TABLES

Table 3.1: Analytical Results for Surface-Water Samples in the Reference Areas

Analyte	Units	Screening Level [1]	REFERENCE AREA 1		REFERENCE AREA 2		REFERENCE AREA 3		AVERAGE	
			04/23/04	10/13/04	04/22/04	10/14/04	04/22/04	10/14/04	04/22/04	10/14/04
PHYSICAL (field parameters)										
Flow	cfs	na	1.0800	0.4657	3.7500	0.9421	1.9000	0.0134	2.24	0.47
Temperature	°c	na	8.2	9.9	5	6.2	4.9	12.7	6.0	9.6
pH	s.u.	6.5 - 8.5	**9.11**	8.47	**8.9**	8.42	**8.76**	8.35	**8.9**	8.4
Specific Conductance	(uS/cm)	na	345*	439	150	261	146	557	214	419
Dissolved Oxygen	(mg/L)	5.0	nm	nm	nm	nm	nm	nm	nm	nm
Oxidation Reduction Potential	(rmV)	na	nm	nm	nm	nm	nm	nm	nm	nm
INORGANIC										
Nitrite	(mg/L)	0.05	0 UH	na	< 0.01 U	na	< 0.01 U	na	0.005	na
Nitrate	(mg/L)	4.0	< 0.02 U	na	0.15	na	0.05 B	na	0.07	na
Chloride	(mg/L)	250.0	15	11	2 B	2 B	2 B	4 B	6	6
Sulfate	(mg/L)	250.0	60	30 B	20 B	10 B	10 B	20 B	30	20
Total Phosphorous as P	(mg/L)	0.05	0.03 B	0.03 B	0.01 B	0.02 B	**0.13**	0.01 B	**0.06**	0.02
Total Dissolved Solids	(mg/L)	500.0	300	270	140	150	140	330	193	250
Total Suspended Solids	(mg/L)	35.0	< 5 U	8 B	8 B	< 5 U	**326**	8 B	**112**	6
Bicarbonate as CaCO3	(mg/L)	na	194	181	112	118	107	264	138	188
Carbonate as CaCO3	(mg/L)	na	8 B	5 B	< 2 U	< 2 U	< 2 U	13	3	6
Cation-Anion Balance	%	na	-1.8	0	-1.9	1.9	2	0.8	-0.6	0.9
Hardness as CaCO3	(mg/L)	na	227	188	120	123	104	209	150	173
Hydroxide as CaCO3	(mg/L)	na	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	1	1
Nitrate/Nitrite as N, dissolve	(mg/L)	na	0 UH	na	0.15	na	0.05 B	na	0.10	na
Sum of Anions	meq/L	na	5.7	4.6	2.7	2.6	2.4	6	3.6	4.4
Sum of Cations	meq/L	na	5.5	4.6	2.6	2.7	2.5	6.1	3.5	4.5
TDS (calculated)	(mg/L)	na	305	243	141	134	127	318	191	232
TDS (ratio - measured/calculated)		na	0.98	1.11	0.99	1.12	1.1	1.04	1.02	1.09
Total Alkalinity	(mg/L)	na	202	186	112	118	107	277	140	194
METALS										
Antimony, dissolved	µg/L	124.0	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.1	0.1
Antimony, total	µg/L	6.0	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.4 U	< 0.2 U	0.1	0.1
Arsenic, dissolved	µg/L	93.0	1.6	2.1 B	0.4 B	< 0.5 U	1.9	5.8	1.3	2.7
Arsenic, total recoverable	µg/L	10.0	1.4	2 B	0.6	< 0.5 U	3.4	5.1	1.8	2.5
Barium, dissolved	µg/L	---	110	104	146	100	126	177	127	127
Barium, total	µg/L	1,000.0	110	116	159	107	194	193	154	139
Beryllium, dissolved	µg/L	---	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	0.05	0.05
Beryllium, total	µg/L	4.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	0.07	0.05
Cadmium, dissolved	µg/L	1.8	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	0.05	0.05
Cadmium, total	µg/L	5.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	0.07	0.05
Calcium, dissolved	µg/L		65400	53400	39200	39600	32400	64400	45667	52467
Chromium, dissolved	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	5	5
Chromium, total	µg/L	50.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	5	5
Copper, dissolved	µg/L	15.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	10 B	5	7
Copper, total	µg/L	1,000.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	5	5
Iron, dissolved	µg/L	300.0	20 B	10 B	40 B	40 B	110	10 B	57	20
Iron, total recoverable	µg/L	300.0	290	200	**370**	180	**2910**	110	**1190**	163
Lead, dissolved	µg/L	5.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	0.2 B	< 0.1 U	0.10	0.05
Lead, total	µg/L	15.0	0.2 B	0.3 B	0.3 B	0.1 B	3.3	0.1 B	1.3	0.2
Magnesium, dissolved	µg/L		15500	13200	5300	5800	5600	11700	8800	10233
Manganese, dissolved	µg/L	50.0	20 B	19 B	15 B	< 5 U	27 B	14 B	21	12
Manganese, total	µg/L	50.0	**68**	40	30	6 B	**218**	15 B	**105**	20
Mercury, dissolved	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.1	0.1
Mercury, total	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.1	0.1
Molybdenum, dissolved	µg/L	---	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	5	5
Molybdenum, total	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	10 B	< 10 U	7	5
Nickel, dissolved	µg/L	87.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	5	5
Nickel, total	µg/L	---	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	7	5
Potassium, dissolved	µg/L		2000	2600	1800	1200	3100	7600	2300	3800
Selenium, dissolved	µg/L	4.6	0.9	1 B	0.3 B	< 1 U	0.6	< 1 U	0.6	0.7
Selenium, total	µg/L	10.0	0.8	1 B	0.2 B	< 1 U	0.7 B	< 1 U	0.6	0.7
Silver, dissolved	µg/L	0.2	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	0.025	0.025
Silver, total	µg/L	50.0	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.1 U	< 0.05 U	0.033	0.025
Sodium, dissolved	µg/L		22700	18800	4400	5000	9500	39200	12200	21000
Uranium, dissolved	µg/L	---	5.2	7.28	0.58	0.35	1.91	3.45	2.56	3.69
Uranium, total	µg/L	30.0	4.74	7.43	0.51	0.35	2	3.5	2.42	3.76
Vanadium, dissolved	µg/L	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	2.5	2.5
Vanadium, total	µg/L	---	< 5 U	< 5 U	< 5 U	< 5 U	8 B	< 5 U	4.3	2.5
Zinc, dissolved	µg/L	177.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	5	5
Zinc, total	µg/L	5,000.0	< 10 U	< 10 U	< 10 U	< 10 U	10 B	< 10 U	7	5
RADIOLOGICAL (pCi/L)										
Gross Alpha	pCi/L	15.0	7.81	5.13	3.42	0	**19**	4.55	10.08	3.23
Gross Beta	pCi/L	50 pCi/L; 4 mrem/yr	3.2	1.83	6.1	3.53	18	13.4	9.10	6.25
Radium 226 and 228 (combined)	pCi/L	5.0	1.06	0.05	0.28	0.53	0.73	0.73	0.69	0.44
Thorium 230 and 232 (combined)	pCi/L	---	0.08	-0.95	-0.09	0.05	0.11	-0.45	0.06	0.02
Thorium 228	pCi/L	---	0.08	-0.17	-0.02	-0.12	0.36	0	0.15	0.00

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Holding time not met

[1] Screening level as determined in the Field Sampling Plan.
--- No promulgated standards or risk-based level.
Value in bold indicates level exceeds screening level

Mean calculated using 1/2 the method detection limit for values below detection

Table 3.2: Total Metals and Radionuclides in Sediment at the Reference Areas

Analyte	Units	Human Health Screening Level	Elk RMC	Ref Area 1	Ref Area 2	Ref Area 3	Average
Antimony, total (3050)	mg/Kg	50	----	0.1 B	0.2 B	0.2 B	0.2
Arsenic, total (3050)	mg/Kg	12	328	3.1	3	5.9	4.0
Barium, total (3050)	mg/Kg	71,540	----	271	166	318	252
Beryllium, total (3050)	mg/Kg	2,044	----	0.79	0.75	0.78	0.8
Cadmium, total (3050)	mg/Kg	70	3	0.47	0.34	0.5	0.4
Chromium, total (3050)	mg/Kg	1,533,000	----	8	6	12	9
Copper, total (3050)	mg/Kg	5,000	131	7	5	10	7
Iron, total (3050)	mg/Kg	306,600	----	11300	8820	12400	10840
Lead, total (3050)	mg/Kg	1,000	127	12 B	9 B	16 B	12
Manganese, total (3050)	mg/Kg	19,000	----	890	524	535	650
Mercury, total	mg/Kg	40	11	< 0.04 U	< 0.04 U	< 0.05 U	0.02
Molybdenum, total (3050)	mg/Kg	5,110	----	< 1 U	< 1 U	< 1 U	0.5
Nickel, total (3050)	mg/Kg	2,700	----	4 B	3 B	8	5
Selenium, total (3050)	mg/Kg	700	----	2.8 B	< 0.5 U	< 0.5 U	1.1
Silver, total (3050)	mg/Kg	700	----	< 0.5 U	< 0.5 U	< 0.5 U	0.25
Uranium, total (3050)	mg/Kg	3,066	----	4.86	0.75	0.62	2.1
Vanadium, total (3050)	mg/Kg	7,154	----	24	15.4	24.5	21.3
Zinc, total (3050)	mg/Kg	40,000	275	31	23	37	30
Gross Alpha	pCi/g	----	----	11.2	5.47	6.66	7.8
Gross Beta	pCi/g	----	----	12	6.18	12.3	10.2
Radium 226 (3050)	pCi/g	----	----	0.5	0.79	1.07	0.8
Radium 228 (3050)	pCi/g	----	----	0	1.44	1.84	1.1
Thorium 228	pCi/g	----	----	0.56	0.27	0.58	0.5
Thorium 230	pCi/g	----	----	-0.02	0.74	0.3	0.35
Thorium 232	pCi/g	----	----	0.51	0.59	0.73	0.6
Solids, Percent	%	----	----	44.9	60.6	73	59.5

Mean calculated using 1/2 the method detection limit

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Table 3.3: Total Metals and Radionuclides in Soil Samples Collected at the Reference Areas

Analyte	Units	Human Health Screening Level	Elk RMC	Reference Area 1				Reference Area 2			
				A	B	C	Mean[1]	A	B	C	Mean[1]
Antimony, total (3050)	mg/Kg	50	----	0.2 B	0.2 B	0.3 B	0.2	0.1 B	0.1 B	0.3 B	0.2
Arsenic, total (3050)	mg/Kg	12	328	8.8	5.1	**12.4**	8.8	5.3	4.4	**25.7**	11.8
Barium, total (3050)	mg/Kg	71,540	----	234	128	154	172	302	185	144	210.3
Beryllium, total (3050)	mg/Kg	2,044	----	0.84	0.55	0.71	0.70	0.65	0.45	0.41	0.5
Cadmium, total (3050)	mg/Kg	70	3	0.16 B	0.09 B	0.16 B	0.14	0.2 B	0.19 B	1.34	0.6
Chromium, total (3050)	mg/Kg	1,533,000	----	5	6	6	6	8	5	9	7.3
Copper, total (3050)	mg/Kg	5,000	131	7	4 B	9	7	24	14	75	37.7
Iron, total (3050)	mg/Kg	306,600	----	7640	6290	9490	7807	8090	5700	4790	6193.3
Lead, total (3050)	mg/Kg	1,000	127	16 B	9 B	17 B	14	13 B	11 B	82	35.3
Manganese, total (3050)	mg/Kg	19,000	----	151	207	236	198	308	397	276	327.0
Mercury, total	mg/Kg	40	11	< 0.04 U	< 0.04 U	< 0.04 U	0.02	< 0.04 U	< 0.05 U	< 0.04 U	0.02
Molybdenum, total (3050)	mg/Kg	5,110	----	1 B	< 1 U	1 B	1	< 1 U	< 1 U	7	1.5
Nickel, total (3050)	mg/Kg	2,700	----	5	4 B	5	5	4 B	3 B	3 B	3.3
Selenium, total (3050)	mg/Kg	700	----	< 0.5 U	< 0.5 U	< 0.5 U	0.3	2.2 B	0.9 B	5.2	2.8
Silver, total (3050)	mg/Kg	700	----	< 0.5 U	< 0.5 U	< 0.5 U	0	< 0.5 U	< 0.5 U	< 0.5 U	0.3
Uranium, total (3050)	mg/Kg	3,066	----	0.53	0.42	0.38	0.44	15.3	2.7	15.2	11.1
Vanadium, total (3050)	mg/Kg	7,154	----	12.9	12.1	13.4	12.8	97.8	44.2	136	92.7
Zinc, total (3050)	mg/Kg	40,000	275	16	15	18	16	17	15	125	52.3
Gross Alpha	pCi/g	----	----	4.23	3.39	3.89	3.84	46	22.7	87.8	52.2
Gross Beta	pCi/g	----	----	5.47	4.02	3.29	4.26	26.5	16	38.3	26.9
Radium 226 (3050)	pCi/g	----	----	0.49	0.63	0.69	0.60	7.15	4.65	13.2	8.3
Radium 228 (3050)	pCi/g	----	----	2.98	2.55	0.68	2.07	2.8	3.89	1.67	2.8
Thorium 228	pCi/g	----	----	0.34	0.38	0.26	0.33	0.29	0.31	0.81	0.47
Thorium 230	pCi/g	----	----	-0.36	-0.02	0.31	0.10	4.66	3.44	0.16	2.75
Thorium 232	pCi/g	----	----	0.08	0.16	0.49	0.24	0.36	0.17	0.31	0.28
Solids, Percent	%	----	----	91.7	92.4	93.7	92.6	90.4	94.8	93.5	92.9

Analyte	Units	Human Health Screening Level	Elk RMC	Reference Area 3					Ref Area Summary Statistics		
				A	B	C	C (duplicate)	Mean[1]	Minimum	Maximum	Mean[1]
Antimony, total (3050)	mg/Kg	50	----	0.1 B	0.1 B	< 0.1 U	< 0.1 U	0.1	< 0.1 U	0.3 B	0.2
Arsenic, total (3050)	mg/Kg	12	328	**19.1**	**13.4**	1.5	1.1	8.8	1.1	25.7	9.7
Barium, total (3050)	mg/Kg	71,540	----	419	168	167	151	226.3	128	419	205
Beryllium, total (3050)	mg/Kg	2,044	----	0.78	0.86	0.58	0.61	0.7	0.41	0.86	0.64
Cadmium, total (3050)	mg/Kg	70	3	0.19 B	0.25 B	0.19 B	0.2 B	0.2	0.09 B	1.34	0.30
Chromium, total (3050)	mg/Kg	1,533,000	----	5	9	11	12	9.3	5	12	8
Copper, total (3050)	mg/Kg	5,000	131	7	7	3 B	3 B	5.0	3 B	75	15
Iron, total (3050)	mg/Kg	306,600	----	5740	10600	8140	8760	8310.0	4790	10600	7524
Lead, total (3050)	mg/Kg	1,000	127	9 B	11 B	8 B	9 B	9.3	8 B	82	19
Manganese, total (3050)	mg/Kg	19,000	----	269	340	247	256	278.0	151	397	269
Mercury, total	mg/Kg	40	11	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	0.02	< 0.04 U	0.02	0.02
Molybdenum, total (3050)	mg/Kg	5,110	----	< 1 U	< 1 U	< 1 U	< 1 U	0.5	< 1 U	7	1
Nickel, total (3050)	mg/Kg	2,700	----	3 B	6	6	6	5.3	3 B	6	5
Selenium, total (3050)	mg/Kg	700	----	0.9 B	1.1 B	0.6 B	< 0.5 U	0.7	< 0.5 U	5.2	1.2
Silver, total (3050)	mg/Kg	700	----	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	0.3	< 0.5 U	< 0.5 U	0.3
Uranium, total (3050)	mg/Kg	3,066	----	0.58	0.59	1.6	1.81	1.1	0.38	15.3	3.9
Vanadium, total (3050)	mg/Kg	7,154	----	10.7	16.7	28.8	32.2	22.1	10.7	136	40
Zinc, total (3050)	mg/Kg	40,000	275	12	23	20	21	19.0	12	125	28
Gross Alpha	pCi/g	----	----	4.77	4.91	6.82	18.1	8.7	3.39	87.8	20.3
Gross Beta	pCi/g	----	----	6.6	7.51	11.6	15.9	10.4	3.29	38.3	13.5
Radium 226 (3050)	pCi/g	----	----	0.93	1.21	1.82	1.94	1.5	0.49	13.2	3.3
Radium 228 (3050)	pCi/g	----	----	3.17	1.51	4.15	3.15	3.0	0.68	4.15	2.66
Thorium 228	pCi/g	----	----	0.73	0.34	0.34	0.24	0.4	0.24	0.81	0.40
Thorium 230	pCi/g	----	----	22.3	-0.05	-0.02	0.39	5.7	-0.36	22.3	3.1
Thorium 232	pCi/g	----	----	0.46	0.47	0.47	0.53	0.5	0.08	0.53	0.35
Solids, Percent	%	----	----	88	87.3	91.5	91.6	89.6	87.3	94.8	91.5

[1] Mean calculated using 1/2 the Method Detection Limit

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.4: Total Metals and Radionuclides in Vegetation Samples Collected at Reference Area 3

Analyte	Units	Grass	Forb	Shrub
Antimony, total (3050)	mg/Kg	< 0.1 U	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	< 0.3 U	< 0.3 U	< 0.3 U
Barium, total (3050)	mg/Kg	41.5	106	90.8
Beryllium, total (3050)	mg/Kg	< 0.05 U	< 0.05 U	< 0.06 U
Cadmium, total (3050)	mg/Kg	0.07 B	0.12 B	0.06 B
Chromium, total (3050)	mg/Kg	1 B	2 B	2 B
Copper, total (3050)	mg/Kg	2 B	7	7
Iron, total (3050)	mg/Kg	322	252	255
Lead, total (3050)	mg/Kg	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	95	74.2	42.4
Mercury, total	mg/Kg	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	5 B	3 B	< 1 U
Nickel, total (3050)	mg/Kg	< 1 U	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2.4 B	7.4	1.3 B
Silver, total (3050)	mg/Kg	< 0.5 U	< 0.5 U	< 0.6 U
Uranium, total (3050)	mg/Kg	0.03 B	0.07 B	< 0.03 U
Vanadium, total (3050)	mg/Kg	0.7 B	0.8 B	0.6 B
Zinc, total (3050)	mg/Kg	10	30	33
Gross Alpha	pCi/g	1.63	0.94	2.25
Gross Beta	pCi/g	7.15	13.6	9.2
Radium 226 (3050)	pCi/g	1.98	0.07	0.45
Radium 228 (3050)	pCi/g	1.65	2.02	2.31
Thorium 228	pCi/g	-0.1	0.14	-0.13
Thorium 230	pCi/g	-0.59	-0.28	-0.44
Thorium 232	pCi/g	-0.17	0.06	0.05
Moisture Content	%	41.4	66.6	46.1

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Lim

U Analyte was not detected at the Method Detection Limit

H Holding time not met

Table 3.5: Summary of Community Metrics Calculated at Each Monitoring Station

Metric	Ref Area 1 La Sal Creek	Ref Area 2 Two Mile Creek	Ref Area 3 Hop Creek	La Sal Creek DN1	La Sal Creek DN2
Density (organisms/sq. meter)	92	125	13	108	37
Number of Taxa	10	28	10	22	21
Species Diversity	0.66	4.02	2.56	2.88	3.32
EPT [1] Taxa	2	19	3	9	8
HBI [2]	4.14	2.51	6.77	3.60	4.72
ICI [3]	12	44	18	26	34
B-IBI [4]	7	19	7	9	7

[1] EPT - Ephemeroptera, Plecoptera, and Trichoptera
[2] HBI - Hilsenhoff Biotic Index
[3] ICI - Index of Community Integrity (Deshon 1995)
[4] B-IBI - Benthic Index of Biotic Integrity (Fore 2001)

Table 3.6: Analytical Results for La Sal Creek Surface-Water Samples

Analyte	Units	Screening Level[1]	REFERENCE AREA 1		LA SAL CREEK UP			LA SAL CREEK DN1		LA SAL CREEK DN2		LA SAL CREEK DN3		LA SAL CREEK DN4		LA SAL CREEK DN5	
			04/23/04	10/13/04	04/23/04	4/23/04 (Dup)[2]	10/13/04	04/23/04	10/14/04	04/21/04	10/12/04	04/21/04	10/12/04	04/20/04	10/12/04	04/20/04	10/12/04
PHYSICAL (field parameters)																	
Flow	cfs	na	1.0800	0.4657	1.4300	1.4300	0.5123	1.0400	0.4476	6.7900	1.7126	6.6800	2.0064	7.0800	2.3400	7.6500	2.90905
Temperature	°c	na	8.2	9.9	7	7	9.3	6.2	5.8	7.5	11	6.2	11.7	8.2	10.2	6.1	9.9
pH	s.u.	6.5 - 8.5	**9.11**	8.47	**9.07**	**9.07**	8.38	**9.21**	**8.52**	**9.02**	8.31	**8.95**	8.34	**9**	8.29	**8.84**	8.28
Specific Conductance	(uS/cm)	na	345*	439	337 [3]	337 [3]	449	340 [3]	544	201	361	196	364	208	359	197.4	358
Dissolved Oxygen	(mg/L)	5.0	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Oxidation Reduction Potential	Rmev	na	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
INORGANIC																	
Nitrite	(mg/L)	0.05	0 UH	na	0 UH	0 UH	na	0 UH	na	< 0.01 U	na	< 0.01 U	na	< 0.01 U	na	< 0.01 U	na
Nitrate	(mg/L)	4.0	< 0.02 U	na	< 0.02 U	< 0.02 U	na	0.04 B	na	0.07 B	na	0.07 B	na	0.08 B	na	0.07 B	na
Chloride	(mg/L)	250.0	15	11	15	14	11	15	15	4 B	5	4 B	5	4 B	5 B	4 B	4 B
Sulfate	(mg/L)	250.0	60	30 B	60	60	30 B	60	60	40 B	40 B	20 B	40 B	20 B	30 B	20 B	30 B
Total Phosphorous as P	(mg/L)	0.05	0.03 B	0.03 B	0.04 B	0.03 B	0.05 B	0.05	**0.06**	0.05	0.01 B	0.04 B	0.01 B	0.05	**0.57**	0.05 B	0.03 B
Total Dissolved Solids	(mg/L)	500.0	300	270	300	300	270	310	340	170 H	220 H	160 H	220 H	190	210 H	170	180 H
Total Suspended Solids	(mg/L)	35.0	< 5 U	8 B	12 B	12 B	8 B	32	12 B	24	< 5 U	26	< 5 U	28	**116**	26	10 B
Bicarbonate as CaCO3	(mg/L)	na	194	181	198	195	184	199	209	131	158	134	152	134	155	138	166
Carbonate as CaCO3	(mg/L)	na	8 B	5 B	6 B	8 B	8 B	8 B	11	< 2 U	< 2 U	< 2 U	< 2 U	3 B	< 2 U	< 2 U	< 2 U
Cation-Anion Balance	%	na	-1.8	0	-0.9	-1.8	0	0	0	-4.5	-1.2	1.5	1.2	1.5	2.6	0	0
Hardness as CaCO3	(mg/L)	na	227	188	228	228	192	237	230	138	172	142	173	143	174	144	172
Hydroxide as CaCO3	(mg/L)	na	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	na	0 UH	na	0 UH	0 UH	na	0.04 BH	na	0.07 B	na	0.07 B	na	0.08 B	na	0.07 B	na
Sum of Anions	meq/L	na	5.7	4.6	5.7	5.7	4.7	5.8	6	3.5	4.1	3.2	4	3.2	3.8	3.3	4
Sum of Cations	meq/L	na	5.5	4.6	5.6	5.5	4.7	5.8	6	3.2	4	3.3	4.1	3.3	4	3.3	4
TDS (calculated)	(mg/L)	na	305	243	306	304	250	313	324	184	215	168	212	171	202	170	207
TDS (ratio - measured/calculated)		na	0.98	1.11	0.98	0.99	1.08	0.99	1.05	0.92	1.02	0.95	1.04	1.11	1.04	1	0.87
Total Alkalinity	(mg/L)	na	202	186	204	203	192	207	219	131	158	134	152	137	155	138	166
METALS																	
Antimony, dissolved	µg/L	124.0	< 0.2 U	< 0.2 U	< 0.2 U	0.3 B	< 0.2 U	< 0.2 U	< 0.2 U	0.3 B	< 0.2 U	< 0.2 U	< 0.2 U	0.3 B	< 0.2 U	0.2 B	< 0.2 U
Antimony, total	µg/L	6.0	< 0.2 U	< 0.2 U	< 0.2 U	< 0.4 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Arsenic, dissolved	µg/L	93.0	1.6	2.1 B	1.5	1.5	2.1 B	1.6	1.9 B	1.2	1.8 B	1	1.3 B	1.3	2.3 B	1.4	2.2 B
Arsenic, total recoverable	µg/L	10.0	1.4	2 B	1.4	1.5	2 B	1.3	1.9 B	1.6	1.2 B	1.5	1.2 B	1.5	< 3 U	1.5	1.9 B
Barium, dissolved	µg/L	127 ; 127 [4]	110	104	109	106	105	**128**	100	**139**	123	**142**	123	**142**	**141**	**144**	**149**
Barium, total	µg/L	1,000.0	110	116	109	110	118	136	106	146	118	144	118	154	138	158	145
Beryllium, dissolved	µg/L	0.05 ; 0.05 [4]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	4.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, dissolved	µg/L	1.8	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	5.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Calcium, dissolved	µg/L	45667 ; 52467 [4]	**65400**	**53400**	**65400**	**65600**	**54300**	**67000**	**60000**	41500	46800	42500	46600	41600	45900	41600	44800
Chromium, dissolved	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	50.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 20 U	< 10 U	< 10 U
Copper, dissolved	µg/L	15.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	1,000.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 20 U	< 10 U	< 10 U
Iron, dissolved	µg/L	300.0	20 B	10 B	10 B	10 B	20 B	290	20 B	60	40 B	80	20 B	60	30 B	60	30 B
Iron, total recoverable	µg/L	300.0	290	200	**450**	**340**	**330**	**1170**	210	**820**	120	**690**	110	**840**	170	**900**	240
Lead, dissolved	µg/L	5.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	0.1 B	< 0.1 U	< 0.1 U	0.3 B	< 0.1 U	0.3 B	< 0.1 U	0.4 B	< 0.1 U	0.4 B
Lead, total	µg/L	15.0	0.2 B	0.3 B	0.3 B	< 0.2 U	0.3 B	< 0.1 U	0.4 B	1.1	< 0.1 U	0.9	< 0.1 U	1.2	< 0.1 U	1.3	< 0.1 U
Magnesium, dissolved	µg/L	8800 ; 10233 [4]	**15500**	**13200**	**15700**	**15500**	**13800**	**16900**	**19400**	8300	**13300**	**8800**	**13800**	**9500**	**14500**	**9800**	**14700**
Manganese, dissolved	µg/L	50.0	20 B	19 B	22 B	20 B	26 B	**88**	20 B	17 B	25 B	17 B	24 B	29 B	29 B	28 B	22 B
Manganese, total	µg/L	50.0	**68**	40	**82**	**64**	**61**	**97**	35	**77**	31	**65**	28 B	**75**	30 B	**75**	27 B
Mercury, dissolved	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	5; 5 [4]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Molybdenum, total	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 20 U	< 10 U	< 10 U
Nickel, dissolved	µg/L	87.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	7 ; 5 [4]	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 20 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	2300 ; 3800 [4]	2000	2600	2100	2100	2700	**2300**	3100	2200	2300	2300	2200	**2400**	2400	2200	2300
Selenium, dissolved	µg/L	4.6	0.9	1 B	0.9	1	1 B	1.3	2 B	1.5	< 1 U	1.6	< 1 U	1.6	< 1 U	2	< 1 U
Selenium, total	µg/L	10.0	0.8	1 B	0.9	0.8 B	1 B	1	2 B	1.1	< 1 U	1.3	< 1 U	1.3	< 1 U	1.6	< 1 U
Silver, dissolved	µg/L	0.2	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	50.0	< 0.05 U	< 0.05 U	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Sodium, dissolved	µg/L	12200 ; 21000 [4]	**22700**	18800	**23200**	**21600**	**19600**	**24200**	**30400**	9100	13200	9400	13200	9300	11400	9200	11600
Uranium, dissolved	µg/L	2.56 ; 3.69 [4]	**5.2**	**7.28**	**5.1**	**5.26**	**7.5**	**7.8**	**11**	**4.39**	**7.43**	**4.29**	**7.77**	**4.1**	**7.09**	**7.25**	**17**
Uranium, total	µg/L	30.0	4.74	7.43	4.91	4.8	7.86	7.18	11.6	4.12	6.56	4.31	6.79	4.58	6.42	7.66	15.5
Vanadium, dissolved	µg/L	2.5 ; 2.5 [4]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	**21** B	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Vanadium, total	µg/L	4.3 ; 2.5 [4]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	**5** B	< 10 U	**6** B	**7** B
Zinc, dissolved	µg/L	177.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Zinc, total	µg/L	5,000.0	< 10 U	< 10 U	< 10 U	< 10 U	20 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 20 U	< 10 U	< 10 U
RADIOLOGICAL (pCi/L)																	
Gross Alpha	pCi/L	15.0	7.81	5.13	7.13	4.75	8.58	**15.8**	8.83	6.72	9.19	6.3	7.35	3.53	9.3	4.84	**30.3**
Gross Beta	pCi/L	50 pCi/L; 4 mrem/yr	3.2	1.83	2.46	3.41	4.56	9.35	6.79	5.6	5.2	3.27	5.17	3.35	4.45	3.41	19.1
Radium 226 and 228 (combined)	pCi/L	5.0	1.06	0.05	0.29	0.65	0.51	1.07	2.8	4.22	0.58	0.53	2.15	0.32	1.01	0.83	3.34
Thorium 230 and 232 (combined)	pCi/L	0.06 ; 0.02 [4]	**0.08**	-0.95	**0.27**	**0.15**	-0.09	**0.65**	-0.11	**0.19**	**0.33**	0	**0.58**	**0.57**	-0.22	**0.39**	**2.39**
Thorium 228	pCi/L	0.15 ; 0 [4]	0.08	-0.17	-0.12	0	0	0.04	**0.14**	-0.03	**0.18**	0.04	**0.11**	0.03	**0.17**	0.05	0

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

nm Not measured

[1] Screening level as determined in the Field Sampling Plan.

[2] La Sal Creek Dup is duplicate of sample La Sal Creek Up

[3] Temperature compensation turned off during transit in backpack reading too high use lab SC if available.

[4] Screening level based on average concentration at: April Average of Reference Area 1, 2, and 3 concentrations ; October Average of Reference Area 1, 2, and 3 concentrations. concentrations.

Value in bold indicates level exceeds screening level

Table 3.7: Total Metals and Radionuclides in Stream Sediment at the La Sal Creek Surface-Water Stations

Analyte	Units	Human Health Screening Level	Elk RMC	La Sal Crk Up Sed	La Sal Crk DN 1 Sed	La Sal Crk DN 2 Sed	La Sal Crk DN 3 Sed	La Sal Crk DN 3 (dup)	La Sal Crk DN 4 Sed	La Sal Crk DN 5 Sed
Antimony, total (3050)	mg/Kg	50	----	0.2 B	0.2 B	0.5	0.1 B	0.1 B	0.3 B	0.2 B
Arsenic, total (3050)	mg/Kg	12	328	4.8	9.5	4.7	2.2	2.6	6.2	3.7
Barium, total (3050)	mg/Kg	71,540	----	370	261	59.6	482	245	284	302
Beryllium, total (3050)	mg/Kg	2,044	----	0.77	0.49	0.23 B	0.15 B	0.17 B	1.06	0.3
Cadmium, total (3050)	mg/Kg	70	3	0.47	0.44	0.12 B	0.07 B	0.1 B	0.71	0.28 B
Chromium, total (3050)	mg/Kg	1,533,000	----	7	12	4 B	3 B	3 B	16	6
Copper, total (3050)	mg/Kg	5,000	131	7	34	3 B	2 B	3 B	16	14
Iron, total (3050)	mg/Kg	306,600	----	10900	6580	4420	2700	2710	16200	5150
Lead, total (3050)	mg/Kg	1,000	127	11 B	**141**	< 4 U	7 B	6 B	25	20
Manganese, total (3050)	mg/Kg	19,000	----	2000	306	172	101	119	757	233
Mercury, total	mg/Kg	40	11	< 0.04 U	< 0.04 U	< 0.05 U	< 0.04 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	< 1 U	3 B	< 1 U	< 1 U	< 1 U	1 B	< 1 U
Nickel, total (3050)	mg/Kg	2,700	----	4 B	3 B	2 B	1 B	2 B	10	3 B
Selenium, total (3050)	mg/Kg	700	----	1.5 B	13.1	< 0.5 U	< 0.5 U	0.7 B	< 0.5 U	2 B
Silver, total (3050)	mg/Kg	700	----	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	3,066	----	3.43	35	0.49	1.72	2.25	3.76	8.92
Vanadium, total (3050)	mg/Kg	7,154	----	25.1	477	14.7	29.8	31.4	53.2	127
Zinc, total (3050)	mg/Kg	40,000	275	29	32	11	7	8	49	20
Gross Alpha	pCi/g	7.8 [1]	----	**9.24**	**89.8**	4.5	**10.4**	**15**	**20.9**	**30.8**
Gross Beta	pCi/g	10.2 [1]	----	**10.4**	**45.4**	5.16	4.9	7.86	**19.7**	**19.3**
Radium 226 (3050)	pCi/g	0.8 [1]	----	**1.3**	**19.5**	0.4	**1.75**	**1.13**	**3.64**	**3.81**
Radium 228 (3050)	pCi/g	1.1 [1]	----	**1.97**	**2.18**	**2.42**	**1.2**	**2.34**	**1.43**	**2.62**
Thorium 228	pCi/g	0.47 [1]	----	0.38	0.32	0.05	0.23	0.26	**0.76**	**0.62**
Thorium 230	pCi/g	0.35 [1]	----	**0.87**	**20.6**	0.15	**0.98**	**0.38**	**1.58**	**4.8**
Thorium 232	pCi/g	0.61 [1]	----	0.59	**0.81**	0.18	0.1	-0.07	**0.79**	0.19
Solids, Percent	%	----	----	43	77.4	80	82.5	81.6	49.9	74.5

[1] Screening level based on average concentration at Ref Areas 1, 2, and 3.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Table 3.8: Analytical Results for Two Mile Creek and Hop Creek Surface-Water Samples

Analyte	Units	Screening Level [1]	REFERENCE AREA 2		TWO MILE CREEK			REFERENCE AREA 3		HOP CREEK DN	
			04/22/04	10/14/2004	04/21/04	10/13/04	10/13/04 (dup)	04/22/04	10/14/04	04/22/04	10/13/04
PHYSICAL (field parameters)											
Flow	cfs	na	3.75	0.9421	5.68	0.79775	0.79775	1.9	0.0134	1.84	0.0263
Temperature	°c	na	5	6.2	7.3	8.8	8.8	4.9	12.7	4.9	11.4
pH	s.u.	6.5 - 8.5	**8.9**	8.42	**9.03**	8.35	8.35	**8.76**	8.35	**8.98**	8.23
Specific Conductance	(uS/cm)	na	150	261	160	277	277	146	557	151	396
Dissolved Oxygen	(mg/L)	5.0	nm	nm	nm	nm	nm	nm	nm	nm	nm
Oxidation Reduction Potential	(rmV)	na	nm	nm	nm	nm	nm	nm	nm	nm	nm
INORGANIC											
Nitrite	(mg/L)	0.05	< 0.01 U	na	0 UH	na	na	< 0.01 U	na	< 0.01 U	na
Nitrate	(mg/L)	4.0	0.15	na	< 0.02 U	na	na	0.05 B	na	< 0.02 U	na
Chloride	(mg/L)	250.0	2 B	2 B	15	2 B	2 B	2 B	4 B	2 B	2 B
Sulfate	(mg/L)	250.0	20 B	10 B	60	10 B	20 B	10 B	20 B	20 B	10 B
Total Phosphorous as P	(mg/L)	0.05	0.01 B	0.02 B	0.04 B	< 0.01 U	0.01 B	**0.13**	0.01 B	**0.13**	0.04 B
Total Dissolved Solids	(mg/L)	500.0	140	150	300	160	150	140	330	150	230
Total Suspended Solids	(mg/L)	35.0	8 B	< 5 U	12 B	6 B	< 5 U	**326**	8 B	**138**	6 B
Bicarbonate as CaCO3	(mg/L)	na	112	118	113	128	128	107	264	113	200
Carbonate as CaCO3	(mg/L)	na	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	13	< 2 U	< 2 U
Cation-Anion Balance	%	na	-1.9	1.9	2	1.8	-1.7	2	0.8	0	1.2
Hardness as CaCO3	(mg/L)	na	120	123	116	131	131	104	209	108	175
Hydroxide as CaCO3	(mg/L)	na	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	na	0.15	na	0.08 B	na	na	0.05 B	na	< 0.02 U	na
Sum of Anions	meq/L	na	2.7	2.6	2.5	2.8	3	2.4	6	2.7	4.2
Sum of Cations	meq/L	na	2.6	2.7	2.6	2.9	2.9	2.5	6.1	2.7	4.3
TDS (calculated)	(mg/L)	na	141	134	131	144	154	127	318	143	214
TDS (ratio - measured/calculated)		na	0.99	1.12	1.15	1.11	0.97	1.1	1.04	1.05	1.07
Total Alkalinity	(mg/L)	na	112	118	113	128	128	107	277	113	200
METALS											
Antimony, dissolved	µg/L	124.0	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Antimony, total	µg/L	6.0	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.4 U	< 0.2 U	< 0.2 U	< 1 U
Arsenic, dissolved	µg/L	93.0	0.4 B	< 0.5 U	1	0.8 B	0.8 B	1.9	5.8	2.1	2.7 B
Arsenic, total recoverable	µg/L	10.0	0.6	< 0.5 U	1.7	0.8 B	0.8 B	3.4	5.1	4.5	3 B
Barium, dissolved	µg/L	127 ; 127 [2]	**146**	100	**145**	112	112	126	**177**	**128**	**170**
Barium, total	µg/L	1,000.0	159	107	161	122	122	194	193	207	184
Beryllium, dissolved	µg/L	0.05 ; 0.05 [2]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	4.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	0.2 B	< 0.5 U
Cadmium, dissolved	µg/L	1.8	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	5.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	0.1 B	< 0.5 U
Calcium, dissolved	µg/L	45667 ; 52467 [2]	39200	39600	36900	40300	40300	32400	**64400**	33100	45300
Chromium, dissolved	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	50.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	15.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	10 B	< 10 U	< 10 U
Copper, total	µg/L	1,000.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	300.0	40 B	40 B	100	30 B	30 B	110	10 B	110	50
Iron, total recoverable	µg/L	300.0	**370**	180	**1190**	170	170	**2910**	110	**3170**	**420**
Lead, dissolved	µg/L	5.0	< 0.1 U	< 0.1 U	0.1 B	< 0.1 U	< 0.1 U	0.2 B	< 0.1 U	0.2 B	< 0.1 U
Lead, total	µg/L	15.0	0.3 B	0.1 B	1.5	0.2 B	0.1 B	3.3	0.1 B	4.8	< 0.5 U
Magnesium, dissolved	µg/L	8800 ; 10233 [2]	5300	5800	5700	7400	7400	5600	**11700**	6200	**15000**
Manganese, dissolved	µg/L	50.0	15 B	< 5 U	17 B	16 B	15 B	27 B	14 B	19 B	**141**
Manganese, total	µg/L	50.0	30	6 B	**87**	19 B	19 B	**218**	15 B	**253**	**147**
Mercury, dissolved	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	5; 5 [2]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Molybdenum, total	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	10 B	< 10 U	10 B	< 10 U
Nickel, dissolved	µg/L	87.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	7 ; 5 [2]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	2300 ; 3800 [2]	1800	1200	2200	1600	1600	**3100**	**7600**	**3300**	**4300**
Selenium, dissolved	µg/L	4.6	0.3 B	< 1 U	0.7	1 B	1 B	0.6	< 1 U	1	2 B
Selenium, total	µg/L	10.0	0.2 B	< 1 U	0.6	< 1 U	< 1 U	0.7 B	< 1 U	0.8	< 5 U
Silver, dissolved	µg/L	0.2	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	50.0	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.3 U
Sodium, dissolved	µg/L	12200 ; 21000 [2]	4400	5000	6200	5800	5800	9500	**39200**	10200	17000
Uranium, dissolved	µg/L	2.56 ; 3.69 [2]	0.58	0.35	2.36	3.64	3.65	1.91	3.45	**3.97**	**14.8**
Uranium, total	µg/L	30.0	0.51	0.35	2.3	3.79	3.69	2	3.5	3.35	14.3
Vanadium, dissolved	µg/L	2.5 ; 2.5 [2]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	**5** B
Vanadium, total	µg/L	4.3 ; 2.5 [2]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	**8** B	< 5 U	**7** B	< 5 U
Zinc, dissolved	µg/L	177.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Zinc, total	µg/L	5,000.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	10 B	< 10 U	20 B	< 10 U
RADIOLOGICAL (pCi/L)											
Gross Alpha	pCi/L	15.0	3.42	0	3.22	2.55	1.73	**19**	4.55	12.8	8.9
Gross Beta	pCi/L	50 pCi/L; 4 mrem/yr	6.1	3.53	5.65	5.5	4.68	18	13.4	16.3	10.7
Radium 226 and 228 (combined)	pCi/L	5.0	0.28	0.53	0.86	0.32	0.52	0.73	0.73	0.89	0.83
Thorium 230 and 232 (combined)	pCi/L	0.06 ; 0.02 [2]	-0.09	**0.05**	**0.24**	-0.44	**0.13**	**0.11**	-0.45	**0.32**	**0.18**
Thorium 228	pCi/L	0.15 ; 0 [2]	-0.02	-0.12	-0.05	**0.07**	**0.03**	**0.36**	0	0.09	-0.08

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

nm Not measured

[1] Screening level as determined in the Field Sampling Plan. Bolded parameters have screening level set by concentration results at Reference Area.

[2] Screening level based on average concentration at Ref Area 1, 2, & 3 (April)/Ref Area 1, 2 & 3 (October).

Value in bold box **XX.XX** indicates level exceeds screening level

Table 3.9: Total Metals and Radionuclides in Stream Sediment at the TwoMile Creek and Hop Creek Surface-Water Stations

Analyte	Units	Human Health Screening Level	Elk RMC	TwoMile Crk DN Sed	TwoMile Crk DN (dup)	Hop Crk DN Sed
Antimony, total (3050)	mg/Kg	50	----	0.1 B	< 0.1 U	0.1 B
Arsenic, total (3050)	mg/Kg	12	328	3.8	4.3	6.7
Barium, total (3050)	mg/Kg	71,540	----	136	155	153
Beryllium, total (3050)	mg/Kg	2,044	----	0.25 B	0.27 B	0.51
Cadmium, total (3050)	mg/Kg	70	3	0.07 B	0.07 B	0.14 B
Chromium, total (3050)	mg/Kg	1,533,000	----	3 B	3 B	5
Copper, total (3050)	mg/Kg	5,000	131	3 B	4 B	5 B
Iron, total (3050)	mg/Kg	306,600	----	4170	4150	6600
Lead, total (3050)	mg/Kg	1,000	127	6 B	6 B	9 B
Manganese, total (3050)	mg/Kg	19,000	----	213	241	292
Mercury, total	mg/Kg	40	11	< 0.04 U	< 0.04 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	< 1 U	< 1 U	< 1 U
Nickel, total (3050)	mg/Kg	2,700	----	2 B	2 B	4 B
Selenium, total (3050)	mg/Kg	700	----	< 0.5 U	< 0.5 U	< 0.5 U
Silver, total (3050)	mg/Kg	700	----	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	3,066	----	0.42	0.51	0.84
Vanadium, total (3050)	mg/Kg	7,154	----	9	8.6	13.5
Zinc, total (3050)	mg/Kg	40,000	275	11	12	18
Gross Alpha	pCi/g	7.78 [1]	----	3.25	3.62	5.75
Gross Beta	pCi/g	10.16 [1]	----	4.58	3.44	5.87
Radium 226 (3050)	pCi/g	0.79 [1]	----	0.55	0.72	0.4
Radium 228 (3050)	pCi/g	1.09 [1]	----	**2.35**	**1.42**	**2.56**
Thorium 228	pCi/g	0.47 [1]	----	0.1	-0.03	-0.08
Thorium 230	pCi/g	0.35 [1]	----	-0.64	0.13	-0.1
Thorium 232	pCi/g	0.61 [1]	----	-0.07	0.37	0.15
Solids, Percent	%	----	----	73.2	73	74.5

[1] Screening level based on the average concentration of Reference Areas 1, 2, and 3.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.10: Analytical Results for Lion Canyon Creek Surface-Water Samples

Analyte	Units	Screening Level [1]	LIONCYNCK - UP		LIONCYNCK - DN1			LIONCYNCK - DN2	
			04/13/04	10/12/04	04/13/04	10/12/04	10/12/04 (dup)	04/13/04	10/12/04
PHYSICAL (field parameters)									
Flow	cfs	na	1.30E-03	2.31E-03	1.57E-02	~ 1.40E-02	~ 1.40E-02	2.01E-01	3.93E-02
Temperature	°c	na	11.3	12.4	13.2	13.3	13.3	13.1	13.7
pH	s.u.	6.5 - 8.5	8.33	8.23	**8.89**	**8.82**	**8.82**	8.35	8.29
Specific Conductance	(uS/cm)	na	640	691	578	593	593	280	298
Dissolved Oxygen	(mg/L)	5.0	7.58	6.82	8.23	7.75	7.75	8.15	8.43
Oxidation Reduction Potential	rmV	na	81.7	107.7	46.5	64.8	64.8	32.2	16.2
INORGANIC (mg/L)	(mg/L)								
Nitrite	(mg/L)	0.05	< 0.01 U	na	**0.07**	na	na	< 0.01 U	na
Nitrate	(mg/L)	4.0	0.27	na	< 0.76 U	na	na	0.16	na
Chloride	(mg/L)	250.0	13	7	6	6	6	1 B	2 B
Sulfate	(mg/L)	250.0	70	100	70	70	70	10 B	20 B
Total Phosphorous as P	(mg/L)	0.05	0.04 B	0.04 B	0.02 B	0.02 B	0.02 B	0.01 B	0.01 B
Total Dissolved Solids	(mg/L)	500.0	440	460 H	380	360 H	390 H	170	170 H
Total Suspended Solids	(mg/L)	35.0	18 B	< 5 U	8 B	6 BH	6 BH	6 B	< 5 U
Bicarbonate as CaCO3	(mg/L)	na	274	286	231	241	252	145	156
Carbonate as CaCO3	(mg/L)	na	7 B	< 2 U	31	42	42	< 2 U	< 2 U
Cation-Anion Balance	%	na	5.1	2.4	4.8	0	-1.4	6.1	0
Hardness as CaCO3	(mg/L)	na	111	168	165	168	167	145	147
Hydroxide as CaCO3	(mg/L)	na	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	na	0.27	na	0.76	na	na	0.16	na
Sum of Anions	meq/L	na	7.4	8	6.9	7.3	7.5	3.1	3.6
Sum of Cations	meq/L	na	8.2	8.4	7.6	7.3	7.3	3.5	3.6
TDS (calculated)	(mg/L)	na	433	455	404	412	418	163	180
TDS (ratio - measured/calculated)		na	1.02	1.01	0.94	0.87	0.93	1.04	0.94
Total Alkalinity	(mg/L)	na	280	286	262	283	293	145	156
METALS									
Antimony, dissolved	µg/L	124.0	< 2 U	0.8 B	< 1 U	0.5 B	0.5 B	< 0.4 U	< 0.2 U
Antimony, total	µg/L	6.0	0.6 B	0.8 B	0.5 B	0.5 B	0.5 B	< 0.2 U	< 0.2 U
Arsenic, dissolved	µg/L	93.0	46.2	46.8	36.7	33	29.4	4.5	5.8
Arsenic, total recoverable	µg/L	10.0	**40.6**	**44.7**	**31.7**	**28.3**	**32**	4.5	5.4
Barium, dissolved	µg/L	127/127 [2]	75	93	107	**133**	**131**	**209**	**214**
Barium, total	µg/L	1,000.0	78	90	120	126	125	193	207
Beryllium, dissolved	µg/L	0.05/0.05 [2]	< 1 U	< 0.1 U	< 0.5 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U
Beryllium, total	µg/L	4.0	< 0.1 U	< 0.2 U	< 0.1 U	< 1 U	< 1 U	< 0.1 U	< 0.1 U
Cadmium, dissolved	µg/L	1.8	0.3 B	< 0.1 U	0.2 B	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	5.0	0.3 B	< 0.2 U	0.4 B	0.1 B	< 0.2 U	< 0.1 U	< 0.1 U
Calcium, dissolved	µg/L	45,667/52,467 [2]	26100	38200	32300	34300	34000	31400	32100
Chromium, dissolved	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	50.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	15.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	1,000.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	300.0	40 B	10 B	20 B	< 10 U	< 10 U	50 B	40 B
Iron, total recoverable	µg/L	300.0	**340**	130	**610**	70	110	240	**500**
Lead, dissolved	µg/L	5.0	0.4 B	**6**	0.2 B	< 0.1 U	**7**	< 0.1 U	0.4 B
Lead, total	µg/L	15.0	1.7	< 1 U	3.7	< 1 U	< 1 U	0.6	< 0.1 U
Magnesium, dissolved	µg/L	8,800/10,233 [2]	**11100**	**17700**	**20400**	**19900**	**19900**	**16300**	**16200**
Manganese, dissolved	µg/L	50.0	14 B	14 B	< 5 U	< 5 U	< 5 U	**57**	**88**
Manganese, total	µg/L	50.0	33	20 B	43	6 B	8 B	**68**	**90**
Mercury, dissolved	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 1 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	5/5 [2]	**170**	**190**	**120**	**110**	**110**	**20** B	**10** B
Molybdenum, total	µg/L	100.0	**160**	**180**	**110**	**110**	**110**	< 10 U	20 B
Nickel, dissolved	µg/L	87.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	7/5 [2]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	2,300/3,800 [2]	**8200**	**9200**	**8900**	**8300**	**8300**	2200	2300
Selenium, dissolved	µg/L	4.6	**274**	**330**	**241**	**167**	**162**	**20.2**	**9**
Selenium, total	µg/L	10.0	**260**	**268**	**184**	**145**	**131**	**15.8**	**11**
Silver, dissolved	µg/L	0.2	< 0.05 U	< 0.05 U	0.07 B	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	50.0	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U
Sodium, dissolved	µg/L	12,200/21,000 [2]	**132000**	**111000**	**93200**	**86800**	**86500**	14100	14100
Uranium, dissolved	µg/L	2.56/3.69 [2]	**1200**	**1080**	**744**	**754**	**760**	**97.2**	**131**
Uranium, total	µg/L	30.0	**1240**	**938**	**763**	**653**	**652**	**114**	**116**
Vanadium, dissolved	µg/L	2.5/2.5 [2]	**393**	**630**	**531**	**533**	**534**	**50**	**53**
Vanadium, total	µg/L	4.3/2.5 [2]	**397**	**578**	**558**	**519**	**518**	**55**	**64**
Zinc, dissolved	µg/L	177.0	< 10 U	< 10 U	< 10 U	20 B	< 10 U	< 10 U	< 10 U
Zinc, total	µg/L	5,000.0	< 10 U	10 B	20 B	10 B	10 B	< 10 U	< 10 U
RADIOLOGICAL (pCi/L)									
Gross Alpha	pCi/L	15.0	**656**	**691**	**353**	**506**	**559**	**94.8**	**105**
Gross Beta	pCi/L	50 pCi/L; 4 mrem/yr	**239**	**226**	**136**	**150**	**137**	26.9	32.6
Radium 226 and 228 (combined)	pCi/L	5.0	**10.22**	**14.3**	**11.38**	**14.48**	**13.99**	4.74	**7.15**
Thorium 230 and 232 (combined)	pCi/L	0.06/0.02 [2]	**0.67**	-0.51	**1.17**	**0.55**	**0.86**	-0.05	-0.3
Thorium 228		0.15/0 [2]	0.07	-0.05	-0.07	-0.05	-0.05	0.05	-0.08

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average concentration at Reference Areas (April/October)

Value in bold indicates level exceeds screening level

Table 3.11: Total Metals and Radionuclides in Stream Sediment
Lion Canyon Creek Surface-Water Stations

Analyte	Units	Human Health Screening Level	Elk RMC	Lion Cyn Crk UP Sed	Lion Cyn Crk DN 1 Sed	Lion Cyn Crk DN 2 Sed
Antimony, total (3050)	mg/Kg	50	----	0.2 B	0.1 B	0.1 B
Arsenic, total (3050)	mg/Kg	12	328	**13.8**	10	4.7
Barium, total (3050)	mg/Kg	71,540 [2]	----	103	70.8	216
Beryllium, total (3050)	mg/Kg	2044 [2]	----	0.42	0.28 B	0.5
Cadmium, total (3050)	mg/Kg	70	3	0.95	0.62	0.31
Chromium, total (3050)	mg/Kg	1,533,000 [2]	----	25	10	6
Copper, total (3050)	mg/Kg	5,000	131	34	29	7
Iron, total (3050)	mg/Kg	306,600 [2]	----	4510	3110	7090
Lead, total (3050)	mg/Kg	1,000	127	109	112	36
Manganese, total (3050)	mg/Kg	19,000	----	162	129	363
Mercury, total	mg/Kg	40	11	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110 [2]	----	5 B	4 B	< 1 U
Nickel, total (3050)	mg/Kg	2,700	----	4 B	2 B	3 B
Selenium, total (3050)	mg/Kg	700	----	25.5	22.8	3.2
Silver, total (3050)	mg/Kg	700	----	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	3,066 [2,3]	----	151	86.8	14.5
Vanadium, total (3050)	mg/Kg	7,154 [2]	----	972	776	167
Zinc, total (3050)	mg/Kg	40,000	275	88	51	132
Gross Alpha	pCi/g	7.78 [1]	----	**323**	**325**	**49.6**
Gross Beta	pCi/g	10.16 [1]	----	**157**	**130**	**24.6**
Radium 226 (3050)	pCi/g	0.79 [1]	----	**45.2**	**38.3**	**0.84**
Radium 228 (3050)	pCi/g	1.09 [1]	----	**2.33**	**2.25**	**1.12**
Thorium 228	pCi/g	0.47 [1]	----	**0.6**	0.21	0.27
Thorium 230	pCi/g	0.35 [1]	----	**45.6**	**45.8**	**7.96**
Thorium 232	pCi/g	0.61 [1]	----	0.5	0.24	0.25
Solids, Percent	%	----	----	77.2	77.6	72.6

Qualifiers are defined as follows:

[1] Screening level based on the average concentration of Reference Areas 1, 2, and 3.

