Table 3-1 START Surface Soil Analytical Data (mg/kg)
Limited Removal Assessment

Sample Number: / Sample Date: / Chemical	PRGs (mg/kg)	99010401 1/7/1999	99010402 1/7/99	99010403 1/7/99	99010404 1/7/99
Naphthalene	4	150	ND	12,000	2,800
2-Methylnaphthalene	—	83	ND	9,300	1,300
Acenaphthylene	—	11	0.53	ND	93
Acenaphthene	29	180	0.60	ND	1,700
3-Nitroaniline	—	ND	0.42	ND	ND
Dibenzofuran	—	100	ND	ND	1,000
Fluorene	28	150	0.67	ND	1,500
Phenanthrene	—	450	2	ND	ND
Anthracene	590	420	3	30,000	3,700
Carbazole	0.03	ND	ND	3,300	530
Fluoranthene	210	420	16	18,000	2,800
Pyrene	210	410	13	14,000	2,400
Benzo(a)anthracene [1]	0.08	190	7	5,500	960
Chrysene [1]	8	200	13	16,000	1,200
Benzo(b)fluoranthene [1]	0.2	ND	14	3,400	890
Benzo(k)fluoranthene [1]	2	230	9	3,200	430
Benzo(a)pyrene [1]	0.4	120	12	3,500	760
Indeno(1,2,3-cd)pyrene [1]	0.7	73	7	1,200	300
Dibenz(a,h)anthracene [1]	0.8	16	ND	590	26
Benzo(g,h,i)perylene	—	60	6	890	220
Total [2] PAHs	—	3,080	104	108,280	19,779
Total [2] CPAHs	—	829	68	33,390	4,566

Notes:

PRGs - USEPA Region 9 Preliminary Remediation Goals, Migration to Groundwater (Dilution Attenuation Factor 1) (USEPA, 2000).

Shading indicates value exceeds PRGs.

ND - Not detected at method reporting limits.

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

Table 3-2 Polynuclear Aromatic Hydrocarbons in Excavation Pit Soil Samples (mg/kg) from Removal Action Sampling

Sample Location:		99MEX01SB		99MEX02SB		99MEX03SB		99MEX04SB	
USEPA Sample ID No.:		99094051		99094052		99094053		99094054	
Sample Depth (feet):		9–10		9–10		9–10		9–10	
Sample Date:		2/23/99		2/23/99		2/24/99		2/24/99	
Compound	**PRGs (mg/kg)**								
Naphthalene	4	**140,000**		< *4,300*	U	**71,000**		**280,000**	
Acenaphthylene	—	< 56,000	U	**720**	JQ	< 34,000	U	**2,500**	JQ
Acenaphthene	29	**83,000**		< *4,300*	U	**60,000**		**230,000**	
Fluorene	28	**72,000**		**610**	JQ	**68,000**		**150,000**	
Phenanthrene	—	**240,000**		**2,500**	JQ	**170,000**		**560,000**	
Anthracene	590	**120,000**		**8,000**		**40,000**		**190,000**	
Fluoranthene	210	**290,000**		**3,600**	JQ	**110,000**		**410,000**	
Pyrene	210	**240,000**		**4,400**		**85,000**		**410,000**	
Benzo(a)anthracene [1]	0.08	**10,000**		**8,200**		**31,000**	JQ	**120,000**	
Chrysene [1]	8	**150,000**		**62,000**		**32,000**	JQ	**170,000**	
Benzo(b)fluoranthene [1]	0.2	**74,000**		**21,000**		**18,000**	JQ	**67,000**	JL
Benzo(k)fluoranthene [1]	2	**64,000**		**16,000**		**26,000**	JQ	**90,000**	
Benzo(a)pyrene [1]	0.4	**67,000**		**18,000**		**20,000**	JQ	**53,000**	JL
Indeno(1,2,3-cd)pyrene [1]	0.7	**35,000**	JQ	**14,000**		**10,000**	JQ	**18,000**	
Dibenzo(a,h)anthracene [1]	0.8	**13,000**	JQ	**5,300**		**4,300**	JQ	**9,000**	
Benzo(g,h,i)perylene	—	**31,000**	JQ	**10,000**		**86,000**	JQ	**6,900**	
Total [2] PAHs	—	**1,629,000**		**174,330**		**831,300**		**2,766,400**	
Total [2] CPAHs	—	**413,000**		**144,500**		**141,300**		**527,000**	

Notes:

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds PRGs.

J - The analyte was positively identified. The associated numerical result is an estimate.

L - Low bias.

Q - The result is estimated because the concentration is below the Contract Required Quantitation Limits.

U - The analyte was not detected. The associated numerical value is the sample quantitation limit.

Table 3-3 Polynuclear Aromatic Hydrocarbons in Exposed Riverbank Soil Samples (mg/kg) from Removal Site Assessment

Sample ID No.:		HA-1-0	HA-1-1	HA-2-0	HA-2-1	HA-3-0	HA-3-1	HA-4-0	HA-4-1	HA-5-0 [3]	HA-5-0	HA-5-1	HA-6-0	HA-6-1	HA-7-0	HA-7-1
Sample Depth (feet):		0–1	1–2	0–1	1–2	0–1	1–2	0–1	1–2	0–1	0–1	1–2	0–1	1–2	0–1	1–2
Sample Date:		2/10/99	2/10/99	2/10/99	2/10/99	2/10/99	2/10/99	2/10/99	2/10/99	2/10/99	2/10/99	2/10/99	2/10/99	2/10/99	2/10/99	2/10/99
Compound	PRGs (mg/kg)															
Naphthalene	4	< 0.300	< 0.300	< 0.300	0.682	< 3.30	10.3	471	1,740	3,070	2,320	7,840	3.57	19.6	2.59	< 0.300
Acenaphthylene	—	< 0.300	< 0.300	< 0.300	0.342	< 3.30	< 3.30	< 30.3	177	60.5	140	435	4.38	4.03	1.50	0.540
Acenaphthene	29	< 0.300	< 0.300	< 0.300	1.94	< 3.30	7.26	65.0	757	1,660	1,240	3,080	38.1	29.3	6.25	2.22
Fluorene	28	< 0.300	0.556	< 0.300	1.96	< 3.30	8.07	342	667	1,180	883	2,220	40.5	23.3	5.20	3.35
Phenanthrene	—	< 0.300	2.79	< 0.300	8.73	< 3.30	38.3	272	2,240	3,060	2,740	119	177	< 0.300	16.0	14.7
Anthracene	590	< 0.300	3.32	< 0.300	3.49	5.41	34.6	865	620	1,010	682	6,810	86.5	108	13.3	8.02
Fluoranthene	210	< 0.300	3.67	0.428	8.44	10.9	56.8	347	1,780	1,950	1,640	4,140	81.9	75.5	25.6	23.7
Pyrene	210	< 0.300	2.93	0.426	7.17	9.87	50.4	971	1,300	1,380	1,350	3,370	148	64.1	18.8	24.6
Benzo(a)anthracene [1]	0.08	< *0.300*	1.76	< *0.300*	3.05	16.0	34.3	796	527	565	550	49.7	80.7	2.39	23.3	13.8
Chrysene [1]	8	0.546	3.70	0.324	4.77	33.7	56.6	260	505	555	519	2,220	93.4	35.5	13.4	16.8
Benzo(b)fluoranthene [1]	0.2	0.349	2.17	< *0.300*	2.94	31.1	42.2	377	512	360	416	121	65.0	2.06	0.828	13.6
Benzo(k)fluoranthene [1]	2	< 0.300	0.814	< 0.300	1.10	10.9	15.1	260	170	145	142	984	22.9	37.6	18.6	16.1
Benzo(a)pyrene [1]	0.4	< 0.300	2.50	< 0.300	2.57	23.5	33.9	128	441	260	406	963	54.5	22.3	12.3	8.21
Indeno(1,2,3-cd)pyrene [1]	0.7	< 0.300	0.664	< 0.300	0.870	10.8	13.3	372	259	84.1	159	446	15.7	8.05	6.37	2.99
Dibenzo(a,h)anthracene [1]	0.8	< 0.300	0.325	< 0.300	0.417	3.63	5.46	128	78.0	26.3	54.4	134	6.83	3.86	1.84	1.08
Benzo(g,h,i)perylene	—	0.864	0.720	< 0.300	1.28	9.87	11.9	37.0	217	60.5	178	571	11.9	7.53	5.30	2.30
Total [2] PAHs	—	1.8	26	1.2	50	166	418	5,991	11,990	15,426	13,419	33,503	931	443	171	152
Total [2] cPAHs	—	0.85	12	0.32	16	130	201	2,321	2,492	1,995	2,246	4,918	339	112	77	73

Notes:

All samples were analyzed using USEPA Method 8100, except for HA-5-0 which was analyzed using USEPA Method 8100 and USEPA Method 8270 GC/MS.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds PRGs.

ND - Not detected at detection limits.

PRGs - USEPA Region 9 Preliminary Remediation Goals, Migration to Groundwater (Dilution Attenuation Factor 1) (USEPA, 2000).

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

[3] This sample was analyzed using USEPA Method 8270 GC/MS.

Table 3-4 Polynuclear Aromatic Hydrocarbons in Upland Soil Samples (mg/kg) from Removal Site Assessment

Sample ID No.:		GP-1-4	GP-1-18	GP-2-8 [3]	GP-2-8	GP-2-16	GP-2-25	GP-3-4	GP-3-20	GP-3-25
Sample Depth (feet):		4–5	18	8	8	16	25–27	4	20–21	25
Sample Date:		2/10/99	2/10/99	2/11/99	2/11/99	2/11/99	2/11/99	2/10/99	2/10/99	2/10/99
Compound	**PRGs (mg/kg)**									
Naphthalene	4	< 0.300	< 0.300	**23.1**	**172**	**9.57**	**633**	< *30.3*	**19.3**	**1.66**
Acenaphthylene	—	< 0.300	< 0.300	< 0.1	**10.4**	< 0.300	**30.4**	< 30.3	**1.90**	< 0.300
Acenaphthene	29	< 0.300	< 0.300	**10.1**	**42.8**	< 0.300	**255**	**30.9**	**9.72**	< 0.300
Fluorene	28	< 0.300	< 0.300	**8.77**	**34.2**	< 0.300	**153**	**200**	**9.21**	< 0.300
Phenanthrene	—	< 0.300	< 0.300	**32.6**	**118**	**0.538**	< 3.30	**46.4**	< 0.300	< 0.300
Anthracene	590	< 0.300	< 0.300	**5.37**	**24.5**	< 0.300	**626**	< 30.3	**29.5**	< 0.300
Fluoranthene	210	< 0.300	< 0.300	**23.3**	**83.2**	< 0.300	**310**	**134**	**19.8**	< 0.300
Pyrene	210	< 0.300	< 0.300	**15.1**	**60.1**	< 0.300	**262**	**74.5**	**14.0**	< 0.300
Benzo(a)anthracene[1]	0.08	< *0.300*	< *0.300*	**6.05**	**23.1**	< *0.300*	**94.0**	**70.9**	**6.04**	< *0.300*
Chrysene[1]	8	< 0.300	< 0.300	**3.58**	**15.3**	< 0.300	**56.3**	**93.7**	**4.75**	**0.302**
Benzo(b)fluoranthene[1]	0.2	< *0.300*	< *0.300*	**5.71**	**24.3**	< *0.300*	**68.6**	**79.0**	**5.54**	< *0.300*
Benzo(k)fluoranthene[1]	2	< 0.300	< 0.300	**2.13**	**3.46**	< 0.300	**24.5**	< *30.3*	**1.83**	< 0.300
Benzo(a)pyrene[1]	0.4	< 0.300	< 0.300	**4.09**	**21.3**	< 0.300	**59.2**	**70.7**	**4.81**	< 0.300
Indeno(1,2,3-cd)pyrene[1]	0.7	< 0.300	< 0.300	**1.87**	**8.88**	< 0.300	**18.1**	< *30.3*	**2.10**	**0.880**
Dibenzo(a,h)anthracene[1]	0.8	< 0.300	< 0.300	< *1.0*	< *3.30*	< 0.300	**7.46**	< *30.3*	**0.771**	< 0.300
Benzo(g,h,i)perylene	—	< 0.300	< 0.300	**1.79**	**1.79**	**0.420**	**16.2**	< 30.3	**1.91**	< 0.300
Total[2] PAHs	—	0	0	**144**	**651**	**11**	**2,614**	**800**	**131**	**2.8**
Total[2] cPAHs	—	0	0	**23**	**96**	0	**328**	**314**	**26**	**1.2**

Notes:

All samples were analyzed using USEPA Method 8100, except for those noted which were analyzed using USEPA Method 8100 and USEPA Method 8270 GC/MS.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds PRGs.

