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Table 3-1. Screening Level Risk Calculations for Ambient Air

Station ID	Mean Concentration (LA f/cc)		
	Phase I	Phase II	Combined
A-1	0.00000		0.00000
A-2	0.00000		0.00000
A-3	0.00000		0.00000
A-4	0.00000	0.00000	0.00000
A-5	0.00000	0.00086	0.00057
A-6	0.00000	0.00006	0.00004
A-7	0.00000		0.00000
A-8	0.00000	0.00000	0.00000
A-9		0.00133	0.00133
A-10		0.00000	0.00000
A-11		0.00064	0.00064
A-12		0.00000	0.00000
N Samples	32	64	96
Mean	0.00000	0.00036	0.00022
Stdev	0.00000	0.00052	0.00042
CV	--	1.43	1.96
GSD[a]	--	2.89	3.45
Typical Risk[b]	0.0E+00	1.1E-07	6.4E-08
High-end Risk[c]	0.0E+00	8.6E-07	5.2E-07

[a] GSD estimated from mean and standard deviation

[b] Assumes exposure 2 hrs/day, 25 days/yr, from age 10 to age 35

[c] Assumes exposure 8 hrs/day, 50 days/yr, from age 10 to age 35

TABLE 3-2 SUMMARY OF SURFACE WATER SAMPLES COLLECTED AND ANALYZED FOR NON-ASBESTOS CONTAMINANTS

		Phase I	Phase II			Number of Samples								
Location	Station	Fall	Spring	Summer	Fall	Metals	Pest.	PCBs	VOCs	SVOCs/ PAHs	Hydro-carbons	NO_2/NO_3	Rads	Anions
Carney Creek	CC-1	x	x	x	--	3					3	3		3
	CC-2	x	x	x	--	3					3	3		3
	CC-Pond	--	x	x	--	2					2	2		2
Fleetwood Creek	FC-1	x	x	x	--	3					3	3		3
	FC-2	x	x	x	--	3					3	3		3
	FC-Pond	x	x	x	--	3				1	3	3		3
Mill Pond	MP	x	x	x	--	3					3	3		3
Tailings Pond	TP	x	x	x	--	3					3	3		3
	TP-Toe1	x	x	x	--	3	3	2	3	3	3	3	3	3
	TP-Toe2	x	x	x	--	3					3	3		3
	UTP[1]	--	x	x	--	4					4	4		4
Upper Rainy Creek	URC-1	x	x	x	--	3					3	3		3
	URC-1A	--	x	x	--	2					2	2		2
	URC-2	x	x	x	--	3					3	3		3
Lower Rainy Creek	LRC-1	x	x	x	--	3					3	3		3
	LRC-2	x	x	x	--	3	3	3	3	3	3	3	3	3
	LRC-3	x	x	x	--	3					3	3		3
	LRC-4	x	x	x	--	3					3	3		3
	LRC-5	x	x	x	--	3					3	3		3
	LRC-6	x	x	x	--	3					3	3		3
					Total	**80**	**6**	**5**	**6**	**9**	**80**	**80**	**6**	**80**

[1] Includes both a shallow and deep sample from this station

TABLE 3-3 SUMMARY OF SEDIMENT SAMPLES COLLECTED AND ANALYZED FOR NON-ASBESTOS CONTAMINANTS

Location	Station	Phase I	Phase II			Number of Samples							
		Fall	Spring	Summer	Fall	Metals	Pest.	PCBs	VOCs	SVOCs	PAHs	Hydro-carbons	Anions
Carney Creek	CC-1	x	x	x	x	5					1	3	3
	CC-2	x	x	x	--	3						3	3
	CC-Pond	--	x	x	--	10					3	10	10
Fleetwood Creek	FC-1	x	x	x	--	3					2	3	3
	FC-2	x	x	x	x	4					3	3	3
	FC-Pond	x	x	x	--	11					9	11	11
Mill Pond	MP	x	x	x	--	11					10	11	11
Tailings Pond	TP	x	x	x	--	35					23	35	35
	TP-Toe1	x	x	x	--	3						3	3
	TP-Toe2	x	x	x	x	5	3	3	3	3	3	3	3
Upper Rainy Creek	URC-1	x	x	x	--	3					1	3	3
	URC-1A	--	x	x	x	3						2	2
	URC-2	x	x	x	x	4					3	3	3
Lower Rainy Creek	LRC-1	x	x	x	--	3	1	3				3	3
	LRC-2	x	x	x	x	4	3	3	3	3	3	3	3
	LRC-3	x	x	x	x	4	1	3			1	3	3
	LRC-4	x	x	x	--	3	1	3				3	3
	LRC-5	x	x	x	x	4	1	3				3	3
	LRC-6	x	x	x	--	3	1	3			1	3	3
					Total	**142**	**11**	**21**	**6**	**6**	**72**	**132**	**132**

TABLE 3-4. SCREENING LEVEL RISK CALCULATIONS FOR HUMAN EXPOSURE TO SURFACE WATER

Category	Detected Analytes	Units	Surface Water Summary Statistics				Toxicity Factors					Screening Level Risk Estimates (based on Max)			
			Detection Frequency		Mean [(a)]	Max	Ref. Conc	oRfD (mg/kg-d)		oSF $(mg/kg\text{-}d)^{-1}$		Direct Ingestion of Surface Water		Ingestion of Fish	
			N Detects	N Total				Value	Source	Value	Source	HQ	Cancer	HQ	Cancer
Metals	Barium	mg/L	60	61	0.31	0.7		2.0E-01	I			0.014		0.001	
	Copper	mg/L	1	61	0.001	0.004		4.0E-02	I			0.000		0.000	
	Manganese	mg/L	9	61	0.02	0.14		4.7E-02	I			0.012		0.001	
	Iron	mg/L	1	61	0.02	0.14		7.0E-01	S			0.001		0.000	
Hydrocarbons	Total Extractable Hydrocarbons	mg/L	1	61	0.160	0.47	1.0	2.9E-02	C			0.064		0.006	
Nitrogen Compounds	Nitrite	mg/L	4	61	0.01	0.08		1.0E-01	I			0.003		0.000	
	Nitrate	mg/L	22	56	0.04	0.44		1.6E+00	I			0.001		0.000	
Radionuclides	Gross Alpha	pCi/L	6	6	1.77	2.6	15			2.3E-06	C		1.0E-08		8.9E-10
	Gross Alpha MDC	pCi/L	4	4	2.20	2.3	15			2.3E-06	C		9.0E-09		7.9E-10
	Gross Beta	pCi/L	4	4	6.58	9	50			7.0E-07	C		1.1E-08		9.2E-10
	Gross Beta MDC	pCi/L	4	4	2.98	3.7	50			7.0E-07	C		4.3E-09		3.8E-10
Anions	Fluoride	mg/L	57	59	0.50	1.1		6.0E-02	I			0.072		0.006	
	Sulfate	mg/L	59	59	10.7	24	250	7.1E+00	C			0.013		0.001	
											Total	**0.196**	**9.4E-08**	**0.017**	**8.2E-09**

[(a)] Non-detects evaluated at 1/2 the detection limit.