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.12: Analytical Results for Residence Spring Surface-Water Samples

Analyte	Units	Screening Level [1]	RESIDENCE NO. 1			RESIDENCE NO. 2		RESIDENCE 3U		RESIDENCE 3L		RESIDENCE 3W		
			04/27/04	4/27/04 (dup)	10/18/04	04/27/04	10/18/04	04/28/04	10/18/04	04/27/04	10/19/04	04/28/04	10/19/04	10/19/04 (dup)
PHYSICAL (field parameters)														
Flow	cfs	na	nm	nm	nm	nm	~ 3.53E-03	1.59E-02	1.77E-02	nm	5.77E-03	nm	~ 5.34E-02	~ 5.34E-02
Temperature	°C	na	9.8	9.8	11.5	10.9	10.7	13.1	13.9	12.7	13.2	14.3	14.1	14.1
pH	s.u.	6.5 - 8.5	7.07	7.07	**6.45**	7.52	6.79	7.9	7.43	7.83	7.72	7.36	7.41	7.41
Specific Conductance	(uS/cm)	na	234	234	265	308	305	159.5	165.3	173.9	182.7	275	275	275
Dissolved Oxygen	(mg/L)	< 5.0	**1.14**	**1.14**	**0.75**	7.4	5.2	7.66	7.22	6.83	6.87	**2.12**	**0.62**	**0.62**
Oxidation Reduction Potential	(rmV)	na	159.3	159.3	190.6	146.6	250	121.2	122.8	104.4	130.8	-58.2	-58.1	-58.1
INORGANIC														
Nitrite	(mg/L)	0.05	< 0.01 U	< 0.01 U	na	< 0.01 U	na	< 0.01 U	na	< 0.01 U	na	< 0.01 U	na	na
Nitrate	(mg/L)	4.0	0.11	0.11	na	0.08 B	na	0.27	na	0.26	na	< 0.02 U	na	na
Chloride	(mg/L)	250.0	1 B	1 B	1 B	4 B	3 B	1 B	1 B	1 B	1 B	1 B	< 1 U	< 1 U
Sulfate	(mg/L)	250.0	20 B	20 B	40 B	30 B	30 B	20 B	10 B	20 B	20 B	20 B	20 B	20 B
Total Phosphorous as P	(mg/L)	0.05	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	0.01 B	< 0.01 U	0.01 B	< 0.01 U	0.01 B	< 0.01 U
Total Dissolved Solids	(mg/L)	500.0	140	100	150	150	180	60	70	90	90	150	160	170
Total Suspended Solids (mg/L)	(mg/L)	35.0	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	8 B	< 5 U
Bicarbonate as CaCO3	(mg/L)	na	108	108	109 H	140	142 H	63	64	69	72	142	140	141
Carbonate as CaCO3	(mg/L)	na	< 2 U	< 2 U	0 UH	< 2 U	0 UH	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Cation-Anion Balance	%	na	0	0	-3.4	0	-1.4	-6.3	-3.4	-2.9	-5.9	0	-1.6	-1.6
Hardness as CaCO3	(mg/L)	na	117	116	126	153	147	67	64	74	70	149	145	144
Hydroxide as CaCO3	(mg/L)	na	< 2 U	< 2 U	0 UH	< 2 U	0 UH	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	na	0.11	0.11	na	0.08 B	na	0.27	na	0.26	na	< 0.02 U	na	na
Sum of Anions	meq/L	na	2.6	2.6	3	3.5	3.5	1.7	1.5	1.8	1.8	3.2	3.2	3.2
Sum of Cations	meq/L	na	2.6	2.6	2.8	3.5	3.4	1.5	1.4	1.7	1.6	3.2	3.1	3.1
TDS (calculated)	(mg/L)	na	133	132	157	178	177	86	74	92	92	162	159	159
TDS (ratio - measured/calculated)		na	1.05	0.76	0.96	0.84	1.02	0.7	0.95	0.98	0.98	0.93	1.01	1.07
Total Alkalinity	(mg/L)	na	108	108	109 H	140	142 H	63	64	69	72	142	140	141
METALS														
Antimony, dissolved	µg/L	124.0	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.3 B	< 0.2 U	< 0.2 U
Antimony, total	µg/L	6.0	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 1 U
Arsenic, dissolved	µg/L	93.0	0.5 B	0.4 B	< 0.5 U	0.3 B	< 0.5 U	< 0.1 U	< 0.5 U	< 0.1 U	< 0.5 U	< 0.1 U	< 0.5 U	< 0.5 U
Arsenic, total recoverable	µg/L	10.0	0.5	0.4 B	< 0.5 U	0.3 B	< 0.5 U	< 0.2 U	< 0.5 U	< 0.1 U	< 0.5 U	< 0.2 U	< 0.5 U	< 3 U
Barium, dissolved	µg/L	127/127 [2]	41	40	44	**146**	**140**	79	81	90	88	**167**	**166**	**164**
Barium, total	µg/L	1,000.0	39	39	46	143	145	77	22	87	93	163	167	165
Beryllium, dissolved	µg/L	0.05/0.05 [2]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	**0.1** B	< 0.1 U	**0.1** B
Beryllium, total	µg/L	4.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.5 U
Cadmium, dissolved	µg/L	1.8	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	5.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.5 U
Calcium, dissolved	µg/L	45,667/52,467 [2]	24300	24300	25900	28000	27200	11800	11400	12800	12200	32100	31400	31300
Chromium, dissolved	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	50.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	15.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	1,000.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	300.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**550**	**560**	**560**
Iron, total recoverable	µg/L	300.0	20 B	20 B	160	50	40 B	< 10 U	100	10 B	20 B	**580**	**600**	**590**
Lead, dissolved	µg/L	5.0	0.1 B	< 0.1 U	0.4 B	0.1 B	0.3 B	< 0.1 U	< 0.1 U	0.1 B	0.4 B	< 0.1 U	0.3 B	0.4 B
Lead, total	µg/L	15.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.5 U
Magnesium, dissolved	µg/L	8,800/10,233 [2]	**13700**	**13500**	**14800**	**20100**	**19100**	**9200**	8700	**10200**	9600	**16700**	**16100**	**15900**
Manganese, dissolved	µg/L	50.0	6 B	7 B	23 B	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	**290**	**309**	**301**
Manganese, total	µg/L	50.0	6 B	8 B	**123**	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	**292**	**289**	**287**
Mercury, dissolved	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	5/5 [2]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Molybdenum, total	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	40 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, dissolved	µg/L	87.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	7/5 [2]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	2,300/3,800 [2]	2000	2000	2200	2200	2200	900 B	800 B	1000	1200	**2400**	2400	2300
Selenium, dissolved	µg/L	4.6	**16.4**	**16.3**	**14**	**5**	4 B	0.6	< 1 U	1.3	1 B	< 0.1 U	< 1 U	< 1 U
Selenium, total	µg/L	10.0	**12.4**	**12.4**	10	3.4	4 B	0.3 B	< 1 U	1.1	< 1 U	< 0.1 U	< 1 U	< 5 U
Silver, dissolved	µg/L	0.2	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	50.0	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.3 U
Sodium, dissolved	µg/L	12,200/21,000 [2]	6400	6200	7400	9700	10200	4000	3600	4600	4700	3800	3800	3700
Uranium, dissolved	µg/L	2.56/3.69 [2]	1.38	1.34	1.57	**18.1**	**19.3**	0.39	0.36	0.66	0.64	0.08 B	0.17 B	< 0.1 U
Uranium, total	µg/L	30.0	1.53	1.48	1.48	19.2	16.5	0.4	0.31	0.73	0.64	0.08 B	0.26 B	< 0.3 U
Vanadium, dissolved	µg/L	2.5/2.5 [2]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Vanadium, total	µg/L	4.3/2.5 [2]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Zinc, dissolved	µg/L	177.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	40 B	< 10 U
Zinc, total	µg/L	5,000.0	< 10 U	< 10 U	< 10 U	< 10 U	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	70	< 10 U
RADIOLOGICAL (pCi/L)														
Gross Alpha	pCi/L	15.0	4.58	0	3.94	9.75	**16.5**	-0.8	1.45	0.55	2.01	-1.01	2.59	6.02
Gross Beta	pCi/L	50 pCi/L; 4 mrem/yr	2.13	2.02	4.65	3.82	4.66	-0.38	3.32	-0.67	0.78	1.36	4.43	6.86
Radium 226 and 228 (combined)	pCi/L	5.0	0.31	0.32	0.75	0.51	0.85	0.54	0.06	0.24	1.48	0.82	0.42	0.28
Thorium 230 and 232 (combined)	pCi/L	0.06/0.02 [2]	0.01	**0.28**	-0.02	0	-0.11	-0.05	-0.52	0.06	-0.5	**0.07**	-0.05	-0.3
Thorium 228	pCi/L	0.15/0 [2]	0.13	**0.38**	**0.05**	0.02	**0.09**	0.07	-0.1	-0.02	-0.02	**0.2**	**0.05**	**0.06**

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average concentration at Reference Areas (April/October)

Values in bold indicates level exceeds screening level

Table 3.13: Total Metals and Radionuclides in Soil and Vegetation Samples Collected at Residence 1

Soil

Analyte	Units	Screening Level	Garden Soil	Garden Soil (dup)	Pasture Soil
Antimony, total (3050)	mg/Kg	3	0.3 B	0.3 B	0.2 B
Arsenic, total (3050)	mg/Kg	1	**17.5**	**21.5**	**12.4**
Barium, total (3050)	mg/Kg	5,475	211	315	153
Beryllium, total (3050)	mg/Kg	156	0.85	0.8	0.92
Cadmium, total (3050)	mg/Kg	3	0.39	0.41	0.17 B
Chromium, total (3050)	mg/Kg	117,321	6	6	5
Copper, total (3050)	mg/Kg	250	18	18	11
Iron, total (3050)	mg/Kg	23,464	6680	6580	6110
Lead, total (3050)	mg/Kg	400	28	32	15 B
Manganese, total (3050)	mg/Kg	960	393	391	240
Mercury, total	mg/Kg	2	< 0.04 U	0.06 B+	< 0.04 U
Molybdenum, total (3050)	mg/Kg	391	2 B	1 B	1 B
Nickel, total (3050)	mg/Kg	135	5 B	5 B	4 B
Selenium, total (3050)	mg/Kg	35	3 B	3.3	3.7
Silver, total (3050)	mg/Kg	35	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	235	7.07	8.38	8.53
Vanadium, total (3050)	mg/Kg	548	73	78.3	77.3
Zinc, total (3050)	mg/Kg	2,000	49	48	19
Gross Alpha	pCi/g	20.3 [1]	17.7	20.4	17.9
Gross Beta	pCi/g	13.5 [1]	13.2	14.6	11.2
Radium 226 (3050)	pCi/g	0.06	**6.43**	**6.75**	**4.84**
Radium 228 (3050)	pCi/g	0.09	**0.87**	0	**0.73**
Thorium 228	pCi/g	0.40 [1]	0.08	0.41	0.12
Thorium 230	pCi/g	3.13 [1]	4.81	4.27	4.49
Thorium 232	pCi/g	0.35 [1]	0.48	0.36	0.58
Solids, percent	%	---	87.8	87.9	89.1

[1] Screening level based on average concentration at Reference Areas 1, 2, and 3.

Vegetation

Analyte	Units	Garden Produce	Garden Produce Dup	Ref Area Grass	Pasture Grass
Antimony, total (3050)	mg/Kg	< 0.2 U	< 0.2 U	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	< 0.4 U	< 0.5 U	< 0.3 U	< 0.3 U
Barium, total (3050)	mg/Kg	6.8	8.8	41.5	**55.4**
Beryllium, total (3050)	mg/Kg	< 0.08 U	< 0.1 U	< 0.05 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.15 B	0.2 B	0.07 B	0.05 B
Chromium, total (3050)	mg/Kg	< 2 U	< 2 U	1 B	< 1 U
Copper, total (3050)	mg/Kg	13	14	2 B	**10**
Iron, total (3050)	mg/Kg	54	70	322	76
Lead, total (3050)	mg/Kg	< 6 U	< 9 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	15.1	20	95	73.9
Mercury, total	mg/Kg	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	4 B	3 B	5 B	5 B
Nickel, total (3050)	mg/Kg	< 2 U	< 2 U	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	1.9 B	3 B	2.4 B	**4**
Silver, total (3050)	mg/Kg	< 0.8 U	< 1 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	< 0.04 U	< 0.05 U	0.03 B	**0.16**
Vanadium, total (3050)	mg/Kg	< 0.8 U	< 1 U	0.7 B	< 0.5 U
Zinc, total (3050)	mg/Kg	31	26	10	**28**
Gross Alpha	pCi/g	1.23	1.83	1.63	**2.02**
Gross Beta	pCi/g	42	37.8	7.15	**22.4**
Radium 226 (3050)	pCi/g	0.41	0.83	1.98	0.67
Radium 228 (3050)	pCi/g	4.45	2.7	1.65	**3.32**
Thorium 228	pCi/g	-0.07	0.2	-0.1	**0.05**
Thorium 230	pCi/g	-0.07	-0.75	-0.59	-0.24
Thorium 232	pCi/g	0.43	0.2	-0.17	-0.05
Solids, percent	%	94.7	94.6	41.4	70.2

Value in bold indicates level exceeds screening level (soil) or background level (pasture grass)

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

Table 3.14: Total Metals and Radionuclides in Soil and Vegetation Samples Collected at Residence 2

Soil

Analyte	Units	Screening Level	Pasture Soil
Antimony, total (3050)	mg/Kg	3	0.3 B
Arsenic, total (3050)	mg/Kg	1	**7.1**
Barium, total (3050)	mg/Kg	5,475	192
Beryllium, total (3050)	mg/Kg	156	1
Cadmium, total (3050)	mg/Kg	3	0.24 B
Chromium, total (3050)	mg/Kg	117,321	7
Copper, total (3050)	mg/Kg	250	8
Iron, total (3050)	mg/Kg	23,464	8610
Lead, total (3050)	mg/Kg	400	10 B
Manganese, total (3050)	mg/Kg	960	283
Mercury, total	mg/Kg	2	< 0.05 U
Molybdenum, total (3050)	mg/Kg	391	2 B
Nickel, total (3050)	mg/Kg	135	6
Selenium, total (3050)	mg/Kg	35	0.9 B
Silver, total (3050)	mg/Kg	35	< 0.5 U
Uranium, total (3050)	mg/Kg	13.9	2.33
Vanadium, total (3050)	mg/Kg	548	24.5
Zinc, total (3050)	mg/Kg	2,000	29
Gross Alpha	pCi/g	20.3 [1]	14.6
Gross Beta	pCi/g	13.5 [1]	**16**
Radium 226 (3050)	pCi/g	0.06	**1.59**
Radium 228 (3050)	pCi/g	0.09	0
Thorium 228	pCi/g	0.40 [1]	**0.53**
Thorium 230	pCi/g	3.13 [1]	-0.07
Thorium 232	pCi/g	0.35 [1]	0.12
Solids, percent	%	---	85.8

[1] Screening level based on average concentration at Reference Areas 1, 2, and 3.

Vegetation

Analyte	Units	Ref Area Grass	Pasture Grass
Antimony, total (3050)	mg/Kg	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	< 0.3 U	< 0.3 U
Barium, total (3050)	mg/Kg	41.5	31
Beryllium, total (3050)	mg/Kg	< 0.05 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.07 B	0.05 B
Chromium, total (3050)	mg/Kg	1 B	< 1 U
Copper, total (3050)	mg/Kg	2 B	**10**
Iron, total (3050)	mg/Kg	322	100
Lead, total (3050)	mg/Kg	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	95	42.1
Mercury, total	mg/Kg	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	5 B	5 B
Nickel, total (3050)	mg/Kg	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2.4 B	**2.8 B**
Silver, total (3050)	mg/Kg	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	0.03 B	**0.08 B**
Vanadium, total (3050)	mg/Kg	0.7 B	< 0.5 U
Zinc, total (3050)	mg/Kg	10	**29**
Gross Alpha	pCi/g	1.63	1.01
Gross Beta	pCi/g	7.15	**31.1**
Radium 226 (3050)	pCi/g	1.98	0
Radium 228 (3050)	pCi/g	1.65	0.87
Thorium 228	pCi/g	-0.1	-0.13
Thorium 230	pCi/g	-0.59	-0.79
Thorium 232	pCi/g	-0.17	-0.05
Solids, percent	%	41.4	76.9

Value in bold indicates level exceeds screening level (soil) or background level (pasture grass)

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

Table 3.15: Total Metals and Radionuclides in Soil and Vegetation Samples Collected at Residence 3

Soil

Analyte	Units	Screening Level	Garden Soil
Antimony, total (3050)	mg/Kg	3	0.3 B
Arsenic, total (3050)	mg/Kg	1	**4.4**
Barium, total (3050)	mg/Kg	5,475	156
Beryllium, total (3050)	mg/Kg	156	0.91
Cadmium, total (3050)	mg/Kg	3	0.2 B
Chromium, total (3050)	mg/Kg	117,321	10
Copper, total (3050)	mg/Kg	250	5
Iron, total (3050)	mg/Kg	23,464	7950
Lead, total (3050)	mg/Kg	400	< 4 U
Manganese, total (3050)	mg/Kg	960	352
Mercury, total	mg/Kg	2	< 0.04 U
Molybdenum, total (3050)	mg/Kg	391	< 1 U
Nickel, total (3050)	mg/Kg	135	6
Selenium, total (3050)	mg/Kg	35	< 0.5 U
Silver, total (3050)	mg/Kg	35	< 0.5 U
Uranium, total (3050)	mg/Kg	13.9	0.91
Vanadium, total (3050)	mg/Kg	548	19.2
Zinc, total (3050)	mg/Kg	2,000	23
Gross Alpha	pCi/g	20.3 [1]	3.56
Gross Beta	pCi/g	13.5 [1]	6.21
Radium 226 (3050)	pCi/g	0.06	**0.73**
Radium 228 (3050)	pCi/g	0.09	0
Thorium 228	pCi/g	0.40 [1]	0.13
Thorium 230	pCi/g	3.13 [1]	0.5
Thorium 232	pCi/g	0.35 [1]	**0.55**
Solids, percent	%	---	88.1

[1] Screening level based on average concentration at Reference Areas 1, 2, and 3.
Value in bold indicates level exceeds screening level

Vegetation

Analyte	Units	Fruit Produce
Antimony, total (3050)	mg/Kg	< 0.2 U
Arsenic, total (3050)	mg/Kg	< 0.4 U
Barium, total (3050)	mg/Kg	7.1
Beryllium, total (3050)	mg/Kg	< 0.08 U
Cadmium, total (3050)	mg/Kg	< 0.08 U
Chromium, total (3050)	mg/Kg	< 2 U
Copper, total (3050)	mg/Kg	6 B
Iron, total (3050)	mg/Kg	14
Lead, total (3050)	mg/Kg	< 6 U
Manganese, total (3050)	mg/Kg	1.7 B
Mercury, total	mg/Kg	0 UH
Molybdenum, total (3050)	mg/Kg	< 2 U
Nickel, total (3050)	mg/Kg	< 2 U
Selenium, total (3050)	mg/Kg	0.8 B
Silver, total (3050)	mg/Kg	< 0.8 U
Uranium, total (3050)	mg/Kg	< 0.04 U
Vanadium, total (3050)	mg/Kg	< 0.8 U
Zinc, total (3050)	mg/Kg	2 B
Gross Alpha	pCi/g	1.08
Gross Beta	pCi/g	10.7
Radium 226 (3050)	pCi/g	0
Radium 228 (3050)	pCi/g	1.43
Thorium 228	pCi/g	-0.07
Thorium 230	pCi/g	-0.59
Thorium 232	pCi/g	-0.22
Solids, percent	%	83.3

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Holding time not met

Table 3.16: Radiological Correlation Study Data

Correlation Sample	In Situ Gamma (cpm)	In Situ Gamma (µR/hr)	Unprep (cpm)	Total Uranium (mg/kg)	Total Uranium (pCi/g)	Ra-226 (pCi/g)	Location Description
Blue Cap/Black Hat Mine Complex							
BC-BKG	12,571	13.3	15,743	2.33	1.58	2.23	South of Blue Cap Mine bench
BC-COR1	164,439	182	58,379	295	200	120	Blue Cap Mine bench
BC-COR2	364,623	390	202,520	937	634	396	Blue Cap Mine bench
BC-COR3	243,170	270	60,410	431	292	178	Blue Cap Mine bench
BC-COR4	112,285	135	35,598	176	119	49.3	Blue Cap Mine bench (near adit)
BH-COR1	28,711	29.5	4,552	22.8	15.4	14.9	Top of Black Hat Mine ore loadout
BH-COR2	77,335	85	11,628	25.1	17.0	12	Black Hat Mine bench
BH-COR3	86,206	105	27,121	160	108	59.6	Black Hat Mine bench
SP-COR1	182,464	190	89,609	571	387	276	Saint Patrick Mine dump
SP-COR2	240,877	230	51,369	321	217	57.7	Saint Patrick Mine dump
Vanadium Queen Mine							
VQ-BKG	13,526	14.5	570	2.88	1.95	1.44	North end of cabin area
VQ-COR1	28,699	32	2,032	29	19.6	2.98	South end of mine bench
VQ-COR2	28,529	28	2,937	17.6	11.9	10.5	Near transformers
VQ-COR3	105,392	110	23,816	120	81.2	51	Mine bench (near train engine)
VQ-COR4	144,920	150	57,609	355	240	150	Ore loadout terrace
VQ-COR5	247,672	260	59,200	282	191	102	Ore loadout terrace
VQ-COR6	213,917	230	71,003	382	259	144	Between ore loadout and ore pile
VQ-COR7	69,988	75	15,565	82.2	55.6	28	Entrance to mid-dump, narrow terrace
VQ-COR8	42,995	46	11,265	39.5	26.7	12.6	Drainage channel upstream of confluence
VQ-COR9	55,142	50	3,543	11.6	7.85	27.1	Drainage channel near confluence
Firefly/Pygmy Mine							
FF-BKG	12,126	13	490	1.23	0.83	1.67	50 ft west of cabin
FF-COR1	35,369	33	4,435	27.6	18.7	11.7	Outside of cabin
FF-COR2	64,696	60	20,663	124	83.9	47.7	30 ft from mine adit
FF-COR3	106,708	120	42,708	219	148	82.2	Top of upper dump
FF-COR4	279,718	320	157,652	524	355	247	South end of lower dump
FF-COR5	107,585	120	35,699	197	133	88.5	South end of lower dump
FF-COR6	162,621	190	50,907	454	307	141	Lower dump
FF-COR7	225,218	260	62,948	390	264	155	Lower dump
FF-COR8	9,477	11	492	229	155	0.22	Confluence
FF-COR9	61,817	80	27,487	102	69.1	0.12	La Sal Creek upstream

Table 3.17: Analytical Results for FireFly/Pygmy Mine Area Surface-Water Samples

Analyte	Units	Screening Level [1]	FIREFLY DRAINAGE		FIREFLY ADIT		FIREFLY SPRING NO. 1		FIREFLY SPRING NO. 2		LA SAL CREEK UP		LA SAL CREEK DN1	
			04/20/04	10/11/04	04/20/04	10/11/04	04/26/04	10/14/04	04/26/04	10/14/04	04/23/04	10/13/04	04/23/04	10/14/04
PHYSICAL (field parameters)														
Flow	cfs	na	~ 2.22E-03	~ 2.22E-03	~ 2.22E-03	~ 2.22E-03	≤ 2.22E-03	≤ 2.22E-03	~ 2.22E-03	~ 2.22E-03	1.4300	0.5123	1.0400	0.4476
Temperature	ºc	na	8.9	12	10.7	11.5	11	11.8	10.3	13	7	9.3	6.2	5.8
pH	s.u.	6.5 - 8.5	**8.61**	7.99	8.44	8.21	8.47	8.48	8.23	8.19	**9.07**	8.38	**9.21**	**8.52**
Specific Conductance	(uS/cm)	na	395	460	393	402	470	475	400	385	337 [2]	449	340 [2]	544
Dissolved Oxygen	(mg/L)	5.0	8.06	6.65	7.09	6.18	8.31	8.35	8.49	7.87	nm	nm	nm	nm
Oxidation Reduction Potential	Rmev	na	108.3	86.5	57.4	84.9	116.1	104.2	50.9	48	nm	nm	nm	nm
INORGANIC														
Nitrite	(mg/L)	0.05	< 0.01 U	na	< 0.01 U	na	< 0.01 U	na	< 0.01 U	na	0 UH	na	0 UH	na
Nitrate	(mg/L)	4.0	0.02 B	na	0.12	na	0.07 B	na	0.06 B	na	< 0.02 U	na	0.04 B	na
Chloride	(mg/L)	250.0	1 B	1 B	1 B	1 B	3 B	3 B	2 B	2 B	15	11	15	15
Sulfate	(mg/L)	250.0	20 B	20 B	10 B	20 B	30 B	30 B	30 B	30 B	60	30 B	60	60
Total Phosphorous as P	(mg/L)	0.05	0.01 B	0.01 B	0.02 B	0.02 B	0.04 B	0.03 B	0.02 B	0.03 B	0.04 B	0.05 B	0.05	**0.06**
Total Dissolved Solids	(mg/L)	500.0	220	220	230	200	260	280	300	230	300	270	310	340
Total Suspended Solids	(mg/L)	35.0	< 5 U	< 5 U	< 5 U	6 B	10 B	28	20	20	12 B	8 B	32	12 B
Bicarbonate as CaCO3	(mg/L)	na	199	189	209	199	251	243	218	199	198	184	199	209
Carbonate as CaCO3	(mg/L)	na	10 B	21	< 2 U	< 2 U	8 B	10 B	< 2 U	< 2 U	6 B	8 B	8 B	11
Cation-Anion Balance	%	na	0	0	1.1	1.1	0	0	3.8	-1.1	-0.9	0	0	0
Hardness as CaCO3	(mg/L)	na	169	173	167	170	220	212	201	170	228	192	237	230
Hydroxide as CaCO3	(mg/L)	na	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	na	0.02 B	na	0.12	na	0.07 B	na	0.06 B	na	0 UH	na	0.04 BH	na
Sum of Anions	meq/L	na	4.6	4.6	4.4	4.4	5.9	5.7	5	4.6	5.7	4.7	5.8	6
Sum of Cations	meq/L	na	4.6	4.6	4.5	4.5	5.9	5.7	5.4	4.5	5.6	4.7	5.8	6
TDS (calculated)	(mg/L)	na	232	237	217	219	296	288	258	231	306	250	313	324
TDS (ratio - measured/calculated)		na	0.95	0.93	1.06	0.91	0.88	0.97	1.16	1	0.98	1.08	0.99	1.05
Total Alkalinity	(mg/L)	na	209	210	209	199	259	252	218	199	204	192	207	219
METALS														
Antimony, dissolved	µg/L	124.0	0.6 B	0.5 B	0.5 B	0.3 B	0.3 B	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Antimony, total	µg/L	6.0	0.5 B	0.5 B	0.4 B	< 0.4 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Arsenic, dissolved	µg/L	93.0	30.7	25.8	22.5	16.7	11	10.1	7.9	8.2	1.5	2.1 B	1.6	1.9 B
Arsenic, total recoverable	µg/L	10.0	**25.5**	**24.6**	**18.3**	**18**	**10.4**	8.8	7	7	1.4	2 B	1.3	1.9 B
Barium, dissolved	µg/L	127 ; 127 [3]	**134**	**150**	**147**	**155**	**129**	**128**	**144**	121	**109**	**105**	**128**	100
Barium, total	µg/L	1,000.0	135	143	149	147	135	145	136	140	109	118	136	106
Beryllium, dissolved	µg/L	0.05 ; 0.05 [3]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	4.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, dissolved	µg/L	1.8	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	0.1 B	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	5.0	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U	0.1 B	0.2 B	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Calcium, dissolved	µg/L	45667 ; 52467 [3]	21400	22900	20800	21200	31400	30200	30700	26100	65400	**54300**	**67000**	**60000**
Chromium, dissolved	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	50.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	15.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	1,000.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	300.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	10 B	20 B	290	20 B
Iron, total recoverable	µg/L	300.0	40 B	140	10 B	60	170	**420**	270	**460**	**450**	**330**	**1170**	210
Lead, dissolved	µg/L	5.0	< 0.1 U	0.7	< 0.1 U	0.3 B	0.1 B	< 0.1 U	< 0.1 U	0.1 B	< 0.1 U	< 0.1 U	0.1 B	< 0.1 U
Lead, total	µg/L	15.0	0.9	1.8	< 0.1 U	< 0.2 U	0.1 B	0.4 B	0.2 B	0.4 B	0.3 B	0.3 B	< 0.1 U	0.4 B
Magnesium, dissolved	µg/L	8800 ; 10233 [3]	**28200**	**28100**	**28100**	**28400**	**34400**	**33200**	**30200**	**25500**	**15700**	**13800**	**16900**	**19400**
Manganese, dissolved	µg/L	50.0	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	8 B	22 B	26 B	**88**	20 B
Manganese, total	µg/L	50.0	< 5 U	< 5 U	< 5 U	< 5 U	10 B	30	15 B	22 B	**82**	**61**	**97**	35
Mercury, dissolved	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	0.012	< 0.2 U	0 UH	< 0.2 U	0 UH	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	5; 5 [3]	**50**	**50**	**50** B	**30** B	**60**	**50** B	**20** B	**20** B	< 10 U	< 10 U	< 10 U	< 10 U
Molybdenum, total	µg/L	100.0	50	50	50	30 B	60	50 B	20 B	20 B	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, dissolved	µg/L	87.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	7 ; 5 [3]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	2300 ; 3800 [3]	**5900**	**5800**	**5800**	**5200**	**6000**	**5600**	**5500**	**4700**	**2100**	**2700**	**2300**	**3100**
Selenium, dissolved	µg/L	4.6	**59.3**	**57**	**56**	**45**	**47.4**	**34**	**14.4**	**20**	0.9	1 B	1.3	2 B
Selenium, total	µg/L	10.0	**44.6**	**48**	**45.1**	**38**	**38.9**	**27**	**12.4**	**17**	0.9	1 B	1	2 B
Silver, dissolved	µg/L	0.2	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	50.0	< 0.05 U	< 0.05 U	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Sodium, dissolved	µg/L	12200 ; 21000 [3]	**25600**	**24600**	**24900**	**23900**	**32500**	**30200**	**28400**	**23100**	**23200**	**19600**	**24200**	**30400**
Uranium, dissolved	µg/L	2.56 ; 3.69 [3]	**120**	**111**	**78.6**	**75.8**	**144**	**111**	**69.9**	**55.5**	5.1	**7.5**	**7.8**	**11**
Uranium, total	µg/L	30.0	**123**	**110**	**79.2**	**66**	**128**	**106**	**67.7**	**62**	4.91	7.86	7.18	11.6
Vanadium, dissolved	µg/L	2.5 ; 2.5 [3]	**295**	**310**	**224**	**202**	**96**	**74**	**42**	**45**	< 5 U	< 5 U	**21** B	< 5 U
Vanadium, total	µg/L	4.3 ; 2.5 [3]	**310**	**348**	**226**	**196**	**96**	**83**	**42**	**52**	< 5 U	< 5 U	< 5 U	< 5 U
Zinc, dissolved	µg/L	177.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Zinc, total	µg/L	5,000.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	20 B	< 10 U	< 10 U
RADIOLOGICAL (pCi/L)														
Gross Alpha	pCi/L	15.0	**91.6**	**105**	**54.5**	**46.9**	**68.4**	**61.5**	**42.5**	**31.5**	7.13	8.58	**15.8**	8.83
Gross Beta	pCi/L	50 pCi/L; 4 mrem/yr	31	21.9	16.1	11.8	15.6	37	8.81	21.6	2.46	4.56	9.35	6.79
Radium 226 and 228 (combined)	pCi/L	5.0	**10.27**	**9.93**	1.85	2.26	0.36	**10.72**	0.16	1.12	0.29	0.51	1.07	2.8
Thorium 230 and 232 (combined)	pCi/L	0.06 ; 0.02 [3]	**0.61**	-0.5	-0.07	-0.5	**0.41**	-0.07	**0.44**	-0.25	**0.27**	-0.09	**0.65**	-0.11
Thorium 228	pCi/L	0.15 ; 0 [3]	0	**0.26**	0	**0.13**	0.02	-0.1	-0.04	-0.25	-0.12	0	0.04	**0.14**

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

nm Not measured; na Not analyzed

[1] Screening level as determined in the Field Sampling Plan.

[2] Temperature compensation turned off during transit in backpack reading too high use lab SC if available.

[3] Screening level based on the average concentration of Reference Areas 1, 2, and 3 (April/October).

Value in bold indicates level exceeds screening level

Table 3.18:Total Metals and Radionuclides in Waste-Rock Samples Collected from Boreholes at the Firefly/Pygmy Mine

Analyte	Units	Human Health Screening Level[1]	Elk RMC	FF 1			FF 2			FF 3		
				0 - 0.5	4 - 6	8 - 9.5	0 - 0.5	0 - 0.5 (Dup 4)	6 - 8	0 - 0.5	4 - 6	9 - 11
Antimony, total (3050)	mg/Kg	50	----	0.2 B	0.2 B	0.1 B	0.3 B	0.3 B	1.1	0.5 B	0.5	0.4 B
Arsenic, total (3050)	mg/Kg	12	328	**47.8**	**22.4**	3.13	**42.4**	**41.8**	**81.3**	**80.7**	**68.4**	**39.6**
Barium, total (3050)	mg/Kg	71,540	----	49.8	177	161	131	152	21.7	217	115	141
Beryllium, total (3050)	mg/Kg	2,044	----	0.11 B	0.19 B	0.07 B	0.8 B	0.8	0.18 B	0.6	0.22 B	0.19 B
Cadmium, total (3050)	mg/Kg	70	3	0.35	0.35	0.07 B	0.67	0.6	0.56	0.72	2.02	0.75
Chromium, total (3050)	mg/Kg	1,533,000	----	29	2 B	2 B	7	8	12	15	13	11
Copper, total (3050)	mg/Kg	5,000	131	75	32	5	91	89	**276**	65	**229**	104
Iron, total (3050)	mg/Kg	306,600	----	2040	3200	1750	5450	5650	2040	5580	2830	2580
Lead, total (3050)	mg/Kg	1,000	127	40	91	5 B	26	26	**423**	**290**	**190**	88
Manganese, total (3050)	mg/Kg	19,000	----	189	225	253	512	666	195	178	267	209
Mercury, total	mg/Kg	40	11	< 0.05 U	< 0.05 U	< 0.05 U	0.08 B	< 0.05 U	0.12 B	0.09 B	0.09 B	0.06 B
Molybdenum, total (3050)	mg/Kg	5,110	----	1 B	6	1 B	< 1 U	2 B	11	10	23	4 B
Nickel, total (3050)	mg/Kg	2,700	----	2 B	2 B	1 B	7	6	7	19	5	4 B
Selenium, total (3050)	mg/Kg	700	----	2.4 B	3.4 B	< 0.8 U	4 B	4 B	194	25 B	16 B	6 B
Silver, total (3050)	mg/Kg	700	----	0.29	0.29	0.05 B	1.19	1.01	17.7	1.76	1.52	0.74
Uranium, total (3050)	mg/Kg	3,066	----	78.2	94.5	4	232	114	116	676	260	200
Vanadium, total (3050)	mg/Kg	7,154	----	368	271	18.5	260	253	1340	4160	1020	1230
Zinc, total (3050)	mg/Kg	40,000	275	22	27	4 B	46	50	44	48	118	49
Gross Alpha	pCi/g	20.3 [2]	----	**46.8**	**69.4**	7.22	**161**	**156**	**244**	**922**	**536**	**356**
Gross Beta	pCi/g	13.5 [2]	----	**21.7**	**30.6**	4.64	**112**	**89.6**	**111**	**468**	**244**	**157**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**23.6**	**21.9**	0.71	**33.2**	**16.4**	**26.5**	**117**	**74.4**	**62.6**
Radium 228 (3050)	pCi/g	2.66 [2]	----	0.12	0.57	**2.67**	1.69	1.63	**2.81**	**6.72**	1.99	0.8
Thorium 228	pCi/g	0.40 [2]	----	0.08	0.15	-0.1	**0.49**	**0.62**	0.05	0.32	0.2	0.13
Thorium 230	pCi/g	3.1 [2]	----	**7.42**	**30.6**	1.23	**46.3**	**37.2**	**27.5**	**201**	**112**	**59**
Thorium 232	pCi/g	0.35 [2]	----	0.05	0.24	0.26	-0.41	**0.58**	0.2	**0.97**	-0.07	0.04
Solids, Percent	%	----	----	93.3	96.1	99.2	91.9	91.9	96	90.8	94.7	93.8

Analyte	Units	Human Health Screening Level[1]	Elk RMC	FF 4			FF 5				
				0 - 0.5	1 - 2	4 - 6	0 - 0.5	2 - 4	8 - 10	14.5 - 19.5	21.5 - 23
Antimony, total (3050)	mg/Kg	50	----	2	0.5 B	< 0.1 U	0.6	0.4 B	0.5	0.6	0.4 B
Arsenic, total (3050)	mg/Kg	12	328	**140**	**21.5**	4.11	**44.6**	**32.5**	**48.4**	**68.2**	**29.4**
Barium, total (3050)	mg/Kg	71,540	----	104	54.4	377	78.4	112	80.4	53	133
Beryllium, total (3050)	mg/Kg	2,044	----	0.61	0.29 B	0.09 B	0.28 B	0.18 B	0.26 B	0.23 B	0.4
Cadmium, total (3050)	mg/Kg	70	3	2.87	0.66	0.1 B	1.02	1.07	0.99	1.11	0.21 B
Chromium, total (3050)	mg/Kg	1,533,000	----	23	22	4 B	28	34	35	9	6
Copper, total (3050)	mg/Kg	5,000	131	**383**	**157**	4 B	**202**	100	**191**	**244**	14
Iron, total (3050)	mg/Kg	306,600	----	7570	3610	1620	3290	2400	2580	2490	5870
Lead, total (3050)	mg/Kg	1,000	127	**430**	**464**	9 B	**233**	**316 +**	**253**	**213**	19 B
Manganese, total (3050)	mg/Kg	19,000	----	170	273	274	230	237	233	205	138
Mercury, total	mg/Kg	40	11	0.18 B	0.14 B	< 0.05 U	0.16 B	0.11 B	0.16 B	0.08 B	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	114	6	< 1 U	13	7	10	12	22
Nickel, total (3050)	mg/Kg	2,700	----	7	5 B	< 1 U	5 B	3 B	4 B	7	3 B
Selenium, total (3050)	mg/Kg	700	----	130 B	180	3.4 B	38	43	48	52	46.7
Silver, total (3050)	mg/Kg	700	----	6.18	9.19	0.09 B	4.51	1.69	3.72	5.84	0.64
Uranium, total (3050)	mg/Kg	3,066	----	1510	675	20.2	301	259	272	269	14.6
Vanadium, total (3050)	mg/Kg	7,154	----	6570	1740	163	1510	2170	2050	2840	731
Zinc, total (3050)	mg/Kg	40,000	275	**329**	56	10	90	89	65	60	18
Gross Alpha	pCi/g	20.3 [2]	----	**2610**	**743**	**32.4**	**606**	**738**	**649**	**976**	**31.3**
Gross Beta	pCi/g	13.5 [2]	----	**1130**	**328**	**17.2**	**274**	**292**	**252**	**269**	13.4
Radium 226 (3050)	pCi/g	3.3 [2]	----	**466**	**126**	**4.11**	**123**	**82**	**68**	**110**	**4.04**
Radium 228 (3050)	pCi/g	2.66 [2]	----	**3.01**	1.45	1.69	0.87	0.74	1.1	0.7	0.61
Thorium 228	pCi/g	0.40 [2]	----	0.27	0.11	0.07	0.16	-0.06	0.31	0.25	-0.15
Thorium 230	pCi/g	3.1 [2]	----	**424**	**95.5**	**4.05**	**96.1**	**162**	**363**	**138**	**3.84**
Thorium 232	pCi/g	0.35 [2]	----	**0.54**	**0.57**	0.25	**0.56**	**1.62**	**1.01**	**0.43**	**0.36**
Solids, Percent	%	----	----	92.2	91.5	93.1	92.6	91	91.5	93	77.7

Table 3.18 (cont.):Total Metals and Radionuclides in Waste-Rock Samples Collected from Boreholes at the Firefly/Pygmy Mine

Analyte	Units	Human Health Screening Level[1]	Elk RMC	FF 6					FF 7			
				0 - 0.5	0 - 0.5 (Dup 5)	2 - 4	8 - 10	32.5 - 34.5	0 - 0.5	1 - 3	8 - 10	18 - 22.5
Antimony, total (3050)	mg/Kg	50	----	0.5	0.4 B	0.2 B	0.2 B	0.3 B	0.4 B	0.4 B	0.3 B	0.5 B
Arsenic, total (3050)	mg/Kg	12	328	**70.4**	**62.5**	**53.7**	**43.1**	**26**	**65.2**	**60.2**	**60.1**	**91.2**
Barium, total (3050)	mg/Kg	71,540	----	73	62.9	109	74	31.9	129	123	106	53.8
Beryllium, total (3050)	mg/Kg	2,044	----	0.34	0.32	0.28 B	0.16 B	0.3	0.43	0.34	0.37	0.33
Cadmium, total (3050)	mg/Kg	70	3	1.2	1.19	1.25	0.98	0.33	2.27	2.41	0.77	1.53
Chromium, total (3050)	mg/Kg	1,533,000	----	22	20	25	18	43	19	16	44	7
Copper, total (3050)	mg/Kg	5,000	131	**226**	**241**	97	65	118	**155**	127	80	**238**
Iron, total (3050)	mg/Kg	306,600	----	3570	3170	3370	2270	2810	4220	4300	3640	3990
Lead, total (3050)	mg/Kg	1,000	127	**297**	**233**	**305**	**357**	**335**	**452**	**665**	**355**	125
Manganese, total (3050)	mg/Kg	19,000	----	218	211	222	195	215	231	229	222	272
Mercury, total	mg/Kg	40	11	0.14 B	0.15 B	0.07 B	< 0.05 U	0.14 B	0.15 B	0.09 B	0.15 B	0.07 B
Molybdenum, total (3050)	mg/Kg	5,110	----	20	11	8	19	13	12	26	9	75
Nickel, total (3050)	mg/Kg	2,700	----	5	4 B	5	3 B	3 B	6	4 B	5 B	7
Selenium, total (3050)	mg/Kg	700	----	38.3	32.4	43.2	13.6	124	95.6	54.7	109	30.4
Silver, total (3050)	mg/Kg	700	----	4.34	3.34	1.45	0.57	4.05	2.84	2.03	2.15	2.18
Uranium, total (3050)	mg/Kg	3,066	----	319	300	263	153	115	727	618	339	494
Vanadium, total (3050)	mg/Kg	7,154	----	1730	1650	1790	1280	867	4330	3260	2720	849
Zinc, total (3050)	mg/Kg	40,000	275	119	111	131	93	25	208	244	67	66
Gross Alpha	pCi/g	20.3 [2]	----	**520**	**705**	**384**	**340**	**229**	**1230**	**863**	**582**	**790**
Gross Beta	pCi/g	13.5 [2]	----	**257**	**284**	**241**	**146**	**110**	**632**	**399**	**280**	**389**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**99.2**	**108**	**85**	**63.9**	**52.4**	**286**	**198**	**152**	**159**
Radium 228 (3050)	pCi/g	2.66 [2]	----	**3.43**	**4.8**	**3.11**	**3.39**	**3.26**	**3.38**	**7.35**	**11.7**	**6.4**
Thorium 228	pCi/g	0.40 [2]	----	**0.58**	0.07	0.3	0.2	0.21	0.27	0.15	0.13	0.3
Thorium 230	pCi/g	3.1 [2]	----	**103**	**100**	**142**	**69.3**	**45.2**	**266**	**206**	**174**	**165**
Thorium 232	pCi/g	0.35 [2]	----	0.22	0.04	-0.34	0.29	0.31	**0.45**	0.24	0.33	0.14
Solids, Percent	%	----	----	93.7	94	92.1	91.7	94.8	89.9	91.4	92.1	90.7

Analyte	Units	Human Health Screening Level[1]	Elk RMC	FF 8		
				0 - 0.5	2 - 4	10 - 12
Antimony, total (3050)	mg/Kg	50	----	0.2 B	0.3 B	0.1 B
Arsenic, total (3050)	mg/Kg	12	328	**29.7**	**38.1**	**15.2**
Barium, total (3050)	mg/Kg	71,540	----	204	208	53.9
Beryllium, total (3050)	mg/Kg	2,044	----	0.92	0.39	0.14 B
Cadmium, total (3050)	mg/Kg	70	3	0.6	1.28	1.18
Chromium, total (3050)	mg/Kg	1,533,000	----	17	39	28
Copper, total (3050)	mg/Kg	5,000	131	24	38	5
Iron, total (3050)	mg/Kg	306,600	----	4600	3420	1540
Lead, total (3050)	mg/Kg	1,000	127	**187**	**309**	**271**
Manganese, total (3050)	mg/Kg	19,000	----	258	241	149
Mercury, total	mg/Kg	40	11	0.05 B	0.12 B	< 0.04 U
Molybdenum, total (3050)	mg/Kg	5,110	----	4 B	5	2 B
Nickel, total (3050)	mg/Kg	2,700	----	11	5 B	2 B
Selenium, total (3050)	mg/Kg	700	----	60 B	28 B	8 B
Silver, total (3050)	mg/Kg	700	----	0.67	1.06	0.32
Uranium, total (3050)	mg/Kg	3,066	----	585	352	292
Vanadium, total (3050)	mg/Kg	7,154	----	3380	2210	1520
Zinc, total (3050)	mg/Kg	40,000	275	64	80	100
Gross Alpha	pCi/g	20.3 [2]	----	**834**	**626**	**608**
Gross Beta	pCi/g	13.5 [2]	----	**478**	**268**	**243**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**173**	**97.1**	**194**
Radium 228 (3050)	pCi/g	2.66 [2]	----	**3.37**	**7.57**	**8.7**
Thorium 228	pCi/g	0.40 [2]	----	**0.41**	0.15	0.21
Thorium 230	pCi/g	3.1 [2]	----	**128**	**97.8**	**89.4**
Thorium 232	pCi/g	0.35 [2]	----	**0.78**	**0.46**	**0.37**
Solids, Percent	%	----	----	91.7	92.7	93.3