PRGs - USEPA Region 9 Preliminary Remediation Goals, Migration to Groundwater (Dilution Attenuation Factor 1) (USEPA, 2000).

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

[3] This sample was analyzed using USEPA Method 8270 GC/MS.

Table 3-4 Polynuclear Aromatic Hydrocarbons in Upland Soil Samples (mg/kg) from Removal Site Assessment

Sample ID No.:		GP-5-4	GP-5-13 [3]	GP-5-13	GP-6-9	GP-6-13	GP-10-2	GP-10-5	GP-10-13
Sample Depth (feet):		4–8	13	13	9–11	13	2	5–6	13
Sample Date:		2/11/99	2/11/99	2/11/99	2/12/99	2/12/99	2/12/99	2/10/99	2/10/99
Compound	**PRGs (mg/kg)**								
Naphthalene	4	**524**	**16.0**	**7.34**	< 0.300	< 0.300	**68.6**	**67.5**	**26.8**
Acenaphthylene	—	**35.7**	< 0.1	< 0.300	< 0.300	< 0.300	**103**	**11.7**	**4.07**
Acenaphthene	29	**324**	**3.32**	**1.95**	< 0.300	< 0.300	**353**	**39.4**	**21.4**
Fluorene	28	**205**	**1.36**	**0.611**	< 0.300	< 0.300	**216**	**33.9**	**22.9**
Phenanthrene	—	**13.7**	**1.02**	**0.429**	< 0.300	< 0.300	**396**	< 0.300	< 0.300
Anthracene	590	**817**	**0.177**	< 0.300	< 0.300	< 0.300	**2,380**	**122**	**70.5**
Fluoranthene	210	**425**	**0.315**	< 0.300	< 0.300	< 0.300	**2,860**	**11.1**	**34.1**
Pyrene	210	**360**	**0.266**	< 0.300	< 0.300	< 0.300	**2,120**	**5.40**	**23.1**
Benzo(a)anthracene[1]	0.08	**6.69**	< *0.1*	< *0.300*	< *0.300*	< *0.300*	**193**	**4.70**	**8.15**
Chrysene[1]	8	**161**	< 0.1	< 0.300	< 0.300	< 0.300	**2,200**	**30.9**	**7.01**
Benzo(b)fluoranthene[1]	0.2	**15.2**	< 0.1	< *0.300*	< *0.300*	< *0.300*	**144**	**2.54**	**5.90**
Benzo(k)fluoranthene[1]	2	**110**	< 0.1	< 0.300	< 0.300	< 0.300	**1,530**	**27.0**	**1.97**
Benzo(a)pyrene[1]	0.4	**83.7**	< 0.1	< 0.300	< 0.300	< 0.300	**1,140**	**21.7**	**4.80**
Indeno(1,2,3-cd)pyrene[1]	0.7	**29.2**	< 0.1	< 0.300	< 0.300	< 0.300	**644**	**7.63**	**2.00**
Dibenzo(a,h)anthracene[1]	0.8	**10.6**	< 0.1	< 0.300	< 0.300	< 0.300	**223**	**2.51**	**0.799**
Benzo(g,h,i)perylene	—	**22.6**	< 0.1	< 0.300	< 0.300	< 0.300	**523**	**4.82**	**1.7**
Total[2] PAHs	—	**3,143**	**22**	**10**	0	0	**15,094**	**393**	**235**
Total[2] cPAHs	—	**416**	0	0	0	0	**6,074**	**97**	**31**

Notes:

All samples were analyzed using USEPA Method 8100, except for those noted which were analyzed using USEPA Method 8100 and USEPA Method 8270 GC/MS.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds PRGs.

PRGs - USEPA Region 9 Preliminary Remediation Goals, Migration to Groundwater (Dilution Attenuation Factor 1) (USEPA, 2000).

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

[3] This sample was analyzed using USEPA Method 8270 GC/MS.

Table 3-4 Polynuclear Aromatic Hydrocarbons in Upland Soil Samples (mg/kg) from Removal Site Assessment

Sample ID No.:		GP-11-5	GP-11-15	GP-14-5	GP-14-13	GP-15-13	GP-16-12	GP-17-5	GP-17-11
Sample Depth (feet):		5–9	15–17	5	13	13–15	12–16	5	11–15
Sample Date:		2/12/99	2/12/99	2/11/99	2/11/99	2/11/99	2/12/99	2/11/99	2/11/99
Compound	**PRGs (mg/kg)**								
Naphthalene	4	**1,450**	**2,830**	**1.84**	**21.9**	< 0.300	**1.32**	< 0.300	**1,890**
Acenaphthylene	—	**63.2**	**116**	**0.555**	**9.50**	< 0.300	< 0.300	< 0.300	**88.1**
Acenaphthene	29	**477**	**923**	**1.94**	**61.8**	< 0.300	**0.973**	< 0.300	**683**
Fluorene	28	**346**	**640**	**2.13**	**66.2**	< 0.300	**0.644**	< 0.300	**557**
Phenanthrene	—	**1,020**	**1,940**	**7.23**	< 0.300	< 0.300	**0.973**	< 0.300	**1,700**
Anthracene	590	**699**	**837**	**0.691**	**246**	< 0.300	< 0.300	< 0.300	**215**
Fluoranthene	210	**592**	**1,070**	**3.51**	**13.0**	< 0.300	< 0.300	< 0.300	**856**
Pyrene	210	**475**	**851**	**2.27**	**56.9**	< 0.300	< 0.300	< 0.300	**568**
Benzo(a)anthracene[1]	0.08	**191**	**331**	**0.581**	**1.37**	< *0.300*	< *0.300*	< *0.300*	**206**
Chrysene[1]	8	**266**	**491**	**0.344**	**20.0**	< 0.300	< 0.300	< 0.300	**197**
Benzo(b)fluoranthene[1]	0.2	**145**	**243**	< *0.300*	**1.34**	**0.394**	< *0.300*	< *0.300*	**124**
Benzo(k)fluoranthene[1]	2	< *30.3*	**90.9**	< 0.300	**11.7**	< 0.300	< 0.300	< 0.300	< *30.3*
Benzo(a)pyrene[1]	0.4	**121**	**207**	< 0.300	**7.76**	< 0.300	< 0.300	< 0.300	**103**
Indeno(1,2,3-cd)pyrene[1]	0.7	**38.9**	**65.5**	< 0.300	**2.10**	< 0.300	< 0.300	< 0.300	< *30.3*
Dibenzo(a,h)anthracene[1]	0.8	< *30.3*	< *30.3*	< 0.300	**0.988**	< 0.300	< 0.300	< 0.300	< *30.3*
Benzo(g,h,i)perylene	—	**33.7**	**56.5**	< 0.300	**2.04**	**0.527**	< 0.300	< 0.300	< 30.3
Total[2] PAHs	—	**5,918**	**10,692**	**21**	**523**	**0.92**	**3.9**	0	**7,187**
Total[2] cPAHs	—	**762**	**1,428**	**0.93**	**45**	**0.39**	0	0	**630**

Notes:

All samples were analyzed using USEPA Method 8100, except for those noted which were analyzed using USEPA Method 8100 and USEPA Method 8270 GC/MS.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds PRGs.

PRGs - USEPA Region 9 Preliminary Remediation Goals, Migration to Groundwater (Dilution Attenuation Factor 1) (USEPA, 2000).

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

[3] This sample was analyzed using USEPA Method 8270 GC/MS.

Table 3-4 Polynuclear Aromatic Hydrocarbons in Upland Soil Samples (mg/kg) from Removal Site Assessment

Sample ID No.:		GP-18-5	GP-18-13	GP-23-12[3]	GP-23-12	GP-25-7	GP-25-13	GP-26-5	GP-26-13	GP-28-13
Sample Depth (feet):		5–8	13	12–15	12–15	7–11	13	5–9	13	13–16
Sample Date:		2/12/99	2/12/99	2/12/99	2/12/99	2/12/99	2/12/99	2/12/99	2/12/99	2/12/99
Compound	**PRGs (mg/kg)**									
Naphthalene	4	**0.453**	< 0.300	**0.0164**	< 0.300	**0.357**	**4.48**	< 0.300	< 0.300	< 0.300
Acenaphthylene	—	< 0.300	< 0.300	< 0.01	< 0.300	**2.54**	**0.345**	< 0.300	< 0.300	< 0.300
Acenaphthene	29	**0.384**	< 0.300	< 0.01	< 0.300	**28.8**	**3.75**	< 0.300	< 0.300	< 0.300
Fluorene	28	**0.772**	< 0.300	< 0.01	< 0.300	**26.3**	**3.17**	< 0.300	< 0.300	< 0.300
Phenanthrene	—	**1.55**	**0.518**	**0.0199**	< 0.300	< 0.300	**8.52**	< 0.300	< 0.300	< 0.300
Anthracene	590	**9.06**	**0.605**	< 0.01	< 0.300	**94.0**	**3.33**	< 0.300	< 0.300	< 0.300
Fluoranthene	210	**1.29**	**0.32**	**0.0173**	< 0.300	**1.81**	**8.59**	< 0.300	< 0.300	< 0.300
Pyrene	210	**1.20**	< 0.300	**0.0130**	< 0.300	**3.48**	**6.59**	< 0.300	< 0.300	< 0.300
Benzo(a)anthracene[1]	0.08	**0.732**	< *0.300*	< 0.01	< *0.300*	**0.475**	**3.20**	< *0.300*	< *0.300*	< *0.300*
Chrysene[1]	8	**1.10**	< 0.300	< 0.01	< 0.300	**11.3**	**4.00**	< 0.300	< 0.300	< 0.300
Benzo(b)fluoranthene[1]	0.2	**0.668**	< *0.300*	< 0.01	< *0.300*	**6.57**	**2.78**	< *0.300*	< *0.300*	**0.376**
Benzo(k)fluoranthene[1]	2	< 0.300	< 0.300	< 0.01	< 0.300	**2.45**	**1.19**	< 0.300	< 0.300	< 0.300
Benzo(a)pyrene[1]	0.4	**1.08**	**0.568**	< 0.01	< 0.300	**6.97**	**2.28**	< 0.300	< 0.300	**0.778**
Indeno(1,2,3-cd)pyrene[1]	0.7	< 0.300	< 0.300	< 0.01	< 0.300	**1.52**	**0.830**	< 0.300	< 0.300	< 0.300
Dibenzo(a,h)anthracene[1]	0.8	< 0.300	< 0.300	< 0.01	< 0.300	**0.529**	< 0.300	< 0.300	< 0.300	< 0.300
Benzo(g,h,i)perylene	—	< 0.300	< 0.300	< 0.01	< 0.300	**1.29**	**0.633**	< 0.300	< 0.300	**0.409**
Total[2] PAHs	—	**18**	**2.0**	**0.07**	0	**188**	**54**	0	0	**1.6**
Total[2] cPAHs	—	**4**	**0.57**	0	0	**30**	**14**	0	0	**1.2**

Notes:

All samples were analyzed using USEPA Method 8100, except for those noted which were analyzed using USEPA Method 8100 and USEPA Method 8270 GC/MS.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds PRGs.

PRGs - USEPA Region 9 Preliminary Remediation Goals, Migration to Groundwater (Dilution Attenuation Factor 1) (USEPA, 2000).

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

[3] This sample was analyzed using USEPA Method 8270 GC/MS.