Notes
I = IRIS
P = PPRTV
S = Oak Ridge
H = HEAST
R10 = USEPA Region 10
C = Calculated from Reference Concentration, assuming Target HQ = 1 or Target Risk = 1E-06 and ingestion of 2 L/day by a 70-kg individual

Human Exposure Assumptions (SW Ingestion)

IR	L/day	2
BW	kg	70
EF	days/yr	50
ED	yrs	30
HIF(nc)	L/kg-d	3.9E-03
HIF(c)	L/kg-d	1.7E-03

Human Exposure Assumptions (Fish Ingestion)

IR	kg/day	0.025
BCF	L/kg	1.0
BW	kg	70
EF	days/yr	350
ED	yrs	30
HIF(nc)	kg/kg-d	3.4E-04
HIF(c)	kg/kg-d	1.5E-04

TABLE 3-5 SCREENING LEVEL RISK CALCULATIONS FOR HUMAN EXPOSURE TO SEDIMENT

Category	Analyte	Sediment Summary Statistics				Toxicity Factors				Screening Level Risk Estimates (based on Max)	
		Detection Frequency		Mean [(a)] (mg/kg)	Max (mg/kg)	oRfD (mg/kg-d)		oSF $(mg/kg\text{-}d)^{-1}$			
		N Detects	N Total			Value	Source	Value	Source	HQ	Cancer
Metals	Aluminum	121	121	19500	40700	1.0E+00	P			0.008	
	Arsenic	44	121	1.8	7	3.0E-04	I	1.5E+00	I	0.005	8.8E-07
	Barium	121	121	1115	2970	2.0E-01	I			0.003	
	Boron	8	121	2.8	11	2.0E-01	I			0.000	
	Cadmium	4	121	0.50	1	1.0E-03	I			0.000	
	Chromium	121	121	244	712	3.0E-03	I			0.046	
	Cobalt	113	121	30.1	75	3.0E-04	P			0.049	
	Copper	121	121	50.5	175	4.0E-02	H			0.001	
	Iron	121	121	29980	62900	7.0E-01	P			0.018	
	Manganese	121	121	1221	12700	2.4E-02	I			0.104	
	Nickel	119	121	61.3	146	2.0E-02	I			0.001	
	Selenium	3	115	2.18	1.2	5.0E-03	I			0.000	
	Thallium	42	121	0.5	1.2	6.5E-05	S			0.004	
	Vanadium	121	121	50.7	98	5.0E-03	S			0.004	
	Zinc	121	121	41.9	94	3.0E-01	I			0.000	
	Mercury	2	111	0.1	0.1	3.0E-04	I			0.000	
VOC	Methyl acetate	4	6	0.5	1.4	1.0E+00	H			0.000	
Polycyclic Aromatic Hydrocarbons (PAHs)	Benzo(a)anthracene	1	63	0.4	0.018			7.3E-01	I		1.1E-09
	Benzo(a)pyrene	1	63	0.4	0.012			7.3E+00	I		7.3E-09
	Benzo(b)fluoranthene	2	63	0.4	0.039			7.3E-01	I		2.4E-09
	Benzo(k)fluoranthene	2	63	0.4	0.033			7.3E-02	I		2.0E-10
	Dibenzo(a,h)anthracene	1	63	0.4	0.006			7.3E+00	I		3.7E-09
	Fluoranthene	1	63	0.4	0.01	4.0E-02	I			0.000	
	Indeno(1,2,3-cd)pyrene	1	63	0.4	0.01			7.3E-01	I		6.1E-10
	Pyrene	2	63	0.4	0.012	3.0E-02	I			0.000	
Extractable Hydrocarbons	C11 to C22 Aromatics	47	57	104.1	507	2.0E-02	R10			0.005	
	C19 to C36 Aliphatics	49	57	164.2	739	2.0E+00	R10			0.000	
	C9 to C18 Aliphatics	33	57	99.7	590	3.0E-02	R10			0.004	
Volatile Hydrocarbons	C9 to C10 Aromatics	12	111	5.1	63	1.0E-01	R10			0.000	
	C9 to C12 Aliphatics	17	111	6.2	58	3.0E-02	R10			0.000	
	Naphthalene	2	111	0.2	2.8	2.0E-02	I			0.000	
Anions	Fluoride	57	111	1.7	18	6.0E-02	I			0.000	
									Total	**0.25**	**9.0E-07**

[(a)] Non-detects evaluated at 1/2 the detection limit.

Notes
I = IRIS
P = PPRTV
S = Oak Ridge
H = HEAST
R10 = USEPA Region 10

Human Exposure Assumptions (Sed Ingestion)

IR	100	mg/day
BW	70	kg
EF	50	d/yr
ED	30	yr
HIF(nc)	1.96E-07	kg/kg-day
HIF(c)	8.39E-08	kg/kg-day

TABLE 3-6 SUMMARY OF GROUND WATER SAMPLES COLLECTED AND ANALYZED FOR NON-ASBESTOS CONTAMINANTS

Location	Station	Phase II			Number of Samples[1]								
		Summer	Fall	Spring[2]	Metals	Pest.	PCBs	VOCs	SVOCs/ PAHs	Hydro-carbons	NO_2/NO_3	Rads	Anions
Wells	Well A	x	x	x	2				1	2	2	2	2
	Well C	x	x	x	2					2	2	2	2
	Well D	x	x	x	2					2	2	2	2
	Well E	x	x	x	2				1	2	2	2	2
	Well H	x	--	x	1				1	1	1	1	1
				Total	**9**	**0**	**0**	**0**	**3**	**9**	**9**	**9**	**9**

[1] As of December 2008

[2] Anticipated sampling date May 2009.

TABLE 3-7 SCREENING LEVEL RISK CALCULATIONS FOR HUMAN EXPOSURE TO GROUNDWATER

Category	Analyte	Units	Groundwater Summary Statistics				Toxicity Factors					Screening Level Risk Estimates (based on Max)	
			Detection Frequency		Mean [(a)]	Max	Ref. Conc	oRfD (mg/kg-d)		oSF (mg/kg-d)$^{-1}$			
			N Detects	N Total				Value	Source	Value	Source	HQ	Risk
Metals	Barium	mg/L	7	9	0.34	0.9		2.0E-01	I			0.02	
	Cadmium	mg/L	1	9	0.0001	0.0002		5.0E-04	I			0.00	
	Copper	mg/L	3	9	0.002	0.004		4.0E-02				0.00	
	Manganese	mg/L	5	9	0.26	1.20		4.7E-02	I			0.10	
	Iron	mg/L	4	9	1.4	10.3		7.0E-01				0.06	
	Zinc	mg/L	2	9	0.05	0.35		3.0E-01				0.00	
Hydrocarbons	Total Extractable Hydrocarbons	mg/L	2	9	0.57	1.13	1.0	2.9E-02	C			0.15	
	Toluene	mg/L	3	9	0.002	0.015		8.0E-02				0.00	
	Total Purgeable Hydrocarbons	mg/L	1	9	0.02	0.02	1.0	2.9E-02	C			0.00	
Nitrogen Compounds	Nitrite	mg/L	4	9	0.06	0.44		1.0E-01				0.02	
	Nitrate	mg/L	6	9	1.23	4.59		1.6E+00				0.01	
Radionuclides	Gross Alpha	pCi/L	7	9	3.5	6.6	15			2.3E-06	C		2.6E-08
	Gross Alpha MDC	pCi/L	9	9	2.5	3.7	15			2.3E-06	C		1.4E-08
	Gross Beta	pCi/L	9	9	7.3	14.3	50			7.0E-07	C		1.7E-08
	Gross Beta MDC	pCi/L	9	9	3.1	4.5	50			7.0E-07	C		5.3E-09
Anions	Fluoride	mg/L	4	9	0.2	0.6		6.0E-02				0.04	
	Sulfate	mg/L	9	9	44	143	250	7.1E+00	C			0.08	
											Total	**0.49**	**6.2E-08**

[(a)] Non-detects evaluated at 1/2 the detection limit.

Notes
I = IRIS
P = PPRTV
S = Oak Ridge
H = HEAST
R10 = USEPA Region 10
C = Calculated from Reference Concentration, assuming Target HQ = 1 or Target Risk = 1E-06 and ingestion of 2 L/day by a 70-kg individual

Human Exposure Parameters (GW Ingestion)

IR	2	L/day
BW	70	kg
EF	50	days/yr
ED	30	yrs
HIF(nc)	3.91E-03	L/kg-d
HIF(c)	1.68E-03	L/kg-d