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average value for Reference Areas 1, 2, and 3.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.19: SPLP Metals in Waste-Rock Samples Collected from Boreholes at the Firefly/Pygmy Mine

Analyte	Units	FF 1			FF 2			FF 3		
		0 - 0.5	4 - 6	8 - 9.5	0 - 0.5	0 - 0.5 (Dup 4)	6 - 8	0 - 0.5	4 - 6	9 - 11
Antimony (1312)	mg/L	< 0.001 U	< 0.001 U	< 0.001 U	0.002 B	0.002 B	0.008	0.002 B	< 0.001 U	< 0.001 U
Arsenic (1312)	mg/L	0.0877	0.0423	0.0026 B	0.157	0.17	0.168	0.241	0.199	0.14
Barium (1312)	mg/L	0.025	0.034	0.086	0.033	0.048	0.012	0.018	0.026	0.021
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	0.01 B	< 0.01 U	< 0.01 U
Iron (1312)	mg/L	0.05 B	0.06	0.07	0.05 B	0.04 B	0.03 B	0.05 B	0.03 B	0.04 B
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	< 0.01 U	0.03 B	0.02 B	< 0.01 U	< 0.01 U	0.07	0.04 B	0.07	0.01 B
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	< 0.008 U	0.009 B	< 0.008 U	< 0.008 U	< 0.008 U	0.249	0.022 B	0.037 B	0.009 B
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0062	0.0149	0.0033	0.0081	0.0116	0.0069	0.0592	0.0073	0.0043
Vanadium (1312)	mg/L	0.212	0.092	0.009 B	0.744	0.809	2.93	0.499	0.711	1.24
Zinc (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U

Analyte	Units	FF 4			FF 5				
		0 - 0.5	1 - 2	4 - 6	0 - 0.5	2 - 4	8 - 10	14.5 - 19.5	21.5 - 23
Antimony (1312)	mg/L	0.006	0.003 B	0.002 B	0.002 B	0.001 B	0.002 B	0.005 B	0.01
Arsenic (1312)	mg/L	0.239	0.106	0.0895	0.0936	0.0558	0.0785	0.243	1.24
Barium (1312)	mg/L	0.004 B	0.012	0.038	0.01 B	0.005 B	0.008 B	0.005 B	0.103
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	0.01 B	0.01 B	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Iron (1312)	mg/L	0.05 B	0.05 B	0.04 B	0.04 B	0.03 B	0.03 B	0.02 B	0.07
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	0.015 B	0.207
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	0.11	0.01 B	0.01 B	0.16	0.02 B	0.15	0.41	1.78
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	0.05	0.038 B	0.021 B	0.011 B	0.025 B	0.045	0.13	0.192
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0093	0.0126	0.0105	0.0118	0.0046	0.0038	0.0037	0.0177
Vanadium (1312)	mg/L	5.19	3.69	2.12	1.28	3.55	4.41	37.7	38
Zinc (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	0.03 B	0.03 B

Table 3.19 (cont.): SPLP Metals in Waste-Rock Samples Collected from Boreholes at the Firefly/Pygmy Mine

Analyte	Units	FF 6					FF 7			
		0 - 0.5	0 - 0.5 (Dup 5)	2 - 4	8 - 10	32.5 - 34.5	0 - 0.5	1 - 3	8 - 10	18 - 22.5
Antimony (1312)	mg/L	0.002 B	0.002 B	0.001 B	< 0.001 U	0.003 B	0.002 B	0.002 B	0.003 B	0.004 B
Arsenic (1312)	mg/L	0.178	0.193	0.106	0.0505	0.118	0.0575	0.0744	0.208	0.283
Barium (1312)	mg/L	0.026	0.01	0.012	0.009 B	0.015	0.009 B	0.008 B	0.006 B	0.021
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Iron (1312)	mg/L	0.15	0.01 B	0.06	0.13	0.06	0.07	0.09	0.02 B	0.03 B
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	0.03 B	0.03 B	0.03 B	0.01 B	0.42	0.01 B	0.02 B	0.2	0.39
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	0.013 B	0.015 B	0.008 B	< 0.008 U	0.078	0.012 B	0.022 B	< 0.008 U	0.013 B
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0127	0.007	0.005	0.0049	0.0041	0.0134	0.0109	0.0121	0.0166
Vanadium (1312)	mg/L	1.11	1.19	1.93	1.48	3.56	2.02	2.2	3.16	0.953
Zinc (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U

Analyte	Units	FF 8		
		0 - 0.5	2 - 4	10 - 12
Antimony (1312)	mg/L	0.001 B	< 0.001 U	< 0.001 U
Arsenic (1312)	mg/L	0.171	0.1	0.0393
Barium (1312)	mg/L	0.024	0.029	0.007 B
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U
Iron (1312)	mg/L	0.02 B	0.01 B	0.08
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	< 0.01 U	0.01 B	0.02 B
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	< 0.008 U	0.008 B	< 0.008 U
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0084	0.0044	0.0038
Vanadium (1312)	mg/L	2.68	2.96	2.16
Zinc (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

UH Analyte was not detected at the Method Detection Limit; analysis exceeded method hold time

Table 3.20: Total Metals and Radionuclides in Composite Waste-Rock Samples Collected from the Firefly/Pygmy Mine Dump

Analyte	Units	Human Health Screening Level[1]	Elk RMC	FF Segment 1	FF Segment 2	FF Segment 3	FF Segment 4	FF Segment 5	FF Segment 6	FF Segment 7
Antimony, total (3050)	mg/Kg	50	----	< 0.4 U	< 0.5 U	0.9 B	0.5 B	< 0.5 U	< 0.4 U	< 0.5 U
Arsenic, total (3050)	mg/Kg	12	328	**28**	**44**	**124**	**43**	**58**	**53**	**63**
Barium, total (3050)	mg/Kg	71,540	----	169	156	50.8	80.8	94.1	82.7	89
Beryllium, total (3050)	mg/Kg	2,044	----	0.6 B	0.6 B	< 0.3 U	0.3 B	0.3 B	0.3 B	< 0.3 U
Cadmium, total (3050)	mg/Kg	70	3	0.3 B	0.9 B	2.1	0.3 B	1.3	1.5	1.1
Chromium, total (3050)	mg/Kg	1,533,000	----	12	11	40	71	14	19	14
Copper, total (3050)	mg/Kg	5,000	131	81	61	**404**	**189**	86	100	**162**
Iron, total (3050)	mg/Kg	306,600	----	7500	4710	2980	2110	3890	3200	3290
Lead, total (3050)	mg/Kg	1,000	127	103	**190**	**308**	**303**	**260**	**298**	**416**
Manganese, total (3050)	mg/Kg	19,000	----	247	368	227	154	217	200	236
Mercury, total	mg/Kg	40	11	0.05 BH	0.08 BH	0.12 BH	0.21 H	0.05 BH	0.05 BH	< 0.05 UH
Molybdenum, total (3050)	mg/Kg	5,110	----	13	3 B	22	5 B	6	11	9
Nickel, total (3050)	mg/Kg	2,700	----	5 B	8	6	6	5 B	4 B	4 B
Selenium, total (3050)	mg/Kg	700	----	19 B	25	35	82	34	22	28
Silver, total (3050)	mg/Kg	700	----	1.1	0.9	5.9	8.6	1.1	1.5	1.2
Uranium, total (3050)	mg/Kg	3,066	----	142	303	414	335	337	226	282
Vanadium, total (3050)	mg/Kg	7,154	----	573	2000	1450	2750	2510	2150	1720
Zinc, total (3050)	mg/Kg	40,000	275	32	75	175	36	144	150	113
Gross Alpha	pCi/g	20.3 [2]	----	**20.4**	**41.9**	**73.4**	**70.9**	**64.6**	**38**	**61.2**
Gross Beta	pCi/g	13.5 [2]	----	12.4	**21.2**	**32.2**	**27**	**30**	**17.8**	**25**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**3.67**	**10.7**	**13.8**	**9.16**	**13.2**	**8.54**	**14.6**
Radium 228 (3050)	pCi/g	2.66 [2]	----	0.13	0.22	0.18	0.33	0.18	0.4	0.45
Thorium 228	pCi/g	0.40 [2]	----	0.25	**0.42**	0.16	0.28	0.3	0.2	0.25
Thorium 230	pCi/g	3.1 [2]	----	**28**	**73.2**	**104**	**126**	**90.9**	**68**	**96.3**
Thorium 232	pCi/g	0.35 [2]	----	0.21	0.22	**0.36**	0.34	**0.93**	**0.38**	**0.83**
Solids, Percent	%	----	----	92.3	92.3	93.8	93.8	92.5	93.1	93.4

Analyte	Units	Human Health Screening Level[1]	Elk RMC	FF Segment 8	FF Segment 8 (Dup 6)	FF Segment 9	FF Segment 9 (Dup 7)
Antimony, total (3050)	mg/Kg	50	----	< 0.5 U	< 0.5 U	0.6 B	< 0.5 U
Arsenic, total (3050)	mg/Kg	12	328	**50**	**57**	**44**	**40**
Barium, total (3050)	mg/Kg	71,540	----	78	73.5	85.6	71.5
Beryllium, total (3050)	mg/Kg	2,044	----	0.3 B	0.3 B	< 0.3 U	< 0.3 U
Cadmium, total (3050)	mg/Kg	70	3	1 B	1.1	0.8 B	0.6 B
Chromium, total (3050)	mg/Kg	1,533,000	----	20	19	38	42
Copper, total (3050)	mg/Kg	5,000	131	120	**150**	**156**	**149**
Iron, total (3050)	mg/Kg	306,600	----	4310	4170	2620	2710
Lead, total (3050)	mg/Kg	1,000	127	**340**	**292**	**366**	**383**
Manganese, total (3050)	mg/Kg	19,000	----	205	230	203	204
Mercury, total	mg/Kg	40	11	0.04 BH	< 0.05 UH	0.12 BH	0.12 BH
Molybdenum, total (3050)	mg/Kg	5,110	----	8	9	6	6
Nickel, total (3050)	mg/Kg	2,700	----	4 B	5 B	4 B	4 B
Selenium, total (3050)	mg/Kg	700	----	40	32	57	86
Silver, total (3050)	mg/Kg	700	----	1.6	2.2	2.8	3.9
Uranium, total (3050)	mg/Kg	3,066	----	278	296	265	394
Vanadium, total (3050)	mg/Kg	7,154	----	1550	1660	2570	2540
Zinc, total (3050)	mg/Kg	40,000	275	107	110	64	59
Gross Alpha	pCi/g	20.3 [2]	----	**50.4**	**43.6**	**454**	**50**
Gross Beta	pCi/g	13.5 [2]	----	**22.6**	**20.7**	**200**	**22.2**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**7.33**	**9.88**	**9.05**	**8.32**
Radium 228 (3050)	pCi/g	2.66 [2]	----	0.51	0.27	0	0.38
Thorium 228	pCi/g	0.40 [2]	----	0.21	0.14	0	-0.04
Thorium 230	pCi/g	3.1 [2]	----	**80.7**	**81.3**	**129**	0.59
Thorium 232	pCi/g	0.35 [2]	----	**0.54**	0.21	0.18	0.3
Solids, Percent	%	----	----	92.7	93.8	93	92.9

[1] Screening level as determined in the Field Sampling Plan

[2] Screening level based on average value for Reference Areas 1, 2, and 3

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time was exceeded

Value in bold indicates level exceeds screening level or RMC

Table 3.21: SPLP Metals in Composite Waste-Rock Samples Collected from Firefly/Pygmy Mine Dump

Analyte	Units	FF Segment 1	FF Segment 2	FF Segment 3	FF Segment 4	FF Segment 5	FF Segment 6	FF Segment 7
Antimony (1312)	mg/L	0.001 B	0.001 B	0.002 B	0.006	0.001 B	0.001 B	< 0.001 U
Arsenic (1312)	mg/L	0.137	0.159	0.239	0.135	0.0991	0.148	0.154
Barium (1312)	mg/L	0.03	0.02	0.011	0.01	0.008 B	0.012	0.012
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	< 0.01 U	0.02 B	0.01 B	< 0.01 U	< 0.01 U	0.01 B
Iron (1312)	mg/L	0.15	0.05	0.1	0.07	0.15	0.08	0.1
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	0.03 B	< 0.01 U	0.05	0.03 B	0.01 B	0.04 B	0.06
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	0.012 B	0.01 B	0.033 B	0.098	0.016 B	0.021 B	0.019 B
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0066	0.0083	0.0325	0.0147	0.0114	0.0075	0.0163
Vanadium (1312)	mg/L	1.79	1.42	0.732	4.55	2.23	2.08	1.11
Zinc (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U

Analyte	Units	FF Segment 8	FF Seg 8 (Dup 6)	FF Segment 9	FF Seg 9 (Dup 7)
Antimony (1312)	mg/L	0.002 B	0.001 B	0.002 B	0.002 B
Arsenic (1312)	mg/L	0.166	0.158	0.0467	0.0487
Barium (1312)	mg/L	0.01	0.01	0.007 B	0.006 B
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	< 0.01 U	0.01 B	< 0.01 U
Iron (1312)	mg/L	0.1	0.07	0.06	0.03 B
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	0.02 B	0.03 B	0.04 B	0.04 B
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	0.011 B	0.009 B	0.028 B	0.024 B
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0075	0.0048	0.0074	0.0069
Vanadium (1312)	mg/L	2.48	2.48	3.29	2.3
Zinc (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

UH Analyte was not detected at the Method Detection Limit; analysis exceeded method hold time

Table 3.22: Total Metals and Radionuclides in Ephemeral Drainage Sediment at the Firefly/Pygmy Mine

Analyte	Units	Human Health Screening Level[1]	Elk RMC	FF Sed 1	FF Sed 2	FF Sed 3
Antimony, total (3050)	mg/Kg	50	----	0.3 B	0.3 B	0.2 B
Arsenic, total (3050)	mg/Kg	12	328	**26.3**	**23.1**	7.16
Barium, total (3050)	mg/Kg	71,540	----	113	134	152
Beryllium, total (3050)	mg/Kg	2,044	----	0.21 B	0.29 B	0.22 B
Cadmium, total (3050)	mg/Kg	70	3	0.68	0.61	0.56
Chromium, total (3050)	mg/Kg	1,533,000	----	18	6	6
Copper, total (3050)	mg/Kg	5,000	131	102	64	22
Iron, total (3050)	mg/Kg	306,600	----	2560	3390	3550
Lead, total (3050)	mg/Kg	1,000	127	**307**	**207**	102
Manganese, total (3050)	mg/Kg	19,000	----	170	221	166
Mercury, total	mg/Kg	40	11	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	6	8	2 B
Nickel, total (3050)	mg/Kg	2,700	----	3 B	2 B	2 B
Selenium, total (3050)	mg/Kg	700	----	39.2	25.8	19.7
Silver, total (3050)	mg/Kg	700	----	2.3 B	0.8 B	< 0.5 U
Uranium, total (3050)	mg/Kg	3,066	----	1560	1240	25
Vanadium, total (3050)	mg/Kg	7,154	----	1650	1250	246
Zinc, total (3050)	mg/Kg	40,000	275	47	42	41
Gross Alpha	pCi/g	20.3 [2]	----	**370**	**187**	**66.6**
Gross Beta	pCi/g	13.5 [2]	----	**135**	**70.3**	**29.8**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**25**	**35.2**	**5.73**
Radium 228 (3050)	pCi/g	2.66 [2]	----	0.08	**17.6**	**4.39**
Thorium 228	pCi/g	0.40 [2]	----	0.1	0.17	0.21
Thorium 230	pCi/g	3.1 [2]	----	**57.4**	**68.1**	**11.3**
Thorium 232	pCi/g	0.35 [2]	----	0.25	0.21	0.1
Solids, Percent	%	----	----	95.1	96.4	87

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average value for soil in Reference Areas 1, 2, and 3.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.23: Total Metals and Radionuclides in Vegetation Samples Collected at the Firefly/Pygmy Mine

Mine Drainage Channel

Analyte	Units	Grass		Forb		Shrub	
		Ref Area	Adit Drainage	Ref Area	Adit Drainage	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	< 0.1 U	**0.1 B**	< 0.1 U	< 0.1 U	< 0.1 U	**0.1 B**
Arsenic, total (3050)	mg/Kg	< 0.3 U	**1.6**	< 0.3 U	**1.1**	< 0.3 U	**1.8**
Barium, total (3050)	mg/Kg	41.5	**67**	106	65.1	90.8	81.4
Beryllium, total (3050)	mg/Kg	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.06 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.07 B	**0.18 B**	0.12 B	**0.33**	0.06 B	**1.06**
Chromium, total (3050)	mg/Kg	1 B	< 1 U	2 B	< 1 U	2 B	< 1 U
Copper, total (3050)	mg/Kg	2 B	**4 B**	7	7	7	7
Iron, total (3050)	mg/Kg	322	217	252	91	255	68
Lead, total (3050)	mg/Kg	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	95	**245**	74.2	31.6	42.4	**82.6**
Mercury, total	mg/Kg	0 UH	0 UH	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	5 B	**57**	3 B	**122**	< 1 U	**32**
Nickel, total (3050)	mg/Kg	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2.4 B	**63.7**	7.4	**101**	1.3 B	**87.1**
Silver, total (3050)	mg/Kg	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.5 U
Uranium, total (3050)	mg/Kg	0.03 B	**1.89**	0.07 B	**2.21**	< 0.03 U	**3.07**
Vanadium, total (3050)	mg/Kg	0.7 B	**5.9**	0.8 B	**1.9 B**	0.6 B	< 0.5 U
Zinc, total (3050)	mg/Kg	10	**34**	30	23	33	**231**
Gross Alpha	pCi/g	1.63	**119**	0.94	**73.7**	2.25	**22.7**
Gross Beta	pCi/g	7.15	**220**	13.6	**71.8**	9.2	**21.5**
Radium 226 (3050)	pCi/g	1.98	**6.31**	0.07	**9.16**	0.45	**4.59**
Radium 228 (3050)	pCi/g	1.65	0.42	2.02	0.61	2.31	**2.91**
Thorium 228	pCi/g	-0.1	**0.08**	0.14	-0.03	-0.13	**0.15**
Thorium 230	pCi/g	-0.59	-0.02	-0.28	-0.21	-0.44	-0.2
Thorium 232	pCi/g	-0.17	0	0.06	0.06	0.05	-0.12
Moisture Content	%	41.4	62.1	66.6	69.6	46.1	61.8

Perimeter of Waste-Rock Dump

Analyte	Units	Grass		Forb		Shrub	
		Ref Area	Perimeter	Ref Area	Perimeter	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	< 0.1 U	**0.1 B**	< 0.1 U	< 10 U	< 0.1 U	0.1 B
Arsenic, total (3050)	mg/Kg	< 0.3 U	**2.7**	< 0.3 U	< 30 U	< 0.3 U	**0.7 B**
Barium, total (3050)	mg/Kg	41.5	31.1	106	38.9	90.8	43.5
Beryllium, total (3050)	mg/Kg	< 0.05 U	< 0.05 U	< 0.05 U	< 5 U	< 0.06 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.07 B	**0.12 B**	0.12 B	< 5 U	0.06 B	**0.23 B**
Chromium, total (3050)	mg/Kg	1 B	1 B	2 B	< 1 U	2 B	< 1 U
Copper, total (3050)	mg/Kg	2 B	**8**	7	**11**	7	6
Iron, total (3050)	mg/Kg	322	155	252	143	255	82
Lead, total (3050)	mg/Kg	< 4 U	**5 B**	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	95	60	74.2	35	42.4	**93.1**
Mercury, total	mg/Kg	0 UH	0 UH	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	5 B	**59**	3 B	**101**	< 1 U	**18**
Nickel, total (3050)	mg/Kg	< 1 U	< 1 U	< 1 U	1 B	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2.4 B	**103**	7.4	**180** B	1.3 B	**60**
Silver, total (3050)	mg/Kg	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.5 U
Uranium, total (3050)	mg/Kg	0.03 B	**4.56**	0.07 B	< 3 U	< 0.03 U	**2.91**
Vanadium, total (3050)	mg/Kg	0.7 B	**33.9**	0.8 B	**14**	0.6 B	**6.3**
Zinc, total (3050)	mg/Kg	10	**33**	30	**53**	33	**46**
Gross Alpha	pCi/g	1.63	**15.9**	0.94	**39.4**	2.25	**18.9**
Gross Beta	pCi/g	7.15	**9.71**	13.6	**23.1**	9.2	**14.2**
Radium 226 (3050)	pCi/g	1.98	**9.2**	0.07	**11.2**	0.45	**2.25**
Radium 228 (3050)	pCi/g	1.65	1.42	2.02	0.45	2.31	0
Thorium 228	pCi/g	-0.1	**0.09**	0.14	0.04	-0.13	**0.12**
Thorium 230	pCi/g	-0.59	**1.59**	-0.28	**0.08**	-0.44	-0.24
Thorium 232	pCi/g	-0.17	0	0.06	0.04	0.05	-0.09
Moisture Content	%	41.4	67.2	66.6	74.9	46.1	55.4

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time was exceeded

Value in bold indicates level exceeds maximum background value

Table 3.24: Classification Test Results for Waste Rock at the Firefly/Pygmy, Vanadium Queen, Blue Cap, and Black Hat Mines

Mine	Sample Type	Particle-Size Analysis (% passing)				Atterberg Limit Water Contents[2]			USCS
		Gravel (76.2 mm)	Sand (4.25 mm)	Silt (0.074 mm)	Clay (0.005 mm)	Liquid Limit	Plastic Limit	Plasticity Index	
Firefly/Pygmy	bulk	25	50	13	12	NV	NP	NP	SM
	in situ	-	-	-	-	19	16	3	(SM)[1]
Blue Cap	bulk	21	50	13	16	24	15	9	SC
	in situ	-	-	-	-	20	18	2	(SM)[1]
Vanadium Queen	bulk	29	51	9	11	19	19	NP	SM
	in situ	-	-	-	-	NV	NP	NP	(SM)[1]
Black Hat	bulk	32	49	8	11	NV	NP	NP	SM
	mean	26.8	50.0	10.8	12.5				
	standard deviation	4.8	0.8	2.6	2.4				
	standard error of the mean	2.4	0.4	1.3	1.2				

[1] in situ classification based on particle-size analysis of bulk sample

[2] NV = no value; NP = non-plastic

Table 3.25: Moisture-Density and Shear Strength Results for Waste Rock at the Firefly/Pygmy, Vanadium Queen, Blue Cap, and Black Hat Mines

Mine	Sample	Moisture-Density (ASTM D-698)		Shear Strength ASTM D-3050		Tested Condition
		Maximum Dry Density (pcf)	Optimum Moisture Content (%)	ϕ (^{o})	*c* (psf)	
Firefly/Pygmy	remolded	121.5	11.5	43.4	217.6	116.0 pcf @10.6% (95% @ -1%)
	in situ (16.0 - 17.0 ft)			45.8	243.7	104.8 pcf @ 8.0 (86% @ -3.5%)
Blue Cap	remolded	120.0	12.5	41.1	682.8	116.9 pcf @11.3% (97% @-1.2%)
	in situ (4.0 - 5.0 ft)			44.2	382.5	106.0 pcf @9.7% (88% @ -2.8%)
Vanadium Queen	remolded	120.5	12.0	37.8	258.0	115.0 pcf @ 12.1% (95% @+0.1%)
	in situ (11.0 - 12.0 ft)			32.8	487.8	103.5 pcf @ 6.7% (86% @ -5.3%)
Black Hat	remolded	119.5	12.0	20.9	723.0	113.2 pcf @12.6% (95% @ -0.6%)
	mean	120.4	12.0			
	standard deviation	0.9	0.4			
	standard error of the mean	0.4	0.2			

Table 3.26: In-Situ Properties for Waste Rock at the Firefly, Vanadium Queen, and Blue Cap Mines

Mine	In-Situ Water Content (%)	Blow Counts
Fire Fly	8	9
Blue Cap	9.7	4
Vanadium Queen	6.7	5

Table 3.27: Correlation Sample Results for the Firefly/Pygmy Mine

Sample ID	Uranium, total (3050) (mg/Kg)	Radium 226 (3050) (pCi/g)	Solids, Percent (%)
FF-BKG	1.23	1.67	91.7
FF-COR1	27.6	11.7	90.1
FF-COR2	124	47.7	91.2
FF-COR3	219	82.2	96.5
FF-COR4	524	247	91.9
FF-COR5	197	88.5	93.4
FF-COR6	454	141	92.1
FF-COR7	390	155	88.2
FF-COR8	229	0.22	75.9
FF-COR9	102	0.12	78.1

Table 3.28: Analytical Results for Vanadium Queen Mine Area Surface-Water Samples

Analyte	Units	Screening Level [1]	VQ DRAINAGE 1		VQ ADIT			VQ SPRING NO.1		VQ SPRING NO.2		VQ SPRING NO.3		LA SAL CREEK DN2		LA SAL CREEK DN3	
			04/21/04	10/18/04	04/21/04	4/21/04 (dup)	10/18/04	04/28/04	10/15/04	04/26/04	10/15/04	04/23/04	10/15/04	04/21/04	10/12/04	04/21/04	10/12/04
PHYSICAL (field parameters)																	
Flow	cfs	na	5.89E-03	~ 0.00117	~ 4.46E-03	~ 4.46E-03	~ 2.23E-03	~ 2.23E-03	~ 2.23E-03	~ 5.57E-04	~ 2.23E-03	~ 4.46E-03	~ 0.01114	6.7900	1.7126	6.6800	2.0064
Temperature	°c	na	13	10.2	5.5	5.5	7.7	11.4	13.4	14.5	10.2	12.3	12.7	7.5	11	6.2	11.7
pH	s.u.	6.5 - 8.5	**9.11**	8.23	**8.64**	**8.64**	8.02	8.1	8.2	7.72	7.41	7.61	7.6	**9.02**	8.31	**8.95**	8.34
Specific Conductance	(uS/cm)	na	473	478	477	477	480	401	381	269	276	425	383	201	361	196	364
Dissolved Oxygen	(mg/L)	5.0	6.69	7.72	8.45	8.45	8.08	8.53	7.79	5.47	**3.82**	**3.52**	**3.15**	nm	nm	nm	nm
Oxidation Reduction Potential	Rmev	na	58.5	91.1	62.7	62.7	138.7	59.2	103.7	87.6	149.8	111.6	172.2	nm	nm	nm	nm
INORGANIC																	
Nitrite	(mg/L)	0.05	< 0.01 U	na	< 0.01 U	< 0.01 U	na	< 0.01 U	na	0.02 B	na	0 UH	na	< 0.01 U	na	< 0.01 U	na
Nitrate	(mg/L)	4.0	0.11	na	0.77	0.77	na	1.2	na	0.36	na	0.7	na	0.07 B	na	0.07 B	na
Chloride	(mg/L)	250.0	2 B	1 B	2 B	1 B	1 B	5 B	4 B	4 B	4 B	4 B	4 B	4 B	5	4 B	5
Sulfate	(mg/L)	250.0	50	50	40 B	40 B	50	50	30 B	40 B	20 B	40 B	40 B	40 B	40 B	20 B	40 B
Total Phosphorous as P	(mg/L)	0.05	0.03 B	0.02 B	0.01 B	**0.24**	0.03 B	< 0.01 U	< 0.01 U	**0.07**	< 0.01 U	0.01 B	< 0.01 U	0.05	0.01 B	0.04 B	0.01 B
Total Dissolved Solids	(mg/L)	500.0	280	300	270	270	290	230	230	220	160	230	230	170 H	220 H	160 H	220 H
Total Suspended Solids	(mg/L)	35.0	34	**118**	< 5 U	8 B	< 5 U	< 5 U	< 5 U	24	6 B	< 5 U	< 5 U	24	< 5 U	26	< 5 U
Bicarbonate as CaCO3	(mg/L)	na	184	198 H	223	223	217 H	176	184	132	131	195	181	131	158	134	152
Carbonate as CaCO3	(mg/L)	na	51	32 H	10	10 B	12 H	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Cation-Anion Balance	%	na	0	0	0.9	1.8	0	-1.1	0	-1.4	-1.6	-1	-1.1	-4.5	-1.2	1.5	1.2
Hardness as CaCO3	(mg/L)	na	165	166	168	168	164	149	143	129	117	206	192	138	172	142	173
Hydroxide as CaCO3	(mg/L)	na	< 2 U	0 UH	< 2 U	< 2 U	0 UH	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	na	0.11	na	0.77	0.77	na	1.2	na	0.38	na	0.7 H	na	0.07 B	na	0.07 B	na
Sum of Anions	meq/L	na	5.8	5.6	5.6	5.5	5.6	4.8	4.4	3.6	3.1	4.9	4.5	3.5	4.1	3.2	4
Sum of Cations	meq/L	na	5.8	5.6	5.7	5.7	5.6	4.7	4.4	3.5	3	4.8	4.4	3.2	4	3.3	4.1
TDS (calculated)	(mg/L)	na	324	308	296	295	298	252	225	187	157	250	231	184	215	168	212
TDS (ratio - measured/calculated)		na	0.86	0.97	0.91	0.92	0.97	0.91	1.02	1.18	1.02	0.92	1	0.92	1.02	0.95	1.04
Total Alkalinity	(mg/L)	na	235	230 H	233	233	229 H	176	184	132	131	195	181	131	158	134	152
METALS																	
Antimony, dissolved	µg/L	124.0	1.2	1	1.1	1.1	1	< 0.2 U	< 0.2 U	< 0.4 U	< 0.2 U	0.2 B	< 0.2 U	0.3 B	< 0.2 U	< 0.2 U	< 0.2 U
Antimony, total	µg/L	6.0	1.2	0.8 B	1	0.9 B	1 B	< 0.2 U	< 0.2 U	< 1 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Arsenic, dissolved	µg/L	93.0	**143**	**125**	**126**	**123**	**123**	2	1.9 B	0.4 B	< 0.5 U	0.1 B	< 0.5 U	1.2	1.8 B	1	1.3 B
Arsenic, total recoverable	µg/L	10.0	**131**	**129**	**106**	**107**	**123**	1.6	1.7 B	< 0.5 U	< 3 U	0.1 B	< 3 U	1.6	1.2 B	1.5	1.2 B
Barium, dissolved	µg/L	127/127 [2]	**162**	**168**	**169**	**170**	**166**	**129**	127	**195**	118	98	89	**139**	123	**142**	123
Barium, total	µg/L	1,000.0	171	254	163	187	172	130	135	200	633	93	92	146	118	144	118
Beryllium, dissolved	µg/L	0.05/0.05 [2]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	4.0	0.1 B	< 1 U	< 0.1 U	0.1 B	< 0.5 U	< 0.1 U	< 0.1 U	< 0.5 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, dissolved	µg/L	1.8	0.2 B	0.4 B	0.2 B	0.2 B	0.4 B	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	5.0	0.2 B	0.1 B	0.2 B	0.3 B	< 0.5 U	< 0.1 U	< 0.1 U	< 0.5 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Calcium, dissolved	µg/L	45,667/52,467 [2]	21400	22500	22100	22100	21200	20000	20500	22700	20500	**45900**	42600	41500	46800	42500	46600
Chromium, dissolved	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	50.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	15.0	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	1,000.0	10 B	20 B	< 10 U	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	300.0	20 B	< 10 U	10 B	10 B	< 10 U	< 10 U	< 10 U	**1480**	< 10 U	< 10 U	< 10 U	60	40 B	80	20 B
Iron, total recoverable	µg/L	300.0	**1130**	**2370**	30 B	**460**	< 10 U	< 10 U	20 B	**1230**	50	20 B	10 B	**820**	120	**690**	110
Lead, dissolved	µg/L	5.0	0.2 B	0.4 B	< 0.1 U	< 0.1 U	0.3 B	0.1 B	< 0.1 U	1.9	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	0.3 B	< 0.1 U	0.3 B
Lead, total	µg/L	15.0	2.7	**17.6**	0.1 B	2.4	< 0.5 U	0.2 B	0.1 B	1.6 B	< 0.1 U	< 0.1 U	< 0.1 U	1.1	< 0.1 U	0.9	< 0.1 U
Magnesium, dissolved	µg/L	8,800/10,233 [2]	**27100**	**26800**	**27400**	**27500**	**27000**	**24100**	**22400**	**17600**	**16000**	**22100**	**20700**	8300	**13300**	8800	**13800**
Manganese, dissolved	µg/L	50.0	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	27 B	< 5 U	< 5 U	< 5 U	17 B	25 B	17 B	24 B
Manganese, total	µg/L	50.0	31	**89**	< 5 U	**67**	< 5 U	< 5 U	< 5 U	11 B	**500**	< 5 U	< 5 U	**77**	31	**65**	28 B
Mercury, dissolved	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	5/5 [2]	**170**	**160**	**160**	**160**	**150**	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Molybdenum, total	µg/L	100.0	**170**	**150**	**160**	**150**	**160**	< 10 U	< 10 U	10 B	**510**	< 10 U	< 10 U	10 B	< 10 U	< 10 U	< 10 U
Nickel, dissolved	µg/L	87.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	7/5 [2]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	2,300/3,800 [2]	**9600**	**8600**	**8600**	**8700**	**8400**	**4800**	**4700**	**3500**	2200	**2500**	2500	2200	2300	2300	2200
Selenium, dissolved	µg/L	4.6	**337**	**360**	**330**	**323**	**371**	**159**	**110**	**42.3**	3 B	**59.2**	**55**	1.5	< 1 U	1.6	< 1 U
Selenium, total	µg/L	10.0	**312**	**300**	**294**	**290**	**284**	**115**	**91**	**43.5**	2 B	**47**	**44**	1.1	< 1 U	1.3	< 1 U
Silver, dissolved	µg/L	0.2	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	50.0	0.06 B	0.13 B	< 0.05 U	< 0.05 U	< 0.3 U	< 0.05 U	< 0.05 U	< 0.3 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Sodium, dissolved	µg/L	12,200/21,000 [2]	**52100**	**48500**	**48600**	**48500**	**48100**	**37100**	**33200**	**17000**	15700	**15000**	12500	9100	13200	9400	13200
Uranium, dissolved	µg/L	2.56/3.69 [2]	**902**	**829**	**817**	**815**	**796**	**46.4**	**32.7**	**10.4**	0.77	**6.73**	**4.89**	**4.39**	**7.43**	**4.29**	**7.77**
Uranium, total	µg/L	30.0	**1000**	**813**	**893**	**892**	**785**	**47.6**	**33.7**	9.1	0.9 B	6.17	4.82	4.12	6.56	4.31	6.79
Vanadium, dissolved	µg/L	2.5/2.5 [2]	**1360**	**1210**	**1020**	**1030**	**1080**	**14** B	**8** B	**6** B	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Vanadium, total	µg/L	4.3/2.5 [2]	**1420**	**1460**	**1020**	**1070**	**1150**	**12** B	**12** B	**6** B	**506**	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Zinc, dissolved	µg/L	177.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Zinc, total	µg/L	5,000.0	< 10 U	20 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	510	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
RADIOLOGICAL (pCi/L)																	
Gross Alpha	pCi/L	15.0	**612**	**520**	**635**	**792**	**541**	**28.2**	**25.5**	9.11	3.27	3.06	7.02	6.72	9.19	6.3	7.35
Gross Beta	pCi/L	50 pCi/L; 4 mrem/yr	**134**	**274**	**124**	**144**	**265**	10.7	15.5	5.31	4.09	1.16	4.72	5.6	5.2	3.27	5.17
Radium 226 and 228 (combined)	pCi/L	5.0	**40.31**	**29.42**	**35.27**	**37.97**	**42.18**	0.53	1.68	0.42	0.69	0.05	1.45	4.22	0.58	0.53	2.15
Thorium 230 and 232 (combined)	pCi/L	0.06/0.02 [2]	**1.5**	**4.97**	-0.07	**1.66**	**0.21**	**0.36**	-0.52	-0.13	-0.67	**0.16**	**0.18**	**0.19**	**0.33**	0	**0.58**
Thorium 228	pCi/L	0.15/0 [2]	-0.07	**0.26**	-0.03	0.08	-0.2	**0.34**	-0.17	**0.21**	-0.05	0	-0.03	-0.03	**0.18**	0.04	**0.11**

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average concentration at Reference Areas 1, 2, and 3 (spring/fall).

nm Not measured; na Not analyzed

Table 3.29: Total Metals and Radionuclides in Waste-Rock Samples Collected from Boreholes at the Vanadium Queen Mine

Analyte	Units	Human Health Screening Level[1]	Elk RMC	VQ 1		VQ 2				VQ 3	VQ 4	
				0 - 0.5	0 - 0.5 (Dup 2)	0 - 0.5	2 - 4	10 - 12	15 - 17	0 - 0.5	0 - 0.5	2 - 2.5
Antimony, total (3050)	mg/Kg	50	----	0.5 B	0.5 B	0.5 B	0.5 B	0.3 B	0.2 B	0.3 B	0.1 B	0.2 B
Arsenic, total (3050)	mg/Kg	12	328	**137**	**141**	**87**	**91**	**67.2**	**27.4**	**87.7**	**26.7**	**17.7**
Barium, total (3050)	mg/Kg	71,540	----	40.9	39.2	63.2	41.8	40.7	46.5	31.6	307	143
Beryllium, total (3050)	mg/Kg	2,044	----	0.2 B	0.23 B	0.45	0.32	0.32	0.37	0.14 B	0.46	0.43
Cadmium, total (3050)	mg/Kg	70	3	2.49	2.09	**3.39**	2.65	2.16	1.13	**3.43**	0.52	0.59
Chromium, total (3050)	mg/Kg	1,533,000	----	2 B	1 B	6	3 B	2 B	14	1 B	2 B	11
Copper, total (3050)	mg/Kg	5,000	131	**266**	**278**	**222**	**223**	**389**	**160**	**166**	115	58
Iron, total (3050)	mg/Kg	306,600	----	3310	3270	3840	3250	7680	2990	2790	7000	8170
Lead, total (3050)	mg/Kg	1,000	127	**832**	**623**	**727**	**652**	**308**	**531**	**666**	65	111
Manganese, total (3050)	mg/Kg	19,000	----	123	121	150	146	243	143	107	176	165
Mercury, total	mg/Kg	40	11	< 0.05 U	0.06 B	0.07 B	0.07 B	0.08 B	< 0.05 U	< 0.05 U	0.06 B	0.07 B
Molybdenum, total (3050)	mg/Kg	5,110	----	16	17	7	16	8	24	13	4 B	4 B
Nickel, total (3050)	mg/Kg	2,700	----	6	6	8	7	7	5	4 B	5 B	6
Selenium, total (3050)	mg/Kg	700	----	22.4	22	56.1	64.4	34.9	21.3	19.7	11.3	12
Silver, total (3050)	mg/Kg	700	----	2.48	2.4	2.63	2.7	2.56	2.02	1.82	1.48	0.68
Uranium, total (3050)	mg/Kg	3,066	----	177	219	838	577	778	638	115	453	147
Vanadium, total (3050)	mg/Kg	7,154	----	850	907	4280	2370	2130	2620	382	3450	962
Zinc, total (3050)	mg/Kg	40,000	275	197	167	**305**	215	108	195	**340**	55	72
Gross Alpha	pCi/g	20.3 [2]	----	**41.9**	**42.8**	**126**	**72.4**	**88.7**	**70.4**	**25.3**	**45**	**27.9**
Gross Beta	pCi/g	13.5 [2]	----	**21.9**	**20**	**75.4**	**48.3**	**61.4**	**40.7**	11.8	**32.4**	**15.6**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**8.52**	**8.22**	**31.3**	**19**	**25.3**	**15.1**	**5.05**	**15.4**	**8.07**
Radium 228 (3050)	pCi/g	2.66 [2]	----	**5.87**	**5.67**	1.5	2.63	**4.27**	2.18	2.36	**2.87**	2.23
Thorium 228	pCi/g	0.40 [2]	----	0.03	0.03	0.04	0.06	0.05	0.04	0.04	0.1	0.05
Thorium 230	pCi/g	3.1 [2]	----	**7.55**	**8.2**	**30.8**	**19**	**26.5**	**19.8**	**4.17**	**12.9**	**5.65**
Thorium 232	pCi/g	0.35 [2]	----	0.02	-0.02	0.05	0.12	0.07	0.1	0.25	0.06	0.03
Solids, Percent	%	----	----	93.4	93.6	92.7	91.5	92.6	91.3	92	93	92.7

Analyte	Units	Human Health Screening Level[1]	Elk RMC	VQ 5		VQ 6				VQ 7	VQ 8
				0 - 0.5	0 - 0.5 (Dup 3)	0 - 0.5	3 - 5	8 - 10	22 - 24	0 - 0.5	0 - 0.5
Antimony, total (3050)	mg/Kg	50	----	0.5	0.5	0.2 B	< 0.1 U	0.1 B	< 0.1 U	0.3 B	0.1 B
Arsenic, total (3050)	mg/Kg	12	328	**103**	**110**	**63.4**	**14.2**	**19**	**23.7**	**59.1**	**14.2**
Barium, total (3050)	mg/Kg	71,540	----	44.3	48	219	486	84.3	72.5	111	114
Beryllium, total (3050)	mg/Kg	2,044	----	0.45	0.38	0.57	0.46	0.26 B	0.41	0.44	0.39
Cadmium, total (3050)	mg/Kg	70	3	2.7	2.58	**3.6**	0.38	0.26 B	0.61	1.11	0.38
Chromium, total (3050)	mg/Kg	1,533,000	----	2 B	3 B	6	3 B	21	4 B	4 B	15
Copper, total (3050)	mg/Kg	5,000	131	**299**	**368**	**347**	17	75	74	**183**	48
Iron, total (3050)	mg/Kg	306,600	----	3940	3710	4820	7700	2800	3060	4000	4210
Lead, total (3050)	mg/Kg	1,000	127	**657**	**720**	**152**	14 B	**301**	**129**	**334**	78
Manganese, total (3050)	mg/Kg	19,000	----	162	137	142	170	144	196	142	255
Mercury, total	mg/Kg	40	11	0.08 B	0.11 B	0.07 B	< 0.05 U	0.07 B	< 0.05 U	0.05 B	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	8	11	6	< 1 U	1 B	4 B	9	2 B
Nickel, total (3050)	mg/Kg	2,700	----	6	6	12	3 B	4 B	6	6	4 B
Selenium, total (3050)	mg/Kg	700	----	97.4	77	11.5	4 B	10.8	18.1	17.9	10.5
Silver, total (3050)	mg/Kg	700	----	3.16	2.66	1.84	0.18	1.02	0.74	1.71	0.79
Uranium, total (3050)	mg/Kg	3,066	----	612	612	345	97.6	98.1	106	436	96.6
Vanadium, total (3050)	mg/Kg	7,154	----	3460	3280	**8840**	202	1510	499	2120	631
Zinc, total (3050)	mg/Kg	40,000	275	221	205	171	28	31	83	105	35
Gross Alpha	pCi/g	20.3 [2]	----	**118**	**114**	**53.5**	**34**	**20.8**	13.6	**64.2**	9.89
Gross Beta	pCi/g	13.5 [2]	----	**59.7**	**63.2**	**30**	**19.1**	11.9	10.9	**37.6**	7.22
Radium 226 (3050)	pCi/g	3.3 [2]	----	**27**	**28.6**	**16.7**	**5.77**	**3.62**	**3.64**	**16.1**	**3.5**
Radium 228 (3050)	pCi/g	2.66 [2]	----	2.44	1.02	**3.12**	**2.96**	1.06	2.54	2.22	**3.54**
Thorium 228	pCi/g	0.40 [2]	----	0.08	0.06	0.06	0.05	0.03	0.03	0.08	0.03
Thorium 230	pCi/g	3.1 [2]	----	**22.2**	**21.3**	**21.9**	**3.62**	**4.43**	**3.48**	**13.8**	**3.26**
Thorium 232	pCi/g	0.35 [2]	----	0.18	0.08	0.08	0.14	0.18	0.07	0.28	0.04
Solids, Percent	%	----	----	92.6	92.7	93	92.2	93.9	89.5	91	88.9

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average value for Reference Areas 1, 2, and 3.

