*
GP-26 *3,900*
R1-IW5 *1,300 J*
R1-IW6 *1,900*
B-61 *6,200*
B-21 *1 U*
B-21 *4 U*
PTM-2U *440*
PTM-2L *3,400*
GP-25 *18,000*
MW-10 *30,000*
R1-IW7 *14,000*
GP-103 *19*
GP-45 *140*
B-63 *20,000 J*
GP-104 *160 J*
B-19 *120*
GP-105 *470 J*
GP-56 *70*
GP-79 *1 U*
B-17 *0.27*
MW-12 *1,900*
GP-52 *5.1*
GP-82 *39,000*
GP-87 *3,800*
GP-78 *3,100*
GP-83 *9.28*
MW-14 *5,800*
GP-42 *95,000 J*
GP-40 *8,700*
GP-57 *8,400*
GP-86 *870*
MW-13 *4,300*
GP-76 *5,600*
B-08 *280*
GP-38 *78*
GP-39 *1.9*
MW-08 *450 J*
GP-106 *4.6*
R2-IW1 *12,000 J*
R2-IW2 *12,000*
GP-28 *50*
MW-04 *7,800 J*
MW-06 *390*
R2-IW3 *20,000*
B-65 *33,000*
GP-27 *5,900*
R2-IW4 *3,900*
R2-IW5 *2,400*
GP-47 *350*
R2-IW6 *5,800*
S-13 *3,207*
B-33A *11,000*
B-35 *6,200*
MW-02 *180*

10
100
1,000
10,000

Notes:

- Groundwater data sourced from 2008-2010.
- The 2nd Water Bearing Zone is defined as the vertical region < -2.346 ft. NAVD 88.
- Total CVOCs = the sum of Perchloroethene, Trichloroethene, cis-1,2-dichloroethene, and Vinyl Chloride concentrations for a specific sample depth. Non-detect sample results are not included in the Total CVOCs value shown on this figure.
- *U* The analyte was not detected greater than or equal to the concentration reported.
- *J* The analyte was detected but the reported concentration is qualified.
- Only 2nd water bearing zone (WBZ) seeps are shown.

N

0 80 160

Scale in Feet

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Figure 5.8b
Current Conditions: Maximum Total PCE, TCE, cis-1,2-DCE, and VC Concentrations in Groundwater in 2nd Water Bearing Zone

F:\projects\FoxAve-RA\GIS\MXD\RIFS\2011 RIFS\Figure 5.8b (Max Total CVOCs in GW in 2nd Water Bearing Zone 2008-2010 Data).mxd
Date: 1/10/2011 3:12 PM

Table 4.1
Frequency of Detection and Maximum Concentration of Organic Compounds Detected in 5 Percent or More of Soil Samples
All Dates

Chemical	Units	Number of Results	Number of Detects	Percent Detects	Minimum Detected Value	Maximum Detected Value	Location of Maximum Detect	Date of Maximum Detect	Number of Non–Detects	Percent Non–Detects	Minimum Reporting Limit	Maximum Reporting Limit
Volatile Organic Compounds												
Chlorinated Ethenes & Ethanes												
Tetrachloroethene	µg/kg	485	294	61%	1	18,000,000	SB-10	1/24/1991	191	39%	1	200
Trichloroethene	µg/kg	485	171	35%	1	1,100,000	SB-10	1/24/1991	314	65%	1	24,000
cis-1,2-Dichloroethene	µg/kg	381	141	37%	1	32,000	GP-85	6/17/2009	240	63%	2	47,000
1,2-Dichloroethene (total)	µg/kg	94	23	24%	10	57,000	B-30	4/7/1992	71	76%	2	17,000
Vinyl chloride	µg/kg	489	47	10%	0.1	3,300	WH-1	8/9/2000	442	90%	0.2	70,000
Other Volatile Organic Compounds												
Acetone	µg/kg	186	24	13%	10	47,000	B-30	4/2/1992	162	87%	20	84,000
Methylene chloride	µg/kg	485	31	6%	2	780,000	SB3	10/12/1990	454	94%	1	16,000
Total Petroleum Hydrocarbons, Benzene, Toluene, Ethylbenzene, Xylene, & Alkylated Benzenes												
Total Petroleum Hydrocarbons (by boiling point range)												
TPH-Mineral Spirits Rang	mg/kg	210	47	22%	2	6,500	B-2/S-3	5/11/1990	163	78%	5	144
TPH-Diesel	mg/kg	104	10	10%	142	770	B-32/S-1	8/28/1992	94	90%	20	287
TPH-Motor Oil	mg/kg	86	11	13%	458	3,900	B-30	4/2/1992	75	87%	5	107
Benzene, Toluene, Ethylbenzene, Xylene												
Benzene	µg/kg	501	23	5%	1	12,000	B-30	4/7/1992	478	95%	1	24,000
Ethylbenzene	µg/kg	500	92	18%	2	470,000	SB-10	1/24/1991	408	82%	1	24,000
Toluene	µg/kg	501	111	22%	11	1,800,000	PT-3	10/3/1990	390	78%	1	24,000
Xylene (total)	µg/kg	475	106	22%	1	1,200,000	SB-10	1/24/1991	369	78%	1	5,000
Xylene (ortho)	µg/kg	115	6	5%	67	150	WH-5	8/9/2000	109	95%	50	5,000
Alkylated Benzenes												
1,2,4-Trimethylbenzene	µg/kg	349	38	11%	2	110,000	GP-72	6/15/2009	311	89%	2	200
1,3,5-Trimethylbenzene	µg/kg	349	51	15%	1	150,000	GP-72	6/15/2009	298	85%	2	200
4-Isopropyltoluene	µg/kg	328	34	10%	20	14,000	GP-77	6/18/2009	294	90%	2	200
iso-Propylbenzene	µg/kg	349	32	9%	1	6,000	GP-72	6/15/2009	317	91%	8	800
n-Butylbenzene	µg/kg	349	22	6%	38	17,000	GP-77	6/18/2009	327	94%	2	200
n-Propylbenzene	µg/kg	349	45	13%	2	27,000	GP-72	6/15/2009	304	87%	2	200
sec-Butylbenzene	µg/kg	349	26	7%	20	11,000	GP-77	6/18/2009	323	93%	2	200
Semivolatile Organic Compounds												
High Molecular Weight Polycyclic Aromatic Hydrocarbons												
Fluoranthene	µg/kg	127	10	8%	60	2,400	B-22	3/27/1992	117	92%	30	3,800
Pyrene	µg/kg	127	9	7%	110	3,100	B-22	3/27/1992	118	93%	30	3,800
Chrysene	µg/kg	127	7	6%	110	1,000	B-22	3/27/1992	120	94%	30	3,800
Low Molecular Weight Polycyclic Aromatic Hydrocarbons												
Naphthalene	µg/kg	476	52	11%	3	43,000	GP-72	6/15/2009	424	89%	3	3,800
2-Methylnaphthalene	µg/kg	127	10	8%	80	2,800	B-38	8/27/1992	117	92%	30	3,800
Phenanthrene	µg/kg	127	9	7%	120	2,400	B-22	3/27/1992	118	93%	30	3,800
Phthalates												
bis(2-ethylhexyl)phthalate	µg/kg	127	34	27%	50	140,000	SB-10	1/24/1991	93	73%	40	1,100
Di-n-butyl phthalate	µg/kg	126	16	13%	40	200,000	SB-10	1/24/1991	110	87%	30	40,000