Table 4-1. LA Concentrations in Surface Water Toxicity Testing, Cycles 1 & 7

Cycle	Dilution	Cycle Collection Timing	Index ID	Sensitivity 1E-06/L	Measured Total LA	
					Count	Conc (MFL)
1 (days 1-10)	1 - 100% (undiluted)	Start	D1-C1-NEW	0.09	**26**	**2.3**
	2 - 10%		D2-C1-NEW	0.06	0	<0.06
	3 - 1%		D3-C1-NEW	0.06	0	<0.06
	4 - 0.1%		D4-C1-NEW	0.06	0	<0.06
	5 - 0.01%		D5-C1-NEW	0.06	0	<0.06
	6 - 0.001%		D6-C1-NEW	0.06	0	<0.06
	7 - 0%		D7-C1-NEW	0.05	0	<0.05
	1 - 100% (undiluted)	End	D1-C1-OLD	0.05	0	<0.05
	2 - 10%		D2-C1-OLD	0.05	0	<0.05
	3 - 1%		D3-C1-OLD	0.05	0	<0.05
	4 - 0.1%		D4-C1-OLD	0.05	0	<0.05
	5 - 0.01%		D5-C1-OLD	0.05	0	<0.05
	6 - 0.001%		D6-C1-OLD	0.06	0	<0.06
	7 - 0%		D7-C1-OLD	0.05	0	<0.05
7 (days 33-35)	1 - 100% (undiluted)	Start	D1-C7-NEW	0.05	**25**	**1.26**
	2 - 10%		D2-C7-NEW	0.06	**1**	**0.06**
	3 - 1%		D3-C7-NEW	0.05	0	<0.05
	4 - 0.1%		D4-C7-NEW	0.05	0	<0.05
	5 - 0.01%		D5-C7-NEW	0.05	0	<0.05
	6 - 0.001%		D6-C7-NEW	0.05	0	<0.05
	7 - 0%		D7-C7-NEW	0.05	0	<0.05
	1 - 100% (undiluted)	End	D1-C7-OLD	0.06	0	<0.06
	2 - 10%		D2-C7-OLD			
	3 - 1%		D3-C7-OLD			
	4 - 0.1%		D4-C7-OLD			
	5 - 0.01%		D5-C7-OLD			
	6 - 0.001%		D6-C7-OLD			
	7 - 0%		D7-C7-OLD			

MFL = million fibers per liter

Analysis Cancelled

Table 4-2. LA Concentrations in Surface Water Toxicity Testing, Cycles 2 & 4

Cycle	Dilution	Cycle Collection Timing	Index ID	Sensitivity 1E+06/L	Total LA	
					Count	Conc (MFL)
2 (days 11-20)	100% (undiluted)	Start	TOX-D1-C2-NEW-STEP 1	0.05	1	0.05
			TOX-D1-C2-NEW-STEP 2	0.62	25	15.6
			TOX-D1-C2-NEW-STEP 3	0.71	27	19.2
			Total			**31.7**
		End	TOX-D1-C2-OLD-STEP 1	0.05	0	<0.05
			TOX-D1-C2-OLD-STEP 2	0.05	1	0.05
			TOX-D1-C2-OLD-STEP 3	0.10	0	<0.1
			Total			**0.05**
4 (days 24-26)	100% (undiluted)	Start	TOX-D1-C4-NEW-STEP 1	0.05	2	0.10
			TOX-D1-C4-NEW-STEP 2	0.23	30	6.8
			TOX-D1-C4-NEW-STEP 3	0.20	25	5.0
			Total			**10.4**
		End	TOX-D1-C4-OLD-STEP 1	0.05	0	<0.05
			TOX-D1-C4-OLD-STEP 2	0.05	1	0.05
			TOX-D1-C4-OLD-STEP 3	0.10	0	<0.1
			Total			**0.05**

MFL = million fibers per liter

Table 4-3. LA Concentrations in Sediment

Station		Event	Sample Date	Index ID	Field QC Type	PLM-VE LA Result
Carney Creek	CC-1	Phase I	10/11/07	P1-00395	FS	4%
		Phase II, Round 1	06/29/08	P2-00490	FS	3%
				P2-00491	FD	3%
		Phase II, Round 2	09/14/08	P2-00987	FS	B2
				P2-00988	FD	B2
		Phase II, Round 3	10/02/08	P2-01073	FS	5%
			10/07/08	P2-01079	FS	5%
	CC-2	Phase I	10/12/07	P1-00399	FS	B2
		Phase II, Round 1	06/25/08	P2-00534	FS	B1
		Phase II, Round 2	09/10/08	P2-00954	FS	B2
	CC-POND-1	Phase II, Round 1	07/01/08	P2-00512	FS	B2
		Phase II, Round 2	09/15/08	P2-01013	FS	2%
	CC-POND-2	Phase II, Round 1	07/01/08	P2-00511	FS	B1
		Phase II, Round 2	09/15/08	P2-01014	FS	B2
	CC-POND-3	Phase II, Round 1	07/01/08	P2-00513	FS	B1
		Phase II, Round 2	09/15/08	P2-01015	FS	B2
	CC-POND-4	Phase II, Round 1	07/02/08	P2-00536	FS	B1
		Phase II, Round 2	09/15/08	P2-01016	FS	B1
	CC-POND-5	Phase II, Round 1	07/02/08	P2-00537	FS	B1
				P2-00538	FS	B1
		Phase II, Round 2	09/15/08	P2-01017	FS	B1
Fleetwood Creek	FC-1	Phase I	10/13/07	P1-00404	FS	A
		Phase II, Round 1	06/28/08	P2-00481	FS	B1
		Phase II, Round 2	09/14/08	P2-00997	FS	B1
	FC-2	Phase I	10/13/07	P1-00406	FS	B1
		Phase II, Round 1	06/27/08	P2-00475	FS	B1
				P2-00476	FD	B1
		Phase II, Round 2	09/14/08	P2-00995	FS	B1
				P2-00996	FD	B1
		Phase II, Round 3	10/02/08	P2-01077	FS	B1
Fleetwood Creek Pond	FC-POND	Phase I	10/13/07	P1-00405	FS	B2
	FC-POND-1	Phase II, Round 1	06/30/08	P2-00496	FS	B2
		Phase II, Round 2	09/14/08	P2-01009	FS	2%
	FC-POND-2	Phase II, Round 1	06/30/08	P2-00497	FS	B2
		Phase II, Round 2	09/14/08	P2-00998	FS	B2
	FC-POND-3	Phase II, Round 1	06/30/08	P2-00498	FS	B1
		Phase II, Round 2	09/14/08	P2-01011	FS	B2
	FC-POND-4	Phase II, Round 1	06/30/08	P2-00499	FS	B2
				P2-00501	FS	B1
		Phase II, Round 2	09/14/08	P2-00999	FS	B2
				P2-01007	FD	B2
	FC-POND-5	Phase II, Round 1	06/30/08	P2-00502	FS	B2
		Phase II, Round 2	09/14/08	P2-01008	FS	B2

Table 4-3. LA Concentrations in Sediment

Station		Event	Sample Date	Index ID	Field QC Type	PLM-VE LA Result
Lower Rainy Creek	LRC-1	Phase I	10/17/07	P1-00338	FS	B2
		Phase II, Round 1	06/25/08	P2-00533	FS	2%
		Phase II, Round 2	09/10/08	P2-00953	FS	B2
	LRC-2	Phase I	10/17/07	P1-00336	FS	B2
				P1-00337	FD	B2
		Phase II, Round 1	06/25/08	P2-00531	FS	B1
				P2-00532	FD	B1
		Phase II, Round 2	09/09/08	P2-00945	FS	B2
				P2-00946	FD	B2
		Phase II, Round 3	10/01/08	P2-01071	FS	2%
	LRC-3	Phase I	10/16/07	P1-00335	FS	2%
		Phase II, Round 1	06/25/08	P2-00466	FS	B1
		Phase II, Round 2	09/09/08	P2-00944	FS	B2
		Phase II, Round 3	10/02/08	P2-01072	FS	2%
	LRC-4	Phase I	10/16/07	P1-00329	FS	B2
		Phase II, Round 1	06/25/08	P2-00465	FS	B1
		Phase II, Round 2	09/09/08	P2-00943	FS	B2
	LRC-5	Phase I	10/16/07	P1-00328	FS	B2
		Phase II, Round 1	06/25/08	P2-00464	FS	B1
		Phase II, Round 2	09/09/08	P2-00942	FS	B2
		Phase II, Round 3	10/01/08	P2-01070	FS	2%
	LRC-6	Phase I	10/16/07	P1-00327	FS	B2
		Phase II, Round 1	06/24/08	P2-00461	FS	B2
		Phase II, Round 2	09/09/08	P2-00941	FS	B2
Mill Pond	MP	Phase I	10/15/07	P1-00348	FS	B2
				P1-00349	FD	B1
	MP-1	Phase II, Round 1	07/01/08	P2-00520	FS	B1
		Phase II, Round 2	09/11/08	P2-00963	FS	1%
	MP-2	Phase II, Round 1	07/01/08	P2-00522	FS	B1
				P2-00523	FD	B2
		Phase II, Round 2	09/11/08	P2-00962	FS	1%
				P2-00966	FD	B2
	MP-3	Phase II, Round 1	07/01/08	P2-00524	FS	B1
		Phase II, Round 2	09/11/08	P2-00961	FS	B1
	MP-4	Phase II, Round 1	07/02/08	P2-00525	FS	B1
		Phase II, Round 2	09/11/08	P2-00964	FS	1%
	MP-5	Phase II, Round 1	07/02/08	P2-00526	FS	B1
		Phase II, Round 2	09/11/08	P2-00965	FS	2%