Value in bold indicates level exceeds screening level or RMC

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Table 3.30: SPLP Metals in Waste-Rock Samples Collected from Boreholes at the Vanadium Queen Mine

Analyte	Units	VQ 1		VQ 2				VQ 3	VQ 4	
		0 - 0.5	0 - 0.5 (Dup 2)	0 - 0.5	2 - 4	10 - 12	15 - 17	0 - 0.5	0 - 0.5	2 - 2.5
Antimony (1312)	mg/L	< 0.001 U	< 0.001 U	0.002 B	0.003 B	0.002 B	< 0.001 U	0.001 B	< 0.001 U	< 0.001 U
Arsenic (1312)	mg/L	0.148	0.13	0.124	0.365	0.282	0.129	0.187	0.0912	0.0268
Barium (1312)	mg/L	0.021	0.016	0.005 B	0.023	0.04	0.025	0.017	0.025	0.032
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	0.01 B	0.02 B	0.01 B	< 0.01 U	< 0.01 U	< 0.01 U	0.02 B	0.02 B	< 0.01 U
Iron (1312)	mg/L	0.08	0.16	0.16	< 0.01 U	< 0.01 U	0.03 B	0.19	0.27	0.04 B
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	0.07 B	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	0.04 B	0.03 B	0.03 B	0.07	0.06	0.03 B	0.03 B	0.03 B	0.05 B
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	0.113	0.098	0.029 B	0.098	0.092	0.078	0.091	< 0.008 U	0.039 B
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0459	0.0192	0.0262	0.0008 B	0.0013	0.0068	0.0147	0.0208	0.0135
Vanadium (1312)	mg/L	0.035	0.048	2.54	2.29	1.87	1.5	0.041	3.45	0.513
Zinc (1312)	mg/L	0.01 B	0.02 B	0.02 B	< 0.01 U	0.01 B	0.02 B	0.03 B	< 0.01 U	0.01 B

Analyte	Units	VQ 5		VQ 6				VQ 7	VQ 8
		0 - 0.5	0 - 0.5 (Dup 3)	0 - 0.5	3 - 5	8 - 10	22 - 24	0 - 0.5	0 - 0.5
Antimony (1312)	mg/L	0.003 B	0.003 B	0.003 B	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U
Arsenic (1312)	mg/L	0.41	0.427	0.572	0.0091	0.0793	0.128	0.0905	0.0622
Barium (1312)	mg/L	0.007 B	0.008 B	0.024	0.048	0.021	0.021	0.017	0.018
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	0.02 B	0.01 B	0.02 B	0.01 B	0.01 B	< 0.01 U	0.05 B	< 0.01 U
Iron (1312)	mg/L	0.15	0.11	0.03 B	0.17	0.07	0.07	0.45	0.03 B
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	0.02 B	0.02 B	0.14	0.03 B	0.03 B	0.02 B	< 0.01 U	< 0.01 U
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	0.029 B	0.036 B	0.094	0.037 B	0.038 B	0.063	< 0.008 U	0.008 B
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0263	0.0239	0.0124	0.0332	0.0034	0.0198	0.0556	0.0174
Vanadium (1312)	mg/L	2.74	2.34	41.7	0.295	2.7	0.926	0.894	2.12
Zinc (1312)	mg/L	0.02 B	0.01 B	0.02 B	0.01 B	0.01 B	< 0.01 U	0.01 B	< 0.01 U

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Analysis exceeded method hold time

Table 3.31: Total Metals and Radionuclides in Composite Waste-Rock Samples Collected from the Vanadium Queen Mine Dump

Analyte	Units	Human Health Screening Level[1]	Elk RMC	VQ Segment 1	VQ Segment 3	VQ Segment 4	VQ Segment 5	VQ Segment 6	VQ Segment 7
Antimony, total (3050)	mg/Kg	50	----	0.1 B	0.4 B	0.2 B	< 1 U	< 0.5 U	< 1 U
Arsenic, total (3050)	mg/Kg	12	328	**13.5**	**61.7**	**19.6**	**71.1**	**32.5**	**36**
Barium, total (3050)	mg/Kg	71,540	----	36.3	45.8	57.8	54.7	32	108
Beryllium, total (3050)	mg/Kg	2,044	----	0.24 B	0.5	0.22 B	0.33	0.27 B	0.48
Cadmium, total (3050)	mg/Kg	70	3	0.52	1.71	0.64	2.04	0.56	0.75
Chromium, total (3050)	mg/Kg	1,533,000	----	2 B	13	9	23	23	8
Copper, total (3050)	mg/Kg	5,000	131	52	**181**	95	**155**	97	**219**
Iron, total (3050)	mg/Kg	306,600	----	2040	4120	2590	3530	2770	5440
Lead, total (3050)	mg/Kg	1,000	127	65	**617**	92	**758**	**136**	109
Manganese, total (3050)	mg/Kg	19,000	----	147	149	172	131	162	214
Mercury, total	mg/Kg	40	11	< 0.05 U	0.09 B	0.07 B	0.12 B	0.08 B	0.08 B
Molybdenum, total (3050)	mg/Kg	5,110	----	< 1 U	6	3 B	14	6	4 B
Nickel, total (3050)	mg/Kg	2,700	----	3 B	6	3 B	5 B	4 B	6
Selenium, total (3050)	mg/Kg	700	----	1.9 B	117	18.4	43.5	12.7	13.9
Silver, total (3050)	mg/Kg	700	----	0.38	2.24	0.89	3.17	1.45	1.79
Uranium, total (3050)	mg/Kg	3,066	----	122	452	167	398	176	372
Vanadium, total (3050)	mg/Kg	7,154	----	729	3240	689	1960	868	1990
Zinc, total (3050)	mg/Kg	40,000	275	47	130	45	154	59	66
Gross Alpha	pCi/g	20.3 [2]	----	**35.3**	**74.8**	**26.7**	**810**	**296**	**965**
Gross Beta	pCi/g	13.5 [2]	----	**15.9**	**43.8**	12.5	**307**	**107**	**411**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**7.27**	**15.7**	**3.35**	**141**	**54**	**123**
Radium 228 (3050)	pCi/g	2.66 [2]	----	**3.09**	2.32	**2.93**	0.57	0.58	1.74
Thorium 228	pCi/g	0.40 [2]	----	0.03	0.07	0.03	0.21	0.02	0.1
Thorium 230	pCi/g	3.1 [2]	----	**6.15**	**26.5**	**3.68**	**135**	**34.9**	**133**
Thorium 232	pCi/g	0.35 [2]	----	0.08	0.16	0.06	0.29	0.21	**0.61**
Solids, Percent	%	----	----	94.5	94	94.2	93.7	93.5	91.3

Note: VQ Segment 2 was not collected due to unstable dump and unsafe work conditions

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average value for Reference Areas 1, 2, and 3.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.32: SPLP Metals in Composite Waste-Rock Samples Collected from the Vanadium Queen Mine Dump

Analyte	Units	VQ Segment 1	VQ Segment 3	VQ Segment 4	VQ Segment 5	VQ Segment 6	VQ Segment 7
Antimony (1312)	mg/L	< 0.001 U	0.002 B	< 0.001 U	0.001 B	0.001 B	< 0.001 U
Arsenic (1312)	mg/L	0.0505	0.105	0.0807	0.202	0.248	0.194
Barium (1312)	mg/L	0.023	0.013	0.012	0.012	0.014	0.026
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Iron (1312)	mg/L	0.03 B	< 0.01 U	0.03 B	0.01 B	0.02 B	0.04 B
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0 UH	< 0 UH	< 0 UH	< 0 UH	< 0 UH	< 0 UH
Molybdenum (1312)	mg/L	< 0.01 U	0.01 B	< 0.01 U	0.04 B	0.02 B	0.02 B
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	0.008 B	0.049	0.008 B	0.165	0.032 B	0.019 B
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0426	0.0007 B	0.0068	0.0114	0.0085	0.0151
Vanadium (1312)	mg/L	0.154	2.33	1.72	1.92	1.02	2.17
Zinc (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U

Note: VQ Segment 2 was not collected due to unstable dump and unsafe work conditions

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Analysis exceeded method hold time

Table 3.33: Total Metals and Radionuclides in Ephemeral Drainage Sediment at the Vanadium Queen Mine

Analyte	Units	Human Health Screening Level[1]	Elk RMC	VQ Sed 1	VQ Sed 1 (Dup 8)	VQ Sed 2	VQ Sed 3
Antimony, total (3050)	mg/Kg	50	----	0.1 B	< 0.1 U	< 0.1 U	0.1 B
Arsenic, total (3050)	mg/Kg	12	328	6.36	5.78	6.12	4.78
Barium, total (3050)	mg/Kg	71,540	----	271	398	367	260
Beryllium, total (3050)	mg/Kg	2,044	----	0.26 B	0.28 B	0.29 B	0.32
Cadmium, total (3050)	mg/Kg	70	3	0.19 B	0.28 B	0.17 B	0.19 B
Chromium, total (3050)	mg/Kg	1,533,000	----	4 B	4 B	3 B	4 B
Copper, total (3050)	mg/Kg	5,000	131	10	34	10	7
Iron, total (3050)	mg/Kg	306,600	----	2950	3360	3060	3610
Lead, total (3050)	mg/Kg	1,000	127	83	71	50	42
Manganese, total (3050)	mg/Kg	19,000	----	158	207	131	147
Mercury, total	mg/Kg	40	11	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	2 B	< 1 U	< 1 U	< 1 U
Nickel, total (3050)	mg/Kg	2,700	----	2 B	2 B	2 B	2 B
Selenium, total (3050)	mg/Kg	700	----	1.7 B	7	7.4	9.6
Silver, total (3050)	mg/Kg	700	----	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	3,066	----	25.9	29.1	10.7	8.31
Vanadium, total (3050)	mg/Kg	7,154	----	116	164	96	74.5
Zinc, total (3050)	mg/Kg	40,000	275	13	16	15	12
Gross Alpha	pCi/g	20.3 [2]	----	3.35	9.06	3.94	2.75
Gross Beta	pCi/g	13.5 [2]	----	1.36	3.87	1.52	1.29
Radium 226 (3050)	pCi/g	3.3 [2]	----	0	**3.74**	0	0.08
Radium 228 (3050)	pCi/g	2.66 [2]	----	0.13	0.07	0.2	0.08
Thorium 228	pCi/g	0.40 [2]	----	0.06	-0.02	0.01	0.01
Thorium 230	pCi/g	3.1 [2]	----	0.75	0.86	0.37	0.3
Thorium 232	pCi/g	0.35 [2]	----	0.04	0	0.01	0.02
Solids, Percent	%	----	----	97.9	97.2	96.2	92.2

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average value for soil in Reference Areas 1, 2, and 3.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.34: Total Metals and Radionuclides in Vegetation Samples Collected at the Vanadium Queen Mine

Mine Drainage Channel

Analyte	Units	Grass			Forb	
		Ref Area	Adit Drainage	Adit Drg (dup)	Ref Area	Adit Drainage
Antimony, total (3050)	mg/Kg	< 0.1 U	**0.3 B**	**0.2 B**	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	< 0.3 U	**1.5**	**1.4**	< 0.3 U	**1.2**
Barium, total (3050)	mg/Kg	41.5	**49.1**	33.3	106	42.6
Beryllium, total (3050)	mg/Kg	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.07 B	**0.21 B**	**0.54**	0.12 B	0.09 B
Chromium, total (3050)	mg/Kg	1 B	< 1 U	1 B	2 B	< 1 U
Copper, total (3050)	mg/Kg	2 B	**4 B**	**5 B**	7	**9**
Iron, total (3050)	mg/Kg	322	120	222	252	102
Lead, total (3050)	mg/Kg	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	95	**221**	93.8	74.2	**145**
Mercury, total	mg/Kg	0 UH	< 0.1 U	< 0.1 U	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	5 B	**19**	**18**	3 B	**41**
Nickel, total (3050)	mg/Kg	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2.4 B	**47**	**39.1**	7.4	**67**
Silver, total (3050)	mg/Kg	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	0.03 B	**13.5**	**4.24**	0.07 B	**1.47**
Vanadium, total (3050)	mg/Kg	0.7 B	**15.9**	**11.6**	0.8 B	**4.1**
Zinc, total (3050)	mg/Kg	10	**23**	**55**	30	**42**
Gross Alpha	pCi/g	1.63	**89.8**	**100**	0.94	**14.5**
Gross Beta	pCi/g	7.15	**164**	**256**	13.6	**19.7**
Radium 226 (3050)	pCi/g	1.98	**10.1**	**7.85**	0.07	**6.1**
Radium 228 (3050)	pCi/g	1.65	**1.83**	1.63	2.02	0.96
Thorium 228	pCi/g	-0.1	-0.06	**0.11**	0.14	-0.06
Thorium 230	pCi/g	-0.59	**1.03**	-0.02	-0.28	-0.21
Thorium 232	pCi/g	-0.17	**0.09**	-0.44	0.06	**0.15**
Moisture Content	%	41.4	62.2	51.2	66.6	65.9

Perimeter of Waste-Rock Dump

Analyte	Units	Grass		Forb		Shrub		Gambles Oak Study	
		Ref Area	Perimeter	Ref Area	Perimeter	Ref Area	Perimeter	Stem	Root
Antimony, total (3050)	mg/Kg	< 0.1 U	**0.3 B**	< 0.1 U	< 0.2 U	< 0.1 U	< 0.6 U	< 0.1 U	0.3 B
Arsenic, total (3050)	mg/Kg	< 0.3 U	**4.5**	< 0.3 U	**9.5**	< 0.3 U	**3 B**	< 0.3 U	**5.4**
Barium, total (3050)	mg/Kg	41.5	18.1	106	13.4	90.8	7	15.3	36.8
Beryllium, total (3050)	mg/Kg	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.06 U	< 0.06 U	< 0.06 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.07 B	**1.06**	0.12 B	**0.43**	0.06 B	**0.35**	< 0.06 U	**1.11**
Chromium, total (3050)	mg/Kg	1 B	1 B	2 B	1 B	2 B	< 1 U	1 B	**4 B**
Copper, total (3050)	mg/Kg	2 B	**20**	7	**15**	7	**25**	6 B	**83**
Iron, total (3050)	mg/Kg	322	260	252	148	255	205	196	**339**
Lead, total (3050)	mg/Kg	< 4 U	**40**	< 4 U	< 4 U	< 4 U	**6 B**	< 5 U	**21**
Manganese, total (3050)	mg/Kg	95	47.6	74.2	59	42.4	35.6	**62.6**	22.1
Mercury, total	mg/Kg	0 UH	< 0.1 U	0 UH	0 UH	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	5 B	**58**	3 B	**115**	< 1 U	**21**	**3 B**	**7**
Nickel, total (3050)	mg/Kg	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**1 B**	< 1 U	**3 B**
Selenium, total (3050)	mg/Kg	2.4 B	**81.7**	7.4	**519**	1.3 B	**152**	**37.3**	**37.7**
Silver, total (3050)	mg/Kg	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U	< 0.6 U	1.1 B
Uranium, total (3050)	mg/Kg	0.03 B	**17.5**	0.07 B	**5.35**	< 0.03 U	**2.62**	**0.31**	**85.5**
Vanadium, total (3050)	mg/Kg	0.7 B	**53.4**	0.8 B	**17.1**	0.6 B	**13.7**	**2 B**	**411**
Zinc, total (3050)	mg/Kg	10	**47**	30	**66**	33	147	27	**45**
Gross Alpha	pCi/g	1.63	**40.6**	0.94	**23.2**	2.25	**14.1**	**10.9**	**136**
Gross Beta	pCi/g	7.15	**22.1**	13.6	**27.8**	9.2	**17.4**	**12**	**37.9**
Radium 226 (3050)	pCi/g	1.98	**9.75**	0.07	**6.84**	0.45	**4.45**	**3.78**	**36.1**
Radium 228 (3050)	pCi/g	1.65	**2.22**	2.02	**3.7**	2.31	1.87	0.55	1.58
Thorium 228	pCi/g	-0.1	-0.06	0.14	-0.03	-0.13	-0.11	-0.03	-0.1
Thorium 230	pCi/g	-0.59	**3.27**	-0.28	**4.26**	-0.44	**0.08**	**0.14**	**6.28**
Thorium 232	pCi/g	-0.17	-0.14	0.06	**0.14**	0.05	-0.16	0	**0.13**
Moisture Content	%	41.4	73.6	66.6	60.6	46.1	52.2	33.2	65.1

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time was exceeded

Value in bold indicates level exceeds background value

Table 3.35: Correlation Sample Results for the Vanadium Queen Mine

Sample ID	Uranium, total (3050) (mg/Kg)	Radium 226 (3050) (pCi/g)	Solids, Percent (%)
VQ-BKG	2.88	1.44	94.4
VQ-COR1	29	2.98	75.3
VQ-COR2	17.6	10.5	92.9
VQ-COR3	120	51	93.2
VQ-COR4	355	150	94.9
VQ-COR5	282	102	92.2
VQ-COR6	382	144	95.1
VQ-COR7	82.2	28	95.5
VQ-COR8	39.5	12.6	97.6
VQ-COR9	11.6	27.1	95.9

Table 3.36: Analytical Results for the Soil Sample Collected at the Vanadium Queen Mine Shop

Analyte	Units	VC SHOP
Aroclor 1016	ug/Kg	< 500 U
Aroclor 1221	ug/Kg	< 500 U
Aroclor 1232	ug/Kg	< 500 U
Aroclor 1242	ug/Kg	< 500 U
Aroclor 1248	ug/Kg	< 500 U
Aroclor 1254	ug/Kg	< 500 U
Aroclor 1260	ug/Kg	< 500 U
Oil & Grease	mg/Kg	59000
Solids, Percent	%	94

Qualifiers are defined as follows:

U Analyte was not detected at the Method Detection Limit

Table 3.37: Analytical Results for Surface-Water Samples Collected at the Black Hat/Blue Cap Mine Complex

Analyte	Units	Screening Level [1]	BLUE CAP ADIT		BLUE CAP DRAINAGE			BLACK HAT SPRING		ALCOVE SPRING	
			04/14/04	10/13/04	04/14/04	04/14/04 (dup)	10/12/04	04/14/04	10/12/04	04/14/04	10/12/04
PHYSICAL (field parameters)											
Flow	cfs	na	~ 3.03E-03	~ 4.56E-03	3.03E-03	3.03E-03	~ 4.56E-03	1.03E-02	1.14E-02	2.87E-04	3.24E-04
Temperature	°C	na	6.1	8	9.5	9.5	9	11.5	13.4	10.5	13.1
pH	s.u.	6.5 - 8.5	8.21	**8.67**	8.37	8.37	**8.59**	8.08	8.32	8.2	**8.58**
Specific Conductance	(uS/cm)	na	515	526	505	505	514	402	399	579	564
Dissolved Oxygen	(mg/L)	5.0	8.83	8.89	9.38	9.38	8.16	8.15	7.91	7.47	6.51
Oxidation Reduction Potential	Rmev	na	72.1	151.4	67.6	67.6	94.9	91.7	125.6	68.6	101.8
INORGANIC											
Nitrite	(mg/L)	0.05	< 0.01 U	na	< 0.01 U	< 0.01 U	na	< 0.01 U	na	< 0.01	na
Nitrate	(mg/L)	4.0	0.54	na	0.39	0.49	na	0.42	na	0.45	na
Chloride	(mg/L)	250.0	1 B	2 B	2 B	1 B	2 BH	3 B	3 BH	16	13
Sulfate	(mg/L)	250.0	60	70	70	70	50	20 B	20 B	70	60
Total Phosphorous as P	(mg/L)	0.05	< 0.01 U	0.01 B	< 0.01 U	< 0.01 U	0.01 B	0.01 B	0.01 B	< 0.01	< 0.01 U
Total Dissolved Solids	(mg/L)	500.0	340	320	330	320	320 H	270	240 H	410	350 H
Total Suspended Solids	(mg/L)	35.0	< 5 U	< 5 U	< 5 U	< 5 U	0 UH	8 B	8 B	< 5	0 UH
Bicarbonate as CaCO3	(mg/L)	na	214	207	203	203	189	211	207 H	230	220
Carbonate as CaCO3	(mg/L)	na	16	12	25	25	21	6 B	21 H	12	21
Cation-Anion Balance	%	na	4.8	-2.6	2.4	2.4	7	4	-2	3.6	0.8
Hardness as CaCO3	(mg/L)	na	125	111	123	123	119	133	125	49	46
Hydroxide as CaCO3	(mg/L)	na	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	0 UH	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	na	0.54 H	na	0.39 H	0.39 H	na	0.42 H	na	0.45 H	na
Sum of Anions	meq/L	na	5.9	5.9	6.1	6.1	5.3	4.8	5	6.7	6.4
Sum of Cations	meq/L	na	6.5	5.6	6.4	6.4	6.1	5.2	4.8	7.2	6.5
TDS (calculated)	(mg/L)	na	341	323	352	352	312	260	263	398	372
TDS (ratio - measured/calculated)		na	1	0.99	0.94	0.94	1.03	1.04	0.91	1.03	0.94
Total Alkalinity	(mg/L)	na	229	219	228	228	210	217	228 H	242	241
METALS											
Antimony, dissolved	µg/L	124.0	< 1 U	0.8 B	< 1 U	< 1 U	0.8 B	< 0.2 U	< 0.2 U	< 2	0.5 B
Antimony, total	µg/L	6.0	0.8 B	1 B	0.8 B	0.8 B	0.7 B	< 0.2 U	< 0.2 U	0.5	0.5 B
Arsenic, dissolved	µg/L	93.0	70.3	67.8	71.4	71.8	59.5	8.7	6.4	48.9	37
Arsenic, total recoverable	µg/L	10.0	**58.1**	**59**	**59.1**	**58.2**	**55.3**	7.3	6.5	**40.8**	**39.8**
Barium, dissolved	µg/L	127/127 [2]	**176**	**155**	**173**	**175**	**175**	**163**	**163**	74	74
Barium, total	µg/L	1,000.0	150	164	150	151	168	142	161	65	70
Beryllium, dissolved	µg/L	0.05/0.05 [2]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1	< 0.1 U
Beryllium, total	µg/L	4.0	< 0.1 U	< 0.5 U	< 0.1 U	< 0.1 U	< 0.5 U	< 0.1 U	< 0.1 U	< 0.1	< 0.1 U
Cadmium, dissolved	µg/L	1.8	0.2 B	0.2 B	0.2 B	0.2 B	< 0.1 U	< 0.1 U	< 0.1 U	0.2	< 0.1 U
Cadmium, total	µg/L	5.0	0.3 B	< 0.5 U	0.2 B	0.2 B	< 0.1 U	< 0.1 U	< 0.1 U	0.3	< 0.1 U
Calcium, dissolved	µg/L	45,667/52,467 [2]	19000	16900	18900	19200	18200	21800	20500	9100	8500
Chromium, dissolved	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10	< 10 U
Chromium, total	µg/L	50.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10	< 10 U
Copper, dissolved	µg/L	15.0	< 10 U	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10	< 10 U
Copper, total	µg/L	1,000.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10	< 10 U
Iron, dissolved	µg/L	300.0	< 10 U	10 B	20 B	< 10 U	< 10 U	20 B	20 B	20	< 10 U
Iron, total recoverable	µg/L	300.0	50	100 B	30 B	30 B	70	80	120	40	200
Lead, dissolved	µg/L	5.0	< 0.1 U	< 0.1 U	0.2 B	0.2 B	0.2 B	< 0.1 U	0.4 B	0.1	**7**
Lead, total	µg/L	15.0	0.9	0.7 B	0.2 B	0.1 B	0.7 B	< 0.1 U	< 0.1 U	< 0.1	< 1 U
Magnesium, dissolved	µg/L	8,800/10,233 [2]	**18800**	**16700**	**18400**	**18800**	**18000**	**19100**	**17900**	6300	5900
Manganese, dissolved	µg/L	50.0	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5	< 5 U
Manganese, total	µg/L	50.0	< 5 U	< 5 U	< 5 U	< 5 U	10 B	< 5 U	9 B	< 5	< 5 U
Mercury, dissolved	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2	< 0.2 U
Mercury, total	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2	< 0.2 U
Molybdenum, dissolved	µg/L	5/5 [2]	**130**	**120**	**130**	**130**	**120**	**10** B	< 10 U	**180**	**170**
Molybdenum, total	µg/L	100.0	**110**	**120**	**110**	**110**	**120**	< 10 U	< 10 U	**160**	**170**
Nickel, dissolved	µg/L	87.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10	< 10 U
Nickel, total	µg/L	7/5 [2]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10	< 10 U
Potassium, dissolved	µg/L	2,300/3,800 [2]	**8200**	**7100**	**8100**	**8200**	**7300**	**6700**	**5900**	**7500**	**6800**
Selenium, dissolved	µg/L	4.6	**213**	**251**	**222**	**214**	**219**	**44.5**	**40**	**382**	**395**
Selenium, total	µg/L	10.0	**193**	**228**	**191**	**188**	**173**	**34**	**30**	**334**	**318**
Silver, dissolved	µg/L	0.2	< 0.05 U	< 0.3 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05	< 0.05 U
Silver, total	µg/L	50.0	< 0.05 U	< 0.3 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05	< 0.05 U
Sodium, dissolved	µg/L	12,200/21,000 [2]	**87300**	**74400**	**86300**	**87700**	**82100**	**55400**	**50100**	**137000**	**125000**
Uranium, dissolved	µg/L	2.56/3.69 [2]	**521**	**523**	**518**	**522**	**548**	**198**	**168**	**1170**	**1210**
Uranium, total	µg/L	30.0	**589**	**565**	**590**	**592**	**507**	**195**	**160**	**1300**	**1010**
Vanadium, dissolved	µg/L	2.5/2.5 [2]	**324**	**298**	**335**	**335**	**302**	**448**	**378**	**374**	**356**
Vanadium, total	µg/L	4.3/2.5 [2]	**288**	**308**	**299**	**294**	**298**	**391**	**369**	**337**	**348**
Zinc, dissolved	µg/L	177.0	< 10 U	< 10 U	< 10 U	< 10 U	30 B	< 10 U	< 10 U	< 10	< 10 U
Zinc, total	µg/L	5,000.0	< 10 U	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10	< 10 U
RADIOLOGICAL (pCi/L)											
Gross Alpha	pCi/L	15.0	**404**	**420**	**382**	**382**	**414**	**111**	**107**	**1130**	**1020**
Gross Beta	pCi/L	50 pCi/L; 4 mrem/yr	**122**	**171**	**115**	**116**	**96**	38.9	46.7	**255**	**523**
Radium 226 and 228 (combined)	pCi/L	5.0	**12.46**	**28.2**	**14.27**	**12.95**	**15.24**	**8.16**	4.37	**6.81**	0
Thorium 230 and 232 (combined)	pCi/L	0.06/0.02 [2]	**0.07**	-0.02	**0.22**	**0.05**	**1.51**	-0.19	-0.09	**0.25**	0
Thorium 228	pCi/L	0.15/0 [2]	0.05	-0.07	**0.16**	0.08	**0.07**	-0.04	-0.03	-0.02	**0.02**

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

[1] Screening level as determined in the Field Sampling Plan.

[2] LIONCYNCK is duplicate of sample LIONCYNCK-DN1, and WILLOW SPRING is duplicate of BLUE CAP DRAINAGE

[3] Screening level based on average concentration of Reference Areas 1, 2, and 3.

Value in bold indicates level exceeds screening level

Table 3.37 (cont'd): Analytical Results for Surface-Water Samples Collected at the Black Hat/Blue Cap Mine Complex

Analyte	Units	Screening Level [1]	LIONCYNCK - UP		LIONCYNCK - DN1			LIONCYNCK - DN2		LA SAL CREEK DN4		LA SAL CREEK DN5	
			04/13/04	10/12/04	04/13/04	10/12/04	10/12/04 (dup)	04/13/04	10/12/04	04/20/04	10/12/04	04/20/04	10/12/04
PHYSICAL (field parameters)													
Flow	cfs	na	1.30E-03	2.31E-03	1.57E-02	~ 1.40E-02	~ 1.40E-02	2.01E-01	3.93E-02	7.0800	2.3400	7.6500	2.90905
Temperature	°C	na	11.3	12.4	13.2	13.3	13.3	13.1	13.7	8.2	10.2	6.1	9.9
pH	s.u.	6.5 - 8.5	8.33	8.23	**8.89**	**8.82**	**8.82**	8.35	8.29	**9**	8.29	**8.84**	8.28
Specific Conductance	(uS/cm)	na	640	691	578	593	593	280	298	208	359	197.4	358
Dissolved Oxygen	(mg/L)	5.0	7.58	6.82	8.23	7.75	7.75	8.15	8.43	nm	nm	nm	nm
Oxidation Reduction Potential	rmV	na	81.7	107.7	46.5	64.8	64.8	32.2	16.2	nm	nm	nm	nm
INORGANIC (mg/L)	(mg/L)												
Nitrite	(mg/L)	0.05	< 0.01 U	na	**0.07**	na	na	< 0.01 U	na	< 0.01 U	na	< 0.01 U	na
Nitrate	(mg/L)	4.0	0.27	na	< 0.76 U	na	na	0.16	na	0.08 B	na	0.07 B	na
Chloride	(mg/L)	250.0	13	7	6	6	6	1 B	2 B	4 B	5 B	4 B	4 B
Sulfate	(mg/L)	250.0	70	100	70	70	70	10 B	20 B	20 B	30 B	20 B	30 B
Total Phosphorous as P	(mg/L)	0.05	0.04 B	0.04 B	0.02 B	0.02 B	0.02 B	0.01 B	0.01 B	0.05	**0.57**	0.05 B	0.03 B
Total Dissolved Solids	(mg/L)	500.0	440	460 H	380	360 H	390 H	170	170 H	190	210 H	170	180 H
Total Suspended Solids	(mg/L)	35.0	18 B	< 5 U	8 B	6 BH	6 BH	6 B	< 5 U	28	**116**	26	10 B
Bicarbonate as CaCO3	(mg/L)	na	274	286	231	241	252	145	156	134	155	138	166
Carbonate as CaCO3	(mg/L)	na	7 B	< 2 U	31	42	42	< 2 U	< 2 U	3 B	< 2 U	< 2 U	< 2 U
Cation-Anion Balance	%	na	5.1	2.4	4.8	0	-1.4	6.1	0	1.5	2.6	0	0
Hardness as CaCO3	(mg/L)	na	111	168	165	168	167	145	147	143	174	144	172
Hydroxide as CaCO3	(mg/L)	na	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	na	0.27	na	0.76	na	na	0.16	na	0.08 B	na	0.07 B	na
Sum of Anions	meq/L	na	7.4	8	6.9	7.3	7.5	3.1	3.6	3.2	3.8	3.3	4
Sum of Cations	meq/L	na	8.2	8.4	7.6	7.3	7.3	3.5	3.6	3.3	4	3.3	4
TDS (calculated)	(mg/L)	na	433	455	404	412	418	163	180	171	202	170	207
TDS (ratio - measured/calculated)		na	1.02	1.01	0.94	0.87	0.93	1.04	0.94	1.11	1.04	1	0.87
Total Alkalinity	(mg/L)	na	280	286	262	283	293	145	156	137	155	138	166
METALS													
Antimony, dissolved	µg/L	124.0	< **2** U	0.8 B	< 1 U	0.5 B	0.5 B	< 0.4 U	< 0.2 U	0.3 B	< 0.2 U	0.2 B	< 0.2 U
Antimony, total	µg/L	6.0	0.6 B	0.8 B	0.5 B	0.5 B	0.5 B	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Arsenic, dissolved	µg/L	93.0	46.2	46.8	36.7	33	29.4	4.5	5.8	1.3	2.3 B	1.4	2.2 B
Arsenic, total recoverable	µg/L	10.0	**40.6**	**44.7**	**31.7**	**28.3**	**32**	4.5	5.4	1.5	< 3 U	1.5	1.9 B
Barium, dissolved	µg/L	127/127 [2]	75	93	107	**133**	**131**	**209**	**214**	**142**	**141**	**144**	**149**
Barium, total	µg/L	1,000.0	78	90	120	126	125	193	207	154	138	158	145
Beryllium, dissolved	µg/L	0.05/0.05 [2]	< 1 U	< 0.1 U	< 0.5 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	4.0	< 0.1 U	< 0.2 U	< 0.1 U	< 1 U	< 1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, dissolved	µg/L	1.8	0.3 B	< 0.1 U	0.2 B	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	5.0	0.3 B	< 0.2 U	0.4 B	0.1 B	< 0.2 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Calcium, dissolved	µg/L	45,667/52,467 [2]	26100	38200	32300	34300	34000	31400	32100	41600	45900	41600	44800
Chromium, dissolved	µg/L	100.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	50.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 20 U	< 10 U	< 10 U
Copper, dissolved	µg/L	15.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	1,000.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 20 U	< 10 U	< 10 U
Iron, dissolved	µg/L	300.0	40 B	10 B	20 B	< 10 U	< 10 U	50 B	40 B	60	30 B	60	30 B
Iron, total recoverable	µg/L	300.0	**340**	130	**610**	70	110	240	**500**	**840**	170	**900**	240
Lead, dissolved	µg/L	5.0	0.4 B	**6**	0.2 B	< 0.1 U	**7**	< 0.1 U	0.4 B	< 0.1 U	0.4 B	< 0.1 U	0.4 B
Lead, total	µg/L	15.0	1.7	< 1 U	3.7	< 1 U	< 1 U	0.6	< 0.1 U	1.2	< 0.1 U	1.3	< 0.1 U
Magnesium, dissolved	µg/L	8,800/10,233 [2]	**11100**	**17700**	**20400**	**19900**	**19900**	**16300**	**16200**	**9500**	**14500**	**9800**	**14700**
Manganese, dissolved	µg/L	50.0	14 B	14 B	< 5 U	< 5 U	< 5 U	**57**	**88**	29 B	29 B	28 B	22 B
Manganese, total	µg/L	50.0	33	20 B	43	6 B	8 B	**68**	**90**	**75**	30 B	**75**	27 B
Mercury, dissolved	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	0.012	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 1 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	5/5 [2]	**170**	**190**	**120**	**110**	**110**	**20** B	**10** B	< 10 U	< 10 U	< 10 U	< 10 U
Molybdenum, total	µg/L	100.0	**160**	**180**	**110**	**110**	**110**	< 10 U	20 B	< 10 U	< 20 U	< 10 U	< 10 U
Nickel, dissolved	µg/L	87.0	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	7/5 [2]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 20 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	2,300/3,800 [2]	**8200**	**9200**	8900	**8300**	**8300**	2200	2300	**2400**	2400	2200	2300
Selenium, dissolved	µg/L	4.6	**274**	**330**	**241**	**167**	**162**	**20.2**	**9**	1.6	< 1 U	2	< 1 U
Selenium, total	µg/L	10.0	**260**	**268**	**184**	**145**	**131**	**15.8**	**11**	1.3	< 1 U	1.6	< 1 U
Silver, dissolved	µg/L	0.2	< 0.05 U	< 0.05 U	0.07 B	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	50.0	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Sodium, dissolved	µg/L	12,200/21,000 [2]	**132000**	**111000**	**93200**	**86800**	**86500**	**14100**	14100	9300	11400	9200	11600
Uranium, dissolved	µg/L	2.56/3.69 [2]	**1200**	**1080**	**744**	**754**	**760**	**97.2**	**131**	**4.1**	**7.09**	**7.25**	**17**
Uranium, total	µg/L	30.0	**1240**	**938**	**763**	**653**	**652**	**114**	**116**	4.58	6.42	7.66	15.5
Vanadium, dissolved	µg/L	2.5/2.5 [2]	**393**	**630**	**531**	**533**	**534**	**50**	**53**	< 5 U	< 5 U	< 5 U	< 5 U
Vanadium, total	µg/L	4.3/2.5 [2]	**397**	**578**	**558**	**519**	**518**	**55**	**64**	**5** B	< 10 U	**6** B	**7** B
Zinc, dissolved	µg/L	177.0	< 10 U	< 10 U	< 10 U	20 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Zinc, total	µg/L	5,000.0	< 10 U	10 B	20 B	10 B	10 B	< 10 U	< 10 U	< 10 U	< 20 U	< 10 U	< 10 U
RADIOLOGICAL (pCi/L)													
Gross Alpha	pCi/L	15.0	**656**	**691**	**353**	**506**	**559**	**94.8**	**105**	3.53	9.3	4.84	**30.3**
Gross Beta	pCi/L	50 pCi/L; 4 mrem/yr	**239**	**226**	**136**	**150**	**137**	26.9	32.6	3.35	4.45	3.41	19.1
Radium 226 and 228 (combined)	pCi/L	5.0	**10.22**	**14.3**	**11.38**	**14.48**	**13.99**	4.74	0	0.32	1.01	0.83	3.34
Thorium 230 and 232 (combined)	pCi/L	0.06/0.02 [2]	**0.67**	-0.51	**1.17**	**0.55**	**0.86**	-0.05	0	**0.57**	-0.22	**0.39**	**2.39**
Thorium 228		0.15/0 [2]	0.07	-0.05	-0.07	-0.05	-0.05	0.05	-0.08	0.03	**0.17**	0.05	0

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Holding time not met

[1] Screening level as determined in the Field Sampling Plan.
[2] Screening level is based on average concentration of Reference Areas 1, 2, and 3 (April/October).
Value in bold indicates level exceeds screening level
nm Not measured; na Not analyzed

Table 3.38: Total Metals and Radionuclides in Waste-Rock Samples Collected from Boreholes at the Blue Cap Mine

Analyte	Units	Human Health Screening Level[1]	Elk RMC	BC 1			BC 2		BC 3		
				0 - 0.5	2 - 4	8 - 9	0 - 0.5	2 - 4.5	0 - 0.5	2 - 4	10 - 12
Antimony, total (3050)	mg/Kg	50	----	0.2 B	0.2 B	0.1 B	0.1 B	0.2 B	0.6	0.3 B	0.2 B
Arsenic, total (3050)	mg/Kg	12	328	**48**	**70**	**26**	11.5	**15.2**	**74**	**25.5**	3.59
Barium, total (3050)	mg/Kg	71,540	----	42.2	55.6	63.9	43.1	35.4	25.6	44.8	168
Beryllium, total (3050)	mg/Kg	2,044	----	< 0.5 U	0.4 B	0.3 B	0.4 B	0.4 B	< 0.3 U	0.2 B	0.58
Cadmium, total (3050)	mg/Kg	70	3	1.4	1.21	1.18	0.31	0.21 B	1.59	2.49	0.11 B
Chromium, total (3050)	mg/Kg	1,533,000	----	4 B	7	7	5 B	9	1 B	3 B	7
Copper, total (3050)	mg/Kg	5,000	131	103	**134**	37	28	18	66	34	5
Iron, total (3050)	mg/Kg	306,600	----	3410	4480	5050	3650	2420	2840	2530	8530
Lead, total (3050)	mg/Kg	1,000	127	**293**	**247**	**157**	123	43	**699**	100	36
Manganese, total (3050)	mg/Kg	19,000	----	163	178	205	233	168	117	97	205
Mercury, total	mg/Kg	40	11	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	0.07 B	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	18	17	7	5 B	3 B	41	15	3 B
Nickel, total (3050)	mg/Kg	2,700	----	4 B	4 B	3 B	3 B	3 B	4 B	1 B	4 B
Selenium, total (3050)	mg/Kg	700	----	35 B	62	37	25	10	10 B	8	6.51
Silver, total (3050)	mg/Kg	700	----	1.6	1.2	0.6	0.44	0.43	1.5	0.89	0.15
Uranium, total (3050)	mg/Kg	3,066	----	351	306	262	103	117	127	75.6	27.9
Vanadium, total (3050)	mg/Kg	7,154	----	1330	1260	1290	509	517	319	282	105
Zinc, total (3050)	mg/Kg	40,000	275	125	115	120	35	19	98	136	22
Gross Alpha	pCi/g	20.3 [2]	----	**474**	**331**	**351**	**126**	**109**	**218**	**145**	**27.2**
Gross Beta	pCi/g	13.5 [2]	----	**323**	**267**	**247**	**94.5**	**78.9**	**161**	**107**	**23.8**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**139**	**105**	**113**	**45.8**	**45.2**	**56.9**	**28.8**	**5.32**
Radium 228 (3050)	pCi/g	2.66 [2]	----	2.19	2.06	1.25	1.84	0.39	0.27	2.05	0.23
Thorium 228	pCi/g	0.40 [2]	----	**0.91**	0.36	0.24	0.26	0.32	**0.68**	**0.41**	**0.47**
Thorium 230	pCi/g	3.1 [2]	----	**96.2**	**70.3**	**74.7**	**22.5**	**29.2**	**41.9**	**33.8**	**3.58**
Thorium 232	pCi/g	0.35 [2]	----	**1.34**	0.18	**0.65**	-0.21	**0.4**	**0.95**	**0.41**	**0.58**
Solids, Percent	%	----	----	92.3	89.5	91.9	92.4	92.4	91.8	92.2	87.9

Analyte	Units	Human Health Screening Level[1]	Elk RMC	BC 4			
				0 - 0.5	2 - 4	8 - 10	26.5 - 28.5
Antimony, total (3050)	mg/Kg	50	----	< 1 U	< 0.2 U	< 0.5 U	0.1 B
Arsenic, total (3050)	mg/Kg	12	328	**19.1**	10.2	**15.9**	**24.4**
Barium, total (3050)	mg/Kg	71,540	----	85.4	62.6	38.6	29.9
Beryllium, total (3050)	mg/Kg	2,044	----	0.76	0.26 B	0.18 B	0.19 B
Cadmium, total (3050)	mg/Kg	70	3	0.65	0.17 B	0.51	0.23 B
Chromium, total (3050)	mg/Kg	1,533,000	----	5 B	59	10	17
Copper, total (3050)	mg/Kg	5,000	131	49	28	42	19
Iron, total (3050)	mg/Kg	306,600	----	7290	2850	2460	3030
Lead, total (3050)	mg/Kg	1,000	127	100	**130**	**142**	90
Manganese, total (3050)	mg/Kg	19,000	----	238	181	161	197
Mercury, total	mg/Kg	40	11	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	7	2 B	2 B	3 B
Nickel, total (3050)	mg/Kg	2,700	----	3 B	2 B	2 B	3 B
Selenium, total (3050)	mg/Kg	700	----	21.5	25.5	19.6	25.4
Silver, total (3050)	mg/Kg	700	----	0.55	0.44	0.55	0.47
Uranium, total (3050)	mg/Kg	3,066	----	344	112	244	38.2
Vanadium, total (3050)	mg/Kg	7,154	----	843	1170	1210	477
Zinc, total (3050)	mg/Kg	40,000	275	78	21	51	36
Gross Alpha	pCi/g	20.3 [2]	----	**330**	**233**	**451**	**52.7**
Gross Beta	pCi/g	13.5 [2]	----	**176**	**106**	**206**	**41.4**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**40.9**	**44.1**	**68.2**	**21.1**
Radium 228 (3050)	pCi/g	2.66 [2]	----	1.48	0	**14.5**	0.58
Thorium 228	pCi/g	0.40 [2]	----	**0.85**	**0.46**	0.02	0.04
Thorium 230	pCi/g	3.1 [2]	----	**45.6**	**48.7**	**52.2**	**13.4**
Thorium 232	pCi/g	0.35 [2]	----	**0.81**	-1.63	0.13	0.07
Solids, Percent	%	----	----	82.3	91.6	92.2	91

Table 3.38 (cont.): Total Metals and Radionuclides in Waste-Rock Samples Collected from Boreholes at the Blue Cap Mine

Analyte	Units	Human Health Screening Level[1]	Elk RMC	BC 5					BC 6
				0 - 0.5	0 - 0.5 (Dup 1)	2 - 4	7 - 9	18.5 - 20.5	0 - 0.5
Antimony, total (3050)	mg/Kg	50	----	0.1 B	0.1 B	0.2 B	0.2 B	0.2 B	0.1 B
Arsenic, total (3050)	mg/Kg	12	328	**16**	**14**	**38**	**35.3**	**27**	**52**
Barium, total (3050)	mg/Kg	71,540	----	96.2	105	90.8	72.7	45.3	63.3
Beryllium, total (3050)	mg/Kg	2,044	----	0.4 B	0.3 B	0.6 B	0.4 B	< 0.3 U	0.5 B
Cadmium, total (3050)	mg/Kg	70	3	1.01	1.32	0.93	0.51	2.75	1.36
Chromium, total (3050)	mg/Kg	1,533,000	----	10	10	2 B	8	35	38
Copper, total (3050)	mg/Kg	5,000	131	49	50	22	23	49	31
Iron, total (3050)	mg/Kg	306,600	----	3590	3580	4340	4550	3130	5710
Lead, total (3050)	mg/Kg	1,000	127	**129**	**131**	53	52	**186**	**227**
Manganese, total (3050)	mg/Kg	19,000	----	130	127	237	226	114	213
Mercury, total	mg/Kg	40	11	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	8	4 B	21	26	11	6
Nickel, total (3050)	mg/Kg	2,700	----	3 B	3 B	2 B	3 B	3 B	6
Selenium, total (3050)	mg/Kg	700	----	30	21	9 B	6 B	34	63
Silver, total (3050)	mg/Kg	700	----	1	0.6	0.6 B	0.6	0.7	0.7
Uranium, total (3050)	mg/Kg	3,066	----	267	245	191	109	233	311
Vanadium, total (3050)	mg/Kg	7,154	----	1280	1060	594	192	1180	1460
Zinc, total (3050)	mg/Kg	40,000	275	90	112	110	93	**281**	146
Gross Alpha	pCi/g	20.3 [2]	----	**334**	**326**	**288**	**114**	**251**	**352**
Gross Beta	pCi/g	13.5 [2]	----	**225**	**224**	**224**	**90.7**	**209**	**271**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**89.6**	**115**	**77.1**	**76.1**	**85.9**	**132**
Radium 228 (3050)	pCi/g	2.66 [2]	----	1.7	2.04	1.75	1.97	1.96	**2.88**
Thorium 228	pCi/g	0.40 [2]	----	0.19	**0.85**	0.28	0.35	0.29	0.27
Thorium 230	pCi/g	3.1 [2]	----	**290**	**86.7**	**60.5**	**115**	**54.6**	**92**
Thorium 232	pCi/g	0.35 [2]	----	**1.01**	**2.17**	**0.62**	**0.44**	0.25	**0.51**
Solids, Percent	%	----	----	93.5	92.7	88.3	92.6	94.5	91.7

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average value for Reference Areas 1, 2, and 3.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.39: SPLP Metals in Waste-Rock Samples Collected from Boreholes at the Blue Cap Mine

Analyte	Units	BC 1			BC 2		BC 3		
		0 - 0.5	2 - 4	8 - 9	0 - 0.5	2 - 4.5	0 - 0.5	2 - 4	10 - 12
Antimony (1312)	mg/L	0.001 B	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U
Arsenic (1312)	mg/L	0.19	0.0731	0.0471	0.0563	0.0685	0.115	0.0672	0.0196
Barium (1312)	mg/L	0.01	0.011	0.016	0.03	0.038	0.03	0.085	0.038
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	0.01 B	0.02 B	< 0.01 U	< 0.01 U
Iron (1312)	mg/L	0.06	0.03 B	0.1	0.15	0.13	0.41	0.13	0.03 B
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	0.08 B	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	0.04 B	0.02 B	0.03 B	< 0.01 U	0.16	0.07	0.04 B	0.04 B
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	0.034 B	0.036 B	0.098	< 0.008 U	0.131	0.017 B	0.012 B	0.128
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0162	0.0029	0.0118	0.0071	0.0098	0.0192	0.0044	0.0026
Vanadium (1312)	mg/L	2.68	7.81	3	1.93	1.43	0.074	0.785	0.196
Zinc (1312)	mg/L	0.01 B	0.01 B	0.01 B	< 0.01 U	< 0.01 U	0.02 B	0.01 B	< 0.01 U

Analyte	Units	BC 4			
		0 - 0.5	2 - 4	8 - 10	26.5 - 28.5
Antimony (1312)	mg/L	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U
Arsenic (1312)	mg/L	0.0509	0.0357	0.0363	0.0587
Barium (1312)	mg/L	< 0.003 U	0.01	0.007 B	0.103
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Iron (1312)	mg/L	0.04 B	0.02 B	0.02 B	< 0.01 U
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	0.11	< 0.01 U	0.02 B	0.01 B
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	0.097	0.025 B	0.023 B	0.076
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0328	0.007	0.007	0.0052
Vanadium (1312)	mg/L	1.84	3.7	3.33	0.116
Zinc (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U

Table 3.39 (cont.): SPLP Metals in Waste-Rock Samples Collected from Boreholes at the Blue Cap Mine

Analyte	Units	BC 5					BC 6
		0 - 0.5	0 - 0.5 (Dup 1)	2 - 4	7 - 9	18.5 - 20.5	0 - 0.5
Antimony (1312)	mg/L	< 0.001 U	< 0.001 U	0.002 B	< 0.001 U	< 0.001 U	< 0.001 U
Arsenic (1312)	mg/L	0.0561	0.0501	0.129	0.0743	0.0541	0.154
Barium (1312)	mg/L	0.019	0.019	0.023	0.074	0.074	0.008 B
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	0.01 B
Iron (1312)	mg/L	0.08	0.15	0.09	0.01 B	0.01 B	0.08
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	< 0.01 U	< 0.01 U	0.14	0.24	0.06	< 0.01 U
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	< 0.008 U	< 0.008 U	0.014 B	0.064	0.09	0.016 B
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0094	0.0122	0.0065	0.0089	0.0088	0.0149
Vanadium (1312)	mg/L	1.9	1.79	5.42	0.554	1.16	7.72
Zinc (1312)	mg/L	< 0.01 U	0.02 B	< 0.01 U	< 0.01 U	< 0.01 U	0.02 B

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Analysis exceeded method hold time

Table 3.40: Total Metals and Radionuclides in Composite Waste-Rock Samples Collected from the Blue Cap Mine Dump

Analyte	Units	Human Health Screening Level[1]	Elk RMC	BC Segment 1	BC Segment 2	BC Segment 3	BC Segment 4	BC Segment 5	BC Segment 6
Antimony, total (3050)	mg/Kg	50	----	< 1 U	< 0.5 U	< 0.5 U	< 1 U	< 1 U	< 0.5 U
Arsenic, total (3050)	mg/Kg	12	328	**18.6**	**33.3**	**18.5**	**57.2**	**40.9**	**50.6**
Barium, total (3050)	mg/Kg	71,540	----	60.2	80	26.8	56	45.2	44.3
Beryllium, total (3050)	mg/Kg	2,044	----	0.39	0.46	0.2 B	0.34	0.3	0.29 B
Cadmium, total (3050)	mg/Kg	70	3	0.52	2.85	0.79	2.83	1.69	1.94
Chromium, total (3050)	mg/Kg	1,533,000	----	44	36	3 B	8	10	7
Copper, total (3050)	mg/Kg	5,000	131	50	83	68	85	107	60
Iron, total (3050)	mg/Kg	306,600	----	3460	5080	2020	3970	3050	3780
Lead, total (3050)	mg/Kg	1,000	127	**176**	**210**	114	**425**	**275**	**374**
Manganese, total (3050)	mg/Kg	19,000	----	167	175	88.7	190	144	205
Mercury, total	mg/Kg	40	11	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	3 B	7	2 B	17	8	13
Nickel, total (3050)	mg/Kg	2,700	----	4 B	6	2 B	5	4 B	5
Selenium, total (3050)	mg/Kg	700	----	48.5	35.7	23.3	38	30.8	28.4
Silver, total (3050)	mg/Kg	700	----	1.08	1.14	0.99	1.64	1.04	1.25
Uranium, total (3050)	mg/Kg	3,066	----	298	257	198	403	346	262
Vanadium, total (3050)	mg/Kg	7,154	----	1450	1650	783	1320	1480	1140
Zinc, total (3050)	mg/Kg	40,000	275	55	225	125	**324**	125	166
Gross Alpha	pCi/g	20.3 [2]	----	**490**	**453**	**251**	**442**	**586**	**685**
Gross Beta	pCi/g	13.5 [2]	----	**189**	**189**	**98.2**	**206**	**253**	**254**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**96.9**	**71.2**	**35.8**	**79.7**	**96.6**	**85.5**
Radium 228 (3050)	pCi/g	2.66 [2]	----	0.44	**13.1**	1.15	1.42	1.33	**3.08**
Thorium 228	pCi/g	0.40 [2]	----	**0.49**	0.15	0.16	0.07	0.08	0.08
Thorium 230	pCi/g	3.1 [2]	----	**86.9**	**59.2**	**27.2**	**76.5**	**29.3**	**83.5**
Thorium 232	pCi/g	0.35 [2]	----	0.32	0.22	-0.5	0.24	0	**0.59**
Solids, Percent	%	----	----	91.2	92.7	93.8	94.1	92.5	93.4

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average value for Reference Areas 1, 2, and 3.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.41: SPLP Metals in Composite Waste-Rock Samples Collected from the Blue Cap Mine Dump

Analyte	Units	BC Segment 1	BC Segment 2	BC Segment 3	BC Segment 4	BC Segment 5	BC Segment 6
Antimony (1312)	mg/L	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	0.002 B	< 0.001 U
Arsenic (1312)	mg/L	0.0627	0.0743	0.0753	0.103	0.149	0.094
Barium (1312)	mg/L	0.015	0.023	0.003 B	0.048	0.007 B	0.045
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Iron (1312)	mg/L	0.02 B	0.02 B	0.03 B	< 0.01 U	0.02 B	< 0.01 U
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0 UH	< 0 UH	< 0 UH	< 0 UH	< 0 UH	< 0 UH
Molybdenum (1312)	mg/L	0.02 B	0.02 B	0.02 B	0.04 B	0.02 B	0.04 B
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	0.021 B	0.02 B	0.027 B	0.044	0.025 B	0.043
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0086	0.0064	0.0072	0.0028	0.0145	0.0038
Vanadium (1312)	mg/L	1.92	2.1	2.61	0.772	3.03	0.727
Zinc (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Analysis exceeded method hold time

Table 3.42: Total Metals and Radionuclides in Vegetation Samples Collected at the Blue Cap Mine

Mine Drainage Channel

Analyte	Units	Grass		Forb		Shrub	
		Ref Area	Adit Drainage	Ref Area	Adit Drainage	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	< 0.1 U	**0.2 B**	< 0.1 U	< 0.1 U	< 0.1 U	0.1 B
Arsenic, total (3050)	mg/Kg	< 0.3 U	**1.2**	< 0.3 U	**0.8 B**	< 0.3 U	**1 B**
Barium, total (3050)	mg/Kg	41.5	39.6	106	44.6	90.8	76.7
Beryllium, total (3050)	mg/Kg	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.06 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.07 B	**0.45**	0.12 B	**0.4**	0.06 B	**2.63**
Chromium, total (3050)	mg/Kg	1 B	1 B	2 B	< 1 U	2 B	< 1 U
Copper, total (3050)	mg/Kg	2 B	**3 B**	7	**8**	7	6
Iron, total (3050)	mg/Kg	322	**371**	252	77	255	134
Lead, total (3050)	mg/Kg	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	95	**171**	74.2	**80.3**	42.4	**67.9**
Mercury, total	mg/Kg	0 UH	< 0.1 U	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	5 B	**16**	3 B	**22**	< 1 U	**5 B**
Nickel, total (3050)	mg/Kg	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2.4 B	**22.5**	7.4	**15.9**	1.3 B	**19.1**
Silver, total (3050)	mg/Kg	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.5 U
Uranium, total (3050)	mg/Kg	0.03 B	**7.1**	0.07 B	**1**	< 0.03 U	**1.75**
Vanadium, total (3050)	mg/Kg	0.7 B	**7.3**	0.8 B	**1.5 B**	0.6 B	**0.8 B**
Zinc, total (3050)	mg/Kg	10	**36**	30	**63**	33	**251**
Gross Alpha	pCi/g	1.63	**18.1**	0.94	**18.8**	2.25	**9.51**
Gross Beta	pCi/g	7.15	**19.3**	13.6	**21.2**	9.2	6.84
Radium 226 (3050)	pCi/g	1.98	**4.9**	0.07	**6.68**	0.45	**9.25**
Radium 228 (3050)	pCi/g	1.65	1.32	2.02	**2.32**	2.31	**4**
Thorium 228	pCi/g	-0.1	-0.05	0.14	0.06	-0.13	**0.37**
Thorium 230	pCi/g	-0.59	0	-0.28	-0.09	-0.44	-0.28
Thorium 232	pCi/g	-0.17	-0.13	0.06	0.03	0.05	0
Moisture Content	%	41.4	55.4	66.6	62.9	46.1	58.5