Table 4.1
Frequency of Detection and Maximum Concentration of Organic Compounds Detected in 5 Percent or More of Soil Samples
All Dates

Chemical	Units	Number of Results	Number of Detects	Percent Detects	Minimum Detected Value	Maximum Detected Value	Location of Maximum Detect	Date of Maximum Detect	Number of Non–Detects	Percent Non–Detects	Minimum Reporting Limit	Maximum Reporting Limit
Semivolatile Organic Compounds (continued)												
Chlorinated Phenols												
Pentachlorophenol	µg/kg	190	57	30%	2.2	71,000	B-38	8/27/1992	133	70%	2	19,000
2,4-Dichlorophenol	µg/kg	181	18	10%	28	2,100	B-21	4/8/1992	163	90%	30	19,000
Tetrachlorophenols (total	µg/kg	57	5	9%	20	38,000	B-38	8/27/1992	52	91%	6	700
Glycols & Alcohols												
Glycols												
Diethylene glycol	µg/kg	6	4	67%	10	11,000	25-S	8/31/1990	2	33%	5	5
Ethylene glycol	µg/kg	6	2	33%	10	12,000	21-C	8/31/1990	4	67%	5	10,000
Propylene glycol	µg/kg	6	1	17%	12	12	15/16N	9/19/1990	5	83%	5	10,000

Table 4.2
Frequency of Detection and Maximum Concentration of Metals Detected in 5 Percent or More of Soil Samples
All Dates

Chemical	Units	Number of Results	Number of Detects	Percent Detects	Minimum Detected Value	Maximum Detected Value	Location of Maximum Detect	Date of Maximum Detect	Number of Non–Detects	Percent Non–Detects	Minimum Reporting Limit	Maximum Reporting Limit	Puget Sound Background Concentration[1]	Typical Soil Ranges for Continental United States[2]
Aluminum	µg/kg	59	59	100%	1,400,000	16,000,000	B-30	4/2/1992						5,000,000 to > 100,000,000
Arsenic	µg/kg	79	77	97%	460	43,000	B-28	4/7/1992	2	2.53%	50	310	7,300	
Barium	µg/kg	59	59	100%	7,400	1,700,000	B-29	4/8/1992						10,000 to 5,000,000
Cadmium	µg/kg	79	76	96%	10	4,300	SB-10	1/24/1991	3	3.80%	10	10	800	
Chromium	µg/kg	79	79	100%	3,300	42,000	B-31	4/2/1992					48,200	
Copper	µg/kg	79	79	100%	2,500	210,000	B-29	4/8/1992					36,400	
Lead	µg/kg	80	67	84%	260	500,000	B-28	4/7/1992	13	16.25%	1,100	10,000	16,800	
Mercury	µg/kg	78	12	15%	100	8,800	B-16	8/16/1991	66	84.62%	70	250	70	
Nickel	µg/kg	79	79	100%	3,000	30,000	B-22	3/27/1992					38,200	
Zinc	µg/kg	79	79	100%	8,200	880,000	B-05	4/9/1992					85,100	

Notes:
1 Background values are from *Natural Background Soil Metals Concentrations in Washington State* (Ecology 1994).
2 Table 1-2 from *Handbook of Soil Science* by (Sumner 1999).

Table 4.3
Frequency of Detection and Maximum Concentration of Organic Chemicals Detected in 5 Percent or More of Groundwater Samples
All Dates

Chemical	Units	Number of Samples	Number of Detects	Percent Detects	Minimum Detected Value	Maximum Detected Value	Location of Maximum Detect	Date of Maximum Detect	Maximum Detected Value Since 2007	Location of Maximum Detect Since 2007	Date of Maximum Detect Since 2007
Volatile Organic Compounds											
Chlorinated Ethenes & Ethanes											
Tetrachloroethene	µg/L	1,194	850	71%	0.006	1,900,000	B-12	10/15/1990	64,000	B-46	1/28/2009
Trichloroethene	µg/L	1,194	867	73%	0.3	94,000	B-43	6/29/1993	44,000	GP-42	12/11/2008
1,1-Dichloroethene	µg/L	749	177	24%	0.49	810	B-43	6/29/1993	110	R1-IW2	7/23/2009
cis-1,2-Dichloroethene	µg/L	1,042	906	87%	0.21	75,000	B-47	7/9/1993	50,000	GP-42	12/11/2008
trans-1,2-Dichloroethene	µg/L	604	220	37%	0.55	680	B-58	10/14/1999	240	GP-38	12/8/2008
Vinyl chloride	µg/L	1,303	847	65%	0.01	25,000	B-33A	10/13/1999	15,600	PTM-2U	8/9/2007
1,1,1-Trichloroethane	µg/L	749	140	19%	1	18,000	B-31	9/15/1992	1,400	B-30	1/27/2009
1,1-Dichloroethane	µg/L	749	231	31%	0.58	2,500	B-08	9/28/1990	130	GP-38	12/8/2008
1,2-Dichloroethane	µg/L	749	76	11%	0.8	300	B-10/10A	10/15/1990	29	GP-102	10/26/2010
Other Volatile Organic Compounds											
1,2-Dichlorobenzene	µg/L	773	151	21%	0.5	1,000	B-42	11/3/1998	400	B-47	1/29/2009
1,3-Dichlorobenzene	µg/L	773	46	7%	0.5	91	B-29	5/6/1992	14	B-39	10/20/2010
1,4-Dichlorobenzene	µg/L	773	76	11%	0.5	290	B-42	11/3/1998	58	B-39	10/20/2010
Acetone	µg/L	283	46	18%	6	30,000	B-30	9/17/1992	Not Measured		
Chloroform	µg/L	749	59	8%	0.66	13,000	B-07	10/8/1990	24	B-60	2/16/2010
Methyl ethyl ketone	µg/L	283	18	8%	6	170,000	B-15	4/29/1992	Not Measured		
Methyl isobutyl ketone	µg/L	283	29	12%	5	12,000	B-30	9/17/1992	Not Measured		
Methylene Chloride	µg/L	754	65	9%	3	43,000	B-08	9/28/1990	Not Detected at 1.0 µg/L		
Total Petroleum Hydrocarbons, Benzene, Toluene, Ethylbenzene, Xylene, & Alkylated Benzene											
Total Petroleum											
TPH-Mineral Spirits Range	µg/L	234	74	32%	50	230,000	B-12	10/15/1990	6,400	B-30	1/29/2010
TPH-Diesel Range	µg/L	123	8	7%	360	5,000	B-30	9/17/1992	360	B-30	1/29/2010
TPH-Heavy Oil	µg/L	138	6	4%	130	1,100	B-30	1/29/2010	1,100	B-30	1/29/2010
Benzene, Toluene, Ethylbenzene, Xylene											
Benzene	µg/L	732	228	31%	0.75	1,500	B-30	9/17/1992	64	GP-26	12/1/2008
Toluene	µg/L	732	242	34%	0.37	53,000	B-49	10/25/1995	3,100	GP-38	12/8/2008
Ethylbenzene	µg/L	732	202	28%	0.8	4,500	B-07	10/8/1990	1,000	MW-10	1/26/2009
Xylene (total)	µg/L	723	202	28%	0.7	14,000	B-07	10/8/1990	920	GP-38	12/8/2008
Xylene (meta & para)	µg/L	174	41	23%	2.3	5,300	B-47	6/22/1998	Not Measured		
Xylene (ortho)	µg/L	174	41	23%	1	2,500	B-49	11/3/1998	Not Measured		
Alkylated Benzenes											
1,2,4-Trimethylbenzene	µg/L	160	31	19%	1.2	11,000	B-49	10/18/1999	Not Measured		
1,3,5-Trimethylbenzene	µg/L	160	17	11%	18	9,600	B-49	10/18/1999	Not Measured		
iso-Propylbenzene	µg/L	160	6	4%	5.3	100	B-47	6/22/1998	Not Measured		
n-Propylbenzene	µg/L	160	1	1%	9.8	2,200	B-49	10/18/1999	Not Measured		
sec-Butylbenzene	µg/L	160	5	3%	4.7	2,300	B-49	10/18/1999	Not Measured		
Styrene	µg/L	317	29	9%	15	1,800	B-49	11/3/1998	Not Measured		