Table 3-4 Polynuclear Aromatic Hydrocarbons in Upland Soil Samples (mg/kg) from Removal Site Assessment

Sample ID No.:		GP-30-5	GP-30-11	GP-31-5	GP-31-13	MW-1D-32.5	MW-1D-52.5[3]	MW-1D-52.5	MW-1D-55	MW-1D-62.5[3]	MW-1D-62.5
Sample Depth (feet):		5	11–15	5	13–17	32.5–35	52.5	52.5	55	62.5–64.5	62.5
Sample Date:		2/12/1999	2/12/1999	2/12/99	2/12/99	3/1/1999	3/1/99	3/1/1999	3/1/1999	3/1/1999	3/1/1999
Compound	**PRGs (mg/kg)**										
Naphthalene	4	< 0.300	< 0.300	< 0.300	< 0.300	**68.6**	**5.87**	**4.6**	**4.94**	**3.18**	**3.33**
Acenaphthylene	—	< 0.300	< 0.300	< 0.300	< 0.300	**4.26**	< 0.1	**0.384**	**0.308**	< 0.05	< 0.3
Acenaphthene	29	< 0.300	< 0.300	< 0.300	< 0.300	**34.6**	**2.65**	**3.02**	**2.46**	**1.18**	**1.92**
Fluorene	28	< 0.300	< 0.300	< 0.300	< 0.300	**29.6**	**2.76**	**2.82**	**2.24**	**1.07**	**1.72**
Phenanthrene	—	< 0.300	< 0.300	< 0.300	< 0.300	**88.0**	**8.36**	**8.70**	**6.68**	**3.09**	**5.09**
Anthracene	590	< 0.300	< 0.300	< 0.300	< 0.300	**11.5**	**1.49**	**1.80**	**1.75**	**0.805**	**1.06**
Fluoranthene	210	< 0.300	< 0.300	< 0.300	< 0.300	**45.8**	**4.46**	**4.55**	**3.36**	**1.58**	**2.57**
Pyrene	210	< 0.300	< 0.300	< 0.300	< 0.300	**30.2**	**3.14**	**3.04**	**2.26**	**1.10**	**1.73**
Benzo(a)anthracene[1]	0.08	< *0.300*	< *0.300*	< *0.300*	< *0.300*	**9.51**	**1.23**	**1.08**	**0.811**	**0.459**	**0.611**
Chrysene[1]	8	< 0.300	< 0.300	< 0.300	< 0.300	**7.95**	**1.08**	**1.11**	**0.914**	**0.444**	**0.685**
Benzo(b)fluoranthene[1]	0.2	< *0.300*	< *0.300*	< *0.300*	< *0.300*	**5.42**	**0.812**	**1.02**	**0.904**	**0.360**	**0.650**
Benzo(k)fluoranthene[1]	2	< 0.300	< 0.300	< 0.300	< 0.300	< *3.3*	**0.3**	**1.12**	**1.47**	**0.123**	**0.901**
Benzo(a)pyrene[1]	0.4	< 0.300	< 0.300	< 0.300	< 0.300	**4.18**	**0.512**	**2.00**	**2.44**	**0.227**	**1.58**
Indeno(1,2,3-cd)pyrene[1]	0.7	< 0.300	< 0.300	< 0.300	< 0.300	< *3.3*	**0.242**	**0.557**	**0.783**	**0.128**	**0.516**
Dibenzo(a,h)anthracene[1]	0.8	< 0.300	< 0.300	< 0.300	< 0.300	< *3.3*	< 0.1	< 0.3	< 0.3	< 0.5	< 0.3
Benzo(g,h,i)perylene	—	< 0.300	< 0.300	< 0.300	**0.528**	< 3.3	**0.203**	**2.17**	**2.83**	**0.109**	**1.86**
Total[2] PAHs	—	0	0	0	0	**340**	**33**	**38**	**33**	**14**	**24**
Total[2] cPAHs	—	0	0	0	0	**27**	**4.2**	**6.9**	**6.4**	**1.7**	**4.9**

Notes:

All samples were analyzed using USEPA Method 8100, except for those noted which were analyzed using USEPA Method 8100 and USEPA Method 8270 GC/MS.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds PRGs.

PRGs - USEPA Region 9 Preliminary Remediation Goals, Migration to Groundwater (Dilution Attenuation Factor 1) (USEPA, 2000).

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

[3] This sample was analyzed using USEPA Method 8270 GC/MS.

Table 3-4 Polynuclear Aromatic Hydrocarbons in Upland Soil Samples (mg/kg) from Removal Site Assessment

Sample ID No.:		MW-2D-15[3]	MW-2D-50[3]	MW-3D-25[3]	MW-3D-35[3]	MW-3D-45[3]	MW-4D-5[3]	MW-4D-45[3]
Sample Depth (feet):		15–17	50–52	25–27	35	45	5–7	45
Sample Date:		3/2/1999	3/2/1999	3/2/1999	3/2/1999	3/2/1999	3/3/1999	3/3/1999
Compound	**PRGs (mg/kg)**						**Background**	**Background**
Naphthalene	4	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**0.0179**	< 0.02
Acenaphthylene	—	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**0.0393**	< 0.02
Acenaphthene	29	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**0.0313**	< 0.02
Fluorene	28	< 0.01	< 0.02	< 0.02	**0.0107**	< 0.01	**0.0921**	< 0.02
Phenanthrene	—	< 0.01	< 0.02	**0.0321**	**0.0534**	**0.0348**	**0.595**	< 0.02
Anthracene	590	< 0.01	< 0.02	< 0.02	**0.0146**	**0.0122**	**0.164**	< 0.02
Fluoranthene	210	< 0.01	< 0.02	**0.0214**	**0.0262**	**0.0179**	**0.345**	< 0.02
Pyrene	210	< 0.01	< 0.02	< 0.02	**0.0175**	**0.0122**	**0.366**	< 0.02
Benzo(a)anthracene[1]	0.08	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**0.162**	< 0.02
Chrysene[1]	8	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**0.137**	< 0.02
Benzo(b)fluoranthene[1]	0.2	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**1.28**	< 0.02
Benzo(k)fluoranthene[1]	2	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**0.0474**	< 0.02
Benzo(a)pyrene[1]	0.4	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**0.132**	< 0.02
Indeno(1,2,3-cd)pyrene[1]	0.7	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**0.0822**	< 0.02
Dibenzo(a,h)anthracene[1]	0.8	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**0.0152**	< 0.02
Benzo(g,h,i)perylene	—	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**0.0849**	< 0.02
Total[2] PAHs	—	0	0	**0.05**	**0.12**	**0.08**	**2.4**	0
Total[2] cPAHs	—	0	0	0	0	0	**1.9**	0

Notes:

All samples were analyzed using USEPA Method 8100, except for those noted which were analyzed using USEPA Method 8100 and USEPA Method 8270 GC/MS.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds PRGs.

PRGs - USEPA Region 9 Preliminary Remediation Goals, Migration to Groundwater (Dilution Attenuation Factor 1) (USEPA, 2000).

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

[3] This sample was analyzed using USEPA Method 8270 GC/MS.

Table 3-5 Polynuclear Aromatic Hydrocarbons in Geoprobe Boring Groundwater (µg/L) from Removal Site Assessment

Sample ID No.:		GPW-1-0299-30	GPW-2-0299-30	GPW-3-0299-30	GPW-5-0299-15	GWP-10-0299-15	GPW-14-0299-18	GPW-15-0299-18	GPW-16-0299-15	GPW-18-0299-15	GPW-23-0299-15	GPW-26-0299-15	GPW-28-0299-18
Sample Depth (feet):		26.5–30	26.5–30	26.5–30	15	15	18	18	15	14.5–18	15	15	18
Sample Date:		2/10/99	2/11/99	2/10/99	2/11/99	2/10/99	2/11/99	2/11/99	2/12/99	2/12/99	2/12/99	2/12/99	2/12/1999
Compound	PRGs (µg/L)									Background			
Naphthalene	6.2	0.379	2,010	199	6,450	5,200	5,070	88.0	3,500	11.4	0.933	9.22	19.7
Acenaphthylene	—	< 0.100	< 0.500	< 0.100	18.3	4.90	6.50	0.520	2.32	0.320	< 0.100	0.267	0.720
Acenaphthene	370	0.189	10.0	0.758	453	250	532	37.2	109	9.08	1.24	14.7	30.9
Fluorene	240	0.189	7.00	0.695	216	187	438	36.4	42.8	8.32	1.54	15.8	26.7
Phenanthrene	—	0.547	17.8	2.67	325	252	858	76.1	38.0	22.1	5.92	38.5	67.6
Anthracene	1,800	0.189	2.80	0.779	51.0	35.9	67.8	7.82	4.53	5.68	1.14	7.91	8.44
Fluoranthene	1,500	0.526	5.10	2.11	114	93.8	342	22.6	13.6	8.68	2.90	13.4	19.6
Pyrene	180	0.421	3.10	1.39	68.8	59.0	167	12.7	9.79	5.94	1.83	8.84	13.5
Benzo(a)anthracene [1]	0.092	0.126	1.00	0.526	19.4	22.0	64.7	3.90	2.74	1.34	0.248	2.13	2.20
Chrysene [1]	9.2	0.211	1.90	0.632	22.0	18.1	41.6	3.78	2.00	1.56	0.229	3.69	2.56
Benzo(b)fluoranthene [1]	0.092	0.105	1.50	0.421	12.1	14.1	37.1	2.32	2.11	0.680	< *0.100*	1.11	0.920
Benzo(k)fluoranthene [1]	0.92	< 0.100	< 0.500	0.147	4.50	4.30	11.1	0.860	0.737	0.240	< 0.100	0.422	0.340
Benzo(a)pyrene [1]	0.0092	< *0.100*	1.10	0.253	8.25	8.70	22.1	1.46	1.37	0.420	< *0.100*	0.711	0.600
Indeno(1,2,3-cd)pyrene [1]	0.092	< *0.100*	1.60	0.105	3.00	3.30	8.30	0.660	0.632	0.140	< *0.100*	0.289	0.220
Dibenzo(a,h)anthracene [1]	0.0092	< *0.100*	< *0.500*	< *0.100*	1.00	1.10	2.70	0.200	< *0.500*	< *0.100*	< *0.100*	< *0.100*	< *0.100*
Benzo(g,h,i)perylene	—	< 0.100	1.60	0.105	2.25	2.90	6.70	0.540	0.526	0.120	< 0.100	0.222	0.160
Total [2] PAHs	—	2.9	2,065	210	7,769	6,157	7,676	295	3,730	76	16	117	194
Total [2] CPAHs	—	0.44	7.1	2.1	69.5	71	188	13	9.6	4.4	0.48	8.4	6.8

Notes:

All samples were analyzed using USEPA Method 8270 GC/MS.

Italicized values are detection limits that exceed the PRGs.

Shading indicates value exceeds PRGs.

PRGs - USEPA Region 9 Preliminary Remediation Goals, Tap Water (USEPA, 2000).

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

Table 3-6 Polynuclear Aromatic Hydrocarbons in Monitoring Well Groundwater (µg/L) from Removal Site Assessment

Sample ID No.:		MW-1S	MW-1D	MW-2S	MW-2D	MW-3S	MW-3D	MW-4S	MW-5S [3]	MW-4D
Sample Depth (feet):		6.66	8.92	4.62	9.08	4.40	6.90	2.89	2.89	7.23
Sample Date:		3/10/1999	3/10/99	3/10/99	3/10/99	3/10/99	3/10/99	3/9/99	3/9/99	3/9/99
Compound	**PRGs (µg/L)**									
Naphthalene	6.2	**7,430**	**3,090**	< 0.3	< 0.3	< 0.3	< 0.3	**2.04**	**1.90**	< 0.3
Acenaphthylene	—	**11.7**	< 10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	370	**462**	**256**	< 0.1	< 0.1	< 0.1	< 0.1	**5.22**	**5.12**	< 0.1
Fluorene	240	**279**	**164**	< 0.1	< 0.1	< 0.1	< 0.1	**1.62**	**1.60**	< 0.1
Phenanthrene	—	**402**	**207**	< 0.1	**0.156**	< 0.1	**0.176**	< 0.1	< 0.1	**0.137**
Anthracene	1,800	**44.9**	**25.4**	**0.156**	< 0.1	< 0.1	< 0.1	**0.267**	**0.286**	< 0.1
Fluoranthene	1,500	**89.8**	< 30	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Pyrene	180	**48.8**	< 30	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Benzo(a)anthracene [1]	0.092	**13.7**	< *10*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*
Chrysene [1]	9.2	< *10*	< *10*	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene [1]	0.092	< *10*	< *10*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*
Benzo(k)fluoranthene [1]	0.92	< *10*	< *10*	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene [1]	0.0092	< *10*	< *10*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*
Indeno(1,2,3-cd)pyrene [1]	0.092	< *10*	< *10*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*
Dibenzo(a,h)anthracene [1]	0.0092	< *10*	< *10*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*	< *0.1*
Benzo(g,h,i)perylene	—	< 10	< 10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total [2] PAHs	—	**8,782**	**3,742**	**0.16**	**0.16**	0	**0.18**	**9.1**	**8.9**	**0.14**
Total [2] CPAHs	—	**14**	0	0	0	0	0	0	0	0

Notes:

All samples were analyzed using USEPA Method 8270 GC/MS.