Perimeter of Waste-Rock Dump

Analyte	Units	Grass		Forb		Shrub	
		Ref Area	Perimeter	Ref Area	Perimeter	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	< 0.1 U	**0.5 B**	< 0.1 U	< 0.5 U	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	< 0.3 U	**4.5**	< 0.3 U	**11**	< 0.3 U	**1.2**
Barium, total (3050)	mg/Kg	41.5	20.6	106	10.9	90.8	11.2
Beryllium, total (3050)	mg/Kg	< 0.05 U	0.05 B	< 0.05 U	< 0.05 U	< 0.06 U	< 0.06 U
Cadmium, total (3050)	mg/Kg	0.07 B	**2.42**	0.12 B	**1.23**	0.06 B	**0.68**
Chromium, total (3050)	mg/Kg	1 B	**4 B**	2 B	1 B	2 B	1 B
Copper, total (3050)	mg/Kg	2 B	**7**	7	**10**	7	**10**
Iron, total (3050)	mg/Kg	322	**526**	252	111	255	149
Lead, total (3050)	mg/Kg	< 4 U	**15 B**	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	95	21.6	74.2	31.7	42.4	25.8
Mercury, total	mg/Kg	0 UH	< 0.1 U	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	5 B	**69**	3 B	**183**	< 1 U	**10**
Nickel, total (3050)	mg/Kg	< 1 U	**2 B**	< 1 U	< 1 U	< 1 U	**2 B**
Selenium, total (3050)	mg/Kg	2.4 B	**68.2**	7.4	**467**	1.3 B	**107**
Silver, total (3050)	mg/Kg	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U
Uranium, total (3050)	mg/Kg	0.03 B	**14.2**	0.07 B	**2.23**	< 0.03 U	**0.44**
Vanadium, total (3050)	mg/Kg	0.7 B	**65.7**	0.8 B	**10.8**	0.6 B	**3.7**
Zinc, total (3050)	mg/Kg	10	**53**	30	**92**	33	**70**
Gross Alpha	pCi/g	1.63	**39.8**	0.94	**15.1**	2.25	**7.69**
Gross Beta	pCi/g	7.15	**23**	13.6	**21.3**	9.2	**22.9**
Radium 226 (3050)	pCi/g	1.98	**7.62**	0.07	**5.28**	0.45	**5.32**
Radium 228 (3050)	pCi/g	1.65	**3.14**	2.02	**2.62**	2.31	**2.38**
Thorium 228	pCi/g	-0.1	-0.08	0.14	-0.09	-0.13	**0.15**
Thorium 230	pCi/g	-0.59	**4.43**	-0.28	-0.27	-0.44	**1.16**
Thorium 232	pCi/g	-0.17	0	0.06	**0.27**	0.05	**0.36**
Moisture Content	%	41.4	63	66.6	62.6	46.1	50.9

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time was exceeded

Value in bold indicates level exceeds background value

Table 3.43: Correlation Sample Results for the Blue Cap, Black Hat, and Saint Patrick Mine Area

Sample ID	Uranium, total (3050) (mg/Kg)	Radium 226 (3050) (pCi/g)	Solids, Percent (%)
BC-BKG	2.33	2.23	94.2
BC-COR1	295	120	92.1
BC-COR2	937	396	92.1
BC-COR3	431	178	94.2
BC-COR4	176	49.3	92.4
BH-COR1	22.8	14.9	94.9
BH-COR2	25.1	12	93.7
BH-COR3	160	59.6	94.1
SP-COR1	571	276	94.7
SP-COR2	321	57.7	95.5

Table 3.44: Analytical Results for Soil Sample Collected at the Blue Cap Mine Shop

Analyte	Units	VC SHOP
Aroclor 1016	ug/Kg	< 500 U
Aroclor 1221	ug/Kg	< 500 U
Aroclor 1232	ug/Kg	< 500 U
Aroclor 1242	ug/Kg	< 500 U
Aroclor 1248	ug/Kg	< 500 U
Aroclor 1254	ug/Kg	< 500 U
Aroclor 1260	ug/Kg	< 500 U
DCBP	%	61.4
TCMX	%	69.2
Oil & Grease	mg/Kg	93000
Solids, Percent	%	97.5

Qualifiers are defined as follows:

U Analyte was not detected at the Method Detection Limit

Table 3.45: Total Metals and Radionuclides in Waste-Rock Samples Collected from Boreholes at the Black Hat Mine

Analyte	Units	Human Health Screening Level[1]	Elk RMC	BH 1				BH 2		
				0 - 0.5	2 - 4	8 - 10	11 - 13	0 - 0.5	2 - 4	5.5 - 7.5
Antimony, total (3050)	mg/Kg	50	----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	0.1 B	< 0.1 U	0.1 B
Arsenic, total (3050)	mg/Kg	12	328	9	10	8.7	2.1 B	11	**17**	**30**
Barium, total (3050)	mg/Kg	71,540	----	48.5	32.7	16.9	279	67	37.7	44.1
Beryllium, total (3050)	mg/Kg	2,044	----	0.4 B	< 0.3 U	0.2 B	0.7	0.4 B	< 0.5 U	0.4 B
Cadmium, total (3050)	mg/Kg	70	3	0.39	0.35	0.2 B	0.21 B	0.41	0.39	0.42
Chromium, total (3050)	mg/Kg	1,533,000	----	12	48	35	4 B	5	5	12
Copper, total (3050)	mg/Kg	5,000	131	16	52	30	6	13	35	62
Iron, total (3050)	mg/Kg	306,600	----	2450	2380	2630	5900	2860	2600	3620
Lead, total (3050)	mg/Kg	1,000	127	120	**206**	**141**	11 B	102	**235**	**164**
Manganese, total (3050)	mg/Kg	19,000	----	132	132	210	617	136	160	173
Mercury, total	mg/Kg	40	11	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	< 1 U	2 B	< 1 U	< 1 U	2 B	< 1 U	5
Nickel, total (3050)	mg/Kg	2,700	----	3 B	2 B	2 B	3 B	3 B	3 B	3 B
Selenium, total (3050)	mg/Kg	700	----	21	50	41	< 2 U	20 B	61	30
Silver, total (3050)	mg/Kg	700	----	0.4 B	0.6	0.52	< 0.05 U	0.4 B	0.8 B	1
Uranium, total (3050)	mg/Kg	3,066	----	303	182	106	3.67	344	387	303
Vanadium, total (3050)	mg/Kg	7,154	----	798	863	750	26.4	1170	1130	1340
Zinc, total (3050)	mg/Kg	40,000	275	45	43	23	17	43	50	56
Gross Alpha	pCi/g	20.3 [2]	----	**301**	**232**	**206**	8.16	**383**	**361**	**262**
Gross Beta	pCi/g	13.5 [2]	----	**227**	**164**	**145**	8.3	**246**	**262**	**185**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**90.5**	**91.8**	**42**	1.45	**139**	**184**	**89.5**
Radium 228 (3050)	pCi/g	2.66 [2]	----	**2.7**	1.23	1.47	1.42	1.73	1.1	0.27
Thorium 228	pCi/g	0.40 [2]	----	0.4	**0.52**	0.18	**0.45**	0.27	**0.56**	0.21
Thorium 230	pCi/g	3.1 [2]	----	**48.3**	**83.7**	**46.2**	2.12	**134**	**66.1**	**56.5**
Thorium 232	pCi/g	0.35 [2]	----	0.34	**0.39**	**0.5**	**0.39**	**0.59**	**0.56**	0.21
Solids, Percent	%	----	----	93.7	92.9	91.3	91.4	95.4	93	92.3

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average value for Reference Areas 1, 2, and 3.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.46: SPLP Metals in Waste-Rock Samples Collected from Boreholes at the Black Hat Mine

Analyte	Units	BH 1				BH 2		
		0 - 0.5	2 - 4	8 - 10	11 - 13	0 - 0.5	2 - 4	5.5 - 7.5
Antimony (1312)	mg/L	< 0.001 U	< 0.001 U	0.001 B	0.002 B	< 0.001 U	< 0.001 U	< 0.001 U
Arsenic (1312)	mg/L	0.0151	0.0478	0.033	0.039	0.0183	0.0695	0.101
Barium (1312)	mg/L	0.007 B	0.012	< 0.003 U	< 0.003 U	0.016	0.006 B	0.003 B
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	0.01 B	< 0.01 U	< 0.01 U	0.02 B	< 0.01 U	< 0.01 U
Iron (1312)	mg/L	0.1	0.17	0.03 B	0.05 B	0.46	0.07	0.08
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	0.007 B	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH	< 0.0002 UH
Molybdenum (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	0.01 B	< 0.01 U	< 0.01 U	0.03 B
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	< 0.008 U	0.014 B	0.058	0.051	< 0.008 U	0.012 B	0.043
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0124	0.0141	0.0056	0.0072	0.0966	0.0143	0.0064
Vanadium (1312)	mg/L	1.74	2.36	5.19	3.97	1.31	3.75	4.33
Zinc (1312)	mg/L	< 0.01 U	0.01 B	< 0.01 U	< 0.01 U	0.02 B	0.01 B	0.01 B

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Analysis exceeded method hold time

Table 3.47: Total Metals and Radionuclides in Composite Waste-Rock Samples Collected from the Black Hat Mine Dump

Analyte	Units	Human Health Screening Level[1]	Elk RMC	BH Segment 1	BH Segment 2
Antimony, total (3050)	mg/Kg	50	----	< 1 U	< 1 U
Arsenic, total (3050)	mg/Kg	12	328	**30.5**	**16.9**
Barium, total (3050)	mg/Kg	71,540	----	41.4	73.1
Beryllium, total (3050)	mg/Kg	2,044	----	0.43	0.37
Cadmium, total (3050)	mg/Kg	70	3	0.54	0.63
Chromium, total (3050)	mg/Kg	1,533,000	----	34	14
Copper, total (3050)	mg/Kg	5,000	131	36	108
Iron, total (3050)	mg/Kg	306,600	----	3310	3150
Lead, total (3050)	mg/Kg	1,000	127	**251**	**190**
Manganese, total (3050)	mg/Kg	19,000	----	152	175
Mercury, total	mg/Kg	40	11	< 0.05 U	< 0.04 U
Molybdenum, total (3050)	mg/Kg	5,110	----	4 B	6
Nickel, total (3050)	mg/Kg	2,700	----	6	4 B
Selenium, total (3050)	mg/Kg	700	----	55.6	36.8
Silver, total (3050)	mg/Kg	700	----	1.2	1.1
Uranium, total (3050)	mg/Kg	3,066	----	349	313
Vanadium, total (3050)	mg/Kg	7,154	----	1580	954
Zinc, total (3050)	mg/Kg	40,000	275	72	83
Gross Alpha	pCi/g	20.3 [2]	----	**819**	**563**
Gross Beta	pCi/g	13.5 [2]	----	**265**	**233**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**78.7**	**83.6**
Radium 228 (3050)	pCi/g	2.66 [2]	----	1.7	1.29
Thorium 228	pCi/g	0.40 [2]	----	0.17	0.36
Thorium 230	pCi/g	3.1 [2]	----	**110**	**71.8**
Thorium 232	pCi/g	0.35 [2]	----	0.22	0.27
Solids, Percent	%	----	----	93.1	95.5

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average value for Reference Areas 1, 2, and 3.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.48: SPLP Metals in Composite Waste-Rock Samples Collected from the Black Hat Mine Dump

Analyte	Units	BH Segment 1			BH Segment 2		
Antimony (1312)	mg/L		0.0004	B		0.0004	B
Arsenic (1312)	mg/L		0.0614			0.0556	
Barium (1312)	mg/L	<	0.003	U		0.04	
Beryllium (1312)	mg/L	<	0.0001	U	<	0.0001	U
Cadmium (1312)	mg/L	<	0.0001	U	<	0.0001	U
Chromium (1312)	mg/L	<	0.01	U	<	0.01	U
Copper (1312)	mg/L	<	0.01	U	<	0.01	U
Iron (1312)	mg/L		0.05		<	0.01	U
Lead (1312)	mg/L	<	0.04	U	<	0.04	U
Manganese (1312)	mg/L	<	0.005	U	<	0.005	U
Mercury (1312)	mg/L	<	0.0002	U	<	0.0002	U
Molybdenum (1312)	mg/L		0.02	B		0.01	B
Nickel (1312)	mg/L	<	0.01	U	<	0.01	U
Selenium (1312)	mg/L		0.0244			0.074	
Silver (1312)	mg/L		0.00007	B	<	0.00005	U
Uranium (1312)	mg/L		0.00915			0.0134	
Vanadium (1312)	mg/L		2.92			1.07	
Zinc (1312)	mg/L	<	0.01	U	<	0.01	U

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Table 3.49: Total Metals and Radionuclides in Vegetation Samples Collected at the Black Hat Mine

Perimeter of Waste-Rock Dump

Analyte	Units	Grass		Forb		Shrub	
		Ref Area	Perimeter	Ref Area	Perimeter	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	< 0.1 U	**0.4 B**	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	< 0.3 U	**3.4**	< 0.3 U	**14.7**	< 0.3 U	< 0.3 U
Barium, total (3050)	mg/Kg	41.5	**50.3**	106	41.6	90.8	12.4
Beryllium, total (3050)	mg/Kg	< 0.05 U	**0.13 B**	< 0.05 U	< 0.05 U	< 0.06 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.07 B	**0.73**	0.12 B	**0.58**	0.06 B	**0.41**
Chromium, total (3050)	mg/Kg	1 B	**3 B**	2 B	< 1 U	2 B	< 1 U
Copper, total (3050)	mg/Kg	2 B	**9**	7	**12**	7	**17**
Iron, total (3050)	mg/Kg	322	**755**	252	172	255	119
Lead, total (3050)	mg/Kg	< 4 U	**13 B**	< 4 U	**4 B**	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	95	49.4	74.2	61.6	42.4	**46.4**
Mercury, total	mg/Kg	0 UH	< 0.1 U	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	5 B	**42**	3 B	**145**	< 1 U	**9**
Nickel, total (3050)	mg/Kg	< 1 U	**2 B**	< 1 U	**1 B**	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2.4 B	**66.6**	7.4	**660**	1.3 B	**50.9**
Silver, total (3050)	mg/Kg	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.5 U
Uranium, total (3050)	mg/Kg	0.03 B	**29**	0.07 B	**2.87**	< 0.03 U	**0.56**
Vanadium, total (3050)	mg/Kg	0.7 B	**78.6**	0.8 B	**17.1**	0.6 B	**2 B**
Zinc, total (3050)	mg/Kg	10	**77**	30	**43**	33	**74**
Gross Alpha	pCi/g	1.63	**47.6**	0.94	**48.4**	2.25	**3.27**
Gross Beta	pCi/g	7.15	**26.7**	13.6	**27.9**	9.2	**15.9**
Radium 226 (3050)	pCi/g	1.98	**12.9**	0.07	**15.2**	0.45	**1.71**
Radium 228 (3050)	pCi/g	1.65	**2.43**	2.02	1.98	2.31	**8.19**
Thorium 228	pCi/g	-0.1	-0.03	0.14	0	-0.13	-0.03
Thorium 230	pCi/g	-0.59	**3.33**	-0.28	**0.6**	-0.44	-0.45
Thorium 232	pCi/g	-0.17	0	0.06	**0.14**	0.05	**0.12**
Moisture Content	%	41.4	61.8	66.6	68.3	46.1	56.6

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time was exceeded

Value in bold indicates level exceeds background value

Table 3.50: Total Metals and Radionuclides in Composite Waste-Rock Samples Collected from the Saint Patrick Mine Dump

Analyte	Units	Human Health Screening Level[1]	Elk RMC	SP Segment 1	SP Segment 1 (Dup 9)	SP Segment 2
Antimony, total (3050)	mg/Kg	50	----	0.1 B	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	12	328	10	7.96	10.1
Barium, total (3050)	mg/Kg	71,540	----	123	73.3	54.1
Beryllium, total (3050)	mg/Kg	2,044	----	0.29 B	0.27 B	0.23 B
Cadmium, total (3050)	mg/Kg	70	3	0.76	0.8	0.77
Chromium, total (3050)	mg/Kg	1,533,000	----	18	13	16
Copper, total (3050)	mg/Kg	5,000	131	23	29	22
Iron, total (3050)	mg/Kg	306,600	----	3150	2740	2340
Lead, total (3050)	mg/Kg	1,000	127	**167**	**154**	**173**
Manganese, total (3050)	mg/Kg	19,000	----	134	101	128
Mercury, total	mg/Kg	40	11	< 0.05 U	< 0.04 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	5,110	----	< 1 U	< 1 U	< 1 U
Nickel, total (3050)	mg/Kg	2,700	----	3 B	3 B	3 B
Selenium, total (3050)	mg/Kg	700	----	19.7	21.9	14.5
Silver, total (3050)	mg/Kg	700	----	0.45	0.51	0.37
Uranium, total (3050)	mg/Kg	3,066	----	373	474	219
Vanadium, total (3050)	mg/Kg	7,154	----	2770	2690	1240
Zinc, total (3050)	mg/Kg	40,000	275	81	81	76
Gross Alpha	pCi/g	20.3 [2]	----	**92.2**	**89.6**	**35.2**
Gross Beta	pCi/g	13.5 [2]	----	**33.9**	**32.5**	**13.6**
Radium 226 (3050)	pCi/g	3.3 [2]	----	**45.5**	**5.25**	**20.1**
Radium 228 (3050)	pCi/g	2.66 [2]	----	0.1	0.04	0.03
Thorium 228	pCi/g	0.40 [2]	----	0	0.02	-0.01
Thorium 230	pCi/g	3.1 [2]	----	**16.2**	**15.4**	**7.96**
Thorium 232	pCi/g	0.35 [2]	----	0.03	-0.02	0
Solids, Percent	%	----	----	94.5	94.4	94.6

[1] Screening level as determined in the Field Sampling Plan.

[2] Screening level based on average value for Reference Areas 1, 2, and 3.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds screening level or RMC

Table 3.51: SPLP Metals in Composite Waste-Rock Samples Collected from the Saint Patrick Mine Dump

Analyte	Units	SP Segment 1	SP Seg 1 (Dup 9)	SP Segment 2
Antimony (1312)	mg/L	< 0.001 U	< 0.001 U	< 0.001 U
Arsenic (1312)	mg/L	0.0216	0.0113	0.0181
Barium (1312)	mg/L	0.004 B	0.009 B	0.004 B
Beryllium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium (1312)	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U
Copper (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U
Iron (1312)	mg/L	0.09	0.09	0.09
Lead (1312)	mg/L	< 0.04 U	< 0.04 U	< 0.04 U
Manganese (1312)	mg/L	< 0.005 U	< 0.005 U	< 0.005 U
Mercury (1312)	mg/L	< 0 UH	< 0 UH	< 0 UH
Molybdenum (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U
Nickel (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U
Selenium (1312)	mg/L	0.018 B	< 0.008 U	0.013 B
Silver (1312)	mg/L	< 0.0003 U	< 0.0003 U	< 0.0003 U
Uranium (1312)	mg/L	0.0086	0.0119	0.0099
Vanadium (1312)	mg/L	6.43	1.44	5.99
Zinc (1312)	mg/L	< 0.01 U	< 0.01 U	< 0.01 U

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Analysis exceeded method hold time

Table 3.52: Total Metals and Radionuclides in Vegetation Samples Collected at the Saint Patrick Mine

Perimeter of Waste-Rock Dump

Analyte	Units	Grass		Forb			Shrub	
		Ref Area	Perimeter	Ref Area	Perimeter	Duplicate	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	< 0.1 U	**0.2 B**	< 0.1 U	**0.2 B**	< 0.1 U	< 0.1 U	**0.1 B**
Arsenic, total (3050)	mg/Kg	< 0.3 U	**0.7 B**	< 0.3 U	**1.5**	**1.5**	< 0.3 U	< 0.3 U
Barium, total (3050)	mg/Kg	41.5	26.6	106	74.3	71.3	90.8	28.8
Beryllium, total (3050)	mg/Kg	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.06 U	< 0.06 U
Cadmium, total (3050)	mg/Kg	0.07 B	**0.1 B**	0.12 B	**0.34**	**0.25 B**	0.06 B	**0.07 B**
Chromium, total (3050)	mg/Kg	1 B	< 1 U	2 B	1 B	1 B	2 B	2 B
Copper, total (3050)	mg/Kg	2 B	**5 B**	7	6	**9**	7	**8**
Iron, total (3050)	mg/Kg	322	181	252	114	110	255	208
Lead, total (3050)	mg/Kg	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	95	60	74.2	32.5	33.1	42.4	40.2
Mercury, total	mg/Kg	0 UH	< 0.1 U	0 UH	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	5 B	**8**	3 B	**20**	**29**	< 1 U	**2 B**
Nickel, total (3050)	mg/Kg	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2.4 B	**9.6**	7.4	**67.9**	**101**	1.3 B	**13.2**
Silver, total (3050)	mg/Kg	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U
Uranium, total (3050)	mg/Kg	0.03 B	**1.42**	0.07 B	**1.33**	**1.93**	< 0.03 U	**0.95**
Vanadium, total (3050)	mg/Kg	0.7 B	**8.1**	0.8 B	**14**	**15.5**	0.6 B	**12.1**
Zinc, total (3050)	mg/Kg	10	**20**	30	**37**	**39**	33	**58**
Gross Alpha	pCi/g	1.63	**6.08**	0.94	**26.6**	**32.2**	2.25	**6.06**
Gross Beta	pCi/g	7.15	**12.1**	13.6	**19.2**	**22.7**	9.2	9.03
Radium 226 (3050)	pCi/g	1.98	1.7	0.07	**8.5**	**11.7**	0.45	**1.56**
Radium 228 (3050)	pCi/g	1.65	**1.8**	2.02	2.02	**2.52**	2.31	1.86
Thorium 228	pCi/g	-0.1	-0.13	0.14	0.12	0.03	-0.13	**0.07**
Thorium 230	pCi/g	-0.59	**0.38**	-0.28	-0.52	**3.33**	-0.44	**0.87**
Thorium 232	pCi/g	-0.17	**0.1**	0.06	**0.28**	**1.4**	0.05	**3.06**
Moisture Content	%	41.4	60.6	66.6	68	63.7	46.1	91.2

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time was exceeded

Value in bold indicates level exceeds background value

Table 4.1: Human-Health and Aquatic-Life (Chronic) Risk Criteria for Constituents of Concern in Surface Water

Parameter	Human Health				Aquatic Life (Chronic)	
	BLM	EPA		EPA		
	Camper RMC[1]	MCL	Modified MCL[2]	Secondary Std	Colorado[3]	Utah[4]
PHYSICAL						
Dissolved Oxygen (mg/L)	-----	-----	-----	-----	5.0	6.5
pH	-----	-----	-----	6.5 - 8.5	6.5 - 9.0	6.5 - 9.0
Total Suspended Solids (mg/L)	-----	-----	-----	-----	-----	35
INORGANIC (mg/L)						
Nitrite	-----	1	26	-----	0.05	-----
Nitrate	-----	10	260	-----	10	4
Chloride	-----	-----	-----	250	250	-----
Sulfate	-----	-----	-----	250	250	-----
Total Phosphorous as P	-----	-----	-----	-----	-----	0.05
Total Dissolved Solids	-----	-----	-----	500	-----	-----
METALS (µg/L)						
Antimony, Dissolved	124	-----	-----	-----	-----	-----
Antimony, Total	-----	6	156	-----	-----	-----
Arsenic, Total Recoverable	-----	10	260	-----	-----	-----
Arsenic, Dissolved	93	-----	-----	-----	-----	190
Barium, Dissolved	-----	-----	-----	-----	-----	-----
Barium, Total	-----	2000	52000	-----	-----	-----
Beryllium, Dissolved	-----	-----	-----	-----	-----	-----
Beryllium, Total	-----	4	104	-----	-----	-----
Cadmium, Dissolved	155	-----	-----	-----	3.5 [5]	1.8 [6]
Cadmium, Total	-----	5	130	-----	-----	-----
Chromium, Dissolved	-----	-----	-----	-----	122 [5]	340 [6]
Chromium, Total	-----	100	2600	-----	-----	-----
Copper, Dissolved	11,490	-----	-----	-----	15 [5]	20 [6]
Copper, Total	-----	1300	33800	1000	-----	-----
Iron, Dissolved	-----	-----	-----	-----	-----	1000
Iron, Total Recoverable	-----	-----	-----	300	1000	-----
Lead, Dissolved	50	-----	-----	-----	5 [5]	7 [6]
Lead, Total	-----	15	390	-----	-----	-----
Manganese, Dissolved	1,548	-----	-----	-----	2016 [5]	-----
Manganese, Total	-----	-----	-----	50	-----	-----
Mercury, Dissolved	93	-----	-----	-----	-----	0.012
Mercury, Total	-----	2	52	-----	0.01	-----
Molybdenum, Dissolved	-----	-----	-----	-----	-----	-----
Molybdenum, Total	-----	-----	-----	-----	-----	-----
Nickel, Dissolved	6,194	-----	-----	-----	87 [5]	263 [6]
Nickel, Total	-----	-----	-----	-----	-----	-----
Selenium, Dissolved	1,548	-----	-----	-----	4.6 [5]	5
Selenium, Total	-----	50	1300	-----	-----	-----
Silver, Dissolved	1,548	-----	-----	-----	0.2 [5]	-----
Silver, Total	-----	-----	-----	100	-----	-----
Uranium, Dissolved	-----	-----	-----	-----	-----	-----
Uranium, Total	-----	30	780	-----	-----	-----
Vanadium, Dissolved	-----	-----	-----	-----	-----	-----
Vanadium, Total	-----	-----	-----	-----	-----	-----
Zinc, Dissolved	92,909	-----	-----	-----	197 [5]	177 [6]
Zinc, Total	-----	-----	-----	5,000	-----	-----
RADIOLOGICAL (pCi/L)						
Gross Alpha (excluding uranium)	-----	15	390	-----	-----	15 [7]
Gross Beta	-----	4 mrem/yr	104 mrem/yr	-----	-----	50
Radium 226 and 228 (combined)	-----	5	130	-----	-----	-----
Thorium 230 and 232 (combined)	-----	-----	-----	-----	-----	-----

[1] From Ford, 1996; applies to swimming only.

[2] Modified by using exposure factor of 365/14 days (26x) for camper scenario.

[3] Colorado standards from Regulation No. 35 – Classification and Numeric Standards for Gunnison and Lower Dolores River Basins.

[4] Utah standards from Rule R317-2 - Standards of Quality for Waters of the State.

[5] Hardness dependent criterion calculated using equations presented in Regulation No. 35 - Classification and Numeric Standards for Gunnison and Lower Dolores River Basins. Calculated value based on a mean hardness value of 183 mg/L from historical sample results for La Sal Creek at the Colorado/Utah stateline during low-flow conditions.

[6] Hardness dependent criterion calculated using equations presented in Rule 317-2 - Standards of Quality for Waters of the state. Calculated value based on a mean hardness value of 183 mg/L from historical sample results for La Sal Creek at the Colorado/Utah stateline during low-flow conditions.

[7] Utah standard based on gross alpha including uranium.

Table 4.2: Human-Health and Ecological Risk Criteria for Constituents of Concern in Waste Rock, Ephemeral Drainage Sediment, and Perennial Drainage Sediment at Mine Sites

Analyte	Units	Human Health			Ecological
		BLM - Camper RMC		EPA Region 3	BLM - Elk RMC
		Soil	Sediment	Industrial SSL	Soil[1]
Antimony, total (3050)	mg/Kg	50	62	---	----
Arsenic, total (3050)	mg/Kg	20	46	---	328
Barium, total (3050)	mg/Kg	---	----	71540	----
Beryllium, total (3050)	mg/Kg	---	----	2044	----
Cadmium, total (3050)	mg/Kg	70	155	---	3
Chromium, total (3050)	mg/Kg	---	----	1533000	----
Copper, total (3050)	mg/Kg	5000	5,745	---	131
Iron, total (3050)	mg/Kg	---	----	306600	----
Lead, total (3050)	mg/Kg	1000	1,000	---	127
Manganese, total (3050)	mg/Kg	19000	21,679	---	----
Mercury, total	mg/Kg	40	46	---	11
Molybdenum, total (3050)	mg/Kg	---	----	5110	----
Nickel, total (3050)	mg/Kg	2700	3,094	---	----
Selenium, total (3050)	mg/Kg	700	774	---	----
Silver, total (3050)	mg/Kg	700	774	---	----
Uranium, total (3050)	mg/Kg	---	----	3066	3323 [2]
Vanadium, total (3050)	mg/Kg	---	----	7154	280 [3]
Zinc, total (3050)	mg/Kg	40000	46,455	---	275
Gross Alpha	pCi/g	---	----	---	----
Gross Beta	pCi/g	---	----	---	----
Radium 226 (3050)	pCi/g	---	----	---	----
Radium 228 (3050)	pCi/g	---	----	---	----
Thorium 228	pCi/g	---	----	---	----
Thorium 230	pCi/g	---	----	---	----
Thorium 232	pCi/g	---	----	---	----
Solids, Percent	%	---	----	---	----

[1] Values listed are modified for each mine based on the area use factor (mine area/home range of 640 acres)

[2] Value derived by the BLM in 2005 based on ORNL (1996) chemical toxicity values and uptake to plants.

[3] Value specific for mammalian receptors; from *Ecological Soil Screening Levels for Vanadium* (EPA, 2005)

Table 4.3: Human-Health Risk Criteria for Metals and Radionuclides of Concern in Soil at Pastures and Gardens of Area Residents

Parameter	BLM Resident RMC Soil	EPA Soil Screening Level[1]
METALS (mg/Kg)		
Antimony	3	-----
Arsenic	1	-----
Barium	-----	5,475
Beryllium	-----	156
Cadmium	3	-----
Chromium	-----	117,321
Copper	250	-----
Iron	-----	23,464
Lead	400	-----
Manganese	960	-----
Mercury	2	-----
Molybdenum	-----	391
Nickel	135	-----
Selenium	35	-----
Silver	35	-----
Uranium	-----	235
Vanadium	-----	548
Zinc	2000	-----
RADIONUCLIDES (pCi/g)		
Gross Alpha	-----	-----
Gross Beta	-----	-----
Radium 226 (3050)	-----	0.07 / 1.1 [2]
Radium 228 (3050)	-----	0.09 / 1.3 [3]
Thorium 228	-----	-----
Thorium 230	-----	-----
Thorium 232	-----	-----

[1] Reflects residental SSLs for metals from EPA Region 3 and generic SSLs for radium-226 and -228 from EPA's Soil Screening Guidance for Radionuclides – Appendix A: Generic SSLs (EPA, 2000)

[2] Radium-226 level of 0.07 pCi/g for ingestion of homegrown vegetables
Radium-226 level of 1.1 pCi/g for ingestion of soil

[3] Radium-228 level of 0.09 pCi/g for ingestion of homegrown vegetables
Radium-228 level of 1.3 pCi/g for ingestion of soil

Table 4.4: Comparison of Surface-Water Results for La Sal Creek Near the Firefly/Pygmy Mine to Aquatic Life Chronic Standards

Analyte	Units	Aquatic-Life Std.		LA SAL CREEK UP[1]						LA SAL CREEK DN1[2]			
		Colorado	Utah	04/23/04		4/23/04 (Dup)		10/13/04		04/23/04		10/14/04	
PHYSICAL (field parameters)													
Flow	cfs	-----	-----	1.4300		1.4300		0.5123		1.0400		0.4476	
Temperature	ºC	-----	-----	7		7		9.3		6.2		5.8	
pH	s.u.	6.5 - 9.0	6.5 - 9.0	**9.07**		**9.07**		8.38		**9.21**		8.52	
Specific Conductance	(uS/cm)	-----	-----	337 [3]		337 [3]		449		340 [3]		544	
Dissolved Oxygen	(mg/L)	5.0	6.5	nm		nm		nm		nm		nm	
Oxidation Reduction Potential	Rmev	-----	-----	nm		nm		nm		nm		nm	
INORGANIC													
Nitrite	(mg/L)	0.05	-----	0	UH	0	UH	na		0	UH	na	
Nitrate	(mg/L)	10	4	< 0.02	U	< 0.02	U	na		0.04	B	na	
Chloride	(mg/L)	250	-----	15		14		11		15		15	
Sulfate	(mg/L)	250	-----	60		60		30	B	60		60	
Total Phosphorous as P	(mg/L)	-----	0.05	0.04	B	0.03	B	0.05	B	0.05		**0.06**	+
Total Dissolved Solids	(mg/L)	-----	-----	300		300		270		310		340	
Total Suspended Solids	(mg/L)	-----	35	12	B	12	B	8	B	32		12	B
Bicarbonate as CaCO3	(mg/L)	-----	-----	198		195		184		199		209	
Carbonate as CaCO3	(mg/L)	-----	-----	6	B	8	B	8	B	8	B	11	
Cation-Anion Balance	%	-----	-----	-0.9		-1.8		0		0		0	
Hardness as CaCO3	(mg/L)	-----	-----	228		228		192		237		230	
Hydroxide as CaCO3	(mg/L)	-----	-----	< 2	U	< 2	U	< 2	U	< 2	U	< 2	U
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----	0	UH	0	UH	na		0.04	BH	na	
Sum of Anions	meq/L	-----	-----	5.7		5.7		4.7		5.8		6	
Sum of Cations	meq/L	-----	-----	5.6		5.5		4.7		5.8		6	
TDS (calculated)	(mg/L)	-----	-----	306		304		250		313		324	
TDS (ratio - measured/calculated)		-----	-----	0.98		0.99		1.08		0.99		1.05	
Total Alkalinity	(mg/L)	-----	-----	204		203		192		207		219	
METALS													
Antimony, dissolved	µg/L	-----	-----	< 0.2	U	0.3	B	< 0.2	U	< 0.2	U	< 0.2	U
Antimony, total	µg/L	-----	-----	< 0.2	U	< 0.4	U	< 0.2	U	< 0.2	U	< 0.2	U
Arsenic, dissolved	µg/L	-----	-----	1.5		1.5		2.1	B	1.6		1.9	B
Arsenic, total recoverable	µg/L	-----	190	1.4		1.5		2	B	1.3		1.9	B
Barium, dissolved	µg/L	-----	-----	109		106		105		128		100	
Barium, total	µg/L	-----	-----	109		110		118		136		106	
Beryllium, dissolved	µg/L	-----	-----	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U
Beryllium, total	µg/L	-----	-----	< 0.1	U	< 0.2	U	< 0.1	U	< 0.1	U	< 0.1	U
Cadmium, dissolved	µg/L	3.5 [3]	1.8 [3]	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U
Cadmium, total	µg/L	-----	-----	< 0.1	U	< 0.2	U	< 0.1	U	< 0.1	U	< 0.1	U
Calcium, dissolved	µg/L			65400		65600		54300		67000		60000	
Chromium, dissolved	µg/L	122 [3]	340 [3]	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U
Chromium, total	µg/L	-----	-----	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U
Copper, dissolved	µg/L	15 [3]	20 [3]	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U
Copper, total	µg/L	-----	-----	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U
Iron, dissolved	µg/L	-----	1000	10	B	10	B	20	B	290		20	B
Iron, total recoverable	µg/L	1000	-----	450		340		330		1170		210	
Lead, dissolved	µg/L	5 [3]	7 [3]	< 0.1	U	< 0.1	U	< 0.1	U	0.1	B	< 0.1	U
Lead, total	µg/L	-----	-----	0.3	B	< 0.2	U	0.3	B	< 0.1	U	0.4	B
Magnesium, dissolved	µg/L			15700		15500		13800		16900		19400	
Manganese, dissolved	µg/L	2016 [3]	-----	22	B	20	B	26	B	88		20	B
Manganese, total	µg/L	-----	-----	82		64		61		97		35	
Mercury, dissolved	µg/L	-----	0.012	< 0.2	U	< 0.2	U	< 0.2	U	< 0.2	U	< 0.2	U
Mercury, total	µg/L	0.01	-----	< 0.2	U	< 0.2	U	< 0.2	U	< 0.2	U	< 0.2	U
Molybdenum, dissolved	µg/L	-----	-----	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U
Molybdenum, total	µg/L	-----	-----	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U
Nickel, dissolved	µg/L	87 [3]	263 [3]	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U
Nickel, total	µg/L	-----	-----	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U
Potassium, dissolved	µg/L			2100		2100		2700		2300		3100	
Selenium, dissolved	µg/L	4.6 [3]	5	0.9		1		1	B	1.3		2	B
Selenium, total	µg/L	-----	-----	0.9		0.8	B	1	B	1		2	B
Silver, dissolved	µg/L	0.2 [3]	-----	< 0.05	U	< 0.05	U	< 0.05	U	< 0.05	U	< 0.05	U
Silver, total	µg/L	-----	-----	< 0.05	U	< 0.1	U	< 0.05	U	< 0.05	U	< 0.05	U
Sodium, dissolved	µg/L			23200		21600		19600		24200		30400	
Uranium, dissolved	µg/L	-----	-----	5.1		5.26		7.5		7.8		11	
Uranium, total	µg/L	-----	-----	4.91		4.8		7.86		7.18		11.6	
Vanadium, dissolved	µg/L	-----	-----	< 5	U	< 5	U	< 5	U	21	B	< 5	U
Vanadium, total	µg/L	-----	-----	< 5	U	< 5	U	< 5	U	< 5	U	< 5	U
Zinc, dissolved	µg/L	197 [3]	177 [3]	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U
Zinc, total	µg/L	-----	-----	< 10	U	< 10	U	20	B	< 10	U	< 10	U
RADIOLOGICAL (pCi/L)													
Gross Alpha	pCi/L	-----	15	7.13		4.75		8.58		**15.8**	+	8.83	
Gross Beta	pCi/L	-----	50	2.46		3.41		4.56		9.35		6.79	
Radium 226 and 228 (combined)	pCi/L	-----	-----	0.29		0.65		0.51		1.07		0	
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.27		0.15		-0.09		0.65		0	
Thorium 228	pCi/L	-----	-----	-0.12		0		0		0.04		0.14	

[1] Station LA SAL CREEK UP located immediately upstream of Firefly/Pygmy Mine

[2] Station LA SAL CREEK DN1 located immediately downstream of Firefly/Pygmy Mine

[3] Hardness-dependent criterion calculated using hardness value of 183 mg/L

nm = not measured; na = not analyzed

Shaded value in bold indicates level exceeds aquatic-life standard

\+ Media concentration >1-10 times standard

++ Media concentration >10-100 times standard

+++ Media concentration >100 times standard

Table 4.4 B: Total Metals and Radionuclides in Stream Sediment Compared to Consensus-Based Probable Effects Concentrations at the La Sal Creek Surface-Water Stations near the Firefly/Pygmy Mine

Analyte	Units	Consensus-Based PEL[1]	Ref Area 1 Up Sed	La Sal Crk Up Sed	La Sal Crk DN 1 Sed
Antimony, total (3050)	mg/Kg	----	0.1 B	0.2 B	0.2 B
Arsenic, total (3050)	mg/Kg	33	3.1	4.8	9.5
Barium, total (3050)	mg/Kg	----	271	370	261
Beryllium, total (3050)	mg/Kg	----	0.79	0.77	0.49
Cadmium, total (3050)	mg/Kg	4.98	0.47	0.47	0.44
Chromium, total (3050)	mg/Kg	111	8	7	12
Copper, total (3050)	mg/Kg	149	7	7	34
Iron, total (3050)	mg/Kg	----	11300	10900	6580
Lead, total (3050)	mg/Kg	128	12 B	11 B	**141 +**
Manganese, total (3050)	mg/Kg	----	890	2000	306
Mercury, total	mg/Kg	1.06	< 0.04 U	< 0.04 U	< 0.04 U
Molybdenum, total (3050)	mg/Kg	----	< 1 U	< 1 U	3 B
Nickel, total (3050)	mg/Kg	48.6	4 B	4 B	3 B
Selenium, total (3050)	mg/Kg	----	2.8 B	1.5 B	13.1
Silver, total (3050)	mg/Kg	----	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	----	4.86	3.43	35
Vanadium, total (3050)	mg/Kg	----	24	25.1	477
Zinc, total (3050)	mg/Kg	459	31	29	32
Gross Alpha	pCi/g	----	11.2	9.24	89.8
Gross Beta	pCi/g	----	12	10.4	45.4
Radium 226 (3050)	pCi/g	----	0.5	1.3	19.5
Radium 228 (3050)	pCi/g	----	0	1.97	2.18
Thorium 228	pCi/g	----	0.56	0.38	0.32
Thorium 230	pCi/g	----	-0.02	0.87	20.6
Thorium 232	pCi/g	----	0.51	0.59	0.81
Solids, Percent	%	----	44.9	43	77.4

[1] From Prediction of Sediment Toxicity Using Consensus-Based Freshwater Sediment Quality Guidelines (EPA, 2000)

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds consensus-based PEL

\+ Media concentration >1-10 times criterion

++ Media concentration >10-100 times criterion

+++ Media concentration >100 times criterion

Table 4.5: Selection of Contaminants of Concern in Surface Water at the Firefly/Pygmy Mine

Analyte	Units	Ref Areas 1, 2, & 3 (April 04)			Ref Areas 1, 2, & 3 (Oct 04)			FIREFLY DRAINAGE		FIREFLY ADIT	
		Min	Max	Mean	Min	Max	Mean	04/20/04	10/11/04	04/20/04	10/11/04
PHYSICAL (field parameters)											
Flow	cfs	1.08	3.75	2.24	0.01	0.94	0.47	~ 2.22E-03	~ 2.22E-03	~ 2.22E-03	~ 2.22E-03
Temperature	°C	4.90	8.20	6.0	6.2	12.7	9.6	8.9	12	10.7	11.5
pH	s.u.	8.76	9.11	8.9	8.4	8.5	8.4	8.61	7.99	8.44	8.21
Specific Conductance	(uS/cm)	146	345	214	261	557	419	**395**	460	**393**	402
Dissolved Oxygen	(mg/L)	nm	nm	nm	nm	nm	nm	8.06	6.65	7.09	6.18
Oxidation Reduction Potential	Rmev	nm	nm	nm	nm	nm	nm	108.3	86.5	57.4	84.9
INORGANIC											
Nitrite	(mg/L)	0.00	< 0.01	0.005	na	na	na	< 0.01 U	na	< 0.01 U	na
Nitrate	(mg/L)	<0.02	0.15	0.07	na	na	na	0.02 B	na	0.12	na
Chloride	(mg/L)	2 B	15	6	2 B	11	6	1 B	1 B	1 B	1 B
Sulfate	(mg/L)	10 B	60	30	10 B	30 B	20	20 B	20 B	10 B	20 B
Total Phosphorous as P	(mg/L)	0.01 B	0.13	0.06	0.01 B	0.03 B	0.02	0.01 B	0.01 B	0.02 B	0.02 B
Total Dissolved Solids	(mg/L)	140	300	193	150	330	250	220	220	230	200
Total Suspended Solids	(mg/L)	< 5	326	112	< 5	8 B	6	< 5 U	< 5 U	< 5 U	6 B
Bicarbonate as CaCO3	(mg/L)	107	194	138	118	264	188	**199 +**	189	**209 +**	199
Carbonate as CaCO3	(mg/L)	< 2	8 B	3	< 2	13	6	**10 B+**	**21 +**	< 2 U	< 2 U
Cation-Anion Balance	%	-1.9	2.0	-0.6	0	1.9	0.9	0	0	1.1	1.1
Hardness as CaCO3	(mg/L)	104	227	150	123	209	173	169	173	167	170
Hydroxide as CaCO3	(mg/L)	< 2	< 2	1	< 2	< 2	1	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	0	0.15	0.10	na	na	na	0.02 B	na	0.12	na
Sum of Anions	meq/L	2.4	5.7	3.6	2.6	6.0	4.4	4.6	4.6	4.4	4.4
Sum of Cations	meq/L	2.5	5.5	3.5	2.7	6.1	4.5	4.6	4.6	4.5	4.5
TDS (calculated)	(mg/L)	127	305	191	134	318	232	232	237	217	219
TDS (ratio - measured/calculated)		0.98	1.10	1.02	1.04	1.12	1.09	0.95	0.93	1.06	0.91
Total Alkalinity	(mg/L)	107	202	140	118	277	194	**209 +**	210	**209 +**	199
METALS											
Antimony, dissolved	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	**0.6 B+**	**0.5 B+**	**0.5 B+**	**0.3 B+**
Antimony, total	µg/L	< 0.2	< 0.4	0.1	< 0.2	< 0.2	0.1	**0.5 B+**	**0.5 B+**	0.4 B	< 0.4 U
Arsenic, dissolved	µg/L	0.4 B	1.9	1.3	< 0.5	5.8	2.7	**30.7 ++**	**25.8 +**	**22.5 ++**	**16.7 +**
Arsenic, total recoverable	µg/L	0.6	3.4	1.8	< 0.5	5.1	2.5	**25.5 +**	**24.6 +**	**18.3 +**	**18 +**
Barium, dissolved	µg/L	110	146	127	100	177	127	134	150	**147 +**	155
Barium, total	µg/L	110	194	154	107	193	139	135	143	149	147
Beryllium, dissolved	µg/L	< 0.1	< 0.1	0.05	< 0.1	< 0.1	0.05	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	< 0.1	<0.2	0.07	< 0.1	< 0.1	0.05	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U
Cadmium, dissolved	µg/L	< 0.1	< 0.1	0.05	< 0.1	< 0.1	0.05	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	< 0.1	< 0.2	0.07	< 0.1	< 0.1	0.05	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U
Calcium, dissolved	µg/L	32400	65400	45667	39600	64400	52467	21400	22900	20800	21200
Chromium, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	< 10	< 10	5	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	< 10	< 10	5	< 10	10 B	7	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	< 10	< 10	5	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	20 B	110	57	10 B	40 B	20	< 10 U	< 10 U	< 10 U	< 10 U
Iron, total recoverable	µg/L	290	2910	1190	110	200	163	40 B	140	10 B	60
Lead, dissolved	µg/L	< 0.1	0.2 B	0.10	< 0.1	< 0.1	0.05	< 0.1 U	**0.7 +**	< 0.1 U	**0.3 B+**
Lead, total	µg/L	0.2 B	3.3	1.3	0.1 B	0.3 B	0.2	0.9	**1.8 +**	< 0.1 U	< 0.2 U
Magnesium, dissolved	µg/L	5300	15500	8800	5800	13200	10233	**28200 +**	**28100 +**	**28100 +**	**28400 +**
Manganese, dissolved	µg/L	15 B	27 B	21	< 5	19 B	12	< 5 U	< 5 U	< 5 U	< 5 U
Manganese, total	µg/L	30	218	105	6 B	40	20	< 5 U	< 5 U	< 5 U	< 5 U
Mercury, dissolved	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	< 0.2 U	0 UH	< 0.2 U	0 UH
Molybdenum, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	**50 +**	**50 +**	**50 B+**	**30 B+**
Molybdenum, total	µg/L	< 10	10 B	7	< 10	< 10	5	**50 +**	**50 +**	**50 +**	**30 B+**

Table 4.5 (cont.): Selection of Contaminants of Concern in Surface Water at the Firefly/Pygmy Mine

Analyte	Units	Ref Areas 1, 2, & 3 (April 04)			Ref Areas 1, 2, & 3 (Oct 04)			FIREFLY DRAINAGE		FIREFLY ADIT	
		Min	Max	Mean	Min	Max	Mean	04/20/04	10/11/04	04/20/04	10/11/04
Nickel, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	< 10	10 B	7	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	1800	3100	2300	1200	7600	3800	**5900 +**	5800	**5800 +**	5200
Selenium, dissolved	µg/L	0.3 B	0.9	0.6	< 1	1 B	0.7	**59.3 ++**	**57 ++**	**56 ++**	**45 ++**
Selenium, total	µg/L	0.2 B	0.8	0.6	< 1	1 B	0.7	**44.6 ++**	**48 ++**	**45.1 ++**	**38 ++**
Silver, dissolved	µg/L	< 0.05	< 0.05	0.025	< 0.05	< 0.05	0.025	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	0.050	< 0.1	0.033	< 0.05	< 0.05	0.025	< 0.05 U	< 0.05 U	< 0.05 U	< 0.1 U
Sodium, dissolved	µg/L	4400	22700	12200	5000	39200	21000	**25600 +**	24600	**24900 +**	23900
Uranium, dissolved	µg/L	0.58	5.20	2.56	0.35	7.28	3.69	**120 ++**	**111 ++**	**78.6 ++**	**75.8 ++**
Uranium, total	µg/L	0.51	4.74	2.42	0.35	7.43	3.76	**123 ++**	**110 ++**	**79.2 ++**	**66 +**
Vanadium, dissolved	µg/L	< 5	< 5	2.5	< 5	< 5	2.5	**295 ++**	**310 ++**	**224 ++**	**202 ++**
Vanadium, total	µg/L	<5	8 B	4.3	< 5	< 5	2.5	**310 ++**	**348 ++**	**226 ++**	**196 ++**
Zinc, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U
Zinc, total	µg/L	< 10	10 B	7	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U
RADIOLOGICAL (pCi/L)											
Gross Alpha	pCi/L	3.42	19.00	10.08	0.00	5.13	3.23	**91.6 +**	**105 ++**	**54.5 +**	**46.9 +**
Gross Beta	pCi/L	3.20	18.00	9.10	1.83	13.40	6.25	**31 +**	**21.9 +**	16.1	11.8
Radium 226 and 228 (combined)	pCi/L	0.28	1.06	0.69	0.05	0.73	0.44	**10.27 +**	**9.93 ++**	**1.85 +**	**2.26 +**
Thorium 230 and 232 (combined)	pCi/L	-0.09	0.11	0.06	-0.95	0.05	0.02	**0.61 +**	-0.5	-0.07	-0.5
Thorium 228	pCi/L	-0.02	0.36	0.15	-0.17	0.00	0.00	0	**0.26 +**	0	**0.13 +**

Value in bold indicates level exceeds maximum background
+ Value exceeds background level by 1 to 10 times
++ Value exceeds background level by 10 to 100 times
+++ Value exceeds background level by more than 100 times
nm = not measured; na = not analyzed

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Holding time not met

Table 4.6: Comparison of COC Concentrations in Surface Water at the Firefly/Pygmy Mine to Human-Health Risk Criteria

Analyte		RMC (Camper)	Modified MCL[1]	Max. Bkg Value		FIREFLY DRAINAGE		FIREFLY ADIT	
				Apr 04	Oct 04	04/20/04	10/11/04	04/20/04	10/11/04
PHYSICAL (field parameters)									
Flow	cfs	---	---	3.75	0.94	~ 2.22E-03	~ 2.22E-03	~ 2.22E-03	~ 2.22E-03
Temperature	°C	---	---	8.20	12.7	8.9	12	10.7	11.5
pH	s.u.	---	---	9.11	8.5	8.61	7.99	8.44	8.21
Specific Conductance	(uS/cm)	---	---	345	557	395	460	393	402
Dissolved Oxygen	(mg/L)	---	---	nm	nm	8.06	6.65	7.09	6.18
Oxidation Reduction Potential	Rmev	---	---	nm	nm	108.3	86.5	57.4	84.9
METALS									
Antimony, dissolved	µg/L	124	-----	< 0.2	< 0.2	0.6 B+	0.5 B+	0.5 B+	0.3 B+
Antimony, total	µg/L	---	156	< 0.4	< 0.2	0.5 B+	0.5 B+	0.4 B	< 0.4 U
Arsenic, dissolved	µg/L	93	-----	1.9	5.8	30.7 ++	25.8 +	22.5 ++	16.7 +
Arsenic, total recoverable	µg/L	---	260	3.4	5.1	25.5 +	24.6 +	18.3 +	18 +
Barium, dissolved	µg/L	---	-----	146	177	134	150	147 +	155
Lead, dissolved	µg/L	50	-----	0.2 B	< 0.1	< 0.1 U	0.7 +	< 0.1 U	0.3 B+
Lead, total	µg/L	---	390	3.3	0.3 B	0.9	1.8 +	< 0.1 U	< 0.2 U
Magnesium, dissolved	µg/L	---	---	15500	13200	28200 +	28100 +	28100 +	28400 +
Molybdenum, dissolved	µg/L	---	-----	< 10	< 10	50 +	50 +	50 B+	30 B+
Molybdenum, total	µg/L	---	-----	10 B	< 10	50 +	50 +	50 +	30 B+
Potassium, dissolved	µg/L	---	---	3100	7600	5900 +	5800	5800 +	5200
Selenium, dissolved	µg/L	1548	-----	0.9	1 B	59.3 ++	57 ++	56 ++	45 ++
Selenium, total	µg/L	---	1300	0.8	1 B	44.6 ++	48 ++	45.1 ++	38 ++
Sodium, dissolved	µg/L	---	---	22700	39200	25600 +	24600	24900 +	23900
Uranium, dissolved	µg/L	---	-----	5.20	7.28	120 ++	111 ++	78.6 ++	75.8 ++
Uranium, total	µg/L	---	780	4.74	7.43	123 ++	110 ++	79.2 ++	66 +
Vanadium, dissolved	µg/L	---	-----	< 5	< 5	295 ++	310 ++	224 ++	202 ++
Vanadium, total	µg/L	---	---	8 B	< 5	310 ++	348 ++	226 ++	196 ++
RADIOLOGICAL (pCi/L)		---							
Gross Alpha	pCi/L	---	---	19.00	5.13	91.6 +	105 ++	54.5 +	46.9 +
Gross Alpha (excl. uranium)	pCi/L	---	390	15.82	0.15	9.19	31.30 +	1.44	2.68
Gross Beta	pCi/L	---	104 mrem/yr	18.00	13.40	31 +	21.9 +	16.1	11.8
Radium 226 and 228 (combined)	pCi/L	---	130	1.06	0.73	10.27 +	9.93 ++	1.85 +	2.26 +
Thorium 230 and 232 (combined)	pCi/L	---	-----	0.11	0.05	0.61 +	-0.5	-0.07	-0.5
Thorium 228	pCi/L	---		0.36	0.00	0	0.26 +	0	0.13 +

[1] MCL modified with exposure factor of 365/14 days to better evaluate risk to campers.