Table 4-3. LA Concentrations in Sediment

Station		Event	Sample Date	Index ID	Field QC Type	PLM-VE LA Result
Tailings Impoundment	TP	Phase I	10/14/07	P1-00407	FS	B2
	TP-1	Phase II, Round 1	06/27/08	P2-00477	FS	B2
		Phase II, Round 2	09/10/08	P2-00949	FS	B2
	TP-2	Phase II, Round 1	06/27/08	P2-00478	FS	B2
		Phase II, Round 2	09/10/08	P2-00948	FS	B2
	TP-3	Phase II, Round 1	06/28/08	P2-00483	FS	B2
		Phase II, Round 2	09/10/08	P2-00950	FS	2%
	TP-4	Phase II, Round 1	06/28/08	P2-00482	FS	B1
		Phase II, Round 2	09/10/08	P2-00952	FS	2%
	TP-5	Phase II, Round 2	09/10/08	P2-00951	FS	B2
	TP-6	Phase II, Round 1	07/01/08	P2-00503	FS	B1
		Phase II, Round 2	09/13/08	P2-00982	FS	B2
	TP-7	Phase II, Round 1	07/01/08	P2-00504	FS	B1
		Phase II, Round 2	09/13/08	P2-00981	FS	2%
	TP-8	Phase II, Round 1	07/01/08	P2-00505	FS	B1
		Phase II, Round 2	09/13/08	P2-00979	FS	B2
	TP-9	Phase II, Round 1	07/01/08	P2-00506	FS	B1
		Phase II, Round 2	09/13/08	P2-00980	FS	B2
	TP-10	Phase II, Round 1	07/01/08	P2-00507	FS	B1
				P2-00508	FS	B1
		Phase II, Round 2	09/12/08	P2-00975	FS	1%
	TP-11	Phase II, Round 1	07/01/08	P2-00509	FS	B2
				P2-00510	FD	B1
		Phase II, Round 2	09/13/08	P2-00977	FS	B1
				P2-00978	FD	B1
	TP-12	Phase II, Round 1	07/01/08	P2-00519	FS	B1
		Phase II, Round 2	09/12/08	P2-00974	FS	B2
	TP-13	Phase II, Round 1	07/01/08	P2-00518	FS	B2
		Phase II, Round 2	09/12/08	P2-00969	FS	B2
	TP-14	Phase II, Round 1	07/01/08	P2-00517	FS	B1
		Phase II, Round 2	09/12/08	P2-00970	FS	B2
	TP-15	Phase II, Round 1	07/01/08	P2-00516	FS	B1
		Phase II, Round 2	09/12/08	P2-00971	FS	B1
	TP-16	Phase II, Round 1	07/01/08	P2-00515	FS	B1
		Phase II, Round 2	09/12/08	P2-00972	FS	B2
	TP-17	Phase II, Round 1	07/01/08	P2-00514	FS	B1
		Phase II, Round 2	09/12/08	P2-00973	FS	B2
Toe of Impoundment	TP-TOE1	Phase I	10/15/07	P1-00326	FS	2%
		Phase II, Round 1	06/26/08	P2-00470	FS	B2
		Phase II, Round 2	09/12/08	P2-00968	FS	1%
	TP-TOE2	Phase I	10/15/07	P1-00325	FS	3%
		Phase II, Round 1	06/26/08	P2-00469	FS	2%
		Phase II, Round 2	09/10/08	P2-01010	FS	2%
		Phase II, Round 3	10/02/08	P2-01074	FS	2%
			10/07/08	P2-01080	FS	3%
				P2-01081	FD	3%

Table 4-3. LA Concentrations in Sediment

Station		Event	Sample Date	Index ID	Field QC Type	PLM-VE LA Result
Upper Rainy Creek	URC-1	Phase I	10/14/07	P1-00409	FS	A
				P1-00347	FD	A
		Phase II, Round 1	06/27/08	P2-00474	FS	A
		Phase II, Round 2	09/14/08	P2-00994	FS	A
	URC-1A	Phase II, Round 1	06/27/08	P2-00473	FS	B1
		Phase II, Round 2	09/14/08	P2-00986	FS	A
		Phase II, Round 3	10/02/08	P2-01076	FS	A
	URC-2	Phase I	10/14/07	P1-00408	FS	B2
		Phase II, Round 1	06/27/08	P2-00472	FS	B1
		Phase II, Round 2	09/13/08	P2-00983	FS	B1
		Phase II, Round 3	10/02/08	P2-01075	FS	B1
Kootenai River	UKR-2	Phase II, Round 1	08/20/08	P2-00866	FS	A
	KR-9	Phase II, Round 1	08/20/08	P2-00860	FS	B1
	KR-10	Phase II, Round 1	08/20/08	P2-00861	FS	B1
	KR-11	Phase II, Round 1	08/20/08	P2-00862	FS	B1
	KR-12	Phase II, Round 1	08/20/08	P2-00863	FS	A
	KR-13	Phase II, Round 1	08/20/08	P2-00864	FS	B1
				P2-00865	FD	B1
Reference Stations	BTT-R1	Phase II, Round 3	10/03/08	P2-01078	FS	A
	NSY-R1	Phase II, Round 3	10/07/08	P2-01082	FS	A

Bin A = Non-detect
Bin B1 = <0.2%
Bin B2 = 0.2% to <1%

FS = Field Sample
FD = Field Duplicate

Table 4-4. Summary of Results of Sediment Toxicity Test with *Chironomus tentans*

Survival Data by Treatment[1]

Treatment	Site ID	Proportion Survived (± SD)	
		Day 24	Total Test
1	Lab Control	0.55 ± 0.27	0.58 ± 0.25
2	Lab Control	0.92 ± 0.10	0.62 ± 0.27
3	Field Collected[2]	0.40 ± 0.27	0.47 ± 0.28
4	BTT-R1	0.73 ± 0.24	0.67 ± 0.27
5	NSY-R1	0.53 ± 0.17	0.69 ± 0.18
6	CC-1	0.67 ± 0.14	0.64 ± 0.16
7	TP-TOE2	0.87 ± 0.19	0.58 ± 0.30

[1] Survival is reported as the average survival within a treatment (combination of all replicates within a treatment). Survival reported under the Day 24 column are the results from the four replicates terminated on Day 24. Survival reported under the test termination column includes the Day 24 replicates, but excludes the auxiliary replicates.

[2] Field collected sediment from Beaver Creek, OR

SD = Standard Deviation

Survival Data by Category[1]

Endpoint	Proportion Survived			Category #1 vs. Category #3		Category #2 vs. Category #3	
	Category #1	Category #2	Category #3	p-value	% change	p-value	% change
Day 24 Survival	0.73	0.55	0.77	0.907	4.5%	0.549	38.6%
Day 52 Survival	0.60	0.61	0.61	0.984	0.5%	0.961	-0.4%

[1]Category #1: T1 and T2 = Formulated control sediments

Category #2: T3, T4 and T5 = Field reference sediments

Category #3: T6 and T7 = Libby site sediments

Proportion Survived means are model-based means

p-value less than 0.05 represents a statistically significant difference.

Emergence by Treatment[1]

Treatment	Site ID	Proportion Emerged (± SD)
1	Lab Control	0.60 ± 0.26
2	Lab Control	0.46 ± 0.17
3	Field Collected[2]	0.49 ± 0.30
4	BTT-R1	0.63 ± 0.29
5	NSY-R1	0.79 ± 0.13
6	CC-1	0.63 ± 0.17
7	TP-TOE2	0.46 ± 0.26

[1] Emergence is reported as the average emergence within a treatment (does not include the auxiliary chambers).