Italicized values are detection limits that exceed the PRGs.

Shading indicates value exceeds PRGs.

PRGs - USEPA Region 9 Preliminary Remediation Goals, Tap Water (USEPA, 2000).

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

[3] MW-5S is duplicate sample of MW-4S.

Table 3-7 Polynuclear Aromatic Hydrocarbons in St. Joe River Surface Sediments (µg/kg) START Site Integrated Assessment Samples

Sample Location:			RV10SD	RV09SD	RV01SD	RV02SD	RV03SD	RV04SD	RV05SD	RV06SD	RV07SD	RV08SD
USEPA Sample ID No.:			99084115	99084114	99084101	99084102	99084103	99084104	99084105	99084111	99084112	99084113
Sample Date:			2/13/99	2/13/99	2/13/99	2/13/99	2/13/99	2/13/99	2/13/99	2/13/99	2/13/99	2/13/99
Compound	**LEL (µg/kg dry wt.)**	**SEL (µg/kg %OC [3])**	**Background**	**Outfalls**	**Wetland**		**River**					
Naphthalene	—	—	1,400	< 360 U	< 550 U	< 430 U	< 500 U	< 500 U	6,100	97,000	21,000	89,000,000
Acenaphthylene	—	—	< 500 U	70 JQ	< 550 U	< 430 U	< 500 U	< 500 U	320 JQ	1,000 JQ	< 16,000 U	160,000 JQ
Acenaphthene	—	—	91 JQ	310 JQ	41 JQ	< 430 U	49 JQ	300 JQ	2,500 JH	100,000	16,000 JQ	4,300,000 JL
Fluorene	190	160,000	86 JQ	400	38 JQ	< *430* U	48 JQ	420 JQ	2,500 JH	74,000 JQ	13,000 JQ	3,800,000 JL
Phenanthrene	560	950,000	330 JQ	1,600 JH	< 550 U	< 430 U	170 JQ	1,700	6,500	220,000	39,000	5,700,000 JL
Anthracene	—	—	360 JQ	4,800	110 JQ	< 430 U	140 JQ	1,600	8,000	83,000	9,500 JQ	6,400,000 JL
Fluoranthene	750	1,020,000	380 JQ	7,700	120 JQ	43 JQ	170 JQ	1,700	9,000	200,000	32,000	3,500,000 JL
Pyrene	490	850,000	550	9,200	130 JQ	54 JQ	190 JQ	1,400	8,000	160,000	42,000	2,800,000 JL
Benzo(a)anthracene [1]	320	1,480,000	270 JQ	5,400	62 JQ	24 JQ	100 JQ	710	5,000	71,000	23,000	980,000
Chrysene [1]	340	460,000	590	9,300	110 JQ	26 JQ	200 JQ	1,300	9,100	72,000	42,000	1,400,000
Benzo(b)fluoranthene [1]	—	—	560	6,600	46 JQ	25 JQ	84 JQ	410 JQ	3,200	41,000	22,000	270,000 JQ
Benzo(k)fluoranthene [1]	240	1,340,000	540	4,700	39 JQ	< *430* U	88 JQ	460 JQ	3,500	33,000	26,000	300,000 JQ
Benzo(a)pyrene [1]	370	1,440,000	410 JQ	4,800	48 JQ	24 JQ	91 JQ	470 JQ	3,600	42,000	26,000	360,000
Indeno(1,2,3-cd)pyrene [1]	200	320,000	140 JQ	2,800 JH	< *550* U	< *430* U	35 JQ	200 JQ	1,400 JH	12,000 JQ	29,000	120,000 JQ
Dibenzo(a,h)anthracene [1]	60	130,000	41 JQ	820 JH	< *550* U	< *430* U	< *500* U	82 JQ	270 JQ	5,700 JQ	4,200 JQ	60,000 JQ
Benzo(g,h,i)perylene	170	320,000	95 JQ	2,200 JH	< *550* U	< *430* U	29 JQ	150 JQ	850 JH	10,000 JQ	7,900 JQ	78,000 JQ
Total [2] PAHs	4,000	10,000,000	5,843	60,700	744	196	1,394	10,902	69,840	1,221,700	352,600	119,228,000
Total [2] CPAHs	—	—	2,551	34,420	305	99	598	3,632	26,070	276,700	172,200	3,490,000

Notes:

Samples were collected from the top 6 inches of sediment.

Sediment Screening Values are not chemical specific ARARs. They are to be considered.

LEL - Lowest Effect Level from Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (Ontario Ministry of the Environment, 1993).

SEL - Severe Effect Level (ug/g organic carbon) from Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (Ontario Ministry of the Environment, 1993).

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds LEL.

Shading indicates value exceeds SEL.

H - High bias.

J - The analyte was positively identified. The associated numerical result is an estimate.

L - Low bias.

Q - The result is estimated because the concentration is below the Contract Required Quantitation Limits.

U - The analyte was not detected. The associated numerical value is the sample quantitation limit.

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

[3] No TOC data available.

Table 3-8 Semivolatile Organic Compounds in St. Joe River Type 1 Surface Sediment (µg/kg) from Integrated Assessment Addendum Sampling

		USEPA Sample Number:	99454141		99454142		99454101		99454102		99454105		99454109		99454110		99454111		99454112		99454114		99454115		99454116		99454117		99454118	
		START Sample ID:	99SMSD41		99SMSD42		99SMSD01		99SMSD02		99SMSD05		99SMSD09		99SMSD10		99SMSD11		99SMSD12		99SMSD14		99SMSD15		99SMSD16		99SMSD17		99SMSD18	
		Sample Date:	11/4/1999		11/4/1999		11/2/1999		11/2/1999		11/2/1999		11/2/1999		11/2/1999		11/2/1999		11/2/1999		11/2/1999		11/2/1999		11/3/1999		11/3/1999		11/3/1999	
Compound	LEL (µg/kg dry wt.)	Site-specific SEL [2] (µg/kg dry wt.)	Background		Background																											
Total Organic Carbon (%)	1.00	0.30	**2.22**		**1.43**		**2.57**		**2.19**		**2.09**		**2.62**		**2.18**		**1.50**		**1.51**		**2.04**		**1.89**		**2.48**		**3.72**		**1.70**	
Semivolatile Organic Compounds (µg/kg)																																
2,4-Dimethylphenol	—	—	271	U	221	U	292	U	314	U	318	U	341	U	247	U	229	U	246	U	274	U	199	U	260	U	189	U	200	U		
4-Methylphenol	—	—	271	U	221	U	292	U	314	U	318	U	341	U	247	U	229	U	246	U	274	U	199	U	260	U	189	U	200	U		
9H-Carbazole [3]	—	140	*271*	U	*221*	U	*292*	U	*314*	U	*318*	U	*341*	U	**110**	JQ	*229*	U	*246*	U	**6,590**		**516**		**2,100**		**338**		*200*	U		
9H-Fluorene	190	4,822	*271*	U	*221*	U	*292*	U	**79.8**	JQ	*318*	U	**223**	JQ	**169**	JQ	*229*	U	*246*	U	**5,700**		**1,800**		**3,500**		**683**		**90.7**	JQ		
Acenaphthene [SEL 3, PEL 4]	620	3,500	271	U	221	U	292	U	314	U	318	U	**194**	JQ	**108**	JQ	229	U	246	U	**2,230**		**2,360**		**2,770**		**582**		**110**	JQ		
Acenaphthylene [3]	—	1,900	271	U	221	U	292	U	314	U	318	U	341	U	247	U	229	U	246	U	**125**	JQ	199	U	**134**	JQ	189	U	200	U		
Anthracene	0.22	11.2	*271*	U	*221*	U	**168**	JQ	**310**	JQ	*318*	U	**429**		**763**		*229*	U	*246*	U	**27,300**		**2,820**		**14,100**		**1,840**		**184**	JQ		
Benzo(a)anthracene [5]	320	44,607	271	U	221	U	292	U	314	U	318	U	**382**		**520**		229	U	246	U	**7,750**		**2,380**		**8,430**		**1,140**		200	U		
Benzo(a)pyrene [5]	370	43,402	271	U	221	U	**99.1**	JQ	**130**	JQ	318	U	**242**	JQ	**342**		229	U	246	U	**3,760**		**1,630**		**5,320**		**750**		**69.1**	JQ		
Benzo(g,h,i)perylene	170	9,645	*542*	U	*442*	U	*585*	U	*627*	U	*637*	U	*682*	U	**271**	JQ	*457*	U	*491*	U	**1,080**		**663**		**1,980**		**387**		*200*	U		
Benzo(b)fluoranthene [5]	—	—	542	U	442	U	**397**	JQ	**452**	JQ	637	U	**611**	JQ	**707**		457	U	491	U	**5,690**		**2,500**		**7,970**		**1,260**		**258**	JQ		
Benzo(k)fluoranthene [5]	240	40,388	*271*	U	221	U	*292*	U	**88.4**	JQ	*318*	U	**149**	JQ	**193**	JQ	229	U	*246*	U	**2,400**		**1,090**		**3,230**		**445**		200	U		
Chrysene [5]	340	13,864	271	U	221	U	**228**	JQ	**340**		318	U	**597**		**1,050**		229	U	246	U	**11,400**		**4,030**		**12,600**		**1,710**		174	JQ		
Dibenzo(a,h)anthracene [5]	60	3,918	*1,350*	U	*1,100*	U	*1,460*	U	*1,570*	U	*1,590*	U	*1,710*	U	*1,240*	U	*1,140*	U	*1,230*	U	**728**	JQ	**473**	JQ	**976**	JQ	**376**	JQ	*1,000*	U		
Dibenzofuran [4]	2,000	—	271	U	221	U	292	U	314	U	318	U	**125**	JQ	**105**	JQ	229	U	246	U	**2,240**		**1,080**		**1,900**		**403**		**59.8**	JQ		
Fluoranthene	750	30,743	271	U	221	U	**336**		**426**		318	U	**801**		**889**		229	U	246	U	**26,500**		**5,550**		**19,700**		**2,540**		**304**			
Indeno(1,2,3-cd)pyrene [5]	200	9,645	*542*	U	*442*	U	*585*	U	*627*	U	*637*	U	**405**	JQ	*494*	U	*457*	U	*491*	U	**1,450**		**818**		**2,260**		**477**		*400*	U		
Naphthalene [6]	140	—	*271*	U	*221*	U	*292*	U	*314*	U	*318*	U	**204**	JQ	**115**	JQ	*229*	U	*246*	U	**1,760**		**4,540**		**1,590**		**505**		**257**			
Naphthalene, 2-methyl-	—	—	271	U	221	U	292	U	314	U	318	U	341	U	**55**	JQ	229	U	246	U	**1,480**		**1,220**		**956**		**261**		**55.8**	JQ		
Phenanthrene	560	28,633	271	U	221	U	**297**		**334**		318	U	**811**		**652**		229	U	246	U	**23,800**		**5,070**		**13,000**		**2,080**		**247**			
Pyrene	490	25,619	271	U	221	U	**312**		**407**		318	U	**742**		**806**		229	U	246	U	**21,100**		**4,750**		**16,200**		**2,170**		**255**			
Total [7] PAHs	4,000	301,400	0		0		**1,837**		**2,567**		0		**5,790**		**6,585**		0		0		**142,773**		**40,474**		**113,760**		**16,945**		**1,949**			
Total [7] CPAHs	—	—	0		0		**724**		**1,010**		0		**2,386**		**3,083**		0		0		**34,258**		**13,584**		**42,766**		**6,545**		**501**			

Notes:

Samples were collected from the top 6 inches of sediment.

Sediment Screening Values are not chemical specific ARARs. They are to be considered.