Shaded value in bold indicates level exceeds human-health criterion

+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

nm = not measured; na = not analyzed

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

Table 4.7: Comparison of COC Concentrations in Surface Water at the Firefly/Pygmy Mine to Aquatic-life Standards

Analyte	Units	Aquatic Life Std (Chronic)		Max. Bkg Value		FIREFLY DRAINAGE		FIREFLY ADIT	
		Colorado	Utah	Apr 04	Oct 04	04/20/04	10/11/04	04/20/04	10/11/04
PHYSICAL (field parameters)									
Flow	cfs	-----	-----	3.75	0.94	~ 2.22E-03	~ 2.22E-03	~ 2.22E-03	~ 2.22E-03
Temperature	°C	-----	-----	8.20	12.7	8.9	12	10.7	11.5
pH	s.u.	6.5 - 9.0	6.5 - 9.0	9.11	8.5	8.61	7.99	8.44	8.21
Specific Conductance	(uS/cm)	-----	-----	345	557	395	460	393	402
Dissolved Oxygen	(mg/L)	5.0	6.5	nm	nm	8.06	6.65	7.09	6.18
Oxidation Reduction Potential	Rmev	-----	-----	nm	nm	108.3	86.5	57.4	84.9
METALS									
Antimony, dissolved	µg/L	-----	-----	< 0.2	< 0.2	0.6 B+	0.5 B+	0.5 B+	0.3 B+
Antimony, total	µg/L	-----	-----	< 0.4	< 0.2	0.5 B+	0.5 B+	0.4 B	< 0.4 U
Arsenic, dissolved	µg/L	-----	190	1.9	5.8	30.7 ++	25.8 +	22.5 ++	16.7 +
Arsenic, total recoverable	µg/L	-----	-----	3.4	5.1	25.5 +	24.6 +	18.3 +	18 +
Barium, dissolved	µg/L	-----	-----	146	177	134	150	147 +	155
Lead, dissolved	µg/L	5 [1]	7 [1]	0.2 B	< 0.1	< 0.1 U	0.7 +	< 0.1 U	0.3 B+
Lead, total	µg/L	-----	-----	3.3	0.3 B	0.9	1.8 +	< 0.1 U	< 0.2 U
Magnesium, dissolved	µg/L	-----	-----	15500	13200	28200 +	28100 +	28100 +	28400 +
Molybdenum, dissolved	µg/L	-----	-----	< 10	< 10	50 +	50 +	50 B+	30 B+
Molybdenum, total	µg/L	-----	-----	10 B	< 10	50 +	50 +	50 +	30 B+
Potassium, dissolved	µg/L	-----	-----	3100	7600	5900 +	5800	5800 +	5200
Selenium, dissolved	µg/L	4.6 [1]	5	0.9	1 B	**59.3 ++**	**57 ++**	**56 ++**	**45 ++**
Selenium, total	µg/L	-----	-----	0.8	1 B	44.6 ++	48 ++	45.1 ++	38 ++
Sodium, dissolved	µg/L	-----	-----	22700	39200	25600 +	24600	24900 +	23900
Uranium, dissolved	µg/L	-----	-----	5.20	7.28	120 ++	111 ++	78.6 ++	75.8 ++
Uranium, total	µg/L	-----	-----	4.74	7.43	123 ++	110 ++	79.2 ++	66 +
Vanadium, dissolved	µg/L	-----	-----	< 5	< 5	295 ++	310 ++	224 ++	202 ++
Vanadium, total	µg/L	-----	-----	8 B	< 5	310 ++	348 ++	226 ++	196 ++
RADIOLOGICAL (pCi/L)									
Gross Alpha	pCi/L	-----	15	19.00	5.13	**91.6 +**	**105 +**	**54.5 +**	**46.9 +**
Gross Beta	pCi/L	-----	50	18.00	13.40	31 +	21.9 +	16.1	11.8
Radium 226 and 228 (combined)	pCi/L	-----	-----	1.06	0.73	10.27 +	9.93 ++	1.85 +	2.26 +
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.11	0.05	0.61 +	-0.5	-0.07	-0.5
Thorium 228	pCi/L	-----	-----	0.36	0.00	0	0.26 +	0	0.13 +

[1] Hardness dependent criterion based on a mean hardness value of 183 mg/L from historical sample results for La Sal Creek at the Colorado/Utah stateline during low-flow conditions.

Shaded value in bold indicates level exceeds aquatic life standard

+ Value exceeds standard (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds standard (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds standard (shaded) or maximum background (not shaded) by more than 100 times

nm = not measured; na = not analyzed

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

Table 4.8: Comparison of COCs in Borehole Waste-Rock Samples at the Firefly/Pygmy Mine to Human-Health Risk Criteria

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			FF 1			FF 2			FF 3		
				Min	Max	Mean	0 - 0.5	4 - 6	8 - 9.5	0 - 0.5	0 - 0.5 (Dup 4)	6 - 8	0 - 0.5	4 - 6	9 - 11
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	0.2 B	0.2 B	0.1 B	0.3 B	0.3 B	1.1 +	0.5 B	0.5	0.4 B+
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	**47.8 +**	**22.4 +**	3.13	**42.4 +**	**41.8 +**	**81.3 +**	**80.7 +**	**68.4 +**	**39.6 +**
Barium, total (3050)	mg/Kg	---	71540	128	419	205	49.8	177	161	131	152	21.7	217	115	141
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.11 B	0.19 B	0.07 B	0.8 B	0.8	0.18 B	0.6	0.22 B	0.19 B
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	0.35	0.35	0.07 B	0.67	0.6	0.56	0.72	2.02	0.75
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	29 +	2 B	2 B	7	8	12	15 +	13 +	11
Copper, total (3050)	mg/Kg	5000	---	3	75	15	75	32	5	91 +	89 +	276 +	65	229 +	104 +
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	2040	3200	1750	5450	5650	2040	5580	2830	2580
Lead, total (3050)	mg/Kg	1000	---	8	82	19	40	91 +	5 B	26	26	423 +	290 +	190 +	88
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	189	225	253	512 +	666 +	195	178	267	209
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	0.08 B+	< 0.05 U	0.12 B+	0.09 B+	0.09 B+	0.06 B+
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	1 B	6	1 B	< 1 U	2 B	11 +	10 +	23 +	4 B
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	2 B	2 B	1 B	7 +	6	7 +	19 +	5	4 B
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	2.4 B	3.4 B	< 0.8 U	4 B	4 B	194 ++	25 B+	16 B+	6 B+
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	0.29	0.29	0.05 B	1.19 +	1.01 +	17.7 ++	1.76 +	1.52 +	0.74 B+
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	78.2 +	94.5 +	4	232 ++	114 +	116 +	676 ++	260 ++	200 B++
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	368 +	271 +	18.5	260 +	253 +	1340 +	4160 ++	1020 +	1230 +
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	22	27	4 B	46	50	44	48	118	49
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	46.8	69.4	7.22	161 +	156 +	244 +	922 ++	536 +	356 +
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	21.7	30.6	4.64	112 +	89.6	111 +	468 ++	244 ++	157 ++
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	23.6 +	21.9 +	0.71	33.2 +	16.4 +	26.5 +	117 +	74.4 +	62.6 +
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	0.12	0.57	2.67	1.69	1.63	2.81	6.72 +	1.99	0.8
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.08	0.15	-0.1	0.49	0.62	0.05	0.32	0.2	0.13
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	7.42	30.6 +	1.23	46.3 +	37.2 +	27.5 +	201 +	112 +	59 +
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.05	0.24	0.26	-0.41	0.58 +	0.2	0.97 +	-0.07	0.04
Solids, Percent	%	---	---	87.3	94.8	91.5	93.3	96.1	99.2	91.9	91.9	96	90.8	94.7	93.8

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			FF 4			FF 5				
				Min	Max	Mean	0 - 0.5	1 - 2	4 - 6	0 - 0.5	2 - 4	8 - 10	14.5 - 19.5	21.5 - 23
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	2	0.5 B+	< 0.1 U	0.6 +	0.4 B+	0.5 +	0.6 +	0.4 B+
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	**140 +**	**21.5 +**	4.11	**44.6 +**	**32.5 +**	**48.4 +**	**68.2 +**	**29.4 +**
Barium, total (3050)	mg/Kg	---	71540	128	419	205	104	54.4	377	78.4	112	80.4	53	133
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.61	0.29 B	0.09 B	0.28 B	0.18 B	0.26 B	0.23 B	0.4
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	2.87 +	0.66	0.1 B	1.02	1.07	0.99	1.11	0.21 B
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	23 +	22 +	4 B	28 +	34 +	35 +	9	6
Copper, total (3050)	mg/Kg	5000	---	3	75	15	383 +	157 +	4 B	202 +	100 +	191 +	244 +	14
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	7570	3610	1620	3290	2400	2580	2490	5870
Lead, total (3050)	mg/Kg	1000	---	8	82	19	430 +	464 +	9 B	233 +	316 +	253 +	213 +	19 B
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	170	273	274	230	237	233	205	138
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	0.18 B+	0.14 B+	< 0.05 U	0.16 B+	0.11 B+	0.16 B+	0.08 B+	< 0.05 U
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	114 ++	6	< 1 U	13 +	7	10 +	12 +	22 +
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	7 +	5 B	< 1 U	5 B	3 B	4 B	7 +	3 B
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	130 B++	180 ++	3.4 B	38 +	43 +	48 +	52 +	46.7 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	6.18 ++	9.19 ++	0.09 B	4.51 +	1.69 +	3.72 +	5.84 ++	0.64 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	1510 ++	675 ++	20.2 +	301 ++	259 ++	272 ++	269 ++	14.6
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	6570 ++	1740 ++	163 +	1510 ++	2170 ++	2050 ++	2840 ++	731 +
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	329 +	56	10	90	89	65	60	18
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	2610 ++	743 +	32.4	606 +	738 +	649 +	976 ++	31.3
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	1130 ++	328 +	17.2	274 +	292 +	252 +	269 +	13.4
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	466 ++	126 +	4.11	123 +	82 +	68 +	110 +	4.04
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	3.01	1.45	1.69	0.87	0.74	1.1	0.7	0.61
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.27	0.11	0.07	0.16	-0.06	0.31	0.25	-0.15
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	424 ++	95.5 +	4.05	96.1 +	162 +	363 ++	138 +	3.84
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.54 +	0.57 +	0.25	0.56 +	1.62 +	1.01 +	0.43	0.36
Solids, Percent	%	---	---	87.3	94.8	91.5	92.2	91.5	93.1	92.6	91	91.5	93	77.7

Table 4.8 (cont.): Comparison of COCs in Borehole Waste-Rock Samples at the Firefly/Pygmy Mine to Human-Health Risk Criteria

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			FF 6					FF 7			
				Min	Max	Mean	0 - 0.5	0 - 0.5 (Dup 5)	2 - 4	8 - 10	32.5 - 34.5	0 - 0.5	1 - 3	8 - 10	18 - 22.5
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	0.5 +	0.4 B+	0.2 B	0.2 B	0.3 B	0.4 B+	0.4 B+	0.3 B	0.5 B+
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	**70.4 +**	**62.5 +**	**53.7 +**	**43.1 +**	**26 +**	**65.2 +**	**60.2 +**	**60.1 +**	**91.2 +**
Barium, total (3050)	mg/Kg	---	71540	128	419	205	73	62.9	109	74	31.9	129	123	106	53.8
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.34	0.32	0.28 B	0.16 B	0.3	0.43	0.34	0.37	0.33
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	1.2	1.19	1.25	0.98	0.33	2.27 +	2.41 +	0.77	1.53 +
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	22 +	20 +	25 +	18 +	43 +	19 +	16 +	44 +	7
Copper, total (3050)	mg/Kg	5000	---	3	75	15	226 +	241 +	97 +	65	118 +	155 +	127 +	80 +	238 +
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	3570	3170	3370	2270	2810	4220	4300	3640	3990
Lead, total (3050)	mg/Kg	1000	---	8	82	19	297 +	233 +	305 +	357 +	335 +	452 +	665 +	355 +	125 +
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	218	211	222	195	215	231	229	222	272
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	0.14 B+	0.15 B+	0.07 B+	< 0.05 U	0.14 B+	0.15 B+	0.09 B+	0.15 B+	0.07 B+
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	20 +	11 +	8 +	19 +	13 +	12 +	26 +	9 +	75 ++
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	5	4 B	5	3 B	3 B	6	4 B	5 B	7 +
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	38.3 +	32.4 +	43.2 +	13.6 +	124 ++	95.6 ++	54.7 ++	109 ++	30.4 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	4.34 +	3.34 +	1.45 +	0.57 +	4.05 +	2.84 +	2.03 +	2.15 +	2.18 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	319 ++	300 ++	263 ++	153 +	115 +	727 ++	618 ++	339 ++	494 ++
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	1730 ++	1650 ++	1790 ++	1280 +	867 +	4330 ++	3260 ++	2720 ++	849 +
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	119	111	131 +	93	25	208 +	244 +	67	66
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	520 +	705 +	384 +	340 +	229 +	1230 ++	863 +	582 +	790 +
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	257 +	284 +	241 +	146 +	110 +	632 ++	399 ++	280 +	389 ++
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	99.2 +	108 +	85 +	63.9 +	52.4 +	286 ++	198 ++	152 ++	159 ++
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	3.43	4.8 +	3.11	3.39	3.26	3.38	7.35 +	11.7 +	6.4 +
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.58	0.07	0.3	0.2	0.21	0.27	0.15	0.13	0.3
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	103 +	100 +	142 +	69.3 +	45.2 +	266 ++	206 +	174 +	165 +
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.22	0.04	-0.34	0.29	0.31	0.45	0.24	0.33	0.14
Solids, Percent	%	---	---	87.3	94.8	91.5	93.7	94	92.1	91.7	94.8	89.9	91.4	92.1	90.7

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			FF 8		
				Min	Max	Mean	0 - 0.5	2 - 4	10 - 12
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	0.2 B	0.3 B	0.1 B
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	**29.7 +**	**38.1 +**	**15.2 +**
Barium, total (3050)	mg/Kg	---	71540	128	419	205	204	208	53.9
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.92 +	0.39	0.14 B
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	0.6	1.28	1.18
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	17 +	39 +	28 +
Copper, total (3050)	mg/Kg	5000	---	3	75	15	24	38	5
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	4600	3420	1540
Lead, total (3050)	mg/Kg	1000	---	8	82	19	187 +	309 +	271 +
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	258	241	149
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	0.05 B+	0.12 B+	< 0.04 U
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	4 B	5	2 B
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	11 +	5 B	2 B
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	60 B	28 B	8 B
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	0.67 +	1.06 +	0.32 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	585 ++	352 ++	292 ++
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	3380 ++	2210 ++	1520 ++
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	64	80	100
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	834 +	626 +	608 +
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	478 ++	268 +	243 +
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	173 ++	97.1 +	194 ++
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	3.37	7.57 +	8.7 +
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.41	0.15	0.21
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	128 +	97.8 +	89.4 +
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.78 +	0.46	0.37
Solids, Percent	%	---	---	87.3	94.8	91.5	91.7	92.7	93.3

Qualifiers are defined as follows:

B Analyte detected value between Method Detection Limit & Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds human-health criterion

\+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Table 4.9: Comparison of COCs in Waste Rock from Composite Surface Samples at the Firefly/Pygmy Mine to Human-Health Risk Criteria

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			FF Segment 1	FF Segment 2	FF Segment 3	FF Segment 4	FF Segment 5	FF Segment 6	FF Segment 7
				Min	Max	Mean							
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	< 0.4 U	< 0.5 U	0.9 B+	0.5 B+	< 0.5 U	< 0.4 U	< 0.5 U
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	**28 +**	**44 +**	**124 +**	**43 +**	**58 +**	**53 +**	**63 +**
Barium, total (3050)	mg/Kg	---	71540	128	419	205	169	156	50.8	80.8	94.1	82.7	89
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.6 B	0.6 B	< 0.3 U	0.3 B	0.3 B	0.3 B	< 0.3 U
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	0.3 B	0.9 B	2.1 +	0.3 B	1.3	1.5 +	1.1
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	12	11	40 +	71 +	14 +	19 +	14 +
Copper, total (3050)	mg/Kg	5000	---	3	75	15	81 +	61	404 +	189 +	86 +	100 +	162 **+**
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	7500	4710	2980	2110	3890	3200	3290
Lead, total (3050)	mg/Kg	1000	---	8	82	19	103 +	190 +	308 +	303 +	260 +	298 +	416 **+**
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	247	368	227	154	217	200	236
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	0.05 BH	0.08 BH+	0.12 BH+	0.21 H+	0.05 BH+	0.05 BH+	< 0.05 UH+
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	13 +	3 B	22 +	5 B	6	11 +	9 +
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	5 B	8 +	6	6	5 B	4 B	4 B
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	19 B+	25 +	35 +	82 ++	34 +	22 +	28 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	1.1 +	0.9 +	5.9 ++	8.6 ++	1.1 +	1.5 +	1.2 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	142 +	303 ++	414 ++	335 ++	337 ++	226 ++	282 ++
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	573 +	2000 ++	1450 ++	2750 ++	2510 ++	2150 ++	1720 ++
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	32	75	175 +	36	144 +	150 +	113
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	20.4	41.9	73.4	70.9	64.6	38	61.2
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	12.4	21.2	32.2	27	30	17.8	25
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	3.67	10.7	13.8 +	9.16	13.2	8.54	14.6 +
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	0.13	0.22	0.18	0.33	0.18	0.4	0.45
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.25	0.42	0.16	0.28	0.3	0.2	0.25
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	28 +	73.2 +	104 +	126 +	90.9 +	68 +	96.3 +
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.21	0.22	0.36	0.34	0.93 +	0.38	0.83 +
Solids, Percent	%	---	---	87.3	94.8	91.5	92.3	92.3	93.8	93.8	92.5	93.1	93.4

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			FF Segment 8	FF Segment 8 (Dup 6)	FF Segment 9	FF Segment 9 (Dup 7)
				Min	Max	Mean				
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	< 0.5 U	< 0.5 U	0.6 B+	< 0.5 U
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	**50 +**	**57 +**	**44 +**	**40 +**
Barium, total (3050)	mg/Kg	---	71540	128	419	205	78	73.5	85.6	71.5
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.3 B	0.3 B	< 0.3 U	< 0.3 U
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	1 B	1.1	0.8 B	0.6 B
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	20 +	19 +	38 +	42 +
Copper, total (3050)	mg/Kg	5000	---	3	75	15	120 +	150 +	156 +	149 +
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	4310	4170	2620	2710
Lead, total (3050)	mg/Kg	1000	---	8	82	19	340 +	292 +	366 +	383 +
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	205	230	203	204
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	0.04 BH+	< 0.05 UH	0.12 BH+	0.12 BH+
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	8	9	6	6
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	4 B	5 B	4 B	4 B
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	40 +	32 +	57 ++	86 ++
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	1.6 +	2.2 +	2.8 +	3.9 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	278 ++	296 ++	265 ++	394 ++
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	1550 ++	1660 ++	2570 ++	2540 ++
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	107	110	64	59
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	50.4	43.6	454 +	50
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	22.6	20.7	200 +	22.2
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	7.33	9.88	9.05	8.32
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	0.51	0.27	0	0.38
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.21	0.14	0	-0.04
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	80.7 +	81.3 +	129 +	0.59
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.54 +	0.21	0.18	0.3
Solids, Percent	%	---	---	87.3	94.8	91.5	92.7	93.8	93	92.9

Qualifiers are defined as follows:

B Analyte detected value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time was exceeded

Shaded value in bold indicates level exceeds human-health criterion

\+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Table 4.10: Sample Sites at Firefly/Pygmy Mine Where Radionuclide Activities in Near-Surface Samples Exceeded Maximum Background Levels

Radionuclide	Borehole Samples (FF)								Composite Surface Samples (Seg)									Factor Exceeded Background			
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9	Min	Max	Mean	Median
Gross alpha		○	○	○	○	○	○	○									○	1.78	29.73	9.34	7.47
Gross beta		○	○	○	○	○	○	○									○	2.34	29.50	10.25	7.28
Radium 226	○	○	○	○	○	○	○	○			○				○			1.05	35.30	9.30	7.85
Radium 228			○			○												1.16	1.62	1.39	1.39
Thorium 228																		----	----	----	----
Thorium 230		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	1.26	19.01	5.38	4.32
Thorium 232		○	○	○	○			○					○		○	○		1.02	1.83	1.35	1.28

Table 4.11: Comparison of COCs in Waste Rock Samples Collected from Boreholes at the Firefly/Pygmy Mine to Ecological Risk Criteria

Analyte	Units	Modified Elk RMC[1]	Background Soil			FF 1			FF 2			FF 3		
			Min	Max	Mean	0 - 0.5	4 - 6	8 - 9.5	0 - 0.5	0 - 0.5 (Dup 4)	6 - 8	0 - 0.5	4 - 6	9 - 11
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	0.2 B	0.2 B	0.1 B	0.3 B	0.3 B	1.1 +	0.5 B	0.5	0.4 B+
Arsenic, total (3050)	mg/Kg	103921	1.1	25.7	9.7	47.8 +	22.4	3.13	42.4 +	41.8 +	81.3 +	80.7 +	68.4 +	39.6 +
Barium, total (3050)	mg/Kg	----	128	419	205	49.8	177	161	131	152	21.7	217	115	141
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.11 B	0.19 B	0.07 B	0.8 B	0.8	0.18 B	0.6	0.22 B	0.19 B
Cadmium, total (3050)	mg/Kg	950	0.09	1.34	0.30	0.35	0.35	0.07 B	0.67	0.6	0.56	0.72	2.02	0.75
Chromium, total (3050)	mg/Kg	----	5	12	8	29 +	2 B	2 B	7	8	12	15 +	13 +	11
Copper, total (3050)	mg/Kg	41505	3	75	15	75	32	5	91 +	89 +	276 +	65	229 +	104 +
Iron, total (3050)	mg/Kg	----	4790	10600	7524	2040	3200	1750	5450	5650	2040	5580	2830	2580
Lead, total (3050)	mg/Kg	40238	8	82	19	40	91 +	5 B	26	26	423 +	290 +	190 +	88
Manganese, total (3050)	mg/Kg	----	151	397	269	189	225	253	512 +	666 +	195	178	267	209
Mercury, total	mg/Kg	3485	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	0.08 B+	< 0.05 U	0.12 B+	0.09 B+	0.09 B+	0.06 B+
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	1 B	6	1 B	< 1 U	2 B	11 +	10 +	23 +	4 B
Nickel, total (3050)	mg/Kg	----	3	6	5	2 B	2 B	1 B	7 +	6	7 +	19 +	5	4 B
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	2.4 B	3.4 B	< 0.8 U	4 B	4 B	194 ++	25 B+	16 B+	6 B+
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	0.29	0.29	0.05 B	1.19 +	1.01 +	17.7 ++	1.76 +	1.52 +	0.74 B+
Uranium, total (3050)	mg/Kg	----	0.38	15.3	3.9	78.2 +	94.5 +	4	232 ++	114 +	116 +	676 ++	260 ++	200 B++
Vanadium, total (3050)	mg/Kg	----	10.7	136	40	368 +	271 +	18.5	260 +	253 +	1340 +	4160 ++	1020 +	1230 +
Zinc, total (3050)	mg/Kg	87129	12	125	28	22	27	4 B	46	50	44	48	118	49
Gross Alpha	pCi/g	----	3.39	87.8	20.3	46.8	69.4	7.22	161 +	156 +	244 +	922 ++	536 +	356 +
Gross Beta	pCi/g	----	3.29	38.3	13.5	21.7	30.6	4.64	112 +	89.6	111 +	468 ++	244 ++	157 ++
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	23.6 +	21.9 +	0.71	33.2 +	16.4 +	26.5 +	117 +	74.4 +	62.6 +
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	0.12	0.57	2.67	1.69	1.63	2.81	6.72 +	1.99	0.8
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.08	0.15	-0.1	0.49	0.62	0.05	0.32	0.2	0.13
Thorium 230	pCi/g	----	-0.36	22.3	3.1	7.42	30.6 +	1.23	46.3 +	37.2 +	27.5 +	201 +	112 +	59 +
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.05	0.24	0.26	-0.41	0.58 +	0.2	0.97 +	-0.07	0.04
Solids, Percent	%	----	87.3	94.8	91.5	93.3	96.1	99.2	91.9	91.9	96	90.8	94.7	93.8

Analyte	Units	Modified Elk RMC[1]	Background Soil			FF 4			FF 5				
			Min	Max	Mean	0 - 0.5	1 - 2	4 - 6	0 - 0.5	2 - 4	8 - 10	14.5 - 19.5	21.5 - 23
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	2	0.5 B+	< 0.1 U	0.6 +	0.4 B+	0.5 +	0.6 +	0.4 B+
Arsenic, total (3050)	mg/Kg	103921	1.1	25.7	9.7	140 +	21.5	4.11	44.6 +	32.5 +	48.4 +	68.2 +	29.4 +
Barium, total (3050)	mg/Kg	----	128	419	205	104	54.4	377	78.4	112	80.4	53	133
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.61	0.29 B	0.09 B	0.28 B	0.18 B	0.26 B	0.23 B	0.4
Cadmium, total (3050)	mg/Kg	950	0.09	1.34	0.30	2.87 +	0.66	0.1 B	1.02	1.07	0.99	1.11	0.21 B
Chromium, total (3050)	mg/Kg	----	5	12	8	23 +	22 +	4 B	28 +	34 +	35 +	9	6
Copper, total (3050)	mg/Kg	41505	3	75	15	383 +	157 +	4 B	202 +	100 +	191 +	244 +	14
Iron, total (3050)	mg/Kg	----	4790	10600	7524	7570	3610	1620	3290	2400	2580	2490	5870
Lead, total (3050)	mg/Kg	40238	8	82	19	430 +	464 +	9 B	233 +	316 +	253 +	213 +	19 B
Manganese, total (3050)	mg/Kg	----	151	397	269	170	273	274	230	237	233	205	138
Mercury, total	mg/Kg	3485	<0.04 U	0.02	0.02	0.18 B+	0.14 B+	< 0.05 U	0.16 B+	0.11 B+	0.16 B+	0.08 B+	< 0.05 U
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	114 ++	6	< 1 U	13 +	7	10 +	12 +	22 +
Nickel, total (3050)	mg/Kg	----	3	6	5	7 +	5 B	< 1 U	5 B	3 B	4 B	7 +	3 B
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	130 B++	180 ++	3.4 B	38 +	43 +	48 +	52 +	46.7 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	6.18 ++	9.19 ++	0.09 B	4.51 +	1.69 +	3.72 +	5.84 ++	0.64 +
Uranium, total (3050)	mg/Kg	----	0.38	15.3	3.9	1510 ++	675 ++	20.2 +	301 ++	259 ++	272 ++	269 ++	14.6
Vanadium, total (3050)	mg/Kg	----	10.7	136	40	6570 ++	1740 ++	163 +	1510 ++	2170 ++	2050 ++	2840 ++	731 +
Zinc, total (3050)	mg/Kg	87129	12	125	28	**329 +**	56	10	90	89	65	60	18
Gross Alpha	pCi/g	----	3.39	87.8	20.3	2610 ++	743 +	32.4	606 +	738 +	649 +	976 ++	31.3
Gross Beta	pCi/g	----	3.29	38.3	13.5	1130 ++	328 +	17.2	274 +	292 +	252 +	269 +	13.4
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	466 ++	126 +	4.11	123 +	82 +	68 +	110 +	4.04
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	3.01	1.45	1.69	0.87	0.74	1.1	0.7	0.61
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.27	0.11	0.07	0.16	-0.06	0.31	0.25	-0.15
Thorium 230	pCi/g	----	-0.36	22.3	3.1	424 ++	95.5 +	4.05	96.1 +	162 +	363 ++	138 +	3.84
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.54 +	0.57 +	0.25	0.56 +	1.62 +	1.01 +	0.43	0.36
Solids, Percent	%	----	87.3	94.8	91.5	92.2	91.5	93.1	92.6	91	91.5	93	77.7

Table 4.11 (cont.): Comparison of COCs in Waste Rock Samples Collected from Boreholes at the Firefly/Pygmy Mine to Ecological Risk Criteria

Analyte	Units	Modified Elk RMC[1]	Background Soil			FF 6					FF 7			
			Min	Max	Mean	0 - 0.5	0 - 0.5 (Dup 5)	2 - 4	8 - 10	32.5 - 34.5	0 - 0.5	1 - 3	8 - 10	18 - 22.5
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	0.5 +	0.4 B+	0.2 B	0.2 B	0.3 B	0.4 B+	0.4 B+	0.3 B	0.5 B+
Arsenic, total (3050)	mg/Kg	103921	1.1	25.7	9.7	70.4 +	62.5 +	53.7 +	43.1 +	26 +	65.2 +	60.2 +	60.1 +	91.2 +
Barium, total (3050)	mg/Kg	----	128	419	205	73	62.9	109	74	31.9	129	123	106	53.8
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.34	0.32	0.28 B	0.16 B	0.3	0.43	0.34	0.37	0.33
Cadmium, total (3050)	mg/Kg	950	0.09	1.34	0.30	1.2	1.19	1.25	0.98	0.33	2.27 +	2.41 +	0.77	1.53 +
Chromium, total (3050)	mg/Kg	----	5	12	8	22 +	20 +	25 +	18 +	43 +	19 +	16 +	44 +	7
Copper, total (3050)	mg/Kg	41505	3	75	15	226 +	241 +	97 +	65	118 +	155 +	127 +	80 +	238 +
Iron, total (3050)	mg/Kg	----	4790	10600	7524	3570	3170	3370	2270	2810	4220	4300	3640	3990
Lead, total (3050)	mg/Kg	40238	8	82	19	297 +	233 +	305 +	357 +	335 +	452 +	665 +	355 +	125 +
Manganese, total (3050)	mg/Kg	----	151	397	269	218	211	222	195	215	231	229	222	272
Mercury, total	mg/Kg	3485	<0.04 U	0.02	0.02	0.14 B+	0.15 B+	0.07 B+	< 0.05 U	0.14 B+	0.15 B+	0.09 B+	0.15 B+	0.07 B+
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	20 +	11 +	8 +	19 +	13 +	12 +	26 +	9 +	75 ++
Nickel, total (3050)	mg/Kg	----	3	6	5	5	4 B	5	3 B	3 B	6	4 B	5 B	7 +
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	38.3 +	32.4 +	43.2 +	13.6 +	124 ++	95.6 ++	54.7 ++	109 ++	30.4 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	4.34 +	3.34 +	1.45 +	0.57 +	4.05 +	2.84 +	2.03 +	2.15 +	2.18 +
Uranium, total (3050)	mg/Kg	1052832	0.38	15.3	3.9	319 ++	300 ++	263 ++	153 +	115 +	727 ++	618 ++	339 ++	494 ++
Vanadium, total (3050)	mg/Kg	88713	10.7	136	40	1730 ++	1650 ++	1790 ++	1280 +	867 +	4330 ++	3260 ++	2720 ++	849 +
Zinc, total (3050)	mg/Kg	87129	12	125	28	119	111	131 +	93	25	208 +	244 +	67	66
Gross Alpha	pCi/g	----	3.39	87.8	20.3	520 +	705 +	384 +	340 +	229 +	1230 ++	863 +	582 +	790 +
Gross Beta	pCi/g	----	3.29	38.3	13.5	257 +	284 +	241 +	146 +	110 +	632 ++	399 ++	280 +	389 ++
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	99.2 +	108 +	85 +	63.9 +	52.4 +	286 ++	198 ++	152 ++	159 ++
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	3.43	4.8 +	3.11	3.39	3.26	3.38	7.35 +	11.7 +	6.4 +
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.58	0.07	0.3	0.2	0.21	0.27	0.15	0.13	0.3
Thorium 230	pCi/g	----	-0.36	22.3	3.1	103 +	100 +	142 +	69.3 +	45.2 +	266 ++	206 +	174 +	165 +
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.22	0.04	-0.34	0.29	0.31	0.45	0.24	0.33	0.14
Solids, Percent	%	----	87.3	94.8	91.5	93.7	94	92.1	91.7	94.8	89.9	91.4	92.1	90.7

Analyte	Units	Modified Elk RMC[1]	Background Soil			FF 8		
			Min	Max	Mean	0 - 0.5	2 - 4	10 - 12
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	0.2 B	0.3 B	0.1 B
Arsenic, total (3050)	mg/Kg	103921	1.1	25.7	9.7	29.7 +	38.1 +	15.2
Barium, total (3050)	mg/Kg	----	128	419	205	204	208	53.9
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.92 +	0.39	0.14 B
Cadmium, total (3050)	mg/Kg	950	0.09	1.34	0.30	0.6	1.28	1.18
Chromium, total (3050)	mg/Kg	----	5	12	8	17 +	39 +	28 +
Copper, total (3050)	mg/Kg	41505	3	75	15	24	38	5
Iron, total (3050)	mg/Kg	----	4790	10600	7524	4600	3420	1540
Lead, total (3050)	mg/Kg	40238	8	82	19	187 +	309 +	271 +
Manganese, total (3050)	mg/Kg	----	151	397	269	258	241	149
Mercury, total	mg/Kg	3485	<0.04 U	0.02	0.02	0.05 B+	0.12 B+	< 0.04 U
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	4 B	5	2 B
Nickel, total (3050)	mg/Kg	----	3	6	5	11 +	5 B	2 B
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	60 B	28 B	8 B
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	0.67 +	1.06 +	0.32 +
Uranium, total (3050)	mg/Kg	1052832	0.38	15.3	3.9	585 ++	352 ++	292 ++
Vanadium, total (3050)	mg/Kg	88713	10.7	136	40	3380 ++	2210 ++	1520 ++
Zinc, total (3050)	mg/Kg	87129	12	125	28	64	80	100
Gross Alpha	pCi/g	----	3.39	87.8	20.3	834 +	626 +	608 +
Gross Beta	pCi/g	----	3.29	38.3	13.5	478 ++	268 +	243 +
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	173 ++	97.1 +	194 ++
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	3.37	7.57 +	8.7 +
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.41	0.15	0.21
Thorium 230	pCi/g	----	-0.36	22.3	3.1	128 +	97.8 +	89.4 +
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.78 +	0.46	0.37
Solids, Percent	%	----	87.3	94.8	91.5	91.7	92.7	93.3

[1] Modified by area use factor (RMC/[2.02 acres/640 acres])

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds elk RMC

+ Value exceeds RMC (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds RMC (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds RMC (shaded) or maximum background (not shaded) by more than 100 times

Table 4.12: Comparison of COCs in Waste Rock from Composite Surface Samples to Ecological Risk Criteria at the Firefly/Pygmy Mine

Analyte	Units	Modified Elk RMC[1]	Background Soil			FF Segment 1	FF Segment 2	FF Segment 3	FF Segment 4	FF Segment 5	FF Segment 6	FF Segment 7
			Min	Max	Mean							
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	< 0.4 U	< 0.5 U	0.9 B+	0.5 B+	< 0.5 U	< 0.4 U	< 0.5 U
Arsenic, total (3050)	mg/Kg	103921	1.1	25.7	9.7	28 +	44 +	124 +	43 +	58 +	53 +	63 +
Barium, total (3050)	mg/Kg	----	128	419	205	169	156	50.8	80.8	94.1	82.7	89
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.6 B	0.6 B	< 0.3 U	0.3 B	0.3 B	0.3 B	< 0.3 U
Cadmium, total (3050)	mg/Kg	950	0.09	1.34	0.30	0.3 B	0.9 B	2.1 +	0.3 B	1.3	1.5 +	1.1
Chromium, total (3050)	mg/Kg	----	5	12	8	12	11	40 +	71 +	14 +	19 +	14 +
Copper, total (3050)	mg/Kg	41505	3	75	15	81 +	61	404 +	189 +	86 +	100 +	162 +
Iron, total (3050)	mg/Kg	----	4790	10600	7524	7500	4710	2980	2110	3890	3200	3290
Lead, total (3050)	mg/Kg	40238	8	82	19	103 +	190 +	308 +	303 +	260 +	298 +	416 +
Manganese, total (3050)	mg/Kg	----	151	397	269	247	368	227	154	217	200	236
Mercury, total	mg/Kg	3485	<0.04 U	0.02	0.02	0.05 BH	0.08 BH+	0.12 BH+	0.21 H+	0.05 BH+	0.05 BH+	< 0.05 UH+
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	13 +	3 B	22 +	5 B	6	11 +	9 +
Nickel, total (3050)	mg/Kg	----	3	6	5	5 B	8 +	6	6	5 B	4 B	4 B
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	19 B+	25 +	35 +	82 ++	34 +	22 +	28 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	1.1 +	0.9 +	5.9 ++	8.6 ++	1.1 +	1.5 +	1.2 +
Uranium, total (3050)	mg/Kg	1052832	0.38	15.3	3.9	142 +	303 ++	414 ++	335 ++	337 ++	226 ++	282 ++
Vanadium, total (3050)	mg/Kg	88713	10.7	136	40	573 +	2000 ++	1450 ++	2750 ++	2510 ++	2150 ++	1720 ++
Zinc, total (3050)	mg/Kg	87129	12	125	28	32	75	175 +	36	144 +	150 +	113
Gross Alpha	pCi/g	----	3.39	87.8	20.3	20.4	41.9	73.4	70.9	64.6	38	61.2
Gross Beta	pCi/g	----	3.29	38.3	13.5	12.4	21.2	32.2	27	30	17.8	25
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	3.67	10.7	13.8 +	9.16	13.2	8.54	14.6 +
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	0.13	0.22	0.18	0.33	0.18	0.4	0.45
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.25	0.42	0.16	0.28	0.3	0.2	0.25
Thorium 230	pCi/g	----	-0.36	22.3	3.1	28 +	73.2 +	104 +	126 +	90.9 +	68 +	96.3 +
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.21	0.22	0.36	0.34	0.93 +	0.38	0.83 +
Solids, Percent	%	----	87.3	94.8	91.5	92.3	92.3	93.8	93.8	92.5	93.1	93.4

Analyte	Units	Modified Elk RMC[1]	Background Soil			FF Segment 8	FF Segment 8 (Dup 6)	FF Segment 9	FF Segment 9 (Dup 7)
			Min	Max	Mean				
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	< 0.5 U	< 0.5 U	0.6 B+	< 0.5 U
Arsenic, total (3050)	mg/Kg	103921	1.1	25.7	9.7	50 +	57 +	44 +	40 +
Barium, total (3050)	mg/Kg	----	128	419	205	78	73.5	85.6	71.5
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.3 B	0.3 B	< 0.3 U	< 0.3 U
Cadmium, total (3050)	mg/Kg	950	0.09	1.34	0.30	1 B	1.1	0.8 B	0.6 B
Chromium, total (3050)	mg/Kg	----	5	12	8	20 +	19 +	38 +	42 +
Copper, total (3050)	mg/Kg	41505	3	75	15	120 +	150 +	156 +	149 +
Iron, total (3050)	mg/Kg	----	4790	10600	7524	4310	4170	2620	2710
Lead, total (3050)	mg/Kg	40238	8	82	19	340 +	292 +	366 +	383 +
Manganese, total (3050)	mg/Kg	----	151	397	269	205	230	203	204
Mercury, total	mg/Kg	3485	<0.04 U	0.02	0.02	0.04 BH+	< 0.05 UH	0.12 BH+	0.12 BH+
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	8	9	6	6
Nickel, total (3050)	mg/Kg	----	3	6	5	4 B	5 B	4 B	4 B
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	40 +	32 +	57 ++	86 ++
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	1.6 +	2.2 +	2.8 +	3.9 +
Uranium, total (3050)	mg/Kg	1052832	0.38	15.3	3.9	278 ++	296 ++	265 ++	394 ++
Vanadium, total (3050)	mg/Kg	88713	10.7	136	40	1550 ++	1660 ++	2570 ++	2540 ++
Zinc, total (3050)	mg/Kg	87129	12	125	28	107	110	64	59
Gross Alpha	pCi/g	----	3.39	87.8	20.3	50.4	43.6	454 +	50
Gross Beta	pCi/g	----	3.29	38.3	13.5	22.6	20.7	200 +	22.2
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	7.33	9.88	9.05	8.32
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	0.51	0.27	0	0.38
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.21	0.14	0	-0.04
Thorium 230	pCi/g	----	-0.36	22.3	3.1	80.7 +	81.3 +	129 +	0.59
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.54 +	0.21	0.18	0.3
Solids, Percent	%	----	87.3	94.8	91.5	92.7	93.8	93	92.9

[1] Modified by area use factor (RMC/[2.02 acres/640 acres])

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Analysis exceeded method holding time

Shaded value in bold indicates level exceeds elk RMC

\+ Value exceeds RMC (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds RMC (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds RMC (shaded) or maximum background (not shaded) by more than 100 times

Table 4.13: Comparison of Total Metals Concentrations in Waste-Rock Samples from Boreholes to Leaching RMC at the Firefly/Pygmy Mine

Analyte	Units	FF 1: 0 - 0.5			FF 1: 4 - 6			FF 1: 8 - 9.5		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	NS	0.2 B	< 0.001 U	NS	0.2 B	< 0.001 U	NS	0.1 B
Arsenic (1312)	mg/L	0.0877	2071.15	47.8	0.0423	2012.29	22.4	0.0026 B	4574.62	3.13
Barium (1312)	mg/L	0.025	NS	49.8	0.034	NS	177	0.086	NS	161
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.11 B	< 0.0005 U	NS	0.19 B	< 0.0005 U	NS	0.07 B
Cadmium (1312)	mg/L	< 0.0005 U	50.40	0.35	< 0.0005 U	50.40	0.35	< 0.0005 U	10.08	0.07 B
Chromium (1312)	mg/L	< 0.01 U	14152.00	29	< 0.01 U	976.00	2 B	< 0.01 U	976.00	2 B
Copper (1312)	mg/L	< 0.01 U	4500.00	75	< 0.01 U	1920.00	32	< 0.01 U	300.00	5
Iron (1312)	mg/L	0.05 B	816000.00	2040	0.06	1066666.67	3200	0.07	500000.00	1750
Lead (1312)	mg/L	< 0.04 U	200.00	40	< 0.04 U	455.00	91	< 0.04 U	25.00	5 B
Manganese (1312)	mg/L	< 0.005 U	3048192.00	189	< 0.005 U	3628800.00	225	< 0.005 U	4080384.00	253
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	< 0.01 U	NS	1 B	0.03 B	NS	6	0.02 B	NS	1 B
Nickel (1312)	mg/L	< 0.01 U	696.00	2 B	< 0.01 U	696.00	2 B	< 0.01 U	348.00	1 B
Selenium (1312)	mg/L	< 0.008 U	55.20	2.4 B	0.009 B	34.76	3.4 B	< 0.008 U	----	< 0.8 U
Silver (1312)	mg/L	< 0.0003 U	7.73	0.29	< 0.0003 U	7.73	0.29	< 0.0003 U	1.33	0.05 B
Uranium (1312)	mg/L	0.0062	NS	78.2	0.0149	NS	94.5	0.0033	NS	4
Vanadium (1312)	mg/L	0.212	NS	368	0.092	NS	271	0.009 B	NS	18.5
Zinc (1312)	mg/L	< 0.01 U	15576.00	22	< 0.01 U	19116.00	27	< 0.01 U	2832.00	4 B

Analyte	Units	FF 2: 0 - 0.5			FF 2: 0 - 0.5 (Dup 4)			FF 2: 6 - 8		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.002 B	NS	0.3 B	0.002 B	NS	0.3 B	0.008	NS	1.1
Arsenic (1312)	mg/L	0.157	1026.24	42.4	0.17	934.35	41.8	0.168	1838.93	81.3
Barium (1312)	mg/L	0.033	NS	131	0.048	NS	152	0.012	NS	21.7
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.8 B	< 0.0005 U	NS	0.8	< 0.0005 U	NS	0.18 B
Cadmium (1312)	mg/L	< 0.0005 U	96.48	0.67	< 0.0005 U	86.40	0.6	< 0.0005 U	80.64	0.56
Chromium (1312)	mg/L	< 0.01 U	3416.00	7	< 0.01 U	3904.00	8	< 0.01 U	5856.00	12
Copper (1312)	mg/L	< 0.01 U	5460.00	91	< 0.01 U	5340.00	89	< 0.01 U	16560.00	276
Iron (1312)	mg/L	0.05 B	2180000.00	5450	0.04 B	2825000.00	5650	0.03 B	1360000.00	2040
Lead (1312)	mg/L	< 0.04 U	130.00	26	< 0.04 U	130.00	26	< 0.04 U	2115.00	423
Manganese (1312)	mg/L	< 0.005 U	8257536.00	512	< 0.005 U	10741248	666	< 0.005 U	3144960.00	195
Mercury (1312)	mg/L	< 0.0002 UH	0.19	0.08 B	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	0.29	0.12 B
Molybdenum (1312)	mg/L	< 0.01 U	NS	< 1 U	< 0.01 U	NS	2 B	0.07	NS	11
Nickel (1312)	mg/L	< 0.01 U	2436.00	7	< 0.01 U	2088.00	6	< 0.01 U	2436.00	7
Selenium (1312)	mg/L	< 0.008 U	92.00	4 B	< 0.008 U	92.00	4 B	0.249	71.68	**194 +**
Silver (1312)	mg/L	< 0.0003 U	31.73	1.19	< 0.0003 U	26.93	1.01	< 0.0003 U	472.00	17.7
Uranium (1312)	mg/L	0.0081	NS	232	0.0116	NS	114	0.0069	NS	116
Vanadium (1312)	mg/L	0.744	NS	260	0.809	NS	253	2.93	NS	1340
Zinc (1312)	mg/L	< 0.01 U	32568.00	46	< 0.01 U	35400.00	50	< 0.01 U	31152.00	44

Table 4.13 (cont.): Comparison of Total Metals Concentrations in Waste-Rock Samples from Boreholes to Leaching RMC at the Firefly/Pygmy Mine

Analyte	Units	FF 3: 0 - 0.5			FF 3: 4 - 6			FF 3: 9 - 11		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.002 B	NS	0.5 B	< 0.001 U	NS	0.5	< 0.001 U	NS	0.4 B
Arsenic (1312)	mg/L	0.241	1272.45	80.7	0.199	1306.13	68.4	0.14	1074.86	39.6
Barium (1312)	mg/L	0.018	NS	217	0.026	NS	115	0.021	NS	141
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.6	< 0.0005 U	NS	0.22 B	< 0.0005 U	NS	0.19 B
Cadmium (1312)	mg/L	< 0.0005 U	103.68	0.72	< 0.0005 U	290.88	2.02	< 0.0005 U	108.00	0.75
Chromium (1312)	mg/L	< 0.01 U	7320.00	15	< 0.01 U	6344.00	13	< 0.01 U	5368.00	11
Copper (1312)	mg/L	0.01 B	1950.00	65	< 0.01 U	13740.00	229	< 0.01 U	6240.00	104
Iron (1312)	mg/L	0.05 B	2232000.00	5580	0.03 B	1886666.67	2830	0.04 B	1290000.00	2580
Lead (1312)	mg/L	< 0.04 U	1450.00	290	< 0.04 U	950.00	190	< 0.04 U	440.00	88
Manganese (1312)	mg/L	< 0.005 U	2870784.00	178	< 0.005 U	4306176.00	267	< 0.005 U	3370752.00	209
Mercury (1312)	mg/L	< 0.0002 UH	0.22	0.09 B	< 0.0002 UH	0.22	0.09 B	< 0.0002 UH	0.14	0.06 B
Molybdenum (1312)	mg/L	0.04 B	NS	10	0.07	NS	23	0.01 B	NS	4 B
Nickel (1312)	mg/L	< 0.01 U	6612.00	19	< 0.01 U	1740.00	5	< 0.01 U	1392.00	4 B
Selenium (1312)	mg/L	0.022 B	104.55	25 B	0.037 B	39.78	16 B	0.009 B	61.33	6 B
Silver (1312)	mg/L	< 0.0003 U	46.93	1.76	< 0.0003 U	40.53	1.52	< 0.0003 U	19.73	0.74
Uranium (1312)	mg/L	0.0592	NS	676	0.0073	NS	260	0.0043	NS	200
Vanadium (1312)	mg/L	0.499	NS	4160	0.711	NS	1020	1.24	NS	1230
Zinc (1312)	mg/L	< 0.01 U	33984.00	48	< 0.01 U	83544.00	118	< 0.01 U	34692.00	49