Table 4.3
Frequency of Detection and Maximum Concentration of Organic Chemicals Detected in 5 Percent or More of Groundwater Samples
All Dates

Chemical	Units	Number of Samples	Number of Detects	Percent Detects	Minimum Detected Value	Maximum Detected Value	Location of Maximum Detect	Date of Maximum Detect	Maximum Detected Value Since 2007	Location of Maximum Detect Since 2007	Date of Maximum Detect Since 2007
Semivolatile Organic Compounds											
High Molecular Weight Polycyclic Aromatic Hydrocarbons											
Benzofluoranthenes (total)	µg/L	1	1	100%	2.0	2	B-12	12/19/1997	Not Measured		
Pyrene	µg/L	216	8	4%	0.55	23	B-12	6/29/1998	Not Measured		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons											
2-Methylnaphthalene	µg/L	218	41	19%	0.5	130	B-10A	10/25/1995	Not Measured		
Acenaphthene	µg/L	216	22	10%	0.5	17	B-12	6/29/1998	Not Measured		
Fluorene	µg/L	216	14	6%	0.5	32	B-49	7/9/1993	Not Measured		
Naphthalene	µg/L	377	64	17%	0.5	6,700	B-44	6/22/1998	Not Measured		
Phenanthrene	µg/L	216	22	10%	0.4	46	B-12	6/29/1998	Not Measured		
Phthalates											
bis(2-ethylhexyl)phthalate	µg/L	217	63	29%	1.0	1,900	B-30	10/25/1995	Not Measured		
Butyl benzyl phthalate	µg/L	216	42	19%	0.5	400	B-27	9/3/1992	Not Measured		
Diethylphthalate	µg/L	216	29	13%	0.27	27	B-30	10/25/1995	Not Measured		
Di-n-butyl phthalate	µg/L	216	42	19%	0.3	880	B-30	9/17/1992	Not Measured		
Chlorinated Phenols											
2,4,5-Trichlorophenol	µg/L	371	17	5%	0.31	5	B-20	10/21/1998	Not Measured		
Pentachlorophenol	µg/L	471	270	57%	0.01	31,000	B-38	9/14/1992	11,500	B-38	8/9/2007
Tetrachlorophenols (total)	µg/L	91	14	15%	0.74	600	B-31	5/4/1992	Not Measured		
Other Semivolatile Organic Compounds											
2,4-Dimethylphenol	µg/L	216	48	22%	0.5	500	B-29	5/6/1992	Not Measured		
2-Methylphenol	µg/L	214	62	29%	0.5	750	B-29	5/6/1992	Not Measured		
3-Methylphenol	µg/L	8	3	38%	11	130	B-12	12/19/1997	Not Measured		
4-Methylphenol	µg/L	205	55	27%	0.5	650	B-39	10/25/1995	Not Measured		
Benzoic acid	µg/L	206	21	10%	1	1,700	B-39	8/13/1993	Not Measured		
Benzyl alcohol	µg/L	211	18	9%	0.5	260	B-12	9/17/1992	Not Measured		
Carbazole	µg/L	123	3	2%	0.5	23	B-49	7/9/1993	Not Measured		
Dibenzofuran	µg/L	216	11	5%	0.5	24	B-49	7/9/1993	Not Measured		
Phenol	µg/L	216	14	6%	0.5	140	B-27	7/9/1993	Not Measured		
Glycols & Alcohols											
Glycols											
Diethylene glycol	µg/L	67	6	9%	700	8,100	B-33A	9/21/1992	Not Measured		
Ethylene glycol	µg/L	66	11	17%	500	22,000	B-15	4/29/1992	Not Measured		
Alcohols											
Methanol	µg/L	68	15	22%	2,300	72,000	B-30	9/17/1992	Not Measured		
Ethanol	µg/L	68	7	10%	2,100	30,000	B-11	9/15/1992	Not Measured		
iso-Propanol	µg/L	68	10	15%	2,900	23,000	B-30	9/17/1992	Not Measured		
1-Propanol	µg/L	68	5	7%	2,000	6,700	B-11	9/15/1992	Not Measured		

Table 4.4
Frequency of Detection and Maximum Concentration of Metals Detected in 5 Percent or More of Groundwater Samples
All Dates

Chemical[1]	Units	Number of Results	Number of Detects	Percent Detects	Minimum Detected Value	Maximum Detected Value	Location of Maximum Detect	Date of Maximum Detect	Maximum Detected Value Since 2007	Location of Maximum Detect Since 2007	Date of Maximum Detect Since 2007
Aluminum	µg/L	17	6	35%	40	190	B-15	9/14/1992	Not Measured		
Antimony	µg/L	8	1	13%	3.0	3.0	B-34	1/26/2009	3.0	B-34	1/26/2009
Arsenic	µg/L	45	11	24%	2.0	8.8	B-15	9/14/1992	5.0	B-59	1/27/2009
Barium	µg/L	17	7	41%	10	80	B-29	5/6/1992	Not Measured		
Beryllium	µg/L	8	3	38%	2.7	7.0	B-33A	1/26/2009	7.0	B-33A	1/26/2009
Cadmium	µg/L	25	5	20%	0.20	0.50	B-19	5/5/1992	Not Detected at 0.4 µg/L		
Chromium	µg/L	25	9	36%	4.00	41	B-34	1/26/2009	41	B-34	1/26/2009
Copper	µg/L	31	14	45%	1.72	55	B-34	1/26/2009	55	B-34	1/26/2009
Molybdenum	µg/L	8	1	13%	98	98	B-34	1/26/2009	98	B-34	1/26/2009
Nickel	µg/L	25	2	8%	21	90	B-15	9/14/1992	21	B-34	1/26/2009
Selenium	µg/L	8	1	13%	4.0	4.0	B-33A	1/26/2009	4	B-33A	1/26/2009
Silver	µg/L	8	2	25%	0.40	0.40	B-60, B-65	1/26-27/2009	0.4	B-60, B-65	1/26-27/2009
Zinc	µg/L	25	13	52%	10	110	B-15	9/14/1992	23	B-65	1/26/2009

Note:
1 Three metals have not been discussed in this table (potassium, manganese, and iron) because their groundwater concentrations are being manipulated as part of interim measures and do not represent COC concentrations. Refer to Section 5.5.1 for details.