LEL - Lowest Effect Level from Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (Ontario Ministry of the Environment, 1993).

SEL - Severe Effect Level (µg/g organic carbon) from Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (Ontario Ministry of the Environment,

Site-specific SEL is SEL corrected for organic carbon.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds LEL.

Shading indicates value exceeds site-specific SEL.

J - The analyte was positively identified. The associated numerical result is an estimate.

Q - The result is estimated because the concentration is below the Contract Required Quantitation Limit.

U - The analyte was not detected. The associated numerical value is the sample quantitation limit.

[1] Type 1 sediments are predominantly silts or silts with a small sand component.

[2] Type 1 sediments site-specific %TOC average is 3.01%.

[3] Washington State - Freshwater Sediment Quality Values, Cubbage et al. (1997).

[4] OSWER - Office of Solid Waste and Emergency Response - Ecotox Threshold, USEPA (1996).

[5] Carcinogenic PAH.

[6] USEPA ARCS - Assessment and Remediation of Contaminated Sediments (ARCS) Program - Probable Effects Level (USEPA, 1996). ARCS values for the HA-28 assay from Ingersoll et al. (1996) and Smith et al. (1996).

[7] When calculating total values, zero was used for those constituents identified as less than the detection limit.

Table 3-8 Semivolatile Organic Compounds in St. Joe River Type 1 Surface Sediment (µg/kg) from Integrated Assessment Addendum Sampling

		USEPA Sample Number:	99454141	99454142	99454119	99454120	99454122	99454123	99454124	99454125	99454127	99454131	99454132	99454133	99454134	99454139	99454140	99454143
		START Sample ID:	99SMSD41	99SMSD42	99SMSD19	99SMSD20	99SMSD22	99SMSD23	99SMSD24	99SMSD25	99SMSD27	99SMSD31	99SMSD32	99SMSD33	99SMSD34	99SMSD39	99SMSD40	99SMSD43
		Sample Date:	11/4/1999	11/4/1999	11/3/1999	11/3/1999	11/3/1999	11/3/1999	11/3/1999	11/3/1999	11/3/1999	11/3/1999	11/3/1999	11/3/1999	11/3/1999	11/4/1999	11/4/1999	11/4/1999
Compound	**LEL (µg/kg dry wt.)**	**Site-specific SEL [2] (µg/kg dry wt.)**	**Background**	**Background**														
Total Organic Carbon (%)	1.00	0.30	**2.22**	**1.43**	**0.66**	**24.60**	**1.82**	**2.96**	**1.09**	**1.79**	**3.10**	**2.17**	**3.14**	**3.34**	**3.85**	**2.26**	**3.64**	**2.21**
Semivolatile Organic Compounds (µg/kg)																		
2,4-Dimethylphenol	—	—	271 U	221 U	210 U	215 U	209 U	280 U	210 U	232 U	215 U	227 U	247 U	262 U	**178** JQ	280 U	269 U	242 U
4-Methylphenol	—	—	271 U	221 U	210 U	215 U	209 U	280 U	210 U	232 U	215 U	227 U	247 U	**328**	**216** JQ	280 U	269 U	242 U
9H-Carbazole [3]	—	140	*271* U	*221* U	*210* U	*215* U	**1,630**	**19,300**	*210* U	*232* U	**8,590**	**2,440**	**4,660**	**30,700**	**147,000**	*280* U	*269* U	*242* U
9H-Fluorene	190	4,822	*271* U	*221* U	*210* U	*215* U	**3,290**	**52,500**	*210* U	*232* U	**14,600**	**6,160**	**7,010**	**213,000**	**241,000**	**117** JQ	*269* U	*242* U
Acenaphthene [SEL 3, PEL 4]	620	3,500	271 U	221 U	210 U	215 U	**2,760**	**55,400**	210 U	232 U	**13,700**	**5,770**	**7,480**	**293,000**	**231,000**	280 U	269 U	242 U
Acenaphthylene [3]	—	1,900	271 U	221 U	210 U	215 U	**94.3** JQ	**1,030**	210 U	232 U	**375**	**138** JQ	**162** JQ	**3,320**	**7,920**	280 U	269 U	242 U
Anthracene	0.22	11.2	*271* U	*221* U	*210* U	*215* U	**9,160**	**91,300**	*210* U	*232* U	**45,700**	**13,900**	**18,700**	**138,000**	**958,000**	**290**	**215** JQ	**69.1** JQ
Benzo(a)anthracene [5]	320	44,607	271 U	221 U	210 U	215 U	**5,650**	**32,700**	210 U	232 U	**12,900**	**6,400**	**6,180**	**109,000**	**105,000**	**296**	269 U	242 U
Benzo(a)pyrene [5]	370	43,402	271 U	221 U	210 U	215 U	**3,490**	**18,600**	210 U	232 U	**8,540**	**4,000**	**3,520**	**56,900**	**42,000**	**222** JQ	**185** JQ	**84.7** JQ
Benzo(g,h,i)perylene	170	9,645	*542* U	*442* U	*420* U	*430* U	**1,200**	**5,710**	*420* U	*463* U	**3,260**	**1,630**	**1,240**	**18,100**	**15,800**	**302** JQ	**327** JQ	*484* U
Benzo(b)fluoranthene [5]	—	—	542 U	442 U	420 U	430 U	**5,380**	**23,700**	420 U	463 U	**11,800**	**6,110**	**4,960**	**96,400**	**77,700**	**577**	**617**	**361** JQ
Benzo(k)fluoranthene [5]	240	40,388	*271* U	221 U	210 U	215 U	**2,040**	**10,700**	210 U	232 U	**4,820**	**2,310**	**2,000**	**35,700**	**36,500**	**161** JQ	**147** JQ	**61.8** JQ
Chrysene [5]	340	13,864	271 U	221 U	210 U	215 U	**9,620**	**49,400**	210 U	232 U	**29,200**	**10,600**	**10,500**	**107,000**	**696,000**	**409**	**342**	**216** JQ
Dibenzo(a,h)anthracene [5]	60	3,918	*1,350* U	*1,100* U	*1,050* U	*1,080* U	**696** JQ	**2,380**	*1,050* U	*1,160* U	**1,370**	**817** JQ	**732** JQ	**7,770**	**7,690**	*1,400* U	*1,340* U	*1,210* U
Dibenzofuran [4]	2,000	—	271 U	221 U	210 U	215 U	**1,620**	**26,400**	210 U	232 U	**8,320**	**3,070**	**4,310**	**134,000**	**124,000**	280 U	**84.4** JQ	**80.8** JQ
Fluoranthene	750	30,743	271 U	221 U	210 U	**101** JQ	**13,200**	**121,000**	210 U	232 U	**32,400**	**17,800**	**17,300**	**420,000**	**327,000**	**417**	**398**	**258**
Indeno(1,2,3-cd)pyrene [5]	200	9,645	*542* U	*442* U	*420* U	*430* U	**1,560**	**7,110**	*420* U	*463* U	**4,020**	**1,640**	**1,390**	**22,400**	**20,300**	**383** JQ	**441** JQ	**270** JQ
Naphthalene [6]	140	—	*271* U	*221* U	*210* U	*215* U	**1,920**	**36,500**	*210* U	*232* U	**13,600**	**1,830**	**16,500**	**394,000**	**276,000**	*280* U	*269* U	**187** JQ
Naphthalene, 2-methyl-	—	—	271 U	221 U	210 U	215 U	**1,030**	**20,700**	210 U	232 U	**6,070**	**1,480**	**4,280**	**159,000**	**118,000**	280 U	**68** JQ	**102** JQ
Phenanthrene	560	28,633	271 U	221 U	210 U	215 U	**10,600**	**162,000**	210 U	232 U	**37,100**	**18,700**	**21,300**	**685,000**	**596,000**	375 U	358 U	268 U
Pyrene	490	25,619	271 U	221 U	210 U	**118** JQ	**10,000**	**97,400**	210 U	232 U	**29,200**	**14,500**	**14,200**	**339,000**	**280,000**	**403**	**438**	**255**
Total [7] PAHs	4,000	301,400	0	0	0	**219**	**80,660**	**767,430**	0	0	**262,585**	**112,305**	**133,174**	**2,938,590**	**3,917,910**	**3,577**	**3,178**	**1,763**
Total [7] CPAHs	—	—	0	0	0	**0**	**29,636**	**150,300**	0	0	**75,910**	**33,507**	**30,522**	**453,270**	**1,000,990**	**2,350**	**2,059**	**994**

Notes:

Samples were collected from the top 6 inches of sediment.

Sediment Screening Values are not chemical specific ARARs. They are to be considered.

LEL - Lowest Effect Level from Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (Ontario Ministry of the Environment, 1993).

SEL - Severe Effect Level (µg/g organic carbon) from Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (Ontario Ministry of the Environment,

Site-specific SEL is SEL corrected for organic carbon.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds LEL.

Shading indicates value exceeds site-specific SEL.

J - The analyte was positively identified. The associated numerical result is an estimate.

Q - The result is estimated because the concentration is below the Contract Required Quantitation Limit.

U - The analyte was not detected. The associated numerical value is the sample quantitation limit.

[1] Type 1 sediments are predominantly silts or silts with a small sand component.

[2] Type 1 sediments site-specific %TOC average is 3.01%.

[3] Washington State - Freshwater Sediment Quality Values, Cubbage et al. (1997).

[4] OSWER - Office of Solid Waste and Emergency Response - Ecotox Threshold, USEPA (1996).

[5] Carcinogenic PAH.

[6] USEPA ARCS - Assessment and Remediation of Contaminated Sediments (ARCS) Program - Probable Effects Level (USEPA, 1996). ARCS values for the HA-28 assay from Ingersoll et al. (1996) and Smith et al. (1996).

[7] When calculating total values, zero was used for those constituents identified as less than the detection limit.

Table 3-9 Semivolatile Organic Compounds in St. Joe River Type 2[1] Surface Sediment (µg/kg) from Integrated Assessment Addendum Sampling