Analyte	Units	FF 4: 0 - 0.5			FF 4: 1 - 2			FF 4: 4 - 6		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.006	NS	2	0.003 B	NS	0.5 B	0.002 B	NS	< 0.1 U
Arsenic (1312)	mg/L	0.239	2225.94	140	0.106	770.75	21.5	0.0895	174.50	4.11
Barium (1312)	mg/L	0.004 B	NS	104	0.012	NS	54.4	0.038	NS	377
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.61	< 0.0005 U	NS	0.29 B	< 0.0005 U	NS	0.09 B
Cadmium (1312)	mg/L	< 0.0005 U	413.28	2.87	< 0.0005 U	95.04	0.66	< 0.0005 U	14.40	0.1 B
Chromium (1312)	mg/L	< 0.01 U	11224.00	23	< 0.01 U	10736.00	22	< 0.01 U	1952.00	4 B
Copper (1312)	mg/L	0.01 B	11490.00	383	0.01 B	4710.00	157	< 0.01 U	240.00	4 B
Iron (1312)	mg/L	0.05 B	3028000.00	7570	0.05 B	1444000.00	3610	0.04 B	810000.00	1620
Lead (1312)	mg/L	< 0.04 U	2150.00	430	< 0.04 U	2320.00	464	< 0.04 U	45.00	9 B
Manganese (1312)	mg/L	< 0.005 U	2741760.00	170	< 0.005 U	4402944.00	273	< 0.005 U	4419072.00	274
Mercury (1312)	mg/L	< 0.0002 UH	0.43	0.18 B	< 0.0002 UH	0.34	0.14 B	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.11	NS	114	0.01 B	NS	6	0.01 B	NS	< 1 U
Nickel (1312)	mg/L	< 0.01 U	2436.00	7	< 0.01 U	1740.00	5 B	< 0.01 U	----	< 1 U
Selenium (1312)	mg/L	0.05	239.20	130 B	0.038 B	435.79	180	0.021 B	14.90	3.4 B
Silver (1312)	mg/L	< 0.0003 U	164.80	6.18	< 0.0003 U	245.07	9.19	< 0.0003 U	2.40	0.09 B
Uranium (1312)	mg/L	0.0093	NS	1510	0.0126	NS	675	0.0105	NS	20.2
Vanadium (1312)	mg/L	5.19	NS	6570	3.69	NS	1740	2.12	NS	163
Zinc (1312)	mg/L	< 0.01 U	232932.00	329	< 0.01 U	39648.00	56	< 0.01 U	7080.00	10

Table 4.13 (cont.): Comparison of Total Metals Concentrations in Waste-Rock Samples from Boreholes to Leaching RMC at the Firefly/Pygmy Mine

Analyte	Units	FF 5: 0 - 0.5			FF 5: 2 - 4			FF 5: 8 - 10		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.002 B	NS	0.6	0.001 B	NS	0.4 B	0.002 B	NS	0.5
Arsenic (1312)	mg/L	0.0936	1810.68	44.6	0.0558	2213.26	32.5	0.0785	2342.93	48.4
Barium (1312)	mg/L	0.01 B	NS	78.4	0.005 B	NS	112	0.008 B	NS	80.4
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.28 B	< 0.0005 U	NS	0.18 B	< 0.0005 U	NS	0.26 B
Cadmium (1312)	mg/L	< 0.0005 U	146.88	1.02	< 0.0005 U	154.08	1.07	< 0.0005 U	142.56	0.99
Chromium (1312)	mg/L	< 0.01 U	13664.00	28	< 0.01 U	16592.00	34	< 0.01 U	17080.00	35
Copper (1312)	mg/L	< 0.01 U	12120.00	202	< 0.01 U	6000.00	100	< 0.01 U	11460.00	191
Iron (1312)	mg/L	0.04 B	1645000.00	3290	0.03 B	1600000.00	2400	0.03 B	1720000.00	2580
Lead (1312)	mg/L	< 0.04 U	1165.00	233	< 0.04 U	1580.00	316	< 0.04 U	1265.00	253
Manganese (1312)	mg/L	< 0.005 U	3709440.00	230	< 0.005 U	3822336.00	237	< 0.005 U	3757824.00	233
Mercury (1312)	mg/L	< 0.0002 UH	0.38	0.16 B	< 0.0002 UH	0.26	0.11 B	< 0.0002 UH	0.38	0.16 B
Molybdenum (1312)	mg/L	0.16	NS	13	0.02 B	NS	7	0.15	NS	10
Nickel (1312)	mg/L	< 0.01 U	1740.00	5 B	< 0.01 U	1044.00	3 B	< 0.01 U	1392.00	4 B
Selenium (1312)	mg/L	0.011 B	317.82	38	0.025 B	158.24	43	0.045	98.13	48
Silver (1312)	mg/L	< 0.0003 U	120.27	4.51	< 0.0003 U	45.07	1.69	< 0.0003 U	99.20	3.72
Uranium (1312)	mg/L	0.0118	NS	301	0.0046	NS	259	0.0038	NS	272
Vanadium (1312)	mg/L	1.28	NS	1510	3.55	NS	2170	4.41	NS	2050
Zinc (1312)	mg/L	< 0.01 U	63720.00	90	< 0.01 U	63012.00	89	< 0.01 U	46020.00	65

Analyte	Units	FF 5: 14.5 - 19.5			FF 5: 21.5 - 23		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.005 B	NS	0.6	0.01	NS	0.4 B
Arsenic (1312)	mg/L	0.243	1066.50	68.2	1.24	90.10	29.4
Barium (1312)	mg/L	0.005 B	NS	53	0.103	NS	133
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.23 B	< 0.0005 U	NS	0.4
Cadmium (1312)	mg/L	< 0.0005 U	159.84	1.11	< 0.0005 U	30.24	0.21 B
Chromium (1312)	mg/L	< 0.01 U	4392.00	9	< 0.01 U	2928.00	6
Copper (1312)	mg/L	< 0.01 U	14640.00	244	< 0.01 U	840.00	14
Iron (1312)	mg/L	0.02 B	2490000.00	2490	0.07	1677142.86	5870
Lead (1312)	mg/L	< 0.04 U	1065.00	213	< 0.04 U	95.00	19 B
Manganese (1312)	mg/L	0.015 B	551040.00	205	0.207	26880.00	138
Mercury (1312)	mg/L	< 0.0002 UH	0.19	0.08 B	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.41	NS	12	1.78	NS	22
Nickel (1312)	mg/L	< 0.01 U	2436.00	7	< 0.01 U	1044.00	3 B
Selenium (1312)	mg/L	0.13	36.80	**52 +**	0.192	22.38	**46.7 +**
Silver (1312)	mg/L	< 0.0003 U	155.73	5.84	< 0.0003 U	17.07	0.64
Uranium (1312)	mg/L	0.0037	NS	269	0.0177	NS	14.6
Vanadium (1312)	mg/L	37.7	NS	2840	38	NS	731
Zinc (1312)	mg/L	0.03 B	7080.00	60	0.03 B	2124.00	18

Table 4.13 (cont.): Comparison of Total Metals Concentrations in Waste-Rock Samples from Boreholes to Leaching RMC at the Firefly/Pygmy Mine

Analyte	Units	FF 6: 0 - 0.5			FF 6: 0 - 0.5 (Dup 5)			FF 6: 2 - 4		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.002 B	NS	0.5	0.002 B	NS	0.4 B	0.001 B	NS	0.2 B
Arsenic (1312)	mg/L	0.178	1502.92	70.4	0.193	1230.57	62.5	0.106	1925.09	53.7
Barium (1312)	mg/L	0.026	NS	73	0.01	NS	62.9	0.012	NS	109
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.34	< 0.0005 U	NS	0.32	< 0.0005 U	NS	0.28 B
Cadmium (1312)	mg/L	< 0.0005 U	172.80	1.2	< 0.0005 U	171.36	1.19	< 0.0005 U	180.00	1.25
Chromium (1312)	mg/L	< 0.01 U	10736.00	22	< 0.01 U	9760.00	20	< 0.01 U	12200.00	25
Copper (1312)	mg/L	< 0.01 U	13560.00	226	< 0.01 U	14460.00	241	< 0.01 U	5820.00	97
Iron (1312)	mg/L	0.15	476000.00	3570	0.01 B	6340000.00	3170	0.06	1123333.33	3370
Lead (1312)	mg/L	< 0.04 U	1485.00	297	< 0.04 U	1165.00	233	< 0.04 U	1525.00	305
Manganese (1312)	mg/L	< 0.005 U	3515904.00	218	< 0.005 U	3403008.00	211	< 0.005 U	3580416.00	222
Mercury (1312)	mg/L	< 0.0002 UH	0.34	0.14 B	< 0.0002 UH	0.36	0.15 B	< 0.0002 UH	0.17	0.07 B
Molybdenum (1312)	mg/L	0.03 B	NS	20	0.03 B	NS	11	0.03 B	NS	8
Nickel (1312)	mg/L	< 0.01 U	1740.00	5	< 0.01 U	1392.00	4 B	< 0.01 U	1740.00	5
Selenium (1312)	mg/L	0.013 B	271.05	38.3	0.015 B	198.72	32.4	0.008 B	496.80	43.2
Silver (1312)	mg/L	< 0.0003 U	115.73	4.34	< 0.0003 U	89.07	3.34	< 0.0003 U	38.67	1.45
Uranium (1312)	mg/L	0.0127	NS	319	0.007	NS	300	0.005	NS	263
Vanadium (1312)	mg/L	1.11	NS	1730	1.19	NS	1650	1.93	NS	1790
Zinc (1312)	mg/L	< 0.01 U	84252.00	119	< 0.01 U	78588.00	111	< 0.01 U	92748.00	131

Analyte	Units	FF 6: 8 - 10			FF 6: 32.5 - 34.5		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	NS	0.2 B	0.003 B	NS	0.3 B
Arsenic (1312)	mg/L	0.0505	3243.17	43.1	0.118	837.29	26
Barium (1312)	mg/L	0.009 B	NS	74	0.015	NS	31.9
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.16 B	< 0.0005 U	NS	0.3
Cadmium (1312)	mg/L	< 0.0005 U	141.12	0.98	< 0.0005 U	47.52	0.33
Chromium (1312)	mg/L	< 0.01 U	8784.00	18	< 0.01 U	20984.00	43
Copper (1312)	mg/L	< 0.01 U	3900.00	65	< 0.01 U	7080.00	118
Iron (1312)	mg/L	0.13	349230.77	2270	0.06	936666.67	2810
Lead (1312)	mg/L	< 0.04 U	1785.00	357	< 0.04 U	1675.00	335
Manganese (1312)	mg/L	< 0.005 U	3144960.00	195	< 0.005 U	3467520.00	215
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	0.34	0.14 B
Molybdenum (1312)	mg/L	0.01 B	NS	19	0.42	NS	13
Nickel (1312)	mg/L	< 0.01 U	1044.00	3 B	< 0.01 U	1044.00	3 B
Selenium (1312)	mg/L	< 0.008 U	312.80	13.6	0.078	146.26	124
Silver (1312)	mg/L	< 0.0003 U	15.20	0.57	< 0.0003 U	108.00	4.05
Uranium (1312)	mg/L	0.0049	NS	153	0.0041	NS	115
Vanadium (1312)	mg/L	1.48	NS	1280	3.56	NS	867
Zinc (1312)	mg/L	< 0.01 U	65844.00	93	< 0.01 U	17700.00	25

Table 4.13 (cont.): Comparison of Total Metals Concentrations in Waste-Rock Samples from Boreholes to Leaching RMC at the Firefly/Pygmy Mine

Analyte	Units	FF 7: 0 - 0.5			FF 7: 1 - 3			FF 7: 8 - 10		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.002 B	NS	0.4 B	0.002 B	NS	0.4 B	0.003 B	NS	0.3 B
Arsenic (1312)	mg/L	0.0575	4308.87	65.2	0.0744	3074.73	60.2	0.208	1097.98	60.1
Barium (1312)	mg/L	0.009 B	NS	129	0.008 B	NS	123	0.006 B	NS	106
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.43	< 0.0005 U	NS	0.34	< 0.0005 U	NS	0.37
Cadmium (1312)	mg/L	< 0.0005 U	326.88	2.27	< 0.0005 U	347.04	2.41	< 0.0005 U	110.88	0.77
Chromium (1312)	mg/L	< 0.01 U	9272.00	19	< 0.01 U	7808.00	16	< 0.01 U	21472.00	44
Copper (1312)	mg/L	< 0.01 U	9300.00	155	< 0.01 U	7620.00	127	< 0.01 U	4800.00	80
Iron (1312)	mg/L	0.07	1205714.29	4220	0.09	955555.56	4300	0.02 B	3640000.00	3640
Lead (1312)	mg/L	< 0.04 U	2260.00	452	< 0.04 U	3325.00	665	< 0.04 U	1775.00	355
Manganese (1312)	mg/L	< 0.005 U	3725568.00	231	< 0.005 U	3693312.00	229	< 0.005 U	3580416.00	222
Mercury (1312)	mg/L	< 0.0002 UH	0.36	0.15 B	< 0.0002 UH	0.22	0.09 B	< 0.0002 UH	0.36	0.15 B
Molybdenum (1312)	mg/L	0.01 B	NS	12	0.02 B	NS	26	0.2	NS	9
Nickel (1312)	mg/L	< 0.01 U	2088.00	6	< 0.01 U	1392.00	4 B	< 0.01 U	1740.00	5 B
Selenium (1312)	mg/L	0.012 B	732.93	95.6	0.022 B	228.75	54.7	< 0.008 U	2507.00	109
Silver (1312)	mg/L	< 0.0003 U	75.73	2.84	< 0.0003 U	54.13	2.03	< 0.0003 U	57.33	2.15
Uranium (1312)	mg/L	0.0134	NS	727	0.0109	NS	618	0.0121	NS	339
Vanadium (1312)	mg/L	2.02	NS	4330	2.2	NS	3260	3.16	NS	2720
Zinc (1312)	mg/L	< 0.01 U	147264.00	208	< 0.01 U	172752.00	244	< 0.01 U	47436.00	67

Analyte	Units	FF 7: 18 - 22.5		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.004 B	NS	0.5 B
Arsenic (1312)	mg/L	0.283	1224.59	91.2
Barium (1312)	mg/L	0.021	NS	53.8
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.33
Cadmium (1312)	mg/L	< 0.0005 U	220.32	1.53
Chromium (1312)	mg/L	< 0.01 U	3416.00	7
Copper (1312)	mg/L	< 0.01 U	14280.00	238
Iron (1312)	mg/L	0.03 B	2660000.00	3990
Lead (1312)	mg/L	< 0.04 U	625.00	125
Manganese (1312)	mg/L	< 0.005 U	4386816.00	272
Mercury (1312)	mg/L	< 0.0002 UH	0.17	0.07 B
Molybdenum (1312)	mg/L	0.39	NS	75
Nickel (1312)	mg/L	< 0.01 U	2436.00	7
Selenium (1312)	mg/L	0.013 B	215.14	30.4
Silver (1312)	mg/L	< 0.0003 U	58.13	2.18
Uranium (1312)	mg/L	0.0166	NS	494
Vanadium (1312)	mg/L	0.953	NS	849
Zinc (1312)	mg/L	< 0.01 U	46728.00	66

Table 4.13 (cont.): Comparison of Total Metals Concentrations in Waste-Rock Samples from Boreholes to Leaching RMC at the Firefly/Pygmy Mine

Analyte	Units	FF 8: 0 - 0.5			FF 8: 2 - 4			FF 8: 10 - 12		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.001 B	NS	0.2 B	< 0.001 U	NS	0.3 B	< 0.001 U	NS	0.1 B
Arsenic (1312)	mg/L	0.171	660.00	29.7	0.1	1447.80	38.1	0.0393	1469.72	15.2
Barium (1312)	mg/L	0.024	NS	204	0.029	NS	208	0.007 B	NS	53.9
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.92	< 0.0005 U	NS	0.39	< 0.0005 U	NS	0.14 B
Cadmium (1312)	mg/L	< 0.0005 U	86.40	0.6	< 0.0005 U	184.32	1.28	< 0.0005 U	169.92	1.18
Chromium (1312)	mg/L	< 0.01 U	8296.00	17	< 0.01 U	19032.00	39	< 0.01 U	13664.00	28
Copper (1312)	mg/L	< 0.01 U	1440.00	24	< 0.01 U	2280.00	38	< 0.01 U	300.00	5
Iron (1312)	mg/L	0.02 B	4600000.00	4600	0.01 B	6840000.00	3420	0.08	385000.00	1540
Lead (1312)	mg/L	< 0.04 U	935.00	187	< 0.04 U	1545.00	309	< 0.04 U	1355.00	271
Manganese (1312)	mg/L	< 0.005 U	4161024.00	258	< 0.005 U	3886848.00	241	< 0.005 U	2403072.00	149
Mercury (1312)	mg/L	< 0.0002 UH	0.12	0.05 B	< 0.0002 UH	0.29	0.12 B	< 0.0002 UH	----	< 0.04 U
Molybdenum (1312)	mg/L	< 0.01 U	NS	4 B	0.01 B	NS	5	0.02 B	NS	2 B
Nickel (1312)	mg/L	< 0.01 U	3828.00	11	< 0.01 U	1740.00	5 B	< 0.01 U	696.00	2 B
Selenium (1312)	mg/L	< 0.008 U	1380.00	60 B	0.008 B	322.00	28 B	< 0.008 U	184.00	8 B
Silver (1312)	mg/L	< 0.0003 U	17.87	0.67	< 0.0003 U	28.27	1.06	< 0.0003 U	8.53	0.32
Uranium (1312)	mg/L	0.0084	NS	585	0.0044	NS	352	0.0038	NS	292
Vanadium (1312)	mg/L	2.68	NS	3380	2.96	NS	2210	2.16	NS	1520
Zinc (1312)	mg/L	< 0.01 U	45312.00	64	< 0.01 U	56640.00	80	< 0.01 U	70800.00	100

NS No aquatic life standard (chronic) has been established for this parameter

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Analysis exceeded method hold time

Shaded value in bold indicates level exceeds leaching RMC

+ Value exceeds RMC by 1 to 10 times

++ Value exceeds RMC by 10 to 100 times

+++ Value exceeds RMC by more than 100 times

Table 4.14: Comparison of Total Metals Concentrations in Composite Waste-Rock Samples from Face of Dump to Leaching RMC at the Firefly/Pygmy Mine

Analyte	Units	FF Segment 1			FF Segment 2			FF Segment 3			FF Segment 4		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.001 B	NS	< 0.4 U	0.001 B	NS	< 0.5 U	0.002 B	NS	0.9 B	0.006	NS	0.5 B
Arsenic (1312)	mg/L	0.137	776.64	28	0.159	1051.57	44	0.239	1971.55	124	0.135	1210.37	43
Barium (1312)	mg/L	0.03	NS	169	0.02	NS	156	0.011	NS	50.8	0.01	NS	80.8
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.6 B	< 0.0005 U	NS	0.6 B	< 0.0005 U	NS	< 0.3 U	< 0.0005 U	NS	0.3 B
Cadmium (1312)	mg/L	< 0.0005 U	43.20	0.3 B	< 0.0005 U	129.60	0.9 B	< 0.0005 U	302.40	2.1	< 0.0005 U	43.20	0.3 B
Chromium (1312)	mg/L	< 0.01 U	5856.00	12	< 0.01 U	5368.00	11	< 0.01 U	19520.00	40	< 0.01 U	34648.00	71
Copper (1312)	mg/L	< 0.01 U	4860.00	81	< 0.01 U	3660.00	61	0.02 B	6060.00	404	0.01 B	5670.00	189
Iron (1312)	mg/L	0.15	1000000.00	7500	0.05	1884000.00	4710	0.1	596000.00	2980	0.07	602857.14	2110
Lead (1312)	mg/L	< 0.04 U	515.00	103	< 0.04 U	950.00	190	< 0.04 U	1540.00	308	< 0.04 U	1515.00	303
Manganese (1312)	mg/L	< 0.005 U	3983616.00	247	< 0.005 U	5935104.00	368	< 0.005 U	3661056.00	227	< 0.005 U	2483712.00	154
Mercury (1312)	mg/L	< 0.0002 UH	0.12	0.05 BH	< 0.0002 UH	0.19	0.08 BH	< 0.0002 UH	0.29	0.12 BH	< 0.0002 UH	0.50	0.21 H
Molybdenum (1312)	mg/L	0.03 B	NS	13	< 0.01 U	NS	3 B	0.05	NS	22	0.03 B	NS	5 B
Nickel (1312)	mg/L	< 0.01 U	1740.00	5 B	< 0.01 U	2784.00	8	< 0.01 U	2088.00	6	< 0.01 U	2088.00	6
Selenium (1312)	mg/L	0.012 B	145.67	19 B	0.01 B	230.00	25	0.033 B	97.58	35	0.098	76.98	**82 +**
Silver (1312)	mg/L	< 0.0003 U	29.33	1.1	< 0.0003 U	24.00	0.9	< 0.0003 U	157.33	5.9	< 0.0003 U	229.33	8.6
Uranium (1312)	mg/L	0.0066	NS	142	0.0083	NS	303	0.0325	NS	414	0.0147	NS	335
Vanadium (1312)	mg/L	1.79	NS	573	1.42	NS	2000	0.732	NS	1450	4.55	NS	2750
Zinc (1312)	mg/L	< 0.01 U	22656.00	32	< 0.01 U	53100.00	75	< 0.01 U	123900.00	175	< 0.01 U	25488.00	36

Analyte	Units	FF Segment 5			FF Segment 6			FF Segment 7		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.001 B	NS	< 0.5 U	0.001 B	NS	< 0.4 U	< 0.001 U	NS	< 0.5 U
Arsenic (1312)	mg/L	0.0991	2224.02	58	0.148	1360.81	53	0.154	1554.55	63
Barium (1312)	mg/L	0.008 B	NS	94.1	0.012	NS	82.7	0.012	NS	89
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.3 B	< 0.0005 U	NS	0.3 B	< 0.0005 U	NS	< 0.3 U
Cadmium (1312)	mg/L	< 0.0005 U	187.20	1.3	< 0.0005 U	216.00	1.5	< 0.0005 U	158.40	1.1
Chromium (1312)	mg/L	< 0.01 U	6832.00	14	< 0.01 U	9272.00	19	< 0.01 U	6832.00	14
Copper (1312)	mg/L	< 0.01 U	5160.00	86	< 0.01 U	6000.00	100	0.01 B	4860.00	162
Iron (1312)	mg/L	0.15	518666.67	3890	0.08	800000.00	3200	0.1	658000.00	3290
Lead (1312)	mg/L	< 0.04 U	1300.00	260	< 0.04 U	1490.00	298	< 0.04 U	2080.00	416
Manganese (1312)	mg/L	< 0.005 U	3499776.00	217	< 0.005 U	3225600.00	200	< 0.005 U	3806208.00	236
Mercury (1312)	mg/L	< 0.0002 UH	0.12	0.05 BH	< 0.0002 UH	0.12	0.05 BH	< 0.0002 UH	----	< 0.05 UH
Molybdenum (1312)	mg/L	0.01 B	NS	6	0.04 B	NS	11	0.06	NS	9
Nickel (1312)	mg/L	< 0.01 U	1740.00	5 B	< 0.01 U	1392.00	4 B	< 0.01 U	1392.00	4 B
Selenium (1312)	mg/L	0.016 B	195.50	34	0.021 B	96.38	22	0.019 B	135.58	28
Silver (1312)	mg/L	< 0.0003 U	29.33	1.1	< 0.0003 U	40.00	1.5	< 0.0003 U	32.00	1.2
Uranium (1312)	mg/L	0.0114	NS	337	0.0075	NS	226	0.0163	NS	282
Vanadium (1312)	mg/L	2.23	NS	2510	2.08	NS	2150	1.11	NS	1720
Zinc (1312)	mg/L	< 0.01 U	101952.00	144	< 0.01 U	106200.00	150	< 0.01 U	80004.00	113

Table 4.14 (cont.): Comparison of Total Metals Concentrations in Composite Waste-Rock Samples from Face of Dump to Leaching RMC at the Firefly/Pygmy Mine

Analyte	Units	FF Segment 8			FF Segment 8 (Dup 6)			FF Segment 9			FF Segment 9 (Dup 7)		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.002 B	NS	< 0.5 U	0.001 B	NS	< 0.5 U	0.002 B	NS	0.6 B	0.002 B	NS	< 0.5 U
Arsenic (1312)	mg/L	0.166	1144.58	50	0.158	1370.89	57	0.0467	3580.30	44	0.0487	3121.15	40
Barium (1312)	mg/L	0.01	NS	78	0.01	NS	73.5	0.007 B	NS	85.6	0.006 B	NS	71.5
Beryllium (1312)	mg/L	< 0.0005 U	NS	0.3 B	< 0.0005 U	NS	0.3 B	< 0.0005 U	NS	< 0.3 U	< 0.0005 U	NS	< 0.3 U
Cadmium (1312)	mg/L	< 0.0005 U	144.00	1 B	< 0.0005 U	158.40	1.1	< 0.0005 U	115.20	0.8 B	< 0.0005 U	86.40	0.6 B
Chromium (1312)	mg/L	< 0.01 U	9760.00	20	< 0.01 U	9272.00	19	< 0.01 U	18544.00	38	< 0.01 U	20496.00	42
Copper (1312)	mg/L	< 0.01 U	7200.00	120	< 0.01 U	9000.00	150	0.01 B	4680.00	156	< 0.01 U	8940.00	149
Iron (1312)	mg/L	0.1	862000.00	4310	0.07	1191428.57	4170	0.06	873333.33	2620	0.03 B	1806666.67	2710
Lead (1312)	mg/L	< 0.04 U	1700.00	340	< 0.04 U	1460.00	292	< 0.04 U	1830.00	366	< 0.04 U	1915.00	383
Manganese (1312)	mg/L	< 0.005 U	3306240.00	205	< 0.005 U	3709440.00	230	< 0.005 U	3273984.00	203	< 0.005 U	3290112.00	204
Mercury (1312)	mg/L	< 0.0002 UH	0.10	0.04 BH	< 0.0002 UH	----	< 0.05 UH	< 0.0002 UH	0.29	0.12 BH	< 0.0002 UH	0.29	0.12 BH
Molybdenum (1312)	mg/L	0.02 B	NS	8	0.03 B	NS	9	0.04 B	NS	6	0.04 B	NS	6
Nickel (1312)	mg/L	< 0.01 U	1392.00	4 B	< 0.01 U	1740.00	5 B	< 0.01 U	1392.00	4 B	< 0.01 U	1392.00	4 B
Selenium (1312)	mg/L	0.011 B	334.55	40	0.009 B	327.11	32	0.028 B	187.29	57	0.024 B	329.67	86
Silver (1312)	mg/L	< 0.0003 U	42.67	1.6	< 0.0003 U	58.67	2.2	< 0.0003 U	74.67	2.8	< 0.0003 U	104.00	3.9
Uranium (1312)	mg/L	0.0075	NS	278	0.0048	NS	296	0.0074	NS	265	0.0069	NS	394
Vanadium (1312)	mg/L	2.48	NS	1550	2.48	NS	1660	3.29	NS	2570	2.3	NS	2540
Zinc (1312)	mg/L	< 0.01 U	75756.00	107	< 0.01 U	77880.00	110	< 0.01 U	45312.00	64	< 0.01 U	41772.00	59

NS No aquatic life standard (chronic) has been established for this parameter

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

BH Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit; analysis exceeded method detection limit

U Analyte was not detected at the Method Detection Limit

H Analysis exceeded method hold time

Shaded value in bold indicates level exceeds leaching RMC

+ Value exceeds RMC by 1 to 10 times

++ Value exceeds RMC by 10 to 100 times

+++ Value exceeds RMC by more than 100 times

Table 4.15: Selection of COCs in Ephemeral Drainage Sediment at the Firefly/Pygmy Mine

Analyte	Units	Background Soil			FF Sed 1	FF Sed 2	FF Sed 3
		Min	Max	Mean			
Antimony, total (3050)	mg/Kg	<0.1 U	0.3 B	0.2	0.3 B	0.3 B	0.2 B
Arsenic, total (3050)	mg/Kg	1.1	25.7	9.7	**26.3 +**	23.1	7.16
Barium, total (3050)	mg/Kg	128	419	205	113	134	152
Beryllium, total (3050)	mg/Kg	0.41	0.86	0.64	0.21 B	0.29 B	0.22 B
Cadmium, total (3050)	mg/Kg	0.09	1.34	0.30	0.68	0.61	0.56
Chromium, total (3050)	mg/Kg	5	12	8	**18 +**	6	6
Copper, total (3050)	mg/Kg	3	75	15	**102 +**	64	22
Iron, total (3050)	mg/Kg	4790	10600	7524	2560	3390	3550
Lead, total (3050)	mg/Kg	8	82	19	**307 +**	**207 +**	**102 +**
Manganese, total (3050)	mg/Kg	151	397	269	170	221	166
Mercury, total	mg/Kg	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	<1 U	7	1	6	**8 +**	2 B
Nickel, total (3050)	mg/Kg	3	6	5	3 B	2 B	2 B
Selenium, total (3050)	mg/Kg	<0.5 U	5.2	1.2	**39.2 +**	**25.8 +**	**19.7 +**
Silver, total (3050)	mg/Kg	<0.5 U	<0.5 U	0.3	**2.3 B+**	**0.8 B+**	< 0.5 U
Uranium, total (3050)	mg/Kg	0.38	15.3	3.9	**1560 +++**	**1240 ++**	**25 +**
Vanadium, total (3050)	mg/Kg	10.7	136	40	**1650 ++**	**1250 +**	**246** +
Zinc, total (3050)	mg/Kg	12	125	28	47	42	41
Gross Alpha	pCi/g	3.39	87.8	20.3	**370 +**	**187 +**	66.6
Gross Beta	pCi/g	3.29	38.3	13.5	**135 +**	**70.3 +**	29.8
Radium 226 (3050)	pCi/g	0.49	13.2	3.3	**25 +**	**35.2 +**	5.73
Radium 228 (3050)	pCi/g	0.68	4.15	2.66	0.08	**17.6 +**	**4.39 +**
Thorium 228	pCi/g	0.24	0.81	0.40	0.1	0.17	0.21
Thorium 230	pCi/g	-0.36	22.3	3.1	**57.4 +**	**68.1 +**	11.3
Thorium 232	pCi/g	0.08	0.53	0.35	0.25	0.21	0.1
Solids, Percent	%	87.3	94.8	91.5	95.1	96.4	87

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Value in bold indicates level exceeds maximum background value

\+ Media concentration >1-10 times maximum background

++ Media concentration >10-100 times maximum background

+++ Media concentration >100 times maximum background

Table 4.16: Comparison of COC Concentrations in Ephemeral Drainage Sediment at the Firefly/Pygmy Mine to Camper RMC, Industrial SSLs, and Elk RMC

Analyte	Units	RMC Camper	SSL Industrial	Modified Elk RMC[1]	FF Sed 1	FF Sed 2	FF Sed 3
Arsenic, total (3050)	mg/Kg	46	----	1399467	26.3 +	23.1	7.16
Chromium, total (3050)	mg/Kg	----	1533000	----	18 +	6	6
Copper, total (3050)	mg/Kg	5,745	----	558933	102 +	64	22
Lead, total (3050)	mg/Kg	1,000	----	541867	307 +	207 +	102 +
Molybdenum, total (3050)	mg/Kg	----	5110	----	6	8 +	2 B
Selenium, total (3050)	mg/Kg	774	----	----	39.2 +	25.8 +	19.7 +
Silver, total (3050)	mg/Kg	774	----	----	2.3 B+	0.8 B+	< 0.5 U
Uranium, total (3050)	mg/Kg	----	3066	14178133	1560 +++	1240 ++	25 +
Vanadium, total (3050)	mg/Kg	----	7154	1194667	1650 ++	1250 +	246 +
Gross Alpha	pCi/g	----	----	----	370 +	187 +	66.6
Gross Beta	pCi/g	----	----	----	135 +	70.3 +	29.8
Radium 226 (3050)	pCi/g	----	----	----	25 +	35.2 +	5.73
Radium 228 (3050)	pCi/g	----	----	----	0.08	17.6 +	4.39 +
Thorium 230	pCi/g	----	----	----	57.4 +	68.1 +	11.3

[1] Modified by area use factor (RMC/[0.15 acres/640 acres]); area along channel measured from aerial photograph.

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds RMC or SSL

\+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Table 4.17: Comparison of Metal and Radionuclide Levels in Vegetation at the Firefly/Pygmy Mine to Maximum Tolerable Levels and Background Values

Mine Drainage Channel

Analyte	Units	Maximum Tolerable Level[1]	Grass		Forb		Shrub	
			Ref Area	Adit Drainage	Ref Area	Adit Drainage	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	----	< 0.1 U	**0.1 B+**	< 0.1 U	< 0.1 U	< 0.1 U	**0.1 B+**
Arsenic, total (3050)	mg/Kg	50	< 0.3 U	**1.6 +**	< 0.3 U	**1.1 +**	< 0.3 U	**1.8 +**
Barium, total (3050)	mg/Kg	20	**41.5 +**	**67 +**	**106 +**	**65.1 +**	**90.8 +**	**81.4 +**
Beryllium, total (3050)	mg/Kg	----	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.06 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.5	0.07 B	**0.18 B+**	0.12 B	**0.33 +**	0.06 B	**1.06 +**
Chromium, total (3050)	mg/Kg	1,000	1 B	< 1 U	2 B	< 1 U	2 B	< 1 U
Copper, total (3050)	mg/Kg	25	2 B	**4 B+**	7	7	7	7
Iron, total (3050)	mg/Kg	500	322	217	252	91	255	68
Lead, total (3050)	mg/Kg	30	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	400	95	**245 +**	74.2	31.6	42.4	**82.6 +**
Mercury, total	mg/Kg	2	0 UH	0 UH	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	10	5 B	**57 +**	3 B	**122 ++**	< 1 U	**32 +**
Nickel, total (3050)	mg/Kg	50	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2	**2.4 B+**	**63.7 ++**	**7.4 +**	**101 ++**	1.3 B	**87.1 ++**
Silver, total (3050)	mg/Kg	100	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.5 U
Uranium, total (3050)	mg/Kg	----	0.03 B	**1.89 ++**	0.07 B	**2.21 ++**	< 0.03 U	**3.07 +++**
Vanadium, total (3050)	mg/Kg	10	0.7 B	**5.9 +**	0.8 B	**1.9 B+**	0.6 B	< 0.5 U
Zinc, total (3050)	mg/Kg	300	10	**34 +**	30	23	33	**231 +**
Gross Alpha	pCi/g	----	1.63	**119 ++**	0.94	**73.7 ++**	2.25	**22.7 ++**
Gross Beta	pCi/g	----	7.15	**220 ++**	13.6	**71.8 +**	9.2	**21.5 +**
Radium 226 (3050)	pCi/g	----	1.98	**6.31 +**	0.07	**9.16 +++**	0.45	**4.59 ++**
Radium 228 (3050)	pCi/g	----	1.65	0.42	2.02	0.61	2.31	**2.91 +**
Thorium 228	pCi/g	----	-0.1	**0.08 +**	0.14	-0.03	-0.13	**0.15 +**
Thorium 230	pCi/g	----	-0.59	-0.02	-0.28	-0.21	-0.44	-0.2
Thorium 232	pCi/g	----	-0.17	0	0.06	0.06	0.05	-0.12
Moisture Content	%	----	41.4	62.1	66.6	69.6	46.1	61.8

Perimeter of Waste-Rock Dump

Analyte	Units	Maximum Tolerable Level[1]	Grass		Forb		Shrub	
			Ref Area	Perimeter	Ref Area	Perimeter	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	----	< 0.1 U	**0.1 B+**	< 0.1 U	< 10 U	< 0.1 U	0.1 B
Arsenic, total (3050)	mg/Kg	50	< 0.3 U	**2.7**	< 0.3 U	< 30 U	< 0.3 U	**0.7 B+**
Barium, total (3050)	mg/Kg	20	**41.5 +**	**31.1 +**	**106 +**	**38.9 +**	**90.8 +**	**43.5 +**
Beryllium, total (3050)	mg/Kg	----	< 0.05 U	< 0.05 U	< 0.05 U	< 5 U	< 0.06 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.5	0.07 B	**0.12 B+**	0.12 B	< 5 U	0.06 B	**0.23 B+**
Chromium, total (3050)	mg/Kg	1,000	1 B	1 B	2 B	< 1 U	2 B	< 1 U
Copper, total (3050)	mg/Kg	25	2 B	**8 +**	7	**11 +**	7	6
Iron, total (3050)	mg/Kg	500	322	155	252	143	255	82
Lead, total (3050)	mg/Kg	30	< 4 U	**5 B+**	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	400	95	60	74.2	35	42.4	**93.1 +**
Mercury, total	mg/Kg	2	0 UH	0 UH	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	10	5 B	**59 +**	3 B	**101 ++**	< 1 U	**18 +**
Nickel, total (3050)	mg/Kg	50	< 1 U	< 1 U	< 1 U	1 B	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2	**2.4 B+**	**103 ++**	**7.4 +**	**180 B++**	1.3 B	**60 ++**
Silver, total (3050)	mg/Kg	100	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.5 U
Uranium, total (3050)	mg/Kg	----	0.03 B	**4.56 +++**	0.07 B	< 3 U	< 0.03 U	**2.91 ++**
Vanadium, total (3050)	mg/Kg	10	0.7 B	**33.9 +**	0.8 B	**14 +**	0.6 B	**6.3 ++**
Zinc, total (3050)	mg/Kg	300	10	**33 +**	30	**53 +**	33	**46 +**
Gross Alpha	pCi/g	----	1.63	**15.9 +**	0.94	**39.4 ++**	2.25	**18.9 +**
Gross Beta	pCi/g	----	7.15	**9.71 +**	13.6	**23.1 +**	9.2	**14.2 +**
Radium 226 (3050)	pCi/g	----	1.98	**9.2 +**	0.07	**11.2 +++**	0.45	**2.25 +**
Radium 228 (3050)	pCi/g	----	1.65	1.42	2.02	0.45	2.31	0
Thorium 228	pCi/g	----	-0.1	**0.09 +**	0.14	0.04	-0.13	**0.12 +**
Thorium 230	pCi/g	----	-0.59	**1.59 +**	-0.28	**0.08 +**	-0.44	-0.24
Thorium 232	pCi/g	----	-0.17	0	0.06	0.04	0.05	-0.09
Moisture Content	%	----	41.4	67.2	66.6	74.9	46.1	55.4

[1] Most restrictive value reported for cattle, sheep, swine, horse, and rabbit in *Mineral Tolerance of Domestic Animals* (National Research Council, 1980)

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Holding time was exceeded

Shaded Value in bold indicates level exceeds maximum tolerable level

\+ Media concentration exceeds criterion (shaded) or background (not shaded) by 1 to 10 times
++ Media concentration exceeds criterion (shaded) or background (not shaded) by 10 to 100 times
+++ Media concentration exceeds criterion (shaded) or background (not shaded) by more than 100 times

Table 4.18: Comparison of Surface-Water Results for La Sal Creek Near the Vanadium Queen Mine to Aquatic Life Chronic Standards

Analyte	Units	Aquatic-Life Std.		LA SAL CREEK DN2[1]				LA SAL CREEK DN3[2]			
		Colorado	Utah	04/21/04		10/12/04		04/21/04		10/12/04	
PHYSICAL (field parameters)											
Flow	cfs	-----	-----	6.7900		1.7126		6.6800		2.0064	
Temperature	°C	-----	-----	7.5		11		6.2		11.7	
pH	s.u.	6.5 - 9.0	6.5 - 9.0	9.02		8.31		8.95		8.34	
Specific Conductance	(uS/cm)	-----	-----	201		361		196		364	
Dissolved Oxygen	(mg/L)	5.0	6.5	nm		nm		nm		nm	
Oxidation Reduction Potential	Rmev	-----	-----	nm		nm		nm		nm	
INORGANIC											
Nitrite	(mg/L)	0.05	-----	< 0.01	U	na		< 0.01	U	na	
Nitrate	(mg/L)	10	4	0.07	B	na		0.07	B	na	
Chloride	(mg/L)	250	-----	4	B	5		4	B	5	
Sulfate	(mg/L)	250	-----	40	B	40	B	20	B	40	B
Total Phosphorous as P	(mg/L)	-----	0.05	0.05		0.01	B	0.04	B	0.01	B
Total Dissolved Solids	(mg/L)	-----	-----	170	H	220	H	160	H	220	H
Total Suspended Solids	(mg/L)	-----	35	24		< 5	U	26		< 5	U
Bicarbonate as CaCO3	(mg/L)	-----	-----	131		158		134		152	
Carbonate as CaCO3	(mg/L)	-----	-----	< 2	U	< 2	U	< 2	U	< 2	U
Cation-Anion Balance	%	-----	-----	-4.5		-1.2		1.5		1.2	
Hardness as CaCO3	(mg/L)	-----	-----	138		172		142		173	
Hydroxide as CaCO3	(mg/L)	-----	-----	< 2	U	< 2	U	< 2	U	< 2	U
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----	0.07	B	na		0.07	B	na	
Sum of Anions	meq/L	-----	-----	3.5		4.1		3.2		4	
Sum of Cations	meq/L	-----	-----	3.2		4		3.3		4.1	
TDS (calculated)	(mg/L)	-----	-----	184		215		168		212	
TDS (ratio - measured/calculated)		-----	-----	0.92		1.02		0.95		1.04	
Total Alkalinity	(mg/L)	-----	-----	131		158		134		152	
METALS											
Antimony, dissolved	µg/L	-----	-----	0.3	B	< 0.2	U	< 0.2	U	< 0.2	U
Antimony, total	µg/L	-----	-----	< 0.2	U	< 0.2	U	< 0.2	U	< 0.2	U
Arsenic, dissolved	µg/L	-----	-----	1.2		1.8	B	1		1.3	B
Arsenic, total recoverable	µg/L	-----	190	1.6		1.2	B	1.5		1.2	B
Barium, dissolved	µg/L	-----	-----	139		123		142		123	
Barium, total	µg/L	-----	-----	146		118		144		118	
Beryllium, dissolved	µg/L	-----	-----	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U
Beryllium, total	µg/L	-----	-----	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U
Cadmium, dissolved	µg/L	3.5 [3]	1.8 [3]	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U
Cadmium, total	µg/L	-----	-----	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U
Calcium, dissolved	µg/L			41500		46800		42500		46600	
Chromium, dissolved	µg/L	122 [3]	340 [3]	< 10	U	< 10	U	< 10	U	< 10	U
Chromium, total	µg/L	-----	-----	< 10	U	< 10	U	< 10	U	< 10	U
Copper, dissolved	µg/L	15 [3]	20 [3]	< 10	U	< 10	U	< 10	U	< 10	U
Copper, total	µg/L	-----	-----	< 10	U	< 10	U	< 10	U	< 10	U
Iron, dissolved	µg/L	-----	1000	60		40	B	80		20	B
Iron, total recoverable	µg/L	1000	-----	820		120		690		110	
Lead, dissolved	µg/L	5 [3]	7 [3]	< 0.1	U	0.3	B	< 0.1	U	0.3	B
Lead, total	µg/L	-----	-----	1.1		< 0.1	U	0.9		< 0.1	U
Magnesium, dissolved	µg/L			8300		13300		8800		13800	
Manganese, dissolved	µg/L	2016 [3]	-----	17	B	25	B	17	B	24	B
Manganese, total	µg/L	-----	-----	77		31		65		28	B
Mercury, dissolved	µg/L	-----	0.012	< 0.2	U	< 0.2	U	< 0.2	U	< 0.2	U
Mercury, total	µg/L	0.01	-----	< 0.2	U	< 0.2	U	< 0.2	U	< 0.2	U
Molybdenum, dissolved	µg/L	-----	-----	< 10	U	< 10	U	< 10	U	< 10	U
Molybdenum, total	µg/L	-----	-----	10	B	< 10	U	< 10	U	< 10	U
Nickel, dissolved	µg/L	87 [3]	263 [3]	< 10	U	< 10	U	< 10	U	< 10	U
Nickel, total	µg/L	-----	-----	< 10	U	< 10	U	< 10	U	< 10	U
Potassium, dissolved	µg/L			2200		2300		2300		2200	
Selenium, dissolved	µg/L	4.6 [3]	5	1.5		< 1	U	1.6		< 1	U
Selenium, total	µg/L	-----	-----	1.1		< 1	U	1.3		< 1	U
Silver, dissolved	µg/L	0.2 [3]	-----	< 0.05	U	< 0.05	U	< 0.05	U	< 0.05	U
Silver, total	µg/L	-----	-----	< 0.05	U	< 0.05	U	< 0.05	U	< 0.05	U
Sodium, dissolved	µg/L			9100		13200		9400		13200	
Uranium, dissolved	µg/L	-----	-----	4.39		7.43		4.29		7.77	
Uranium, total	µg/L	-----	-----	4.12		6.56		4.31		6.79	
Vanadium, dissolved	µg/L	-----	-----	< 5	U	< 5	U	< 5	U	< 5	U
Vanadium, total	µg/L	-----	-----	< 5	U	< 5	U	< 5	U	< 5	U
Zinc, dissolved	µg/L	197 [3]	177 [3]	< 10	U	< 10	U	< 10	U	< 10	U
Zinc, total	µg/L	-----	-----	< 10	U	< 10	U	< 10	U	< 10	U
RADIOLOGICAL (pCi/L)											
Gross Alpha	pCi/L	-----	15	6.72		9.19		6.3		7.35	
Gross Beta	pCi/L	-----	50	5.6		5.2		3.27		5.17	
Radium 226 and 228 (combined)	pCi/L	-----	-----	4.22		0		0.53		0	
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.19		0		0		0	
Thorium 228	pCi/L	-----	-----	-0.03		0.18		0.04		0.11	

[1] Station LA SAL CREEK DN2 located immediately upstream of VQ Mine

[2] Station LA SAL CREEK DN3 located immediately downstream of VQ Mine

[3] Hardness-dependent criterion calculated using hardness value of 183 mg/L

nm = not measured; na = not analyzed

Shaded value in bold indicates level exceeds aquatic-life standard

\+ Media concentration >1-10 times standard

++ Media concentration >10-100 times standard

+++ Media concentration >100 times standard

Table 4.18 B: Total Metals and Radionuclides in Stream Sediment Compared to Consensus-Based Probable Effects Concentrations at the La Sal Creek Surface-Water Stations near the Vanadium Queen Mine

Analyte	Units	Consensus-Based PEL[1]	La Sal Crk DN 2 Sed	La Sal Crk DN 3 Sed	La Sal Crk DN 3 (dup)
Antimony, total (3050)	mg/Kg	----	0.5	0.1 B	0.1 B
Arsenic, total (3050)	mg/Kg	33	4.7	2.2	2.6
Barium, total (3050)	mg/Kg	----	59.6	482	245
Beryllium, total (3050)	mg/Kg	----	0.23 B	0.15 B	0.17 B
Cadmium, total (3050)	mg/Kg	4.98	0.12 B	0.07 B	0.1 B
Chromium, total (3050)	mg/Kg	111	4 B	3 B	3 B
Copper, total (3050)	mg/Kg	149	3 B	2 B	3 B
Iron, total (3050)	mg/Kg	----	4420	2700	2710
Lead, total (3050)	mg/Kg	128	< 4 U	7 B	6 B
Manganese, total (3050)	mg/Kg	----	172	101	119
Mercury, total	mg/Kg	1.06	< 0.05 U	< 0.04 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	----	< 1 U	< 1 U	< 1 U
Nickel, total (3050)	mg/Kg	48.6	2 B	1 B	2 B
Selenium, total (3050)	mg/Kg	----	< 0.5 U	< 0.5 U	0.7 B
Silver, total (3050)	mg/Kg	----	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	----	0.49	1.72	2.25
Vanadium, total (3050)	mg/Kg	----	14.7	29.8	31.4
Zinc, total (3050)	mg/Kg	459	11	7	8
Gross Alpha	pCi/g	----	4.5	10.4	15
Gross Beta	pCi/g	----	5.16	4.9	7.86
Radium 226 (3050)	pCi/g	----	0.4	1.75	1.13
Radium 228 (3050)	pCi/g	----	2.42	1.2	2.34
Thorium 228	pCi/g	----	0.05	0.23	0.26
Thorium 230	pCi/g	----	0.15	0.98	0.38
Thorium 232	pCi/g	----	0.18	0.1	-0.07
Solids, Percent	%	----	80	82.5	81.6

[1] From Prediction of Sediment Toxicity Using Consensus-Based Freshwater Sediment Quality Guidelines (EPA, 2000)

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds consensus-based PEL

\+ Media concentration >1-10 times criterion

++ Media concentration >10-100 times criterion

+++ Media concentration >100 times criterion

Table 4.19: Selection of Contaminants of Concern in Surface Water at the Vanadium Queen Mine