[2] Field collected sediment from Beaver Creek, OR

SD = Standard Deviation

Table 4-4, Cont. Summary of Results of Sediment Toxicity Test with *Chironomus tentans*

Organism Growth Data by Treatment[1]

Treatment	Site ID	Dry Weight in mg (± SD)	
		Dry Weight - Day 24	Ash-Free Dry Weight - Day 24
1	Lab Control	2.43 ± 1.27	2.15 ± 1.06
2	Lab Control	2.35 ± 0.33	2.06 ± 0.33
3	Field Collected[2]	3.35 ± 1.07	2.95 ± 0.90
4	BTT-R1	3.61 ± 0.82	2.71 ± 0.93
5	NSY-R1	3.62 ± N/A	2.85 ± N/A
6	CC-1	2.53 ± 1.04	1.98 ± 1.01
7	TP-TOE2	3.20 ± 0.41	2.66 ± 0.39

[1] Average weight within a treatment. Weights were only taken on larval organisms. Any organisms which had begun the pupal stage were used in survival endpoint but not he weight endpoint.
[2] Field collected sediment from Beaver Creek, OR
SD = Standard Deviation, N/A Not applicable

Growth Data by Category[1]

Endpoint	Weight (mg)			Category #1 vs. Category #3		Category #2 vs. Category #3	
	Category #1	Category #2	Category #3	p-value	% change	p-value	% change
Dry Weight	2.381	3.536	2.911	0.153	22.3%	0.257	-17.7%
Ash-free Dry Weight	2.097	2.795	2.370	0.878	13.0%	0.277	-15.2%

[1]Category #1: T1 and T2 = Formulated control sediments
Category #2: T3, T4 and T5 = Field reference sediments
Category #3: T6 and T7 = Libby site sediments
Growth means are model based means
p-value less than 0.05 represents a statistically significant difference.

Organism Reproduction Data[1]

Treatment	Site ID	Average # eggs/case (± SD)	Average % Hatched (± SD)
1	Lab Control	1916 ± 488	98.9 ± 1.1
2	Lab Control	1543 ± 256	98.8 ± 1.2
3	Field Collected[2]	1766 ± 437	94.9 ± 10.0
4	BTT-R1	1502 ± 299	98.3 ± 1.2
5	NSY-R1	1566 ± 277	98.1 ± 1.2
6	CC-1	1649 ± 159	96.8 ± 2.2
7	TP-TOE2	1708 ± 406	97.0 ± 3.5

[1] Average reproduction within a treatment
[2] Field collected sediment from Beaver Creek, OR
SD = Standard Deviation

Table 4-4, Cont. Summary of Results of Sediment Toxicity Test with *Chironomus tentans*

Reproduction Data by Category[1]

Endpoint	Reproduction			Category #1 vs. Category #3		Category #2 vs. Category #3	
	Category #1	Category #2	Category #3	p-value	% change	p-value	% change
Eggs / Female	1741.8	1618.6	1670.5	0.658	-4.1%	0.530	3.2%
% Eggs Hatched	98.9	97.0	96.9	0.221	-2.0%	0.904	-0.1%

[1]Category #1: T1 and T2 = Formulated control sediments
Category #2: T3, T4 and T5 = Field reference sediments
Category #3: T6 and T7 = Libby site sediments
Reproduction means are model based means

Table 4-5. Summary of Results of Sediment Toxicity Test with *Hyallela azteca*

Survival Data[1]

Treatment	Site ID	% Survived (± SD)		
		Day 28	Day 35	Day 42
1	Lab Control	70 ± 22	70 ± 20	68 ± 22
2	Lab Control	61 ± 28	59 ± 24	59 ± 24
3	Field Collected[2]	89 ± 12	85 ± 14	85 ± 14
4	BTT-R1	83 ± 16	86 ± 7	86 ± 7
5	NSY-R1	94 ± 7	94 ± 5	94 ± 5
6	CC-1	85 ± 12	85 ± 13	84 ± 12
7	TP-TOE2	87 ± 12	87 ± 11	86 ± 13

[1] Survival is reported as the average survival within a treatment (combination of all replicates within a treatment).

[2] Field collected control

SD = Standard Deviation

Survival Data by Category[1]

Endpoint	Proportion Survived			Category #1 vs. Category #3		Category #2 vs. Category #3	
	Category #1	Category #2	Category #3	p-value	% change	p-value	% change
Day 28 Survival	0.654	0.886	0.858	0.000	31.2%	0.410	-3.1%
Day 35 Survival	0.644	0.883	0.869	0.000	35.0%	0.402	-1.6%
Day 42 Survival	0.631	0.883	0.850	0.000	34.7%	0.135	-3.7%

[1]Category #1: T1 and T2 = Formulated control sediments

Category #2: T3, T4 and T5 = Field reference sediments

Category #3: T6 and T7 = Libby site sediments

Proportion Survived means are model based Msmeans.

p-value less than 0.05 represents a statistically significant difference.

Organism Growth Data[1]

Treatment	Site ID	Dry Weight in mg (± SD)	
		Day 28	Day 42
1	Lab Control	0.215 ± 0.050	0.358 ± 0.089
2	Lab Control	0.236 ± 0.076	0.345 ± 0.068
3	Field Collected[2]	0.167 ± 0.023	0.300 ± 0.040
4	BTT-R1	0.160 ± 0.037	0.247 ± 0.029
5	NSY-R1	0.162 ± 0.010	0.239 ± 0.031
6	CC-1	0.234 ± 0.030	0.300 ± 0.034
7	TP-TOE2	0.178 ± 0.015	0.280 ± 0.040

[1] Dry Weight is stated as the average weight per organism (combination of all replicates within a treatment).

[2] Field collected control

SD = Standard Deviation

Table 4-5, Cont. Summary of Results of Sediment Toxicity Test with *Hyallela azteca*

Growth Data by Category[1]

Endpoint	Weight (mg)			Category #1 vs. Category #3		Category #2 vs. Category #3	
	Category #1	Category #2	Category #3	p-value	% change	p-value	% change
Day 28 Growth	0.225	0.163	0.206	0.431	-8.7%	0.015	26.1%
Day 42 Growth	0.351	0.263	0.290	0.003	-17.4%	0.046	10.2%

[1]Category #1: T1 and T2 = Formulated control sediments
Category #2: T3, T4 and T5 = Field reference sediments
Category #3: T6 and T7 = Libby site sediments
Growth means are model based Msmeans
p-value less than 0.05 represents a statistically significant difference.

Organism Reproduction Data[1]

Treatment	Site ID	Average Reproduction (± SD) (young/female)	
		Day 35	Day 42
1	Lab Control	0.37 ± 0.59	2.65 ± 1.73
2	Lab Control	0.22 ± 0.43	2.03 ± 1.89
3	Field Collected[2]	0.32 ± 0.58	1.44 ± 1.10
4	BTT-R1	0.12 ± 0.23	0.40 ± 0.54
5	NSY-R1	0.14 ± 0.27	0.95 ± 0.70
6	CC-1	0.43 ± 0.76	2.17 ± 0.57
7	TP-TOE2	0.16 ± 0.31	1.57 ± 1.10

[1] Reproduction is stated as the average number of young per female (combination of all replicates within a treatment).
[2] Field collected control
SD = Standard Deviation

Reproduction Data by Category[1]

Endpoint	Reproduction			Category #1 vs. Category #3		Category #2 vs. Category #3	
	Category #1	Category #2	Category #3	p-value	% change	p-value	% change
Day 35 Reproduction	0.293	0.194	0.294	0.995	0.4%	0.528	51.3%
Day 42 Reproduction	2.339	0.930	1.868	0.276	-20.1%	0.021	101.0%

[1]Category # 1: T1 and T2 = Formulated control sediments
Category #2: T3, T4 and T5 = Field reference sediments
Category #3: T6 and T7 = Libby site sediments
Reproduction means are model based Msmeans
p-value less than 0.05 represents a statistically significant difference

Table 4-6. Phase III Aquatic Sampling Program

Station ID		Station Description	Aquatic Habitat Assessment	Benthic Invert. Community	Fish Population
Rainy Creek	URC-1A	Upper Rainy Creek above Mine Area 100 yards north of Rainy Creek Rd.	√	√	√
	URC-2	Upper Rainy Creek above Mine Area	√	√	√
	LRC-1	Lower Rainy Creek above confluence with Carney Creek	√	√	√
	LRC-2	Lower Rainy Creek below confluence with Carney Creek	√	√	√
	LRC-3	Lower Rainy Creek	√	√	√
	LRC-5	Lower Rainy Creek	√	√	√
Tailings Impound-ment	TP-TOE2	Toe drain flow to Rainy Creek below diversion	√	√	√
Reference	BTT-R1	Bobtail Creek unnamed tributary	√	√	√
	NSY-R1	Noisy Creek	√	√	√