Compound	LEL (µg/kg dry wt.)	Site-spcific SEL[2] (µg/kg dry wt.)	99454128	99454129	99454103	99454104	99454106	99454107	9945408	99454113	99454121	99454126	99454130	99454135	99454136	99454137	99454138
START Sample ID:			99SMSD28	99SMSD29	99SMSD03	99SMSD04	99SMSD06	99SMSD07	99SMSD08	99SMSD13	99SMSD21	99SMSD26	99SMSD130	99SMSD35	99SMSD36	99SMSD37	99SMSD38
Date Collected:			11/3/1999	11/3/1999	11/2/1999	11/2/1999	11/2/1999	11/2/1999	11/2/1999	11/2/1999	11/3/1999	11/3/1999	11/3/1999	11/4/1999	11/4/1999	11/4/1999	11/4/1999
			Background	Background													
Total Organic Carbon (%)	1.00	0.121	**0.95**	**1.70**	**1.28**	**0.72**	**0.74**	**1.72**	**1.54**	**1.04**	**0.79**	**0.94**	**0.98**	**1.31**	**1.56**	**1.67**	**1.28**
SVOCs (µg/kg)																	
9H-Carbazole[3]	—	140	*198* U	*243* U	**191** JQ	**170** JQ	*187* U	*231* U	*203* U	*193* U	*196* U	**90.1** JQ	*192* U	*206* U	*253* U	**543**	*218* U
9H-Fluorene	190	1,943	*198* U	*243* U	**235** JQ	**143** JQ	187 U	*231* U	*203* U	**66** JQ	*196* U	**99.7** JQ	*192* U	*206* U	*253* U	**839**	**165** JQ
Acenaphthene[SEL 3, PEL 4]	620	3,500	198 U	243 U	**444**	**72.1** JQ	187 U	231 U	203 U	**108** JQ	196 U	**258**	192 U	206 U	253 U	**778**	218 U
Anthracene	0.22	4.49	*198* U	*243* U	**517**	**974**	*187* U	*231* U	*203* U	*193* U	*196* U	**148** JQ	*192* U	*206* U	**245** JQ	**2,490**	**689**
Benzo(a)anthracene[5]	320	17,977	198 U	243 U	**319**	**308**	187 U	231 U	203 U	193 U	196 U	169 U	192 U	206 U	253 U	**1,800**	**535**
Benzo(a)pyrene[5]	370	17,491	198 U	243 U	**240** JQ	**198** JQ	187 U	231 U	203 U	193 U	196 U	**55.3** JQ	192 U	206 U	**142** JQ	**1,770**	**652**
Benzo(g,h,i)perylene	170	3,887	*396* U	*485* U	*537* U	**293** JQ	*374* U	*463* U	*407* U	*385* U	*391* U	*338* U	*384* U	*413* U	*505* U	**1,110**	**536**
Benzo(b)fluoranthene[5]	—	—	396 U	485 U	**562**	**429**	374 U	463 U	407 U	385 U	391 U	**222** JQ	384 U	413 U	**410** JQ	**2,870**	**1,030**
Benzo(k)fluoranthene[5]	240	16,277	198 U	*243* U	**130** JQ	**99.4** JQ	187 U	231 U	203 U	193 U	196 U	169 U	192 U	206 U	**94.1** JQ	**1,120**	**364**
Chrysene[5]	340	5,587	198 U	243 U	**439**	**521**	187 U	231 U	203 U	193 U	196 U	**120** JQ	192 U	206 U	**479**	**3,730**	**1,090**
Di-n-Butylphthalate	—	—	245 U	243 U	270 U	**156** JQ	214 U	231 U	203 U	193 U	196 U	169 U	192 U	357 U	282 U	1,210 U	615 U
Dibenzo(a,h)anthracene[5]	60	1,579	*991* U	*1,210* U	*1,340* U	*1,020* U	*934* U	*1,160* U	*1,020* U	*963* U	*978* U	*844* U	*961* U	*1,030* U	*1,260* U	**609** JQ	**411** JQ
Dibenzofuran[4]	2,000	—	198 U	243 U	**172** JQ	**41.7** JQ	187 U	231 U	203 U	**55.3** JQ	196 U	169 U	192 U	206 U	253 U	**459**	**95.1** JQ
Fluoranthene	750	12,390	198 U	243 U	**643**	**961**	**65.5** JQ	231 U	203 U	193 U	196 U	**223**	192 U	206 U	**411**	**3,010**	**728**
Indeno(1,2,3-cd)pyrene[5]	200	3,887	*396* U	*485* U	*537* U	*408* U	*374* U	*463* U	*407* U	*385* U	*391* U	*338* U	*384* U	*413* U	**297** JQ	**1,260**	**605**
Naphthalene[6]	140	—	*198* U	*243* U	**5,600**	*204* U	**94** JQ	*231* U	*203* U	**286**	**144** JQ	**1,940**	*192* U	**395**	**318**	**1,200**	*218* U
Naphthalene, 2-methyl-	—	—	198 U	243 U	**272**	**42** JQ	187 U	231 U	203 U	**72.5** JQ	19 U	**223**	192 U	206 U	**64.8** JQ	**264**	**59.9** JQ
Phenanthrene	560	11,539	198 U	243 U	**656**	**795**	**48.3** JQ	231 U	203 U	193 U	196 U	**199**	192 U	206 U	321 U	**2,420**	**422**
Pyrene	490	10,325	198 U	243 U	**590**	**808**	**54** JQ	231 U	203 U	193 U	196 U	**194**	192 U	206 U	**370**	**2,730**	**707**
Total[7] PAHs	4,000	121,467	0	0	**10,375**	**5,758**	**262**	0	0	460	144	**3,459**	0	395	**2,766**	**27,736**	**7,934**
Total[7] CPAHs	—	—	0	0	**1,690**	**1,848**	**0**	0	0	0	0	**397**	0	0	**1,422**	**14,269**	**5,223**

Notes:

Samples were collected from the top 6 inches of sediment.

Sediment Screening Values are not chemical specific ARARs. They are to be considered.

LEL - Lowest Effect Level from Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (Ontario Ministry of the Environment, 1993).

SEL - Severe Effect Level (µg/g organic carbon) from Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (Ontario Ministry of the Environment, 1993).

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds LEL.

Shading indicates value exceeds site-specific SEL.

J - The analyte was positively identified. The associated numerical result is an estimate.

Q - The result is estimated because the concentration is below the Contract Required Quantitation Limit.

U - The analyte was not detected. The associated numerical value is the sample quantitation limit.

[1] Type 2 sediments are predominantly sand or sand with a small silt component.

[2] Type 2 sediments site-specific %TOC average is 1.21%.

[3] Washington State - Freshwater Sediment Auality Values, Cubbage et al. (1997).

[4] OSWER - Office of Solid Waste and Emergency Response - Ecotox Threshold, USEPA (1996).

[5] Carcinogenic PAH.

[6] USEPA ARCS - Assessment and Remediation of Contaminated Sediments (ARCS) Program - Probable Effects Level (USEPA, 1996). ARCS values for the HA-28 assay from Ingersoll et al. (1996) and Smith et al. (1996).

[7] When calculating total values, zero was used for those constituents identified as less than the detection limit.

Table 3-10 Polynuclear Aromatic Hydrocarbons in St. Joe River Surface Water (µg/L) START Site Limited Removal Assessment Samples

Compound	USEPA Sample ID No.: / Sample Date:	Human Health Criteria		99010405 1/7/99		99010406 1/7/99	
		Water & Organisms [3]	Organisms Only [4]				
Naphthalene		—	—	**560**	J	**980**	J
Acenaphthylene		—	—	**8**	J	**13**	
Acenaphthene		666	975	**120**	J	**190**	
Fluorene		1,105	5,243	**56**	J	**89**	
Phenanthrene		—	—	**69**	J	**100**	
Anthracene		8,287	39,326	**1**	UJ	< 1	U
Fluoranthene		125	137	**17**	J	**26**	
Pyrene		829	3,933	**14**	J	**21**	
Benzo(a)anthracene [1]		0.0038	0.018	**4**	J	**5**	
Chrysene [1]		0.0038	0.018	**2**	J	**3**	
Benzo(b)fluoranthene [1]		0.0038	0.018	**2**	J	**3**	
Benzo(k)fluoranthene [1]		0.0038	0.018	**2**	J	**3**	
Benzo(a)pyrene [1]		0.0038	0.018	**2**	J	**3**	
Indeno(1,2,3-cd)pyrene [1]		0.0038	0.018	*1*	UJ	< *1*	U
Dibenzo(a,h)anthracene [1]		0.0038	0.018	*1*	UJ	< *1*	U
Benzo(g,h,i)perylene		—	—	1	UJ	< 1	U
Total [2] PAHs		—	—	**856**		**1,436**	
Total [2] CPAHs		—	—	**12**		**17**	

Notes:

Criteria - Water Quality Standards for Surface Waters of the Coeur d'Alene Tribe (Coeur d'Alene Tribe, 2000).

Analyses were carried out following the Contract Laboratory Program analytical methods for SVOCs: CLP OLM03.1.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds the Organisms Only criteria.

No values exceed Water and Organisms criteria.

J - The analyte was positively identified. The associated numerical result is an estimate.

U - The analyte was not detected. The associated numerical value is the sample quantitation limit.

[1] Carcinogenic PAH.

[2] When calculating total values, zero was used for those constituents identified as less than the detection limit.

[3] Values represent the maximum ambient water concentration for consumption of both contaminated water and fish or other aquatic organisms.

[4] Values represent the maximum ambient water concentration for consumption of fish or other aquatic organisms.

Table 3-11 Polynuclear Aromatic Hydrocarbons in St. Joe River Surface Water (µg/L) START Site Integrated Assessment Samples

Compound	Human Health Criteria: Water & Organisms [4]	Human Health Criteria: Organisms Only [5]	Sample Location: R10SW	R09SW	RV01SW	RV02SW	RV03SW	RV04SW	RV05SW	RV06SW	RV07SW	RV08SW
			USEPA Sample ID No.: 99084120	99084119	99084106	99084107	99084108	99084109	99084110	99084116	99084117	99084118
			Sample Date:									
			Background	Outfalls	Wetland		River					
Naphthalene	—	—	< 10 U	**2** JQ	< 10 U	< 10 U	< 10 U	**0.6** JQ	**1** JQ	**2** JQ	**3** JQ	**110**
Acenaphthylene	—	—	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**2** JQ
Acenaphthene	666	975	< 10 U	**1** JQ	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**2** JQ	**1** JQ	**34**
Fluorene	1,105	5,243	< 10 U	**0.7** JQ	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**1** JQ	**0.8** JQ	**24**
Phenanthrene	—	—	< 10 U	**1** JQ	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**1** JQ	**4** JQ	**47**
Anthracene	8,287	39,326	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**28**
Fluoranthene	125	137	< 10 U	**1** JQ	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**2** JQ	**5** JQ	**23**
Pyrene	829	3,933	< 10 U	**0.8** JQ	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**2** JQ	**5** JQ	**20**
Benzo(a)anthracene [1]	0.0038	0.018	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	**0.8** JQ	**5** JQ
Chrysene [1]	0.0038	0.018	< *10* U	**0.5** JQ	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	**0.5** JQ	**8** JQ
Benzo(b)fluoranthene [1]	0.0038	0.018	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	**2** JQ
Benzo(k)fluoranthene [1]	0.0038	0.018	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	**2** JQ
Benzo(a)pyrene [1]	0.0038	0.018	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	< *10* U	**2** JQ
Indeno(1,2,3-cd)pyrene [1, 2]	0.0038	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene [1, 2]	0.0038	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene [2]	—	—	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total [3] PAHs	—	—	0	**7.0**	0	0	0	**0.6**	**1**	**10**	**20**	**307**
Total [3] CPAHs	—	—	0	**0.5**	0	0	0	0	0	0	**1.3**	**19**

Notes:

Criteria - Water Quality Standards for Surface Waters of the Coeur d'Alene Tribe (Surface water quality standards, Coeur d'Alene Tribe, 2000).

Analyses were carried out following the Contract Laboratory Program analytical methods for SVOCs: CLP OLM03.1.

Italicized values are detection limits that exceed the criteria.

Shading indicates value exceeds the Organisms Only criteria.

No values exceed Water and Organisms criteria.

J - The analyte was positively identified. The associated numerical result is an estimate.

NA - Not analyzed.

Q - The result is estimated because the concentration is below the Contract Required Quantitation Limits.

U - The analyte was not detected. The associated numerical value is the sample quantitation limit.

[1] Carcinogenic PAH.

[2] These compounds were not analyzed.

[3] When calculating total values, zero was used for those constituents identified as less than the detection limit.

[4] Values represent the maximum ambient water concentration for consumption of both contaminated water and fish or other aquatic organisms.

[5] Values represent the maximum ambient water concentration for consumption of fish or other aquatic organisms.

Table 4-1 Data Evaluation for CSM Pathways

Pathway	Do Data Exist to Evaluate Pathway?	Is Existing Data of Sufficient Quality?	Additional Information Required?	See Decision Statement No.
Migration Pathways				
DNAPL Migration	Yes. Mobile DNAPL has not accumulated in monitoring wells.	Yes	Yes	2f
Dissolution	Yes. Groundwater impacts have been observed in monitoring wells.	Yes/No	Yes	1d, e, g
Surficial Soil/Sediment Migration	No.	NA	Yes	2c
Dissolved-phase Migration	Yes. Groundwater impacts have been observed in one set of monitoring wells, and several Geoprobe™ test holes.	Yes/No	Yes	2a, b, e
Volatilization	Yes. Soil data can be used to model volatilization.	Yes	No	See Appendix C
Wind Erosion and Atmospheric Dispersion	No.	NA	Yes	1d
Exposure Pathways				
Human Exposure Pathways				
Direct Contact[1] with Surface Soil (site worker)	No.	NA	Yes	3b
Direct Contact with Subsurface Soil or Groundwater (future construction worker)	Yes. Subsurface soil and groundwater data have been collected at the site.	Yes/No	Yes	3b
Groundwater Consumption (future off-site resident)	Yes. Groundwater impacts have been observed only in one set of monitoring wells.	Yes/No	Yes	3b
Direct Contact with Surface Water (recreationalist or subsistence receptor)	Yes.	No	Yes	3a, c
Direct Contact with Sediment (recreationalist or subsistence receptor)	Yes. Sediment data has been collected at the site.	Yes/No	Yes	3a, c
Ingestion of Biota (recreationalist or subsistence receptor)	Yes. Sediment data has been collected at the site and can be used in bioaccumulation modeling	Yes/No	Yes	
Ecological Exposure Pathways				
Direct Contact with Surface Water[2] (aquatic receptor)	Yes.	No	Yes	3a, c
Direct Contact with Sediment[3] (aquatic receptor)	Yes. Sediment data has been collected at the site.	Yes/No	Yes	3a, c, d
Ingestion of Biota (food web; aquatic receptor)	Yes. Sediment data has been collected at the site and can be used in bioaccumulation modeling	Yes/No	Yes	3a, c
Direct Contact with Soil (terrestrial receptor)	No.	NA	Yes	3b
Ingestion of Biota (food web; terrestrial receptor)	No	NA	Yes	3b

1 Human and terrestrial receptor soil direct contact includes dermal contact, incidental ingestion, and inhalation of particulates from wind erosion.