Table 4.5
2000 Ambient Air Data
Detected Chemicals Only

Chemical	CAS Number	Units	Number of Results	Number of Detects	Percent Detects	Minimum Detected Value	Maximum Detected Value	Location of Maximum Detect	Date of Maximum Detect	Number of Non–Detects	Percent Non–Detects	Minimum Reporting Limit	Maximum Reporting Limit
Volatile Organic Compounds													
Chlorinated Ethenes & Ethanes													
Tetrachloroethene	127-18-4	µg/m^3	11	11	100%	0.76	140	Wrhs-	7/12/2000				
Trichloroethene	79-01-6	µg/m^3	11	6	50%	11	33	Wrhs-	7/12/2000	5	42%	1	1
cis-1,2-Dichloroethene	156-59-2	µg/m^3	11	6	50%	2.9	14	Multiple[2]	7/12/2000	5	42%	1	1
1,1,1-Trichloroethane	71-55-6	µg/m^3	11	6	50%	0.94	2.3	Wrhs-	7/12/2000	5	42%	1	1
Freons													
Trichlorotrifluoroethane	76-13-1	µg/m^3	11	9	83%	0.69	0.82	Wrhs-Office	6/9/2000	2	17%	1	1
Trichlorofluoromethane	75-69-4	µg/m^3	11	11	100%	2.3	130	B-63 Upwind[3]	6/9/2000				
Other Volatile Organic Compounds													
1,4-Dichlorobenzene	106-46-7	µg/m^3	11	1	8%	1.4	1.4	Wrhs-	6/9/2000	10	83%	1	1
Acetone	67-64-1	µg/m^3	11	11	100%	7.4	47	Wrhs-	7/12/2000				
Carbon Disulfide	75-15-0	µg/m^3	11	4	33%	1.8	4.1	Wrhs-Office 6-	7/12/2000	7	58%	1	1
Carbon Tetrachloride	56-23-5	µg/m^3	11	4	33%	0.67	1.1	Multiple[2]	7/12/2000	7	58%	1	1
Chloroform	67-66-3	µg/m^3	11	6	50%	4.6	25	Multiple[2]	7/12/2000	5	42%	1	1
Methyl ethyl ketone	78-93-3	µg/m^3	11	11	100%	3.4	16	Wrhs-Office 6-	7/12/2000				
Methyl isobutyl ketone	108-10-1	µg/m^3	11	6	50%	0.93	3.4	Wrhs-Office 6-	7/12/2000	5	42%	1	1
Methylene chloride	75-09-2	µg/m^3	11	11	100%	2.6	58	Wrhs-	7/12/2000				
Total Petroleum Hydrocarbons, Benzene, Toluene, Ethylbenzene, Xylene, & Alkylated Benzenes													
Benzene, Toluene, Ethylbenzene, Xylene													
Benzene	71-43-2	µg/m^3	11	11	100%	2	14	Multiple[2]	7/12/2000				
Toluene	108-88-3	µg/m^3	11	11	100%	20	98	Wrhs-	7/12/2000				
Ethylbenzene	100-41-4	µg/m^3	11	11	100%	4.8	20	Multiple[2]	7/12/2000				
Xylene (ortho)	95-47-6	µg/m^3	11	11	100%	6.3	24	Multiple[2]	7/12/2000				
Xylenes (meta and para)	1330-20-7	µg/m^3	11	11	100%	20	87	Wrhs-	7/12/2000				
Alkylated Benzenes													
Styrene	100-42-5	µg/m^3	11	10	92%	0.87	4.6	At well B-58	6/9/2000	1	8%	1	1

Notes:

1 Inside warehouse in change room, at a height of 5 feet above the floor.

2 Wrhs-ChangeRm 5ft and Wrhs-ChangeRm 6-12in.

3 Upwind of facility on Fox Avenue near railroad tracks. Location is 158 inches to tracks on Fox Ave, perpendicular to tracks, 176 inches from Well B-63.

4 Inside warehouse in office, at a height of 6 to12 inches above the floor.

Table 4.6
Chemicals Detected in Indoor Air--Cascade Columbia 2009 and Seattle Boiler Works 2010

Chemical	Units	Number of Results	Number of Detects	Percent Detect	Minimum Detected Value	Maximum Detected Value	Location of Maximum Detect	Date of Maximum Detect	Number of Non–Detects	Percent Non–Detects	Minimum Reporting Limit	Maximum Reporting Limit
Volatile Organic Compounds												
Chlorinated Ethenes & Ethanes[1]												
Tetrachloroethene	µg/m³	7	7	100%	3.2	75	IA-1 (CC)	3/26/2009				
Trichloroethene	µg/m³	7	7	100%	0.2	1.1	IA-1 (CC)	3/26/2009				
cis-1,2-dichloroethene	µg/m³	3	3	100%	0.22	0.42	SBW-IA-SSVB (SBW)	12/12/2010				
Vinyl Chloride	µg/m³	3	3	100%	0.13	0.22	SBW-IA-SSVB (SBW)	12/12/2010				
Other Volatile Organic Compounds												
Methylene Chloride	µg/m³	4	3	75%	1.6	2.4	IA-3 (CC)	3/26/2009	1	25%	1.1	1.2
Total Petroleum Hydrocarbons, Benzene, Toluene, Ethylbenzene, Xylene, & Alkylated Benzenes												
Benzene	µg/m³	4	4	100%	1.7	2.7	IA-3 (CC)	3/26/2009				

Notes:

1 CC = Cascade Columbia facility; SBW = Seattle Boiler Works facility.

2 The indoor air samples collected at Seattle Boiler Works were also analyzed for trans-1,2-dichloroethene, but it was not detected.

Table 4.7
Comparison of Maximum Soil Concentrations in Upper 15 Feet of Soil to MTCA Cleanup Levels for Direct Contact with Soil
All Dates