Table 4-7. Surface Water Concentrations of LA in OU3 Ponds

	LA Concentration (MFL)			
Date	Tailings Impoundment	Mill Pond	Fleetwood Creek Pond	Carney Creek Pond
05/06/08	28	0.72	83	45
05/12/08	23	4.5	--	32
05/19/08	16	13	--	25
05/27/08	10	13	--	37
06/03/08	8.6	1.0	--	23
06/10/08	1.6	0.50	--	3.8
06/17/08	3.3	0.05	--	22
06/28/08	15	0.00	10.0	11

-- = Not Sampled

Table 4-8. Sediment Concentrations of LA in OU3 Ponds

Location	No. of Samples	Number of Samples in each PLM-VE Bin				Max LA %
		A	B1	B2	C	
Tailings Impoundment	37	0	16	17	4	2%
Mill Pond	14	0	7	3	4	2%
Fleetwood Creek Pond	13	0	2	10	1	2%
Carney Creek Pond	11	0	7	3	1	2%

Bin A = Non-detect
Bin B1 = < 0.2%
Bin B2 = 0.2% to <1%
Bin C = >1%

Table 4-9
Long Term Amphibian Study Design

Study Conditions:	**Value**
Species:	*Rana sp*.
Initial Stage:	Gosner stage 20
Final Stage:	Metamorphosis
Study Design:	Life Cycle Assay
Study Apparatus:	Flow-Through Mini-Diluter System
Culture Media/Negative Control:	Dechlorinated Tap Water
Test Media:	
Exposure 1:	Diluent water (no LA) and synthetic sediment
Exposure 2:	Diluent water (no LA) and field reference sediment
Exposure 3:	100 MFL LA in water + 2% LA in sediments
Aquaria Volumes:	6 L/Aquarium
Volume Renewal:	Flow-through
Aquaria Cleaning:	Daily (M - F)
Number of Replicate Aquaria/Treatment	4
Number of Animals/Aquaria	20
Number of Animals/Treatment	80
Photoperiod:	12 h Light : 12 h dark (on timer)
Food/Frequency:	
Sera Micron® Slurry:	Pre-Metamorphs/Twice Daily (once on S-S)
Salmon Starter (#3 Pellets):	Post-Metamorphs/Once on M-W-F
Parameters:	
Diluter Flow Rate:	10 mL/min
Media Parameters:	3 X weekly
Temperature Range:	22-24ºC
pH Range:	6.5-8.5 su
Dissolved Oxygen:	> 3.5 mg/L
Data Collection:	
Survival Count:	Daily
Developmental Stage:	Daily
Metamorph Count/Weight at Metamorphosis:	Cumulative, Individual Weight (g)
Post-Metamorphs (Juveniles):	≈ 10 d after Metamorphosing
Digital Whole Body Photos (Growth):	Prior to Necropsy
Score External Malformations:	Prior to Necropsy
Juvenile Whole Body Weight:	Prior to Necropsy
Testis/Ovary Weight:	At Necropsy
Testis/Ovary abnormalities:	At Necropsy
Internal (Body Cavity) Photos:	At Necropsy
Collect Gonad Tissue Samples for Histopathology	At Necropsy

Table 4-10. Detection Frequencies of Non-Asbestos Contaminants in Surface Water, Sediment, and Soil

Analyte Group	Analyte	Surface Water		Sediment		Soil	
		Detect	Total	Detect	Total	Detect	Total
Anions	Chloride	48	59	--	--	--	--
	Cyanide, Total	0	6	0	6	0	2
	Fluoride	57	59	57	111	2	38
	Phosphorus, Orthophosphate as P	59	59	--	--	--	--
	Phosphorus, Total	--	--	111	111	38	38
	Sulfate	59	59	--	--	--	--
Extractable Hydrocarbons	C11 to C22 Aromatics	0	1	50	57	5	6
	C19 to C36 Aliphatics	0	1	49	57	6	6
	C9 to C18 Aliphatics	0	1	36	57	2	6
	Total Extractable Hydrocarbons	1	61	158	168	28	36
Metals	Aluminum	0	61	123	123	38	38
	Antimony	0	61	0	90	1	38
	Arsenic	0	61	47	123	4	38
	Barium	60	61	123	123	38	38
	Beryllium	0	61	0	123	0	38
	Boron	0	61	8	123	0	38
	Cadmium	1	61	4	123	0	38
	Chromium	0	61	123	123	38	38
	Chromium, Hexavalent - Soluble	--	--	0	47		
	Calcium	61	61	--	--	--	--
	Cobalt	0	61	115	123	38	38
	Copper	1	61	123	123	37	38
	Iron	1	61	123	123	38	38
	Lead	0	61	119	123	36	38
	Magnesium	61	61	--	--	--	--
	Manganese	9	61	123	123	38	38
	Mercury	0	61	2	113	1	38
	Nickel	0	61	121	123	38	38
	Potassium	61	61	--	--	--	--
	Selenium	0	61	3	117	0	38
	Silver	0	61	0	123	0	38
	Sodium	61	61	--	--	--	--
	Thallium	0	61	42	123	3	38
	Vanadium	0	61	123	123	38	38
	Zinc	0	61	123	123	38	38
Nitrogen compounds	Nitrogen, Ammonia as N	0	56	--	--	--	--
	Nitrogen, Kjeldahl, Total as N	7	56	--	--	--	--
	Nitrogen, Nitrate as N	22	56	--	--	--	--
	Nitrogen, Nitrate+Nitrite as N	24	56	--	--	--	--
	Nitrogen, Nitrite as N	4	61	--	--	--	--
Organophosphorus Pesticides	Azinphos-methyl (Guthion)	0	2	0	2	0	2
	Bolstar (Sulprofos)	0	2	0	2	0	2
	Chlorpyrifos	0	2	0	2	0	2
	Coumaphos	0	2	0	2	0	2
	Demeton-O,S	0	2	--	--	--	--
	Diazinon	0	2	0	2	0	2
	Dichlorvos	0	2	0	2	0	2
	Dimethoate	0	2	0	2	0	2
	Disulfoton	0	2	--	--	--	--
	EPN	0	2	0	2	0	2
	Ethoprop (Prophos)	0	2	0	2	0	2
	Ethyl Parathion	0	2	0	2	0	2
	Fensulfothion	0	2	0	2	0	2
	Fenthion	0	2	0	2	0	2
	Malathion	0	2	0	2	0	2
	Merphos	0	2	0	2	0	2
	Methyl Parathion	0	2	0	2	0	2
	Mevinphos	0	2	0	2	0	2
	Phorate	0	2	--	--	--	--
	Ronnel	0	2	0	2	0	2
	Stirophos (Tetrachlorovinphos)	0	2	0	2	0	2
	Sulfotep	0	2	0	2	0	2
	Tokuthion (Prothiofos)	0	2	0	2	0	2
	Trichloronate	0	2	0	2	0	2

Table 4-10. Detection Frequencies of Non-Asbestos Contaminants in Surface Water, Sediment, and Soil