2 Aquatic receptor exposure to surface water is by respiration.

3 Aquatic receptor sediment direct contact includes dermal contact, ingestion, and respiration.

Table 5-1 Conceptual Data Quality Objectives for St. Maries Creosote Site

State Problem	The St. Maries Creosote Site was used as a wood treating site, and soil, groundwater, surface water, and sediments have been affected. A cost-effective remedy that is protective of human health and the environment needs to be defined. This will include further defining the nature and extent of contamination, migration pathways, exposure scenarios, and appropriate remedial actions.
DQO Team	Carney Products Co., City of St. Maries, USEPA, Coeur d'Alene Tribe, Marten Brown, and RETEC.
Principal Study Question	Determine whether Site contamination poses unacceptable risk to human health and the environment and requires further consideration or a response action, or recommend that no further investigation is necessary. Determine where COCs (refined from COIs and COPCs in the Risk Assessment) exceed ARARs and cleanup levels for the Site and where remedial action is required. Currently, sufficient data are not available to characterize contaminant extent and to select a remedial action based on the historical investigation data.

Decision Statement #1: Where do COIs exceed risk-based screening levels and background levels?

Investigation Objective	Preliminary Inputs to the Decision [1]	Decision Rule
a) Determine if Historical and New Data Is of Sufficient Quality.	• Environmental Site Reconnaissance and Historical Review (EMCON, 1998); • Limited Removal Assessment Report (E&E, 1999); • Removal Site Assessment and Removal Action Reports (EMCON, 1999); • Integrated Assessment Report (E&E, 1999); and • Integrated Assessment Addendum (E&E, 2000).	**Data Conditions:** If data meet the requirements of data adequacy as defined below, then the data will be used to quantitatively evaluate further decision rules: • The suite of analytes are comprised of COIs that represent the potential site contaminants; • Data meet QA/QC requirements defined in the QAPP; • Detection limits are sufficient for comparison to relevant screening level criteria, where achievable; • Sufficient data exist to evaluate each potential exposure pathway identified in the CSM; and • An adequate number of samples are collected to spatially evaluate the nature and extent of risk. Data not meeting these criteria may continue to be used qualitatively.
b) Select Screening Levels.	• Relevant screening levels.[2]	**Ruling:** If screening levels are relevant to management in USEPA Region 10 and/or in Tribal land areas, then they will be applied.
c) Define Background.	• Samples for surface soils, groundwater, surface water, and sediments collected from local upgradient/upstream areas that are not impacted by Site activities.	**Ruling:** If the detection limits are acceptable and locations reasonable based on Site knowledge and history, then the background COI concentration will be statistically determined from the data set (collected between 1998 and 2003).
d) Assess Surface Soil Quality.	• Surface soil samples in the former treating, potential drippage, and surrounding areas.	**Ruling:** If surface soil concentrations are below screening levels and background, then surface soil is not a risk and will not be considered further. If above, the COI will be carried forward in the baseline risk assessment. Data will be used to define lateral extent.

Table 5-1 Conceptual Data Quality Objectives for St. Maries Creosote Site

Decision Statement #1: Where do COIs exceed risk-based screening levels and background levels?		
Investigation Objective	**Preliminary Inputs to the Decision [1]**	**Decision Rule**
e) Evaluate Lateral and Vertical Extent of Subsurface COIs in Soil Towards the River.	• Subsurface soil Impacts in other directions have been defined; • Soil test holes on the north side of the Former Treating Area toward the river. Appropriate depths will be determined prior to initiation of field activities; and • Deep boring near source area.	**Ruling:** If subsurface soil concentrations are below screening levels and background, then subsurface soil is not a risk and will not be considered further. If above, the COI will be carried forward in the baseline risk assessment. Data will be used to define lateral extent.
f) Further Evaluate the Extent of COIs Riverbank Soils.	• Collect riverbank cores up to 500 feet downstream of Source Area.	**Ruling:** If riverbank soil concentrations are below screening levels and background, then riverbank soil is not a risk and will not be considered further. If above, the COI will be carried forward in the baseline risk assessment. Data will be used to define lateral extent.
g) Further Evaluate the Extent of COIs in Groundwater.	• Install groundwater monitoring wells near periphery with 10-foot screen intervals; • Collect groundwater quality samples during wet and dry season. Collect surface water samples at the same time near the sediment/water interface; and • Determine if mobile DNAPL accumulates in wells.	**Ruling:** If groundwater concentrations are below screening levels and background, then groundwater is not a risk and will not be considered further. If above, the COI will be carried forward in the baseline risk assessment. Data will be used to define lateral and vertical extent. **Ruling:** If site COI concentrations are higher than screening levels or background concentrations, then study area soils and groundwater may be considered to be a source to surface water. The COI potentially presents risk to groundwater and surface water and is retained for further consideration (see paragraph 2c).
h) Evaluate Surface Water Quality.	• Surface water samples collected near the sediment/water interface for chemical testing.	**Ruling:** If surface water concentrations are below screening levels and background, then surface water is not a risk and will not be considered further. If above, the COI will be carried forward in the baseline risk assessment. **Ruling:** If the mean site surface water COI concentration is less than background levels, then soil, groundwater, and sediments in the study area (i.e., creosote-related source media) are not considered to be a source to surface water. The COI is not considered to present a risk to surface water and is eliminated.
i) Determine the Horizontal and Vertical Extent of COIs in Sediment.	• Collect surface sediment samples in a grid spacing focusing on defining the boundary of previously delineated impacted area; and • Collect subsurface sediment cores within the previously delineated impacted area to define the vertical extent of COIs.	**Ruling:** If sediment concentrations are below screening levels and background, then sediment is not a risk and will not be considered further regarding toxicity. Bioaccumulation potential will be evaluated in the risk assessment. If above, the COI will be carried forward in the baseline risk assessment. Data will be used to define lateral extent.

Table 5-1 Conceptual Data Quality Objectives for St. Maries Creosote Site

Decision Statement #2: What are the potential migration pathways for COIs in soil, groundwater, NAPL, and sediment?		
Investigation Objective	**Preliminary Inputs to the Decision [1]**	**Decision Rule**
a) What is the Source of PAHs Observed in Riverbank Soils? Are They Primary (i.e., dumping) or Secondary (i.e., migration)?	• Sediment core profiles and riverbank surface and subsurface soil samples; and • Upland test holes between the riverbank and the FTA.	**Ruling:** If free product and/or dissolved fractions are not present in sufficient volumes at the depths and locations expected based on the understanding of Site stratigraphy and flow patterns, then groundwater transport and NAPL migration are not considered migration pathways to the St. Joe River. If discrete mass at riverbank area is sufficient to be a source to the river, observed impacts are from overland dumping.
b) DNAPL Mobility—Is DNAPL Residual, Stratigraphically Trapped, or Mobile?	• Monitoring for DNAPL accumulation in wells; • Physical characteristics of DNAPL such as viscosity, density, and interfacial tension (if mobile DNAPL is identified in sufficient volume to collect sample); • Characteristics of the soil matrix and pore space such as soil water content, soil void space, capillary pressure, and DNAPL saturation; and • Physical observations of soil samples and groundwater samples.	**Ruling:** If DNAPL is mobile, then migration of DNAPL will be considered an ongoing pathway and appropriate remedial options will be considered. If DNAPL is residual with in-place stable chemistry, then mobile DNAPL migration pathways will not be addressed as part of the remedy.
c) Characterization of Site Geology and Hydrogeology. Delineation of the Dissolved-phase Migration Pathway.	• Physical testing of subsurface soil and sediment samples; • Install piezometer(s) in the intermediate interbedded sand and silt layers; • Collect monthly water level data for 1 year in piezometers, monitoring wells, and surface water; • Aquifer testing to determine hydraulic conductivity; • Review of nearby deep well logs; and • Evaluate groundwater quality and temporal trends in groundwater by collecting seasonal groundwater samples.	**Ruling:** If observed geologic and hydrogeologic characteristics can be used to eliminate potential COI migration pathways, then these pathways will be eliminated from further consideration or study. **Ruling:** If the water level data evaluation does not indicate water movement in a particular direction, then migration in this direction is not a significant pathway.

Table 5-1 Conceptual Data Quality Objectives for St. Maries Creosote Site

Decision Statement #2: What are the potential migration pathways for COIs in soil, groundwater, NAPL, and sediment?		
Investigation Objective	**Preliminary Inputs to the Decision [1]**	**Decision Rule**
d) Evaluate Groundwater-Surface Water Interaction. Determine Potential Migration of Groundwater to the River.	• Groundwater and river level elevations; • River flow characteristics; • Groundwater flow characteristics; • Possible use of simple fate and transport modeling; and • Possibly surface water chemistry adjacent to sediment.	**Ruling:** If the evidence indicates that COIs are below relevant screening levels, then there is not a significant interaction between groundwater and surface water, and this migration pathway is eliminated from further consideration. If above, then a weight-of-evidence approach will be used for evaluation. The weight-of-evidence approach includes data such as geologic profiles, transport models, groundwater levels, and concentrations; COI concentrations detected in upland wells (near the top of bank); COI concentrations detected in subsurface riverbank soils and nearshore sediment cores from expected depths; and surface water concentrations. **Ruling:** If soil and groundwater concentrations in the area between the Source Area and the river are below screening levels, then this is not a significant migration pathway.
e) If COIs Exist in Surface Soil, Are They Present at Levels That Could Impact Surface Water During Flood Events? Is There Transport of Surface Soil COIs During Flood Events? Does Seasonal Flooding Affect the Water Table and Groundwater Flow?	• Flood frequency and effects; • Upland soil characteristics; • Surface soil concentrations; • Riverbank soil profiles; • River flow characteristics; and • Aerial photographs.	**Ruling:** Based on a weight-of-evidence approach using aerial photographs, riverbank core profiles, visual observations during spring floods, historical document reviews, Site interviews, and upland soil profiles, if these data do not show evidence of overland surface flow back towards the river, then this pathway is eliminated from further consideration. **Ruling:** If riverbank soil profiles show no significant accumulations of recently mobile material from flood events based on physical stratigraphy and chemical testing, then flooding is not a significant migration pathway. **Ruling:** Using average surface-weighted surface soil samples collected from upland areas, if the concentrations that partition into surface water during estimated flood events are below relevant screening levels, then the exposure and migration pathway is not significant.
f) If COIs Exist in Surface Soil, Are They Present at Levels That Could Present a Risk via Wind Erosion and Atmospheric Dispersion?	• Upland soil characteristics; • Surface soil concentrations; and • Risk assessment.	**Ruling:** If results indicate that this migration pathway is not significant, the pathway will be considered further.
Decision Statement #3: Are human and ecological receptors at risk now or in the future from COIs?		
Investigation Objective	**Preliminary Inputs to the Decision [1]**	**Decision Rule**
a) Characterize Exposure Pathways.	• Inputs described above.	**Ruling:** If groundwater has the potential to migrate to surface water and sediments but these levels are low or not bioavailable, then this is not an exposure pathway.