Chemical	CAS Number	Units	Maximum Detected Value			MTCA Method B (Unrestricted) Direct Contact			MTCA Method C (Industrial) Direct Contact		
			Value	Location	Date	Cancer	Non-cancer	Exceeds?	Cancer	Non-cancer	Exceeds?
Volatile Organic Compounds											
Chlorinated Ethenes & Ethanes											
Tetrachloroethene	127-18-4	µg/kg	18,000	SB-10	1/24/1991	1.9	800	**YES**	240	35,000	**YES**
Trichloroethene	79-01-6	µg/kg	1,100	SB-10	1/24/1991	11	24	**YES**	1,500	1,100	No
cis-1,2-Dichloroethene	156-59-2	µg/kg	32	GP-85	6/17/2009	-	800	No	-	35,000	No
1,2-Dichloroethene (total)	540-59-0	µg/kg	57	B-30	4/7/1992	-	720	No	-	32,000	No
Vinyl chloride	75-01-4	µg/kg	3.3	WH-1	8/9/2000	0.67	240	**YES**	88	11,000	No
Other Volatile Organic Compounds											
Acetone	67-64-1	µg/kg	47	B-30	4/2/1992	-	8,000	No	-	350,000	No
Methylene chloride	75-09-2	µg/kg	780	SB3	10/12/1990	133	4,800	**YES**	18,000	210,000	No
Total Petroleum Hydrocarbons, Benzene, Toluene, Ethylbenzene, Xylene, & Alkylated Benzenes											
Total Petroleum Hydrocarbons											
TPH-Mineral Spirits Range		mg/kg	6,500	B-2/S-3	5/11/1990	-	2,000	**YES**	-	41,500 [1]	No
TPH-Diesel Range[2]		mg/kg	770	B-32/S-1	8/28/1992	-	2,000	No	-	2,000	No
TPH-Motor Oil Range		mg/kg	3,900	B-30	4/2/1992	-	2,000	**YES**	-	2,000	**YES**
Benzene, Toluene, Ethylbenzene, Xylene											
Benzene	71-43-2	µg/kg	12,000	B-30	4/7/1992	18	320	**YES**	2,400	14,000	**YES**
Toluene	108-88-3	µg/kg	1,800	PT-3	10/3/1990	-	6,400	No	-	280,000	No
Ethylbenzene	100-41-4	µg/kg	470	SB-10	1/24/1991	-	8,000	No	-	350,000	No
Xylene (total)	1330-20-7	µg/kg	1,200	SB-10	1/24/1991	-	16,000	No	-	700,000	No
Xylene (ortho)	95-47-6	µg/kg	0.15	WH-5	8/9/2000	-	160,000	No	-	7,000,000	No
Alkylated Benzenes											
1,2,4-Trimethylbenzene	95-63-6	µg/kg	110	GP-72	6/15/2009	-	4,000	No	-	180,000	No
1,3,5-Trimethylbenzene	108-67-8	µg/kg	150	GP-72	6/15/2009	-	4,000	No	-	180,000	No
4-isopropyltoluene	99-87-6	µg/kg	14	GP-77	6/18/2009	-	-			Included in TPH	
iso-Propylbenzene	98-82-8	µg/kg	6	GP-72	6/15/2009	-	8,000	No	-	350,000	No
n-Butylbenzene	104-51-8	µg/kg	17	GP-77	6/18/2009	-	-			Included in TPH	
n-Propylbenzene	103-65-1	µg/kg	27	GP-72	6/15/2009	-	-			Included in TPH	
sec-Butylbenzene	135-98-8	µg/kg	11	GP-77	6/18/2009	-	-			Included in TPH	
Semivolatile Organic Compounds											
High Molecular Weight Polycyclic Aromatic Hydrocarbons											
Chrysene[3]	218-01-9	µg/kg	1,000	B-22	3/27/1992	14,000	-	No	1,800,000	-	No
Fluoranthene	206-44-0	µg/kg	2,400	B-22	3/27/1992	-	3,200,000	No	-	140,000,000	No
Pyrene	129-00-0	µg/kg	3,100	B-22	3/27/1992	-	2,400,000	No	-	105,000,000	No
Low Molecular Weight Polycyclic Aromatic Hydrocarbons											
2-Methylnaphthalene	91-57-6	µg/kg	2,800	B-38	8/27/1992	-	320,000	No	-	14,000,000	No
Naphthalene	91-20-3	µg/kg	43,000	GP-72	6/15/2009	-	1,600,000	No	-	70,000,000	No
Phenanthrene	85-01-8	µg/kg	2,400	B-22	3/27/1992	-	-		-	-	

Table 4.7
Comparison of Maximum Soil Concentrations in Upper 15 Feet of Soil to MTCA Cleanup Levels for Direct Contact with Soil
All Dates

Chemical	CAS Number	Units	Maximum Detected Value			MTCA Method B (Unrestricted) Direct Contact			MTCA Method C (Industrial) Direct Contact		
			Value	Location	Date	Cancer	Non-cancer	Exceeds?	Cancer	Non-cancer	Exceeds?
Phthalates											
bis(2-ethylhexyl)phthalate	117-81-7	µg/kg	140,000	SB-10	1/24/1991	71	1,600,000	No	9,400,000	70,000,000	No
Di-n-butyl phthalate	84-74-2	µg/kg	200,000	SB-10	1/24/1991	-	8,000,000	No	-	350,000,000	No
Chlorinated Phenols											
2,4-Dichlorophenol	120-83-2	µg/kg	2,100	B-21	4/8/1992	-	240,000	No	-	11,000,000	No
Pentachlorophenol	87-86-5	µg/kg	71,000	B-38	8/27/1992	8,333	2,400,000	No	1,100,000	110,000,000	No
Tetrachlorophenols (total)	58-90-2	µg/kg	38,000	B-38	8/27/1992	-	2,400,000	No	-	110,000,000	No
Glycols and Alcohols											
Glycols											
Diethylene glycol	111-46-6	µg/kg	11,000	25-S	8/31/1990	-	160,000,000	No	-	7,000,000,000	No
Ethylene glycol	107-21-1	µg/kg	12,000	21-C	8/31/1990	-	160,000,000	No	-	7,000,000,000	No
Propylene glycol	57-55-6	µg/kg	12	15/16N	9/19/1990	-	1,600,000,000	No	-	70,000,000,000	No
Metals											
Metals, Dissolved											
Arsenic	7440-38-2	µg/kg	43,000	B-28	4/7/1992	7,300	24,000	**YES**	87,500	1,100,000	No
Cadmium	7440-43-9a	µg/kg	4,300	SB-10	1/24/1991	-	80,000	No	-	3,500,000	No
Copper	7440-50-8	µg/kg	210,000	B-29	4/8/1992	-	3,000,000	No	-	130,000,000	No
Lead[4]	7439-92-1	µg/kg	500,000	B-28	4/7/1992	-	250,000	**YES**	-	1,000,000	No
Mercury	7439-97-6	µg/kg	8,800	B-16	8/16/1991	-	24,000	No	-	1,050,000	No
Zinc	7440-66-6	µg/kg	880,000	B-05	4/9/1992	-	24,000,000	No	-	1,100,000,000	No

Notes:

– A dash in the MTCA criteria column indicates that a MTCA CUL listed for that compound has not been researched.
1 TPH MTCA CUL is a site-specific total petroleum hydrocarbon value (refer to Appendix O).
2 TPH-Diesel Range is the higher boiling tail of the mineral spirits and is not Diesel No. 2; therefore, it has been compared to the risk-based value in Note 1.
3 The chrysene CUL values were calculated using the TEF for benzo(a)pyrene.
4 Under MTCA, the Method A residential soil value is used for Method B and the Method A industrial soil value is used for Method C.