Analyte Group	Analyte	Surface Water		Sediment		Soil	
		Detect	Total	Detect	Total	Detect	Total
PCBs	Aroclor 1016	0	5	0	21	0	5
	Aroclor 1221	0	5	0	21	0	5
	Aroclor 1232	0	5	0	21	0	5
	Aroclor 1242	0	5	0	21	0	5
	Aroclor 1248	0	5	0	21	0	5
	Aroclor 1254	0	5	0	21	0	5
	Aroclor 1260	0	5	0	21	0	5
	Aroclor 1262	0	5	0	21	0	5
	Aroclor 1268	0	5	0	21	0	5
Pesticides	2,4,5-T	0	8	0	13	0	2
	2,4,5-TP (Silvex)	0	8	0	13	0	2
	2,4-D	0	8	0	13	0	2
	4,4´-DDD	0	8	0	13	0	2
	4,4´-DDE	0	8	0	13	0	2
	4,4´-DDT	0	8	0	13	0	2
	Aldrin	0	8	0	13	0	2
	alpha-BHC	0	8	0	13	0	2
	alpha-Chlordane	0	8	0	13	0	2
	beta-BHC	0	8	0	13	0	2
	Chlordane	0	8	0	13	0	2
	Dalapon	0	8	0	13	0	2
	delta-BHC	0	8	0	13	0	2
	Dicamba	0	8	0	13	0	2
	Dichlorprop	0	8	0	13	0	2
	Dieldrin	0	8	0	13	0	2
	Endosulfan I	0	8	0	13	0	2
	Endosulfan II	0	8	0	13	0	2
	Endosulfan sulfate	0	8	0	13	0	2
	Endrin	0	8	0	13	0	2
	Endrin aldehyde	0	8	0	13	0	2
	Endrin ketone	0	8	0	13	0	2
	gamma-BHC (Lindane)	0	8	0	13	0	2
	gamma-Chlordane	0	8	0	13	0	2
	Heptachlor	0	8	0	13	0	2
	Heptachlor epoxide	0	8	0	13	0	2
	Isodrin	0	8	0	13	0	2
	MCPA	0	8	0	13	0	2
	MCPP	0	8	0	13	0	2
	Methoxychlor	0	8	0	13	0	2
	Pentachlorophenol	0	2	0	7	1	2
	Toxaphene	0	8	0	13	0	2
Radionuclides	Gross Alpha	6	6	--	--	--	--
	Gross Alpha MDC	4	4	--	--	--	--
	Gross Beta	4	4	--	--	--	--
	Gross Beta MDC	4	4	--	--	--	--
	Radium 226	0	2	--	--	--	--
	Radium 226 + Radium 228	0	2	--	--	--	--
	Radium 228	0	2	--	--	--	--
SVOCs or PAHs	1,2,4,5-Tetrachlorobenzene	0	8	0	8	0	2
	2,3,4,6-Tetrachlorophenol	0	8	0	8	0	2
	2,4,5-Trichlorophenol	0	8	0	8	0	2
	2,4,6-Trichlorophenol	0	8	0	8	0	2
	2,4-Dichlorophenol	0	8	0	8	0	2
	2,4-Dimethylphenol	0	8	0	8	0	2
	2,4-Dinitrophenol	0	8	0	8	0	2
	2,4-Dinitrotoluene	0	8	0	8	0	2
	2,6-Dinitrotoluene	0	8	0	8	0	2
	2-Chloronaphthalene	0	8	0	8	0	2
	2-Chlorophenol	0	8	0	8	0	2
	2-Methylnaphthalene	0	9	1	63	0	6
	2-Nitroaniline	0	8	0	8	0	2
	2-Nitrophenol	0	8	0	8	0	2
	3,3´-Dichlorobenzidine	0	8	0	8	0	2
	3-Nitroaniline	0	8	0	8	0	2

Table 4-10. Detection Frequencies of Non-Asbestos Contaminants in Surface Water, Sediment, and Soil

Analyte Group	Analyte	Surface Water		Sediment		Soil	
		Detect	Total	Detect	Total	Detect	Total
SVOCs or PAHs, cont.	4,6-Dinitro-2-methylphenol	0	8	0	8	0	2
	4-Bromophenyl phenyl ether	0	8	0	8	0	2
	4-Chloro-3-methylphenol	0	8	0	8	0	2
	4-Chlorophenyl phenyl ether	0	8	0	8	0	2
	4-Nitroaniline	0	8	0	8	0	2
	4-Nitrophenol	0	8	0	8	0	2
	Acenaphthene	0	9	0	63	0	6
	Acenaphthylene	0	9	0	63	0	6
	Acetophenone	0	8	0	8	0	2
	Anthracene	0	9	0	63	0	6
	Atrazine	0	8	0	8	0	2
	Benzaldehyde	0	8	0	8	0	2
	Benzo(a)anthracene	0	9	1	63	2	6
	Benzo(a)pyrene	0	9	1	63	1	6
	Benzo(b)fluoranthene	0	9	2	63	1	6
	Benzo(g,h,i)perylene	0	9	0	63	1	6
	Benzo(k)fluoranthene	0	9	2	63	1	6
	Biphenyl	0	8	0	2	0	2
	bis(-2-chloroethoxy)Methane	0	8	0	8	0	2
	bis(-2-chloroethyl)Ether	0	8	0	8	0	2
	bis(2-chloroisopropyl)Ether	0	8	0	8	0	2
	bis(2-ethylhexyl)Phthalate	0	8	0	8	0	2
	Butylbenzylphthalate	0	8	0	8	0	2
	Caprolactam	0	8	0	8	0	2
	Carbazole	0	8	0	8	0	2
	Chrysene	0	9	0	63	2	6
	Dibenzo(a,h)anthracene	0	9	1	63	0	6
	Dibenzofuran	0	8	0	8	0	2
	Diethyl phthalate	0	8	0	8	0	2
	Dimethyl phthalate	0	8	0	8	0	2
	Di-n-butyl phthalate	0	8	0	8	0	2
	Di-n-octyl phthalate	0	8	0	8	0	2
	Fluoranthene	0	9	1	63	0	6
	Fluorene	0	9	0	63	0	6
	Hexachlorobenzene	0	8	0	8	0	2
	Hexachlorobutadiene	0	8	0	8	0	2
	Hexachlorocyclopentadiene	0	8	0	8	0	2
	Hexachloroethane	0	8	0	8	0	2
	Indeno(1,2,3-cd)pyrene	0	9	1	63	1	6
	Isophorone	0	8	0	8	0	2
	m+p-Cresols	0	8	0	8	0	2
	Naphthalene	0	3	0	11	0	6
	Nitrobenzene	0	8	0	8	0	2
	n-Nitroso-di-n-propylamine	0	8	0	8	0	2
	n-Nitrosodiphenylamine	0	8	0	8	0	2
	o-Cresol	0	8	0	8	0	2
	p-Chloroaniline	0	8	0	2	0	2
	Pentachlorophenol	0	14	0	14	0	2
	Phenanthrene	0	9	0	63	0	6
	Phenol	0	8	0	8	0	2
	Pyrene	0	9	2	63	2	6
VOCs	1,1,1-Trichloroethane	0	6	0	6	0	2
	1,1,2,2-Tetrachloroethane	0	6	0	6	0	2
	1,1,2-Trichloro-1,2,2-trifluoroethane	0	6	0	6	0	2
	1,1,2-Trichloroethane	0	6	0	6	0	2
	1,1-Dichloroethane	0	6	0	6	0	2
	1,1-Dichloroethene	0	6	0	6	0	2
	1,2,3-Trichlorobenzene	0	6	0	6	0	2
	1,2,4-Trichlorobenzene	0	6	0	6	0	2
	1,2-Dibromo-3-chloropropane	0	6	0	6	0	2
	1,2-Dibromoethane	0	6	0	6	0	2
	1,2-Dichlorobenzene	0	6	0	6	0	2
	1,2-Dichloroethane	0	6	0	6	0	2
	1,2-Dichloropropane	0	6	0	6	0	2

Table 4-10. Detection Frequencies of Non-Asbestos Contaminants in Surface Water, Sediment, and Soil