Table 5-1 Conceptual Data Quality Objectives for St. Maries Creosote Site

Decision Statement #3: Are human and ecological receptors at risk now or in the future from COIs?		
Investigation Objective	**Preliminary Inputs to the Decision [1]**	**Decision Rule**
b) Determine Upland Ecological Risk and Human Health Risk. Evaluate Risk via Direct Contact with Soil and Ingestion of Groundwater Pathways.	• Surface soil samples; • Evaluation of groundwater use patterns by humans; • Install reliable groundwater well at depth of usable quality and collect samples; • Groundwater data from new and existing wells; and • Terrestrial habitat characterization (no new data) and bioaccumulation modeling.	**Ruling:** If the 95% UCL of COI concentrations in soil and groundwater are below relevant screening levels,[2] then the COI will not be carried forward in the risk assessment.
c) Determine In-water Ecological Risk and Human Health Risk. Evaluate Risk via Ingestion, Dermal Contact, and Food Chain Pathways of Sediment, Surface Water, and Biota.	• Habitat characterization in the vicinity and downstream of the Source Area; • Surface sediment and surface water chemistry data; • Surface sediment toxicity tests to benthic organisms; • Develop trophic transfer and food web model (no new samples); • Bioaccumulation and/or exposure risk modeling; and • Evaluate risk based on weight of evidence.	**Ruling:** If there is not sensitive habitat within 500 feet of the study area, then this habitat and the receptors living in it are not considered at risk. If habitat exists, receptors will be considered in the risk assessment. **Ruling:** If trophic transfer is not considered a significant risk pathway, then sediment toxicity results will override sediment COI concentrations. If trophic transfer is a possible pathway, then a weight-of-evidence approach will be used. **Ruling:** If surface water concentrations are below screening levels and background, then this exposure pathway will not be considered further. If above, this exposure pathway will continue to be considered.
d) Are There Deleterious Substances Present in the Bottom Sediments that Adversely Affect Aquatic Biota?	• Visual description of bottom sediments; • Surface sediment samples; and • Define a deleterious substance (e.g., wood waste).	**Ruling:** If potential deleterious substances are present in surface bottom sediments, then the DQO team will define action levels for the deleterious substances.
Decision Statement #4: Which feasible remedial technologies will cost-effectively protect human health and the environment?		
Investigation Objective	**Preliminary Inputs to the Decision [1]**	**Decision Rule**
a) Determine Site Areas that Require Remedial Action.	• Results of RI and risk assessment.	**Ruling:** If results of the BLRA indicate an unacceptable risk to receptors, then remedial technologies will be evaluated for the affected area and medium.
b) Physical Constraints for Implementing a Remedy.	• Site observations.	**Ruling:** If site access, community concerns, physical properties of the material, and/or other considerations preclude the feasibility of implementing a remedial alternative, then this alternative will likely be eliminated during the FS process.

Table 5-1 Conceptual Data Quality Objectives for St. Maries Creosote Site

Decision Statement #4: Which feasible remedial technologies will cost-effectively protect human health and the environment?		
Investigation Objective	**Preliminary Inputs to the Decision [1]**	**Decision Rule**
c) How Do Physical Properties of Sediment Influence Potential Capping, Dredging, Dewatering, and Disposal Remedies?	• Sediment core samples for MQOs such as geotechnical testing (Atterberg limits, compressive strength, shear strength, percent solids); and • Treatability and dewatering testing.	**Ruling:** Assuming that sediment concentrations are above cleanup levels and require a remedial action, if the physical properties are not appropriate for capping (i.e., compressive strength, percent), then capping will not be considered or modified and other remedies such as dredging will be considered.
d) How Do Physical Characteristics of the River Influence Potential Capping and Natural Attenuation Remedies?	• River flow dynamics; • Scour modeling; and • Soft sediment thickness and bathymetry data.	**Ruling:** If the physical characteristics of the river result in significant scouring of recently deposited sediment, then a capping and/or attenuation alternative will not be feasible.
e) How Do Sedimentation Rates Influence Natural Recovery in the St. Joe River?	• Bathymetry and soft sediment thickness to determine areas of deposition in the St. Joe River; • Sediment cores for potential radioisotope dating in areas of sediment deposition; and • River flow characteristics.	**Ruling:** If the sediment core profiles show that significant net accumulations of cleaner sediment are occurring over time (i.e., burial of contaminated sediment) and localized areas are not subject to scouring from storm events, then specific areas contained within the St. Joe River may be feasible for natural recovery.
f) Determine Soil Characteristics to Evaluate Soil Remedial Technologies.	• Soil characteristics such as grain size; and • Possible treatability testing to further evaluate bioremediation.	**Ruling:** If physical properties of the material and/or other considerations preclude the feasibility of implementing a remedial alternative, then the alternative will likely be eliminated during the FS process.
g) Determine NAPL Characteristics to Evaluate Remedial Technologies.	• Viscosity versus temperature testing; • Other NAPL properties (density, composition); and • Possible treatability testing to further evaluate enhanced steam recovery and electrical heating.	**Ruling:** If DNAPL properties of the material and/or other considerations preclude the feasibility of implementing a remedial alternative, then the alternative will likely be eliminated during the FS process.
h) What Effects Would Potential Remedies Have on Groundwater Migration and NAPL Transport?	• Aquifer hydraulic properties; and • Possible fate and transport modeling (no new data).	**Ruling:** Assuming the groundwater migration to the river is a significant pathway, if a groundwater containment system significantly alters groundwater migration, then the altered groundwater flow directions will be evaluated in the remedy selection process.
i) Determine Subsurface Conditions to Evaluate Natural Attenuation.	• Characterize electron acceptors, biodegradation products, and field parameters in groundwater; and • Possible treatability testing if further evaluation is necessary.	**Ruling:** If results indicate that contaminants are not significantly degrading by naturally occurring processes, then natural attenuation will likely be eliminated as a remedial technology during the FS process.

Table 5-1 Conceptual Data Quality Objectives for St. Maries Creosote Site

Define Study Boundaries	The SOW defines the study area for the St. Maries Creosote Site as "the former wood treating facility and the river immediately north of the treating facility. The study area boundaries will be expanded if, during the RI, contamination is detected at the current study area boundaries." For surface soil, the study area includes the upper 1 foot of soil in areas contained within the property boundary. For groundwater, the study area includes the upper and lower aquifer down to depths of non-contaminated groundwater. Laterally, the study area is initially confined to within the property boundaries. For surface water and surface sediments, the lateral extent of the study area is initially defined as 500 feet upstream (for background) and 500 feet downstream (for transport) of the potential source area including the riverbanks. For subsurface sediments, the vertical boundary area is when unimpacted sediments are encountered. The study area boundary for biological components will include literature values for water, potatoes, fish, and birds and toxicity tests for surface sediments contained within the 500-foot perimeter study area. Final sampling locations will be determined in the field by qualified field personnel; locations will be selected to maximize our understanding of the Site CSM and presence and extent of COIs.

Notes:

1. *Data Quality Objectives Process for Hazardous Waste Site Investigations*, USEPA, 2000. EPA QA/G-4HW Final, and *Guidance for Data Quality Objectives Process*, USEPA, 1994.
2. Relevant screening levels (in order of comparisons) for COI protection of human or ecological health are based on the following hierarchy per media:

   Soil

   Relevant screening criteria for soil if above the PQL:

   a. USEPA Region 9 Screening Levels for the protection of groundwater (dilution attenuation factor 1) (USEPA, 2000);
   b. Concentrations for residential exposure; (risk-based concentrations [RBCs] adjusted to a 0.1 HI for non-carcinogens); and
   c. Concentration that ensures protection to terrestrial receptors.

   Groundwater – Human Health

   d. State and/or Tribe Water Quality Standards;
   e. USEPA Region 9 Screening Levels for the protection of Tap Water/Drinking Water;
   f. Concentrations for residential exposure (RBCs adjusted to a 0.1 HI for non-carcinogens based on the residential ingestion of groundwater); and
   g. Practical quantitation limits (PQLs).

   Surface Sediment – Human Health (adapted from human health criteria applicable to soils)

   h. USEPA Region 10 RBCs, adjusted to 0.1 HI for non-carcinogens; and
   i. PQLs.

   Surface Sediment – Ecological Health

   j. Low Screen: (1) Ontario, Canada Ministry of Environment Lower Effect Level (LEL); (2) Lowest of ARCS (Assessment and Remediation of Contaminated Sediments) *Hyalella azteca* Probable Effect Level (TEL) as presented in Ingersoll et al. (1996); and (3) OSWER SQB;
   k. High Screen: (1) Ontario, Canada Ministry of Environment Severe Effect Level (SEL); (2) Washington proposed FSQV (Freshwater Sediment Quality Values); and (3) if the benchmarks are lower than the PQL, the PQL becomes the screening benchmark.

   Surface Water – Human Health

   l. Coeur d'Alene Tribe Water Quality Standards for Surface Water (protection of aquatic organisms, human health direct consumption, and fish consumption) (USEPA, 2000);
   m. USEPA Maximum Contaminant Levels (MCLs); and
   n. PQLs.

   Surface Water – Ecological Health

   o. Coeur d'Alene Tribe Water Quality Standards for Surface Water (protection of aquatic organisms, human health direct consumption, and fish consumption) (USEPA, 2000);
   p. Lowest of National Ambient Water Quality Criteria – Acute or Chronic (NAWQC-CCC) (adjusted for hardness as appropriate).

   Note: If screening criteria are not available, PQL will be the screening criteria.

Table 8-1 St. Maries Creosote Site Data Gap Assessment

Data Gap	Steps to Address Data Gaps
Site Characteristics	
Upland Ecological Risk	Terrestrial habitat characterization.
In-water Ecological Risk	Research and inspection of habitat and habitat use to develop the food web model.
Upland Health Risk	Groundwater use evaluation.
In-water Human Health Risk	Research and inspection of consumption and use habits to develop the food web model.
Site Conditions	Accessibility, stability of slopes and structures, extent of debris, navigational needs, feasibility of staging areas by visual inspection.
Soil Data	
Surface Soil and Source Definition	Surface samples and COI analysis in source area and potential drippage areas (railroad tracks and roads near the treating area), and the area near GP-25.
Vertical Extent of Soil Impacts	Deep soil boring in source area drilled by conservative methods. Deep borings located on the periphery of the plume (including near GP-25). Limited COI analysis, grain size analysis.
Vertical Extent of Soil Impacts Between Source Area and River (upland)	Soil borings extending to the depth of the riverbed. Limited COI analysis.
Extent of Soil Impacts Along Riverbank	Borings to determine vertical and lateral extent of impacts. COI and grain size analysis.
Characterization of Site Geology	Collect grain size data to evaluate physical characteristics of soil. Estimate bulk density and porosity from literature values. Review regional well logs to delineate deeper geologic units.
Affects of Flooding	Inspection for physical signs of disturbance and depositional patterns, historical river information, and physical characteristics of bank soils (Atterberg limits, shear strength, bulk density, grain size).
Groundwater Data	
Extent of Groundwater Impacts	Installation of additional groundwater monitoring wells with 10-foot screen intervals.
Groundwater Chemistry	Groundwater analysis of potential electron acceptors (oxygen, iron, nitrate, manganese, and sulfate) and potential metabolic byproducts (methane, carbon dioxide, ferrous iron, nitrogen, dissolved manganese, and sulfide). Field parameters measured during sampling that can also aid in the evaluation of natural attenuation processes include pH, redox potential, temperature, conductivity, turbidity, and dissolved oxygen.
Evaluation of Groundwater Quality and Temporal Trends	Groundwater quality data with low detection limits during different seasons.
Groundwater-Surface Water Interaction	Groundwater and surface water level monitoring, over a long enough period to identify seasonal trends.
Characterization of Site Hydrogeology	Collect hydraulic conductivity data and water level measurements to characterize groundwater flow.
DNAPL Data	
DNAPL Characteristics	Presence of mobile product, residual saturation, density, viscosity, and chemical composition.

Table 8-1 St. Maries Creosote Site Data Gap Assessment

Data Gap	Steps to Address Data Gaps
Surface Water/Sediment Data	
Extent of Sediment Impacts	Horizontal – data where detection limits exceed screening levels. Vertical – understand the extent of vertical impacts.
Sediment Characteristics	TOC, grain size, ammonia/sulfides, bathymetry, sedimentation rates, geotechnical properties.
Magnitude of Surface Water Impacts	Surface water quality data with low detection limits (including background). Surface water at sediment-water interface (either seep samples or samples at the sediment-water interface whichever is accessible).
Sedimentation Rates	Inspection of sedimentation pattern in cores. Potential analysis of sediment to determine rates of deposition.
In-water Ecological Risk	Surface sediment toxicity to benthic organisms (with chemistry analysis). Also assess presence of deleterious substances.