Abbreviations:

MTCA Model Toxics Control Act
CUL Cleanup level
TEF Toxic equivalency factor

Table 4.8
Dioxin/Furan Soil Sample Results

Analyte	Supplemental Remedial Investigation/ Feasibility Study Sample[1]			Screening Criteria
	B-30 Surface Total (0–0.5 ft bgs)	B-30/S9 (14.5–16 ft bgs)	B-31/S8 (10.5–12 ft bgs)	MTCA Method C Standard[2]
Dioxins (pg/g)				
2,3,7,8-TCDD	0.007 U	0.0006 U	0.0003 U	
1,2,3,7,8-PeCDD	0.0113	0.0055	0.0003 U	
1,2,3,4,7,8-HxCDD	0.0389	0.0241	0.0014	
1,2,3,6,7,8-HxCDD	0.203	0.178	0.0096	
1,2,3,7,8,9-HxCDD	0.103	0.0744	0.0038	
1,2,3,4,6,7,8-HpCDD	8	7	0.269	
OCDD	84	52	3	NA
Furans (pg/g)				
2,3,7,8-TCDF	0.0125	0.0017	0.0003 U	
1,2,3,7,8-PeCDF	0.0071	0.0039	0.0004 U	
2,3,4,7,8-PeCDF	0.0073	0.004	0.0004 U	
1,2,3,4,7,8-HxCDF	0.0484	0.0384	0.0018	
1,2,3,6,7,8-HxCDF	0.0422	0.0317	0.001	
2,3,4,6,7,8-HxCDF	0.0735	0.061	0.0021	
1,2,3,7,8,9-HxCDF	0.0163 U	0.0216	0.0007 U	
1,2,3,4,6,7,8-HpCDF	1	0.981	0.0333	
1,2,3,4,7,8,9-HpCDF	0.0987	0.0786	0.004	
OCDF	5	3	0.177	NA
Human Health Dioxin/Furan TEQs (pg/g)				
Summed Dioxin/Furan TEQ[3]	0.2	0.15	0.0060	1,500
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[3]	0.2	0.15	0.0064	1,500

Notes:
1 Terra Vac and FSI 2000.
2 MTCA Method C Soil Carcinogen Standard for direct contact industrial land use (Chapter 173-340 WAC).
3 van den Berg et al. 2006.

Abbreviations:
bgs Below ground surface
ft Feet
MTCA Model Toxics Control Act
NA Not applicable
pg/g Picogram/gram
TEQ Toxic equivalency quotient

Qualifier:
U Value is not detected at given reporting limit

Table 4.9
Surface Water Concentrations Protective of Surface Water Uses

Chemical	Units	Protection of Aquatic Species		Human Health	Proposed Surface Water Cleanup Level	Maximum Measured at Shoreline Wells (Data from 2005–2009)[3]	Maximum Measured at Seeps (2009 Data)
		Lowest Promulgated Standard[1]	Lowest Risk-Based Level (Literature)[2]	Lowest Promulgated Standard[1]			
Tetrachloroethene	µg/L	none	331	3.3	3.3	**37**	**73**
Trichloroethene	µg/L	none	2,200	30	30	18	30
1,1,1-Trichoroethane	µg/L	none	1,300	none	1,300[4]	200 U	1 U
cis-1,2-Dichloroethene	µg/L	none	6,785	none	6,785[4]	4,080	1800
trans-1,2-Dichloroethene	µg/L	none	6,785	10,000	6,785[4]	1.2 J	7
1,1-Dichloroethene	µg/L	none	2,400	3.2	3.2	**6.6 J**	**4.9**
1,1-Dichloroethane	µg/L	none	7,800	none	7,800[4]	26	16
1,2-Dichloroethane	µg/L	none	6,927	3.7	3.7	200 U	1 U
Vinyl chloride	µg/L	none	12,800	2.4	2.4	**6,240**	**1,400**
Methylene chloride	µg/L	none	none	590	590	200 U	1 U
Benzene	µg/L	none	none	51	51	8.5	8.4
Toluene	µg/L	none	737	15,000	7374	200 U	1 U
Ethyl benzene	µg/L	none	none	2,100	2,100	200 U	1 U
Xylene	µg/L	none	1,168	none	1,168[4]	2.9	1 U
1,2-Dichlorobenzene	µg/L	none	none	1,300	1,300	200 U	1 U
1,4-Dichlorobenzene	µg/L	none	none	190	190	200 U	1 U
Total petroleum hydrocarbons as mineral spirits	µg/L	none	none	500–1,000	500	3000[5]	NM
Pentachlorophenol	µg/L	7.9[6]	none	3.0	3.0	5 U	NM

Notes:

Bold Indicates exceedance.

1 Lowest of WAC 173-201A, National Toxics Rule, and National Recommended Water Quality Criteria.

2 Appendix C of *Lower Duwamish Waterway Remedial Investigation Draft Final Data and Analysis Report: Porewater Sampling of Lower Duwamish Waterway* (Windward 2006).

3 Shoreline wells are MW-33A and MW-34.

4 Proposed cleanup level is based on the literature value.

5 2003 ERM data from wells along Fox Avenue (ERM 2004); total petroleum hydrocarbon sampling has not been performed at shoreline wells.

6 Marine Standard given.

Abbreviations:

NM Not measured

Qualifiers:

J Value given is an estimate.

U Value is not detected at given reporting limit.

Table 4.10
Groundwater Cleanup Levels for Organic Compounds[1]