Analyte Group	Analyte	Surface Water		Sediment		Soil	
		Detect	Total	Detect	Total	Detect	Total
VOCs, cont.	1,3-Dichlorobenzene	0	6	0	6	0	2
	1,4-Dichlorobenzene	0	6	0	6	0	2
	1,4-Dioxane	0	4	0	5	0	2
	2-Hexanone	0	6	0	6	0	2
	Acetone	0	6	0	6	0	2
	Benzene	0	1	0	1	0	2
	Bromochloromethane	0	6	0	6	0	2
	Bromodichloromethane	0	6	0	6	0	2
	Bromoform	0	6	0	6	0	2
	Bromomethane	0	6	0	6	0	2
	Carbon disulfide	0	6	0	6	0	2
	Carbon tetrachloride	0	6	0	6	0	2
	Chlorobenzene	0	6	0	6	0	2
	Chlorodibromomethane	0	6	0	6	0	2
	Chloroethane	0	6	0	6	0	2
	Chloroform	0	6	0	6	0	2
	Chloromethane	0	6	0	6	0	2
	cis-1,2-Dichloroethene	0	6	0	6	0	2
	cis-1,3-Dichloropropene	0	6	0	6	0	2
	Cyclohexane	0	6	0	6	0	2
	Dichlorodifluoromethane	0	6	0	6	0	2
	Ethylbenzene	0	2	0	2	0	2
	Isopropylbenzene	0	6	0	6	0	2
	m+p-Xylenes	0	2	0	2	0	2
	Methyl acetate	0	6	4	6	2	2
	Methyl ethyl ketone	0	6	0	6	0	2
	Methyl isobutyl ketone	0	6	0	6	0	2
	Methyl tert-butyl ether (MTBE)	0	2	0	2	0	2
	Methylcyclohexane	0	6	0	6	0	2
	Methylene chloride	0	6	0	6	0	2
	o-Xylene	0	2	0	2	0	2
	Styrene	0	6	0	6	0	2
	Tetrachloroethene	0	6	0	6	0	2
	Toluene	0	2	0	2	0	2
	trans-1,2-Dichloroethene	0	6	0	6	0	2
	trans-1,3-Dichloropropene	0	6	0	6	0	2
	Trichloroethene	0	6	0	6	0	2
	Trichlorofluoromethane	0	6	0	6	0	2
	Vinyl chloride	0	6	0	6	0	2
Volatile Hydrocarbons	Benzene	0	64	0	116	0	30
	C5 to C8 Aliphatics	0	59	0	111	1	30
	C9 to C10 Aromatics	0	59	14	111	1	30
	C9 to C12 Aliphatics	0	59	20	111	0	30
	Ethylbenzene	0	63	0	115	0	30
	m+p-Xylenes	0	63	0	115	0	30
	Methyl tert-butyl ether (MTBE)	0	63	0	115	0	30
	Naphthalene	0	65	3	163	0	30
	o-Xylene	0	63	0	115	0	30
	Toluene	0	63	0	115	1	30
	Total Purgeable Hydrocarbons	0	59	32	111	3	30
	Xylenes, Total	0	59	0	111	0	30
Water quality parameters	Alkalinity, Total as CaCO3	61	61	--	--	--	--
	Bicarbonate as HCO3	61	61	--	--	--	--
	Carbonate as CO3	8	61	--	--	--	--
	Hardness as CaCO3	61	61	--	--	--	--
	Organic Carbon, Dissolved (DOC)	60	60	--	--	--	--
	Solids, Total Dissolved TDS @ 180 C	61	61	--	--	--	--
	Solids, Total Suspended TSS @ 105 C	4	61	--	--	--	--
Sediment/soil quality parameters	Carbon, Organic	--	--	123	123	38	38
	Moisture	--	--	124	124	38	38
	pH, sat. paste	--	--	123	123	38	38
	Solids, Total	--	--	106	106	--	--

-- = Not analyzed

Table 4-11. Availability of Data for Metals in Surface Water and Sediment

Reach	Number of Samples	
	Surface Water	Sediment
Site Locations		
Tailings Impoundment	13	43
Mill Pond	3	11
Lower Rainy Creek	18	21
Fleetwood Creek	9	18
Carney Creek	8	18
Upstream & Reference Stations		
Upper Rainy Creek	8	10
Bobtail Creek	1	1
Noisy Creek	1	1

Table 4-12. Surface Water Data for Metals in Mill Pond Samples

Analyte	Detection Frequency		Mean (µg/L)	SD	CV
	Detect	Total			
Aluminum	0	3	45	0	0
Antimony	0	3	2.5	0	0
Arsenic	0	3	2.5	0	0
Barium	3	3	300	0	0
Beryllium	0	3	0.25	0	0
Boron	0	3	8.33	0	0
Cadmium	0	3	0.05	0	0
Calcium	3	3	62,667	11,504	0.18
Chromium	0	3	5	0	0
Cobalt	0	3	5	0	0
Copper	0	3	1	0	0
Iron	0	3	15	0	0
Lead	0	3	0.25	0	0
Magnesium	3	3	18,667	3,215	0.17
Manganese	0	3	10	0	0
Mercury	0	3	0.3	0	0
Nickel	0	3	2.5	0	0
Potassium	3	3	10,333	577	0.06
Selenium	0	3	2.5	0	0
Silver	0	3	0.5	0	0
Sodium	3	3	5,333	577	0.11
Thallium	0	3	50	0	0
Vanadium	0	3	5	0	0
Zinc	0	3	5	0	0

SD = Standard Deviation
CV = Coefficient of Variance

Table 4-13. Metal Concentrations in Surface Water Samples Collected for the Site-Specific Surface Water Toxicity Test

Analyte	Dissolved Metals				Total Metals			
	TOX-PRE-DM1		TOX-PRE-DM2		TOX-PRE-TM1		TOX-PRE-TM2	
	Result (ug/L)	Qual.	Result (ug/L)	Qual.	Result (ug/L)	Qual.	Result (ug/L)	Qual.
Aluminum	90	U	90	U	90	U	90	U
Antimony	5	U	5	U	5	U	5	U
Arsenic	5	U	5	U	5	U	5	U
Barium	200	v	200	v	200	v	200	v
Beryllium	0.5	U	0.5	U	0.5	U	0.5	U
Cadmium	0.1	U	0.1	U	0.1	U	0.1	U
Calcium	53000	v	53000	v	46000	v	46000	v
Chromium	10	U	10	U	10	U	10	U
Cobalt	10	U	10	U	10	U	10	U
Copper	2	U	2	U	2	v	2	v
Iron	30	U	30	U	40	v	40	v
Lead	0.5	U	0.5	U	0.5	U	0.5	U
Magnesium	11000	v	11000	v	9000	v	9000	v
Manganese	20	U	20	U	20	U	20	U
Mercury	0.6	U	0.6	U	0.6	U	0.6	U
Nickel	5	U	5	U	5	U	5	U
Potassium	5000	v	5000	v	5000	v	5000	v
Selenium	5	U	5	U	5	U	5	U
Silver	1	U	1	U	1	U	1	U
Sodium	3000	v	3000	v	4000	v	4000	v
Thallium	100	U	100	U	100	U	100	U
Vanadium	10	U	10	U	10	U	10	U
Zinc	10	U	10	U	10	U	10	U

v = detect
U = nondetect

Table 4-14. Concentrations of Metals in Sediment Toxicity Tests

Analyte	Concentration (mg/kg)							
	CC-1		TP-TOE2		BTT-R1		NSY-R1	
	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Aluminum	10,700	v	17,600	v	8,540	v	7,350	v
Antimony	2	U	2	U	2	U	2	U
Arsenic	2	U	4	v	5	v	5	v
Barium	430	v	1,160	v	263	v	53	v
Beryllium	5	U	5	U	5	U	5	U
Boron	5	U	5	U	5	U	5	U
Cadmium	1	U	1	U	1	U	1	U
Chromium	91	v	358	v	8	v	6	v
Cobalt	16	v	32	v	8	v	5	v
Copper	22	v	34	v	14	v	11	v
Iron	22,000	v	28,200	v	18,900	v	14,000	v
Lead	7	v	14	v	12	v	9	v
Manganese	687	v	7,670	v	1,810	v	267	v
Nickel	31	v	66	v	11	v	9	v
Selenium	5	U	5	U	5	U	5	U
Silver	1	U	1	U	1	U	1	U
Thallium	0.6	U	0.6	U	0.6	U	0.6	U
Vanadium	39	v	64	v	9	v	6	v
Zinc	18	v	37	v	42	v	37	v

v = detect
U = nondetect

Table 4-15. Comparison of Chromium, Copper, Manganese and Nickel Concentrations in Site Sediments vs. Sediment Toxicity Tests

Location	# Samples	Concentration (mg/kg)							
		Chromium		Copper		Manganese		Nickel	
Carney Creek-1*	1	91		22		687		31	
Tailings Impoundment Toe-2*	1	358		34		7,670		66	
		Mean	Max	Mean	Max	Mean	Max	Mean	Max
Upper Rainy Creek	10	16	33	22	37	350	804	8	14
Lower Rainy Creek	21	147	258	25	36	622	1,350	31	52
Carney Creek	7	75	114	36	63	1,579	3,370	21	26
Fleetwood Creek	7	29	47	42	76	277	435	14	21
Tailings Impoundment	35	414	712	54	92	715	1,250	103	146
Tailings Impoundment Toe	7	214	397	25	43	7,743	12,700	46	77
Mill Pond	11	385	503	96	155	1,449	3,210	89	115
Carney Creek Pond	10	225	410	119	175	977	1,530	75	116
Fleetwood Creek Pond	11	234	379	41	80	440	627	64	107

* Sample used in site-specific sediment toxicity test

Higher than maximum tested concentration