Chemical	CAS	Units	Protection of Aquatic Species						Protection of Human Health			Screening Criterion (Lowest Standard)	Maximum Detected in Groundwater Since Measurements Began			Maximum Detected Since 2007 (Post ChemOx Interim Measures)			Maximum Post-IM Concentration Exceeds Criterion?[5]
			Federal Standards				Washington		Federal Standards		Washington								
			National Recommended Water Quality[2] Criteria CWA §304		National Toxics Rule[2] 40 CFR 131		Surface Water Quality Standards[2] WAC 173-201A		National Recommended Water Quality Criteria CWA §304	National Toxics Rule 40 CFR 131	MTCA Method B Surface Water WAC 173-340-730								
			Marine Chronic	Fresh Chronic	Marine Chronic	Fresh Chronic	Marine Chronic	Fresh Chronic	Marine (Organism Only)	Marine (Organism Only)	Fish Consumption		Value	Location	Date	Value	Location	Date	
Volatile Organic Compounds																			
Chlorinated Ethenes & Ethanes																			
Tetrachloroethene	127-18-4	µg/L	-	-	-	-	-	-	3.3	8.9	Use Standard	**3.3**	1,900,000	B-12	10/15/1990	64,000	B-46	1/28/2009	**YES**
Trichloroethene	79-01-6	µg/L	-	-	-	-	-	-	30	81	Use Standard	**30**	94,000	B-43	6/29/1993	44,000	GP-42	12/11/2008	**YES**
1,1-Dichloroethene	75-35-4	µg/L	-	-	-	-	-	-	7,100	3.2	Use Standard	**3.2**	810	B-43	6/29/1993	110	R1-IW2	7/23/2009	**YES**
cis-1,2-Dichloroethene	156-59-2	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	75,000	B-47	7/9/1993	50,000	GP-42	12/11/2008	**no**
trans-1,2-Dichloroethene	156-60-5	µg/L	-	-	-	-	-	-	10,000	No data	Use Standard	**10,000**	680	B-58	10/14/1999	240	GP-38	12/8/2008	**no**
Vinyl chloride	75-01-4	µg/L	-	-	-	-	-	-	2.4	530	Use Standard	**2.4**	25,000	B-33A	10/13/1999	15,600	PTM-2U	8/9/2007	**YES**
1,1,1-Trichloroethane	71-55-6	µg/L	-	-	-	-	-	-	-	-	930,000	**930,000**	18,000	B-31	9/15/1992	1,400	B-30	1/27/2009	**no**
1,1-Dichloroethane	75-34-3	µg/L	-	-	-	-	-	-	-	-		**No Tox Data**	2,500	B-08	9/28/1990	130	GP-38	12/8/2008	**no**
1,2-Dichloroethane	107-06-2	µg/L	-	-	-	-	-	-	37	99	Use Standard	**37**	300	B-10/10A	10/15/1990	29	GP-102	10/26/2010	**no**
Other Volatile Organic Compounds																			
1,2-Dichlorobenzene	95-50-1	µg/L	-	-	-	-	-	-	1,300	17,000	Use Standard	**1,300**	1,000	B-42	11/3/1998	400	B-47	1/29/2009	**no**
1,3-Dichlorobenzene	541-73-1	µg/L	-	-	-	-	-	-	960	2,600	Use Standard	**960**	91	B-29	5/6/1992	14	B-39	10/20/2010	**no**
1,4-Dichlorobenzene	106-46-7	µg/L	-	-	-	-	-	-	190	2,600	Use Standard	**190**	290	B-42	11/3/1998	58	B-39	10/20/2010	**no**
Acetone	67-64-1	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	30,000	B-30	9/17/1992	Not Measured			**no**
Chloroform	67-66-3	µg/L	-	-	-	-	-	-	470	470	Use Standard	**470**	13,000	B-07	10/8/1990	24	B-60	2/16/2010	**no**
Methyl ethyl ketone	78-93-3	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	170,000	B-15	4/29/1992	Not Measured			**no**
Methyl isobutyl ketone	108-10-1	µg/L	-	-	-	-	-	-	0	-	-	**No Tox Data**	12,000	B-30	9/17/1992	Not Measured			**no**
Methylene chloride	75-09-2	µg/L							590	1,600	Use Standard	**590**	43,000	B-08	9/28/1990	Non Detect			**no**
Total Petroleum Hydrocarbons, Benzene, Toluene, Ethylbenzene, Xylene & Alkylated Benzenes																			
Total Petroleum Hydrocarbons[2]																			
TPH-Mineral Spirits Range		µg/L	-	-	-	-	-	-	-	-	800	**800**	230,000	B-12	10/15/1990	6,400	B-30	1/29/2010	**YES**
TPH-Diesel Range		µg/L	-	-	-	-	-	-	-	-	500	**500**	5,000	B-30	9/17/1992	360	B-30	1/29/2010	**no**
TPH-Heavy Oil		µg/L	-	-	-	-	-	-	-	-	500	**500**	1,100	B-30	1/29/2010	1,100	B-30	1/29/2010	**YES, at 1 well**
Benzene, Toluene, Ethylbenzene, Xylene																			
Benzene	71-43-2	µg/L	-	-	-	-	-	-	51	71	Use Standard	**51**	53,000	B-49	10/25/1995	64	GP-26	12/1/2008	**YES**
Toluene	108-88-3	µg/L	-	-	-	-	-	-	15,000	200,000	Use Standard	**15,000**	1,500	B-30	9/17/1992	3,100	GP-38	12/8/2008	**no**
Ethylbenzene	100-41-4	µg/L	-	-	-	-	-	-	2,100	29,000	Use Standard	**2,100**	4,500	B-07	10/8/1990	1,000	MW-10	1/26/2009	**no**
Xylene (total)	1330-20-7	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	14,000	B-07	10/8/1990	920	GP-38	12/8/2008	**no**
Xylene (meta & para)		µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	5,300	B-47	6/22/1998	Not Measured			**no**
Xylene (ortho)	95-47-6	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	2,500	B-49	11/3/1998	Not Measured			**no**
Alkylated Benzenes																			
1,2,4-Trimethylbenzene	95-63-6	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	11,000	B-49	10/18/1999	Not Measured			**no**
1,3,5-Trimethylbenzene	108-67-8	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	9,600	B-49	10/18/1999	Not Measured			**no**
Styrene	100-42-5	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	1,800	B-49	11/3/1998	Not Measured			**no**
n-Propylbenzene	103-65-1	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	2,200	B-49	10/18/1999	Not Measured			**no**
iso-Propylbenzene	98-82-8	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	100	Multiple[3]	Multiple[3]	Not Measured			**no**
sec-Butylbenzene	135-98-8	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	2,300	B-49	10/18/1999	Not Measured			**no**
Semivolatile Organic Compounds																			
High Molecular Weight Polycyclic Aromatic Hydrocarbons																			
Benzofluoranthenes (total)	56832-73-6	µg/L										**No Tox Data**	2	B-12	12/19/1997	Not Measured			**no**
Pyrene	129-00-0	µg/L	-	-	-	-	-	-	4,000	11,000	Use Standard	**4,000**	23	B-12	6/29/1998	Not Measured			**no**
Low Molecular Weight Polycyclic Aromatic Hydrocarbons																			
2-Methylnaphthalene	91-57-6	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	130	B-10A	10/25/1995	Not Measured			**no**
Acenaphthene	83-32-9	µg/L	-	-	-	-	-	-	990	-	Use Standard	**990**	17	B-12	6/29/1998	Not Measured			**no**
Fluorene	86-73-7	µg/L	-	-	-	-	-	-	5,300	14,000	Use Standard	**5,300**	32	B-49	7/9/1993	Not Measured			**no**
Naphthalene	91-20-3	µg/L	-	-	-	-	-	-	-	-	4,900	**4,900**	6,700	B-44	6/22/1998	Non Detect			**no**
Phenanthrene	85-01-8	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	46	B-12	6/29/1998	Not Measured			**no**
Phthalates																			
bis(2-ethylhexyl)phthalate	117-81-7	µg/L	-	-	-	-	-	-	2.2	5.9	Use Standard	**2.2**	1,900	B-30	10/25/1995	Not Measured			**YES (old data)**
Butyl benzyl phthalate	85-68-7	µg/L	-	-	-	-	-	-	1,900	No data	Use Standard	**1,900**	400	B-27	9/3/1992	Not Measured			**no**
Diethylphthalate	84-66-2	µg/L	-	-	-	-	-	-	44,000	120,000	Use Standard	**44,000**	27	B-30	10/25/1995	Not Measured			**no**
Di-n-butyl phthalate	84-74-2	µg/L	-	-	-	-	-	-	4,500	12,000	Use Standard	**4,500**	880	B-30	9/17/1992	Not Measured			**no**
Chlorinated Phenols																			
Pentachlorophenol	87-86-5	µg/L	7.9	15.0	7.9	13.0	7.9	12.8	3.0	8.2	Use Standard	**3.0**	31,000	B-38	9/14/1992	116	B-49	8/6/2007	**YES**
2,4,5-Trichlorophenol	95-95-4	µg/L	-	-	-	-	-	-	3,600	-	Use Standard	**3,600**	5.1	B-20	10/21/1998	Not Measured			**no**
Tetrachlorophenols (total)	58-90-2	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	600	B-31	5/4/1992	Not Measured			**no**

Table 4.10
Groundwater Cleanup Levels for Organic Compounds[1]

Chemical	CAS	Units	Protection of Aquatic Species						Protection of Human Health			Screening Criterion (Lowest Standard)	Maximum Detected in Groundwater Since Measurements Began			Maximum Detected Since 2007 (Post ChemOx Interim Measures)			Maximum Post-IM Concentration Exceeds Criterion?[5]
			Federal Standards				Washington		Federal Standards		Washington								
			National Recommended Water Quality[2] Criteria CWA §304		National Toxics Rule[2] 40 CFR 131		Surface Water Quality Standards[2] WAC 173-201A		National Recommended Water Quality Criteria CWA §304	National Toxics Rule 40 CFR 131	MTCA Method B Surface Water WAC 173-340-730								
			Marine Chronic	Fresh Chronic	Marine Chronic	Fresh Chronic	Marine Chronic	Fresh Chronic	Marine (Organism Only)	Marine (Organism Only)	Fish Consumption		Value	Location	Date	Value	Location	Date	
Other Semivolatile Organic Compounds																			
2,4-Dimethylphenol	105-67-9	µg/L	-	-	-	-	-	-	850	No Data	Use Standard	**850**	500	B-29	5/6/1992	Not Measured			**no**
2-Methylphenol	95-48-7	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	750	B-29	5/6/1992	Not Measured			**no**
3-Methylphenol	108-37-4	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	130	B-12	12/19/1997	Not Measured			**no**
4-Methylphenol	106-44-5	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	650	B-39	10/25/1995	Not Measured			**no**
Benzoic acid	65-85-0	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	1,700	B-39	8/13/1993	Not Measured			**no**
Benzyl alcohol	100-51-6	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	260	B-12	9/17/1992	Not Measured			**no**
Carbazole	86-74-8	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	23	B-49	7/9/1993	Not Measured			**no**
Dibenzofuran	132-64-9	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	24	B-49	7/9/1993	Not Measured			**no**
Phenol	108-95-2	µg/L	-	-	-	-	-	-	1,700,000	4,600,000	Use Standard	**1,700,000**	140	B-27	7/9/1993	Not Measured			**no**
Glycols & Alcohols																			
Glycols																			
Ethylene glycol	107-21-1	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	22,000	B-15	4/29/1992	Not Measured			**no**
Diethylene glycol	111-46-6	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	8,100	B-33A	9/21/1992	Not Measured			**no**
Alcohol																			
Methanol	67-56-1	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	72,000	B-30	9/17/1992	Not Measured			**no**
Ethanol	64-17-5	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	30,000	B-11	9/15/1992	Not Measured			**no**
iso-Propanol	67-63-0	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	23,000	B-30	9/17/1992	Not Measured			**no**
1-Propanol	71-23-8	µg/L	-	-	-	-	-	-	-	-	-	**No Tox Data**	6,700	B-11	9/15/1992	Not Measured			**no**

Notes:

1 The 2007-2010 maximum concentration is compared to the lowest screening criteria or background.

2 Criteria Chronic Concentration used unless otherwise noted.

3 No surface water criteria are available for the TPH fractions; therefore MTCA Method A values for groundwater have been used as surrogates.

4 Well B-47 (6/22/1998), Wells B-18, WH-10, WH-11, WH-12, and WH-8 (8/11/10).

Abbreviations:

CFR Code of Federal Regulations
CWA Clean Water Act
IM Interim measure
MTCA Model Toxics Cleanup Act
WAC Washington Administrative Code

Table 4.11
Groundwater Cleanup Levels for Metals

Chemical	CAS Number	Units	Lower Duwamish Corridor Grounwater Metals Background	Protection of Aquatic Species						Protection of Human Health			Screening Criterion (Lowest Standard Corrected for Background)	Maximum Detected in Groundwater Since Measurements Began			Maximum Detected Since 2007 (Post ChemOx Interim Measures)			Maximum Post-IM Concentration Exceeds Criterion?[4]
				Federal Standards				Washington Standards		Federal Standards		Washington								
				National Recommended Water Quality[1] Criteria CWA §304		National Toxics Rule[1] 40 CFR 131		Surface Water Quality Standards[1] WAC 173-201A		National Recommended Water Quality[1] Criteria CWA §304	National Toxics Rule[1] 40 CFR 131	MTCA Method B Surface Water[1] WAC 173-340-730								
				Marine Chronic	Fresh Chronic	Marine Chronic	Fresh Chronic	Marine Chronic	Fresh Chronic	Fish Consumption	Fish Consumption	Fish Consumption		Value	Location	Date	Value	Location	Date	
Antimony	7440-36-0	µg/L		-	-	-	-	-	-	640	4,300	Use Standard	**640**	3.0	B-34	1/26/2009	3.0	B-34	1/26/2009	No
Arsenic	7440-38-2	µg/L	8.0	36	150	36	190	36	190	0.14	0.14	Use Standard	**8**	8.8	B-15	9/14/1992	5.0	B-59	1/27/2009	No
Barium	7440-39-3	µg/L		-	-	-	-	-	-	-	-	No tox data	**No data**	80	B-29	5/6/1992	Not Measured			-
Beryllium	7440-41-7	µg/L		-	-	-	-	-	-	-	-	270	**270**	7.0	B-33A	1/26/2009	7.0	B-33A	1/26/2009	No
Cadmium	7440-43-9	µg/L		8.8	0.25	9.3	1	9.3	0.37	-	-	20	**0.25**	0.50	B-19	5/5/1992	Not Detected at 0.4 µg/L			No
Chromium	7440-47-3	µg/L		-	-	-	-	-	-	-	-	No tox data	**No data**	41	B-34	1/26/2009	41	B-34	1/26/2009	No
Copper	7440-50-8	µg/L	8.0	3.1	9	2.4	11	3.1	3.5	-	-	2,700	**8.0**	55	B-34	1/26/2009	55	B-34	1/26/2009	**YES**
Molybdenum	7439-98-7	µg/L		-	-	-	-	-	-	-	-	No tox data	**No data**	98	B-34	1/26/2009	98	B-34	1/26/2009	No
Nickel	7440-02-0	µg/L		8.2	52	8.2	160	8.2	49	4,600	4,600	Use Standard	**8.2**	90	B-15	9/14/1992	21	B-34	1/26/2009	**YES**
Selenium	7782-49-2	µg/L		71	5	71	5	71	5	4,200	-	Use Standard	**5.0**	4.0	B-33A	1/26/2009	4.0	B-33A	1/26/2009	No
Silver	7440-22-4	µg/L		-	-	-	-	-	-	-	-	26,000	**26,000**	0.40	B-65,B-60	1/26–27/2009	0.40	B-65,B-60	1/26–27/2009	No
Zinc	7440-66-6	µg/L		81	120	81	100	81	32	26,000	No data	Use Standard	**32**	110	B-15	9/14/1992	23	B-65	1/26/2009	No

Notes:

1 Criteria Chronic Concentration used unless otherwise noted.
2 Wells B-18, WH-10, WH-11, WH-12, and WH-8.
3 Well B-47 (6/22/1998), Wells B-18, WH-10, WH-11, WH-12, and WH-8 (8/11/10).
4 The 2007-2010 maximum concentration is compared to the lowest screening criteria or background.

Abbreviations:

CFR Code of Federal Regulations
CWA Clean Water Act
IM Interim measure
MTCA Model Toxics Cleanup Act
WAC Washington Administrative Code