Analyte	Units	Ref Areas 1, 2, & 3 (April 04)			Ref Areas 1, 2, & 3 (Oct 04)			VQ DRAINAGE 1		VQ ADIT		
		Min	Max	Mean	Min	Max	Mean	04/21/04	10/18/04	04/21/04	4/21/04 (dup)	10/18/04
PHYSICAL (field parameters)												
Flow	cfs	1.08	3.75	2.24	0.01	0.94	0.47	5.89E-03	~ 0.00117	~ 4.46E-03	~ 4.46E-03	~ 2.23E-03
Temperature	°C	4.90	8.20	6.0	6.2	12.7	9.6	13	10.2	5.5	5.5	7.7
pH	s.u.	8.76	9.11	8.9	8.4	8.5	8.4	**9.11**	8.23	8.64	8.64	8.02
Specific Conductance	(uS/cm)	146	345	214	261	557	419	**473**	478	**477**	**477**	480
Dissolved Oxygen	(mg/L)	nm	nm	nm	nm	nm	nm	6.69	7.72	8.45	8.45	8.08
Oxidation Reduction Potential	Rmev	nm	nm	nm	nm	nm	nm	58.5	91.1	62.7	62.7	138.7
INORGANIC												
Nitrite	(mg/L)	0.00	< 0.01	0.005	na	na	na	< 0.01 U	na	< 0.01 U	< 0.01 U	na
Nitrate	(mg/L)	<0.02	0.15	0.07	na	na	na	0.11	na	**0.77 +**	**0.77 +**	na
Chloride	(mg/L)	2 B	15	6	2 B	11	6	2 B	1 B	2 B	1 B	1 B
Sulfate	(mg/L)	10 B	60	30	10 B	30 B	20	50	**50 +**	40 B	40 B	**50 +**
Total Phosphorous as P	(mg/L)	0.01 B	0.13	0.06	0.01 B	0.03 B	0.02	0.03 B	0.02 B	0.01 B	**0.24 +**	0.03 B
Total Dissolved Solids	(mg/L)	140	300	193	150	330	250	280	300	270	270	290
Total Suspended Solids	(mg/L)	< 5	326	112	< 5	8 B	6	34	**118 ++**	< 5 U	8 B	< 5 U
Bicarbonate as CaCO3	(mg/L)	107	194	138	118	264	188	184	198 H	**223 +**	**223 +**	217 H
Carbonate as CaCO3	(mg/L)	< 2	8 B	3	< 2	13	6	**51 +**	**32 H+**	**10 +**	**10 B+**	12 H
Cation-Anion Balance	%	-1.9	2.0	-0.6	0	1.9	0.9	0	0	0.9	1.8	0
Hardness as CaCO3	(mg/L)	104	227	150	123	209	173	165	166	168	168	164
Hydroxide as CaCO3	(mg/L)	< 2	< 2	1	< 2	< 2	1	< 2 U	0 UH	< 2 U	< 2 U	0 UH
Nitrate/Nitrite as N, dissolve	(mg/L)	0	0.15	0.10	na	na	na	0.11	na	**0.77 +**	**0.77 +**	na
Sum of Anions	meq/L	2.4	5.7	3.6	2.6	6.0	4.4	**5.8 +**	5.6	5.6	5.5	5.6
Sum of Cations	meq/L	2.5	5.5	3.5	2.7	6.1	4.5	**5.8 +**	5.6	**5.7 +**	**5.7 +**	5.6
TDS (calculated)	(mg/L)	127	305	191	134	318	232	**324 +**	308	296	295	298
TDS (ratio - measured/calculated)		0.98	1.10	1.02	1.04	1.12	1.09	0.86	0.97	0.91	0.92	0.97
Total Alkalinity	(mg/L)	107	202	140	118	277	194	**235 +**	230 H	**233 +**	**233 +**	229 H
METALS												
Antimony, dissolved	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	**1.2 +**	**1 +**	**1.1 +**	**1.1 +**	**1 +**
Antimony, total	µg/L	< 0.2	< 0.4	0.1	< 0.2	< 0.2	0.1	**1.2 +**	**0.8 B+**	**1 +**	**0.9 B+**	**1 B+**
Arsenic, dissolved	µg/L	0.4 B	1.9	1.3	< 0.5	5.8	2.7	**143 ++**	**125 ++**	**126 ++**	**123 ++**	**123 ++**
Arsenic, total recoverable	µg/L	0.6	3.4	1.8	< 0.5	5.1	2.5	**131 ++**	**129 ++**	**106 ++**	**107 ++**	**123 ++**
Barium, dissolved	µg/L	110	146	127	100	177	127	**162 +**	168	**169 +**	**170 +**	166
Barium, total	µg/L	110	194	154	107	193	139	171	**254 +**	163	187	172
Beryllium, dissolved	µg/L	< 0.1	< 0.1	0.05	< 0.1	< 0.1	0.05	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	< 0.1	<0.2	0.07	< 0.1	< 0.1	0.05	0.1 B	< 1 U	< 0.1 U	0.1 B	< 0.5 U
Cadmium, dissolved	µg/L	< 0.1	< 0.1	0.05	< 0.1	< 0.1	0.05	**0.2 B+**	**0.4 B+**	**0.2 B+**	**0.2 B+**	**0.4 B+**
Cadmium, total	µg/L	< 0.1	< 0.2	0.07	< 0.1	< 0.1	0.05	**0.2 B+**	**0.1 B+**	**0.2 B+**	**0.3 B+**	< 0.5 U
Calcium, dissolved	µg/L	32400	65400	45667	39600	64400	52467	21400	22500	22100	22100	21200
Chromium, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	< 10	< 10	5	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	< 10	< 10	5	< 10	10 B	7	**10 B+**	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	< 10	< 10	5	< 10	< 10	5	**10 B+**	**20 B+**	< 10 U	**10 B+**	< 10 U
Iron, dissolved	µg/L	20 B	110	57	10 B	40 B	20	20 B	< 10 U	10 B	10 B	< 10 U
Iron, total recoverable	µg/L	290	2910	1190	110	200	163	1130	**2370 ++**	30 B	460	< 10 U
Lead, dissolved	µg/L	< 0.1	0.2 B	0.10	< 0.1	< 0.1	0.05	0.2 B	**0.4 B+**	< 0.1 U	< 0.1 U	**0.3 B+**
Lead, total	µg/L	0.2 B	3.3	1.3	0.1 B	0.3 B	0.2	2.7	**17.6 ++**	0.1 B	2.4	< 0.5 U
Magnesium, dissolved	µg/L	5300	15500	8800	5800	13200	10233	**27100 +**	**26800 +**	**27400 +**	**27500 +**	**27000 +**
Manganese, dissolved	µg/L	15 B	27 B	21	< 5	19 B	12	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Manganese, total	µg/L	30	218	105	6 B	40	20	31	**89 +**	< 5 U	67	< 5 U
Mercury, dissolved	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	**170 ++**	**160 ++**	**160 ++**	**160 ++**	**150 ++**
Molybdenum, total	µg/L	< 10	10 B	7	< 10	< 10	5	**170 ++**	**150 ++**	**160 ++**	**150 ++**	**160 ++**

Table 4.19 (cont.): Selection of Contaminants of Concern in Surface Water at the Vanadium Queen Mine

Analyte	Units	Ref Areas 1, 2, & 3 (April 04)			Ref Areas 1, 2, & 3 (Oct 04)			VQ DRAINAGE 1						VQ ADIT								
		Min	Max	Mean	Min	Max	Mean	04/21/04			10/18/04			04/21/04			4/21/04 (dup)			10/18/04		
Nickel, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	<	10	U	<	10	U	<	10	U	<	10	U	<	10	U
Nickel, total	µg/L	< 10	10 B	7	< 10	< 10	5	<	10	U	<	10	U	<	10	U	<	10	U	<	10	U
Potassium, dissolved	µg/L	1800	3100	2300	1200	7600	3800		**9600**	**+**		**8600**	**+**		**8600**	**+**		**8700**	**+**		**8400**	**+**
Selenium, dissolved	µg/L	0.3 B	0.9	0.6	< 1	1 B	0.7		**337**	**+++**		**360**	**+++**		**330**	**+++**		**323**	**+++**		**371**	**+++**
Selenium, total	µg/L	0.2 B	0.8	0.6	< 1	1 B	0.7		**312**	**+++**		**300**	**+++**		**294**	**+++**		**290**	**+++**		**284**	**+++**
Silver, dissolved	µg/L	< 0.05	< 0.05	0.025	< 0.05	< 0.05	0.025	<	0.05	U	<	0.05	U	<	0.05	U	<	0.05	U	<	0.05	U
Silver, total	µg/L	0.050	< 0.1	0.033	< 0.05	< 0.05	0.025		0.06	B		**0.13**	**B+**	<	0.05	U	<	0.05	U	<	0.3	U
Sodium, dissolved	µg/L	4400	22700	12200	5000	39200	21000		**52100**	**+**		**48500**	**+**		**48600**	**+**		**48500**	**+**		**48100**	**+**
Uranium, dissolved	µg/L	0.58	5.20	2.56	0.35	7.28	3.69		**902**	**+++**		**829**	**+++**		**817**	**+++**		**815**	**+++**		**796**	**+++**
Uranium, total	µg/L	0.51	4.74	2.42	0.35	7.43	3.76		**1000**	**+++**		**813**	**+++**		**893**	**+++**		**892**	**+++**		**785**	**+++**
Vanadium, dissolved	µg/L	< 5	< 5	2.5	< 5	< 5	2.5		**1360**	**+++**		**1210**	**+++**		**1020**	**+++**		**1030**	**+++**		**1080**	**+++**
Vanadium, total	µg/L	<5	8 B	4.3	< 5	< 5	2.5		**1420**	**+++**		**1460**	**+++**		**1020**	**+++**		**1070**	**+++**		**1150**	**+++**
Zinc, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	<	10	U	<	10	U	<	10	U	<	10	U	<	10	U
Zinc, total	µg/L	< 10	10 B	7	< 10	< 10	5	<	10	U		20	B	<	10	U	<	10	U	<	10	U
RADIOLOGICAL (pCi/L)																						
Gross Alpha	pCi/L	3.42	19.00	10.08	0.00	5.13	3.23		**612**	**++**		**520**	**+++**		**635**	**++**		**792**	**++**		**541**	**+++**
Gross Beta	pCi/L	3.20	18.00	9.10	1.83	13.40	6.25		**134**	**+**		**274**	**++**		**124**	**+**		**144**	**+**		**265**	**++**
Radium 226 and 228 (combined)	pCi/L	0.28	1.06	0.69	0.05	0.73	0.44		**40.31**	**++**		**29.42**	**++**		**35.27**	**++**		**37.97**	**++**		**42.18**	**++**
Thorium 230 and 232 (combined)	pCi/L	-0.09	0.11	0.06	-0.95	0.05	0.02		**1.5**	**++**		**4.97**	**++**		-0.07			**1.66**	**++**		**0.21**	**+**
Thorium 228	pCi/L	-0.02	0.36	0.15	-0.17	0.00	0.00		-0.07			**0.26**	**+**		-0.03			0.08			-0.2	

Value in bold indicates level exceeds background and analyte considered a COC
+ Value exceeds background level by 1 to 10 times
++ Value exceeds background level by 10 to 100 times
+++ Value exceeds background level by more than 100 times
nm = not measured; na = not analyzed

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Holding time not met

Table 4.20: Comparison of COC Concentrations in Surface Water at the Vanadium Queen Mine to Human-Health Risk Criteria

Analyte	Units	RMC Camper	Modified MCL[1]	Max. Bkg. Value Apr-04	Max. Bkg. Value Oct-04	VQ DRAINAGE 1 04/21/04		VQ DRAINAGE 1 10/18/04		VQ ADIT 04/21/04		VQ ADIT 4/21/04 (dup)		VQ ADIT 10/18/04	
PHYSICAL (field parameters)															
Flow	cfs	-----	-----	3.75	0.94	5.89E-03		~ 0.00117		~ 4.46E-03		~ 4.46E-03		~ 2.23E-03	
Temperature	°C	-----	-----	8.20	12.7	13		10.2		5.5		5.5		7.7	
pH	s.u.	-----	-----	9.11	8.5	9.11		8.23		8.64		8.64		8.02	
Specific Conductance	(uS/cm)	-----	-----	345	557	473		478		477		477		480	
Dissolved Oxygen	(mg/L)	-----	-----	nm	nm	6.69		7.72		8.45		8.45		8.08	
Oxidation Reduction Potential	Rmev	-----	-----	nm	nm	58.5		91.1		62.7		62.7		138.7	
INORGANIC															
Nitrate	(mg/L)	-----	260	0.15	na	0.11		na		0.77	+	0.77	+	na	
Sulfate	(mg/L)	-----	-----	60	30 B	50		50	+	40	B	40	B	50	+
Total Phosphorous as P	(mg/L)	-----	-----	0.13	0.03 B	0.03	B	0.02	B	0.01	B	0.24	+	0.03	B
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----	0.15	na	0.11		na		0.77	+	0.77	+	na	
METALS															
Antimony, dissolved	µg/L	124	-----	< 0.2	< 0.2	1.2	+	1	+	1.1	+	1.1	+	1	+
Antimony, total	µg/L	-----	156	< 0.4	< 0.2	1.2	+	0.8	B+	1	+	0.9	B+	1	B+
Arsenic, dissolved	µg/L	93	-----	1.9	5.8	**143**	**+**	**125**	**+**	**126**	**+**	**123**	**+**	**123**	**+**
Arsenic, total recoverable	µg/L	-----	260	3.4	5.1	131	++	129	++	106	++	107	++	123	++
Barium, dissolved	µg/L	-----	-----	146	177	162	+	168		169	+	170	+	166	
Barium, total	µg/L	-----	52000	194	193	171		254	+	163		187		172	
Cadmium, dissolved	µg/L	155	-----	< 0.1	< 0.1	0.2	B+	0.4	B+	0.2	B+	0.2	B+	0.4	B+
Cadmium, total	µg/L	-----	130	< 0.2	< 0.1	0.2	B+	0.1	B+	0.2	B+	0.3	B+	< 0.5	U
Copper, dissolved	µg/L	11,490	-----	< 10	10 B	10	B+	< 10	U	< 10	U	< 10	U	< 10	U
Copper, total	µg/L	-----	33800	< 10	< 10	10	B+	20	B+	< 10	U	10	B+	< 10	U
Iron, total recoverable	µg/L	-----	-----	2910	200	1130		2370	++	30	B	460		< 10	U
Lead, dissolved	µg/L	50	-----	0.2 B	< 0.1	0.2	B	0.4	B+	< 0.1	U	< 0.1	U	0.3	B+
Lead, total	µg/L	-----	390	3.3	0.3 B	2.7		17.6	+	0.1	B	2.4		< 0.5	U
Magnesium, dissolved	µg/L	-----	-----	15500	13200	27100	+	26800	+	27400	+	27500	+	27000	+
Manganese, total	µg/L	-----	-----	218	40	31		89	+	< 5	U	67		< 5	U
Molybdenum, dissolved	µg/L	-----	-----	< 10	< 10	170	++	160	++	160	++	160	++	150	++
Molybdenum, total	µg/L	-----	-----	10 B	< 10	170	++	150	++	160	++	150	++	160	++
Potassium, dissolved	µg/L	-----	-----	3100	7600	9600	+	8600	+	8600	+	8700	+	8400	+
Selenium, dissolved	µg/L	1,548	-----	0.9	1 B	337	+++	360	+++	330	+++	323	+++	371	+++
Selenium, total	µg/L	-----	1300	0.8	1 B	312	+++	300	+++	294	+++	290	+++	284	+++
Silver, total	µg/L	-----	-----	< 0.1	< 0.05	0.06	B	0.13	B+	< 0.05	U	< 0.05	U	< 0.3	U
Sodium, dissolved	µg/L	-----	-----	22700	39200	52100	+	48500	+	48600	+	48500	+	48100	+
Uranium, dissolved	µg/L	-----	-----	5.20	7.28	902	+++	829	+++	817	+++	815	+++	796	+++
Uranium, total	µg/L	-----	780	4.74	7.43	**1000**	**+**	**813**	**+**	**893**	**+**	**892**	**+**	**785**	**+**
Vanadium, dissolved	µg/L	-----	-----	< 5	< 5	1360	+++	1210	+++	1020	+++	1030	+++	1080	+++
Vanadium, total	µg/L	-----	-----	8 B	< 5	1420	+++	1460	+++	1020	+++	1070	+++	1150	+++
RADIOLOGICAL (pCi/L)															
Gross Alpha	pCi/L	-----	-----	19.00	5.13	612	++	520	+++	635	++	792	++	541	+++
Gross Alpha (excl. uranium)	pCi/L	---	390	15.82	0.15	-58.00		-24.71		37	+	194	++	15	++
Gross Beta	pCi/L	-----	104 mrem/y	18.00	13.40	134	+	274	++	124	+	144	+	265	++
Radium 226 and 228 (combined)	pCi/L	-----	130	1.06	0.73	40.31	++	29.42	++	35.27	+	37.97	++	42.18	++
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.11	0.05	1.5	++	4.97	++	-0.07		1.66	++	0.21	+
Thorium 228	pCi/L	-----	-----	0.36	0.00	-0.07		0.26	+	-0.03		0.08		-0.2	

[1] MCL modified with exposure factor of 365/14 days to better evaluate risk to campers.

Shaded value in bold indicates level exceeds human-health criterion

\+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

nm = not measured; na = not analyzed

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

Table 4.21: Comparison of COC Concentrations in Surface Water at the Vanadium Queen Mine to Aquatic-life Standards

Analyte	Units	Aquatic Life Std.		Max. Bkg. Value		VQ DRAINAGE 1				VQ ADIT					
		Colorado	Utah	Apr-04	Oct-04	04/21/04		10/18/04		04/21/04		4/21/04 (dup)		10/18/04	
PHYSICAL (field parameters)															
Flow	cfs	-----	-----	3.75	0.94	5.89E-03		~ 0.00117		~ 4.46E-03		~ 4.46E-03		~ 2.23E-03	
Temperature	°C	-----	-----	8.20	12.7	13		10.2		5.5		5.5		7.7	
pH	s.u.	6.5 - 9.0	6.5 - 9.0	9.11	8.5	**9.11**		8.23		8.64		8.64		8.02	
Specific Conductance	(uS/cm)	-----	-----	345	557	473		478		477		477		480	
Dissolved Oxygen	(mg/L)	5.0	6.5	nm	nm	6.69		7.72		8.45		8.45		8.08	
Oxidation Reduction Potential	Rmev	-----	-----	nm	nm	58.5		91.1		62.7		62.7		138.7	
INORGANIC															
Nitrate	(mg/L)	10	4	0.15	na	0.11		na		0.77	+	0.77	+	na	
Sulfate	(mg/L)	250	-----	60	30 B	50		50	+	40	B	40	B	50	+
Total Phosphorous as P	(mg/L)	-----	0.05	0.13	0.03 B	0.03	B	0.02	B	0.01	B	**0.24**	**+**	0.03	B
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----	0.15	na	0.11		na		0.77	+	0.77	+	na	
METALS															
Antimony, dissolved	µg/L	-----	-----	< 0.2	< 0.2	1.2	+	1	+	1.1	+	1.1	+	1	+
Antimony, total	µg/L	-----	-----	< 0.4	< 0.2	1.2	+	0.8	B+	1	+	0.9	B+	1	B+
Arsenic, dissolved	µg/L	-----	-----	1.9	5.8	143	++	125	++	126	++	123	++	123	++
Arsenic, total recoverable	µg/L	-----	190	3.4	5.1	131	++	129	++	106	++	107	++	123	++
Barium, dissolved	µg/L	-----	-----	146	177	162	+	168		169	+	170	+	166	
Barium, total	µg/L	-----	-----	194	193	171		254	+	163		187		172	
Cadmium, dissolved	µg/L	3.5 [1]	1.8 [1]	< 0.1	< 0.1	0.2	B+	0.4	B+	0.2	B+	0.2	B+	0.4	B+
Cadmium, total	µg/L	-----	-----	< 0.2	< 0.1	0.2	B+	0.1	B+	0.2	B+	0.3	B+	< 0.5	U
Copper, dissolved	µg/L	15 [1]	20 [1]	< 10	10 B	10	B+	< 10	U	< 10	U	< 10	U	< 10	U
Copper, total	µg/L	-----	-----	< 10	< 10	10	B+	20	B+	< 10	U	10	B+	< 10	U
Iron, total recoverable	µg/L	1000	-----	2910	200	**1130**	**+**	**2370**	**+**	30	B	460		< 10	U
Lead, dissolved	µg/L	5 [1]	7 [1]	0.2 B	< 0.1	0.2	B	0.4	B+	< 0.1	U	< 0.1	U	0.3	B+
Lead, total	µg/L	-----	-----	3.3	0.3 B	2.7		17.6	++	0.1	B	2.4		< 0.5	U
Magnesium, dissolved	µg/L	-----	-----	15500	13200	27100	+	26800	+	27400	+	27500	+	27000	+
Manganese, total	µg/L	-----	-----	218	40	31		89	+	< 5	U	67		< 5	U
Molybdenum, dissolved	µg/L	-----	-----	< 10	< 10	170	++	160	++	160	++	160	++	150	++
Molybdenum, total	µg/L	-----	-----	10 B	< 10	170	++	150	++	160	++	150	++	160	++
Potassium, dissolved	µg/L	-----	-----	3100	7600	9600	+	8600	+	8600	+	8700	+	8400	+
Selenium, dissolved	µg/L	4.6 [1]	5	0.9	1 B	**337**	**++**	**360**	**++**	**330**	**++**	**323**	**++**	**371**	**++**
Selenium, total	µg/L	-----	-----	0.8	1 B	312	+++	300	+++	294	+++	290	+++	284	+++
Silver, total	µg/L	-----	-----	< 0.1	< 0.05	0.06	B	0.13	B+	< 0.05	U	< 0.05	U	< 0.3	U
Sodium, dissolved	µg/L	-----	-----	22700	39200	52100	+	48500	+	48600	+	48500	+	48100	+
Uranium, dissolved	µg/L	-----	-----	5.20	7.28	902	+++	829	+++	817	+++	815	+++	796	+++
Uranium, total	µg/L	-----	-----	4.74	7.43	1000	+++	813	+++	893	+++	892	+++	785	+++
Vanadium, dissolved	µg/L	-----	-----	< 5	< 5	1360	+++	1210	+++	1020	+++	1030	+++	1080	+++
Vanadium, total	µg/L	-----	-----	8 B	< 5	1420	+++	1460	+++	1020	+++	1070	+++	1150	+++
RADIOLOGICAL (pCi/L)															
Gross Alpha	pCi/L	-----	15	19.00	5.13	**612**	**++**	**520**	**++**	**635**	**++**	**792**	**++**	**541**	**++**
Gross Beta	pCi/L	-----	50	18.00	13.40	**134**	**+**	**274**	**+**	**124**	**+**	**144**	**+**	**265**	**+**
Radium 226 and 228 (combined)	pCi/L	-----	-----	1.06	0.73	40.31	++	29.42	++	35.27	++	37.97	++	42.18	++
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.11	0.05	1.5	++	4.97	++	-0.07		1.66	++	0.21	+
Thorium 228	pCi/L	-----	-----	0.36	0.00	-0.07		0.26	+	-0.03		0.08		-0.2	

[1] Hardness-dependent criterion calculated using hardness value of 183 mg/L

Shaded value in bold indicates level exceeds aquatic life standard

\+ Value exceeds standard (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds standard (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds standard (shaded) or maximum background (not shaded) by more than 100 times

nm = not measured; na = not analyzed

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

Table 4.22: Comparison of COCs in Borehole Waste-Rock Samples at the Vanadium Queen Mine to Human-Health Risk Criteria

Analyte	Units	RMC	SSL	Background Soil			VQ 1		VQ 2				VQ 3	VQ 4	
		Camper	Industrial	Min	Max	Mean	0 - 0.5	0 - 0.5 (Dup 2)	0 - 0.5	2 - 4	10 - 12	15 - 17	0 - 0.5	0 - 0.5	2 - 2.5
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	0.5 B+	0.5 B+	0.5 B+	0.5 B+	0.3 B	0.2 B	0.3 B	0.1 B	0.2 B
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	**137 +**	**141 +**	**87 +**	**91 +**	**67.2 +**	**27.4 +**	**87.7 +**	**26.7 +**	17.7
Barium, total (3050)	mg/Kg	---	71540	128	419	205	40.9	39.2	63.2	41.8	40.7	46.5	31.6	307	143
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.2 B	0.23 B	0.45	0.32	0.32	0.37	0.14 B	0.46	0.43
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	2.49 +	2.09 +	3.39 +	2.65 +	2.16 +	1.13	3.43 +	0.52	0.59
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	2 B	1 B	6	3 B	2 B	14 +	1 B	2 B	11
Copper, total (3050)	mg/Kg	5000	---	3	75	15	266 +	278 +	222 +	223 +	389 +	160 +	166 +	115 +	58
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	3310	3270	3840	3250	7680	2990	2790	7000	8170
Lead, total (3050)	mg/Kg	1000	---	8	82	19	832 ++	623 +	727 +	652 +	308 +	531 +	666 +	65	111 +
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	123	121	150	146	243	143	107	176	165
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	< 0.05 U	0.06 B+	0.07 B+	0.07 B+	0.08 B+	< 0.05 U	< 0.05 U	0.06 B+	0.07 B+
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	16 +	17 +	7	16 +	8 +	24 +	13 +	4 B	4 B
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	6	6	8 +	7 +	7 +	5	4 B	5 B	6
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	22.4 +	22 +	56.1 ++	64.4 ++	34.9 +	21.3 +	19.7 +	11.3 +	12 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	2.48 +	2.4 +	2.63 +	2.7 +	2.56 +	2.02 +	1.82 +	1.48 +	0.68 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	177 ++	219 ++	838 ++	577 ++	778 ++	638 ++	115 +	453 ++	147 +
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	850 +	907 +	4280 ++	2370 ++	2130 ++	2620 ++	382 +	3450 ++	962 +
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	197 +	167 +	305 +	215 +	108	195 +	340 +	55	72
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	41.9	42.8	126 +	72.4	88.7 +	70.4	25.3	45	27.9
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	21.9	20	75.4 +	48.3 +	61.4 +	40.7 +	11.8	32.4	15.6
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	8.52	8.22	31.3 +	19 +	25.3 +	15.1 +	5.05	15.4 +	8.07
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	5.87 +	5.67 +	1.5	2.63	4.27 +	2.18	2.36	2.87	2.23
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.03	0.03	0.04	0.06	0.05	0.04	0.04	0.1	0.05
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	7.55	8.2	30.8 +	19	26.5 +	19.8	4.17	12.9	5.65
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.02	-0.02	0.05	0.12	0.07	0.1	0.25	0.06	0.03
Solids, Percent	%	---	---	87.3	94.8	91.5	93.4	93.6	92.7	91.5	92.6	91.3	92	93	92.7

Analyte	Units	RMC	SSL	Background Soil			VQ 5		VQ 6				VQ 7	VQ 8
		Camper	Industrial	Min	Max	Mean	0 - 0.5	0 - 0.5 (Dup 3)	0 - 0.5	3 - 5	8 - 10	22 - 24	0 - 0.5	0 - 0.5
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	0.5 +	0.5 +	0.2 B	< 0.1 U	0.1 B	< 0.1 U	0.3 B	0.1 B
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	**103 +**	**110 +**	**63.4 +**	14.2	19	**23.7 +**	**59.1 +**	14.2
Barium, total (3050)	mg/Kg	---	71540	128	419	205	44.3	48	219	486 +	84.3	72.5	111	114
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.45	0.38	0.57	0.46	0.26 B	0.41	0.44	0.39
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	2.7 +	2.58 +	3.6 +	0.38	0.26 B	0.61	1.11	0.38
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	2 B	3 B	6	3 B	21 +	4 B	4 B	15
Copper, total (3050)	mg/Kg	5000	---	3	75	15	299 +	368 +	347 +	17	75	74	183 +	48
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	3940	3710	4820	7700	2800	3060	4000	4210
Lead, total (3050)	mg/Kg	1000	---	8	82	19	657 +	720 +	152 +	14 B	301 +	129 +	334 +	78
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	162	137	142	170	144	196	142	255
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	0.08 B+	0.11 B+	0.07 B+	< 0.05 U	0.07 B+	< 0.05 U	0.05 B+	< 0.05 U
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	8 +	11 +	6	< 1 U	1 B	4 B	9 +	2 B
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	6	6	12	3 B	4 B	6	6	4 B
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	97.4 ++	77 ++	11.5 +	4 B	10.8 +	18.1 +	17.9 +	10.5 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	3.16 +	2.66 +	1.84 +	0.18	1.02 +	0.74 +	1.71 +	0.79 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	612 ++	612 ++	345 ++	97.6 +	98.1 +	106 +	436 ++	96.6 +
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	3460 ++	3280 ++	**8840 +**	202 +	1510 ++	499 +	2120 ++	631 +
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	221 +	205 +	171 +	28	31	83	105	35
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	118 +	114 +	53.5	34	20.8	13.6	64.2	9.89
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	59.7 +	63.2 +	30	19.1	11.9	10.9	37.6	7.22
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	27 +	28.6 +	16.7 +	5.77	3.62	3.64	16.1 +	3.5
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	2.44	1.02	3.12	2.96	1.06	2.54	2.22	3.54
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.08	0.06	0.06	0.05	0.03	0.03	0.08	0.03
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	22.2	21.3	21.9	3.62	4.43	3.48	13.8	3.26
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.18	0.08	0.08	0.14	0.18	0.07	0.28	0.04
Solids, Percent	%	---	---	87.3	94.8	91.5	92.6	92.7	93	92.2	93.9	89.5	91	88.9

Shaded value in bold indicates level exceeds human-health criterion
+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times
++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times
+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit

Table 4.23: Comparison of COCs in Waste Rock from Composite Surface Samples at the Vanadium Queen Mine to Human-Health Risk Criteria

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			VQ Segment 1	VQ Segment 3	VQ Segment 4	VQ Segment 5	VQ Segment 6	VQ Segment 7
				Min	Max	Mean						
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	0.1 B	0.4 B+	0.2 B	< 1 U	< 0.5 U	< 1 U
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	13.5	**61.7 +**	19.6	**71.1 +**	**32.5 +**	**36 +**
Barium, total (3050)	mg/Kg	---	71540	128	419	205	36.3	45.8	57.8	54.7	32	108
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.24 B	0.5	0.22 B	0.33	0.27 B	0.48
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	0.52	1.71 +	0.64	2.04 +	0.56	0.75
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	2 B	13	9	23 +	23 +	8
Copper, total (3050)	mg/Kg	5000	---	3	75	15	52	181 +	95 +	155 ++	97 +	219 ++
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	2040	4120	2590	3530	2770	5440
Lead, total (3050)	mg/Kg	1000	---	8	82	19	65	617 +	92 +	758 +	136 +	109 +
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	147	149	172	131	162	214
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	< 0.05 U	0.09 B+	0.07 B+	0.12 B+	0.08 B+	0.08 B+
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	< 1 U	6	3 B	14 +	6	4 B
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	3 B	6	3 B	5 B	4 B	6
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	1.9 B	117 ++	18.4 +	43.5 +	12.7 +	13.9 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	0.38	2.24 +	0.89 +	3.17 +	1.45 +	1.79 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	122 +	452 ++	167 ++	398 ++	176 ++	372 ++
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	729 +	3240 ++	689 +	1960 ++	868 +	1990 ++
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	47	130 +	45	154 +	59	66
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	35.3	74.8	26.7	810 +	296 +	965 ++
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	15.9	43.8 +	12.5	307 +	107 +	411 ++
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	7.27	15.7 +	3.35	141 ++	54 +	123 +
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	3.09	2.32	2.93	0.57	0.58	1.74
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.03	0.07	0.03	0.21	0.02	0.1
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	6.15	26.5 +	3.68	135 +	34.9 +	133 +
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.08	0.16	0.06	0.29	0.21	0.61 +
Solids, Percent	%	---	---	87.3	94.8	91.5	94.5	94	94.2	93.7	93.5	91.3

Note: VQ Segment 2 was not collected due to unstable dump and unsafe work conditions
Shaded value in bold indicates level exceeds human-health criterion
+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times
++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times
+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit

Table 4.24: Sample Sites at Vanadium Queen Mine Where Radionuclide Activities in Near-Surface Samples Exceeded Maximum Background Levels

Radionuclide	Borehole Samples (VQ)								Composite Surface Samples (Seg)						Factor Exceeded Background			
	1	2	3	4	5	6	7	8	1	3	4	5	6	7	Min	Max	Mean	Median
Gross alpha		○			○							○	○	○	1.30	10.99	4.61	2.40
Gross beta		○			○					○		○	○	○	1.14	10.73	3.98	1.97
Radium 226		○		○	○	○	○			○		○	○	○	1.17	10.68	3.55	2.11
Radium 228	○														1.41	1.41	1.39	1.39
Thorium 228															----	----	----	----
Thorium 230		○								○		○	○	○	1.19	6.05	3.23	1.57
Thorium 232														○	1.15	1.15	1.15	1.15

Note: A composite surface sample was not collected for Segment 2 because of unstable dump and unsafe conditions.

Table 4.25: Comparison of COCs in Waste Rock Samples Collected from Boreholes to Ecological Risk Criteria at the Vanadium Queen Mine

Analyte	Units	Modified Elk RMC[1]	Background Soil			VQ 1		VQ 2				VQ 3	VQ 4	
			Min	Max	Mean	0 - 0.5	0 - 0.5 (Dup 2)	0 - 0.5	2 - 4	10 - 12	15 - 17	0 - 0.5	0 - 0.5	2 - 2.5
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	0.5 B+	0.5 B+	0.5 B+	0.5 B+	0.3 B	0.2 B	0.3 B	0.1 B	0.2 B
Arsenic, total (3050)	mg/Kg	49862	1.1	25.7	9.7	137 +	141 +	87 +	91 +	67.2 +	27.4 +	87.7 +	26.7 +	17.7
Barium, total (3050)	mg/Kg	----	128	419	205	40.9	39.2	63.2	41.8	40.7	46.5	31.6	307	143
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.2 B	0.23 B	0.45	0.32	0.32	0.37	0.14 B	0.46	0.43
Cadmium, total (3050)	mg/Kg	456	0.09	1.34	0.30	2.49 +	2.09 +	3.39 +	2.65 +	2.16 +	1.13	3.43 +	0.52	0.59
Chromium, total (3050)	mg/Kg	----	5	12	8	2 B	1 B	6	3 B	2 B	14 +	1 B	2 B	11
Copper, total (3050)	mg/Kg	19914	3	75	15	266 +	278 +	222 +	223 +	389 +	160 +	166 +	115 +	58
Iron, total (3050)	mg/Kg	----	4790	10600	7524	3310	3270	3840	3250	7680	2990	2790	7000	8170
Lead, total (3050)	mg/Kg	19306	8	82	19	832 ++	623 +	727 +	652 +	308 +	531 +	666 +	65	111 +
Manganese, total (3050)	mg/Kg	----	151	397	269	123	121	150	146	243	143	107	176	165
Mercury, total	mg/Kg	1672	<0.04 U	0.02	0.02	< 0.05 U	0.06 B+	0.07 B+	0.07 B+	0.08 B+	< 0.05 U	< 0.05 U	0.06 B+	0.07 B+
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	16 +	17 +	7	16 +	8 +	24 +	13 +	4 B	4 B
Nickel, total (3050)	mg/Kg	----	3	6	5	6	6	8 +	7 +	7 +	5	4 B	5 B	6
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	22.4 +	22 +	56.1 ++	64.4 ++	34.9 +	21.3 +	19.7 +	11.3 +	12 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	2.48 +	2.4 +	2.63 +	2.7 +	2.56 +	2.02 +	1.82 +	1.48 +	0.68 +
Uranium, total (3050)	mg/Kg	505159	0.38	15.3	3.9	177 ++	219 ++	838 ++	577 ++	778 ++	638 ++	115 +	453 ++	147 +
Vanadium, total (3050)	mg/Kg	42565	10.7	136	40	850 +	907 +	4280 ++	2370 ++	2130 ++	2620 ++	382 +	3450 ++	962 +
Zinc, total (3050)	mg/Kg	41805	12	125	28	197 +	167 +	305 +	215 +	108	195 +	340 +	55	72
Gross Alpha	pCi/g	----	3.39	87.8	20.3	41.9	42.8	126 +	72.4	88.7 +	70.4	25.3	45	27.9
Gross Beta	pCi/g	----	3.29	38.3	13.5	21.9	20	75.4 +	48.3 +	61.4 +	40.7 +	11.8	32.4	15.6
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	8.52	8.22	31.3 +	19 +	25.3 +	15.1 +	5.05	15.4 +	8.07
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	5.87 +	5.67 +	1.5	2.63	4.27 +	2.18	2.36	2.87	2.23
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.03	0.03	0.04	0.06	0.05	0.04	0.04	0.1	0.05
Thorium 230	pCi/g	----	-0.36	22.3	3.1	7.55	8.2	30.8 +	19	26.5 +	19.8	4.17	12.9	5.65
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.02	-0.02	0.05	0.12	0.07	0.1	0.25	0.06	0.03
Solids, Percent	%	----	87.3	94.8	91.5	93.4	93.6	92.7	91.5	92.6	91.3	92	93	92.7

Analyte	Units	Modified Elk RMC[1]	Background Soil			VQ 5		VQ 6				VQ 7	VQ 8
			Min	Max	Mean	0 - 0.5	0 - 0.5 (Dup 3)	0 - 0.5	3 - 5	8 - 10	22 - 24	0 - 0.5	0 - 0.5
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	0.5 +	0.5 +	0.2 B	< 0.1 U	0.1 B	< 0.1 U	0.3 B	0.1 B
Arsenic, total (3050)	mg/Kg	49862	1.1	25.7	9.7	103 +	110 +	63.4 +	14.2	19	23.7	59.1 +	14.2
Barium, total (3050)	mg/Kg	----	128	419	205	44.3	48	219	486 +	84.3	72.5	111	114
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.45	0.38	0.57	0.46	0.26 B	0.41	0.44	0.39
Cadmium, total (3050)	mg/Kg	456	0.09	1.34	0.30	2.7 +	2.58 +	3.6 +	0.38	0.26 B	0.61	1.11	0.38
Chromium, total (3050)	mg/Kg	----	5	12	8	2 B	3 B	6	3 B	21 +	4 B	4 B	15
Copper, total (3050)	mg/Kg	19914	3	75	15	299 +	368 +	347 +	17	75	74	183 +	48
Iron, total (3050)	mg/Kg	----	4790	10600	7524	3940	3710	4820	7700	2800	3060	4000	4210
Lead, total (3050)	mg/Kg	19306	8	82	19	657 +	720 +	152 +	14 B	301 +	129 +	334 +	78
Manganese, total (3050)	mg/Kg	----	151	397	269	162	137	142	170	144	196	142	255
Mercury, total	mg/Kg	1672	<0.04 U	0.02	0.02	0.08 B+	0.11 B+	0.07 B+	< 0.05 U	0.07 B+	< 0.05 U	0.05 B+	< 0.05 U
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	8 +	11 +	6	< 1 U	1 B	4 B	9 +	2 B
Nickel, total (3050)	mg/Kg	----	3	6	5	6	6	12	3 B	4 B	6	6	4 B
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	97.4 ++	77 ++	11.5 +	4 B	10.8 +	18.1 +	17.9 +	10.5 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	3.16 +	2.66 +	1.84 +	0.18	1.02 +	0.74 +	1.71 +	0.79 +
Uranium, total (3050)	mg/Kg	505159	0.38	15.3	3.9	612 ++	612 ++	345 ++	97.6 +	98.1 +	106 +	436 ++	96.6 +
Vanadium, total (3050)	mg/Kg	42565	10.7	136	40	3460 ++	3280 ++	8840 +	202 +	1510 ++	499 +	2120 ++	631 +
Zinc, total (3050)	mg/Kg	41805	12	125	28	221 +	205 +	171 +	28	31	83	105	35
Gross Alpha	pCi/g	----	3.39	87.8	20.3	118 +	114 +	53.5	34	20.8	13.6	64.2	9.89
Gross Beta	pCi/g	----	3.29	38.3	13.5	59.7 +	63.2 +	30	19.1	11.9	10.9	37.6	7.22
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	27 +	28.6 +	16.7 +	5.77	3.62	3.64	16.1 +	3.5
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	2.44	1.02	3.12	2.96	1.06	2.54	2.22	3.54
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.08	0.06	0.06	0.05	0.03	0.03	0.08	0.03
Thorium 230	pCi/g	----	-0.36	22.3	3.1	22.2	21.3	21.9	3.62	4.43	3.48	13.8	3.26
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.18	0.08	0.08	0.14	0.18	0.07	0.28	0.04
Solids, Percent	%	----	87.3	94.8	91.5	92.6	92.7	93	92.2	93.9	89.5	91	88.9

[1] Modified by area use factor (RMC/[4.21 acres/640 acres])

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds elk RMC

+ Value exceeds RMC (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds RMC (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds RMC (shaded) or maximum background (not shaded) by more than 100 times

Table 4.26: Comparison of COCs in Waste Rock from Composite Surface Samples at the Vanadium Queen Mine to Ecological Risk Criteria

Analyte	Units	Modified Elk RMC[1]	Background Soil			VQ Segment 1	VQ Segment 3	VQ Segment 4	VQ Segment 5	VQ Segment 6	VQ Segment 7
			Min	Max	Mean						
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	0.1 B	0.4 B+	0.2 B	< 1 U	< 0.5 U	< 1 U
Arsenic, total (3050)	mg/Kg	49862	1.1	25.7	9.7	13.5	61.7 +	19.6	71.1 +	32.5 +	36 +
Barium, total (3050)	mg/Kg	----	128	419	205	36.3	45.8	57.8	54.7	32	108
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.24 B	0.5	0.22 B	0.33	0.27 B	0.48
Cadmium, total (3050)	mg/Kg	456	0.09	1.34	0.30	0.52	1.71 +	0.64	2.04 +	0.56	0.75
Chromium, total (3050)	mg/Kg	----	5	12	8	2 B	13	9	23 +	23 +	8
Copper, total (3050)	mg/Kg	19914	3	75	15	52	181 +	95 +	155 +	97 +	219 +
Iron, total (3050)	mg/Kg	----	4790	10600	7524	2040	4120	2590	3530	2770	5440
Lead, total (3050)	mg/Kg	19306	8	82	19	65	617 +	92 +	758 +	136 +	109 +
Manganese, total (3050)	mg/Kg	----	151	397	269	147	149	172	131	162	214
Mercury, total	mg/Kg	1672	<0.04 U	0.02	0.02	< 0.05 U	0.09 B+	0.07 B+	0.12 B+	0.08 B+	0.08 B+
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	< 1 U	6	3 B	14 +	6	4 B
Nickel, total (3050)	mg/Kg	----	3	6	5	3 B	6	3 B	5 B	4 B	6
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	1.9 B	117 ++	18.4 +	43.5 +	12.7 +	13.9 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	0.38	2.24 +	0.89 +	3.17 +	1.45 +	1.79 +
Uranium, total (3050)	mg/Kg	505159	0.38	15.3	3.9	122 +	452 ++	167 ++	398 ++	176 ++	372 ++
Vanadium, total (3050)	mg/Kg	42565	10.7	136	40	729 +	3240 ++	689 +	1960 ++	868 +	1990 ++
Zinc, total (3050)	mg/Kg	41805	12	125	28	47	130 +	45	154 +	59	66
Gross Alpha	pCi/g	----	3.39	87.8	20.3	35.3	74.8	26.7	810 +	296 +	965 ++
Gross Beta	pCi/g	----	3.29	38.3	13.5	15.9	43.8 +	12.5	307 +	107 +	411 ++
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	7.27	15.7 +	3.35	141 ++	54 +	123 +
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	3.09	2.32	2.93	0.57	0.58	1.74
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.03	0.07	0.03	0.21	0.02	0.1
Thorium 230	pCi/g	----	-0.36	22.3	3.1	6.15	26.5 +	3.68	135 +	34.9 +	133 +
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.08	0.16	0.06	0.29	0.21	0.61 +
Solids, Percent	%	----	87.3	94.8	91.5	94.5	94	94.2	93.7	93.5	91.3

[1] Modified by area use factor (RMC/[4.21 acres/640 acres])
Shaded value in bold indicates level exceeds elk RMC
+ Value exceeds RMC (shaded) or maximum background (not shaded) by 1 to 10 times
++ Value exceeds RMC (shaded) or maximum background (not shaded) by 10 to 100 times
+++ Value exceeds RMC (shaded) or maximum background (not shaded) by more than 100 times

Note: VQ Segment 2 was not collected due to unstable dump and unsafe work conditions
Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit

Table 4.27: Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Vanadium Queen Mine

Analyte	Units	VQ 1: 0 - 0.5			VQ 1: 0 - 0.5 (Dup 2)		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	0.5 B	< 0.001 U	----	0.5 B
Arsenic (1312)	mg/L	0.148	3518	137	0.13	4122	141
Barium (1312)	mg/L	0.021	----	40.9	0.016	----	39.2
Beryllium (1312)	mg/L	< 0.0005 U	----	0.2 B	< 0.0005 U	----	0.23 B
Cadmium (1312)	mg/L	< 0.0005 U	359	2.49	< 0.0005 U	301	2.09
Chromium (1312)	mg/L	< 0.01 U	976	2 B	< 0.01 U	488	1 B
Copper (1312)	mg/L	0.01 B	7980	266	0.02 B	4170	278
Iron (1312)	mg/L	0.08	827500	3310	0.16	408750	3270
Lead (1312)	mg/L	< 0.04 U	4160	832	< 0.04 U	3115	623
Manganese (1312)	mg/L	< 0.005 U	1983744	123	< 0.005 U	1951488	121
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	0.14	0.06 B
Molybdenum (1312)	mg/L	0.04 B	----	16	0.03 B	----	17
Nickel (1312)	mg/L	< 0.01 U	2088	6	< 0.01 U	2088	6
Selenium (1312)	mg/L	0.113	18.24	**22.4 +**	0.098	20.65	**22 +**
Silver (1312)	mg/L	< 0.0003 U	66.13	2.48	< 0.0003 U	64.00	2.4
Uranium (1312)	mg/L	0.0459	----	177	0.0192	----	219
Vanadium (1312)	mg/L	0.035	----	850	0.048	----	907
Zinc (1312)	mg/L	0.01 B	69738	197	0.02 B	29559	167

Table 4.27 (cont.): Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Vanadium Queen Mine

Analyte	Units	VQ 2: 0 - 0.5			VQ 2: 2 - 4			VQ 2: 10 - 12		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.002 B	----	0.5 B	0.003 B	----	0.5 B	0.002 B	----	0.3 B
Arsenic (1312)	mg/L	0.124	2666	87	0.365	947	91	0.282	906	67.2
Barium (1312)	mg/L	0.005 B	----	63.2	0.023	----	41.8	0.04	----	40.7
Beryllium (1312)	mg/L	< 0.0005 U	----	0.45	< 0.0005 U	----	0.32	< 0.0005 U	----	0.32
Cadmium (1312)	mg/L	< 0.0005 U	488	3.39	< 0.0005 U	382	2.65	< 0.0005 U	311	2.16
Chromium (1312)	mg/L	< 0.01 U	2928	6	< 0.01 U	1464	3 B	< 0.01 U	976	2 B
Copper (1312)	mg/L	0.01 B	6660	222	< 0.01 U	13380	223	< 0.01 U	23340	389
Iron (1312)	mg/L	0.16	480000	3840	< 0.01 U	13000000	3250	< 0.01 U	30720000	7680
Lead (1312)	mg/L	< 0.04 U	3635	727	< 0.04 U	3260	652	< 0.04 U	1540	308
Manganese (1312)	mg/L	< 0.005 U	2419200	150	< 0.005 U	2354688	146	< 0.005 U	3919104	243
Mercury (1312)	mg/L	< 0.0002 UH	0.17	0.07 B	< 0.0002 UH	0.17	0.07 B	< 0.0002 UH	0.19	0.08 B
Molybdenum (1312)	mg/L	0.03 B	----	7	0.07	----	16	0.06	----	8
Nickel (1312)	mg/L	< 0.01 U	2784	8	< 0.01 U	2436	7	< 0.01 U	2436	7
Selenium (1312)	mg/L	0.029 B	177.97	56.1	0.098	60.46	**64.4 +**	0.092	34.90	34.9
Silver (1312)	mg/L	< 0.0003 U	70.13	2.63	< 0.0003 U	72.00	2.7	< 0.0003 U	68.27	2.56
Uranium (1312)	mg/L	0.0262	----	838	0.0008 B	----	577	0.0013	----	778
Vanadium (1312)	mg/L	2.54	----	4280	2.29	----	2370	1.87	----	2130
Zinc (1312)	mg/L	0.02 B	53985	305	< 0.01 U	152220	215	0.01 B	38232	108

Analyte	Units	VQ 2: 15 - 17		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	0.2 B
Arsenic (1312)	mg/L	0.129	807	27.4
Barium (1312)	mg/L	0.025	----	46.5
Beryllium (1312)	mg/L	< 0.0005 U	----	0.37
Cadmium (1312)	mg/L	< 0.0005 U	163	1.13
Chromium (1312)	mg/L	< 0.01 U	6832	14
Copper (1312)	mg/L	< 0.01 U	9600	160
Iron (1312)	mg/L	0.03 B	1993333	2990
Lead (1312)	mg/L	< 0.04 U	2655	531
Manganese (1312)	mg/L	< 0.005 U	2306304	143
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.03 B	----	24
Nickel (1312)	mg/L	< 0.01 U	1740	5
Selenium (1312)	mg/L	0.078	25.12	21.3
Silver (1312)	mg/L	< 0.0003 U	53.87	2.02
Uranium (1312)	mg/L	0.0068	----	638
Vanadium (1312)	mg/L	1.5	----	2620
Zinc (1312)	mg/L	0.02 B	34515	195

Table 4.27 (cont.): Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Vanadium Queen Mine

Analyte	Units	VQ 3: 0 - 0.5			VQ 4: 0 - 0.5			VQ 4: 2 - 2.5		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.001 B	----	0.3 B	< 0.001 U	----	0.1 B	< 0.001 U	----	0.2 B
Arsenic (1312)	mg/L	0.187	1782	87.7	0.0912	1113	26.7	0.0268	2510	17.7
Barium (1312)	mg/L	0.017	----	31.6	0.025	----	307	0.032	----	143
Beryllium (1312)	mg/L	< 0.0005 U	----	0.14 B	< 0.0005 U	----	0.46	< 0.0005 U	----	0.43
Cadmium (1312)	mg/L	< 0.0005 U	494	3.43	< 0.0005 U	75	0.52	< 0.0005 U	85	0.59
Chromium (1312)	mg/L	< 0.01 U	488	1 B	< 0.01 U	976	2 B	< 0.01 U	5368	11
Copper (1312)	mg/L	0.02 B	2490	166	0.02 B	1725	115	< 0.01 U	3480	58
Iron (1312)	mg/L	0.19	293684	2790	0.27	518519	7000	0.04 B	4085000	8170
Lead (1312)	mg/L	0.07 B	951	666	< 0.04 U	325	65	< 0.04 U	555	111
Manganese (1312)	mg/L	< 0.005 U	1725696	107	< 0.005 U	2838528	176	< 0.005 U	2661120	165
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	0.14	0.06 B	< 0.0002 UH	0.17	0.07 B
Molybdenum (1312)	mg/L	0.03 B	----	13	0.03 B	----	4 B	0.05 B	----	4 B
Nickel (1312)	mg/L	< 0.01 U	1392	4 B	< 0.01 U	1740	5 B	< 0.01 U	2088	6
Selenium (1312)	mg/L	0.091	19.92	19.7	< 0.008 U	259.90	11.3	0.039 B	28.31	12
Silver (1312)	mg/L	< 0.0003 U	48.53	1.82	< 0.0003 U	39.47	1.48	< 0.0003 U	18.13	0.68
Uranium (1312)	mg/L	0.0147	----	115	0.0208	----	453	0.0135	----	147
Vanadium (1312)	mg/L	0.041	----	382	3.45	----	3450	0.513	----	962
Zinc (1312)	mg/L	0.03 B	40120	340	< 0.01 U	38940	55	0.01 B	25488	72

Analyte	Units	VQ 5: 0 - 0.5			VQ 5: 0 - 0.5 (Dup 3)		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.003 B	----	0.5	0.003 B	----	0.5
Arsenic (1312)	mg/L	0.41	955	103	0.427	979	110
Barium (1312)	mg/L	0.007 B	----	44.3	0.008 B	----	48
Beryllium (1312)	mg/L	< 0.0005 U	----	0.45	< 0.0005 U	----	0.38
Cadmium (1312)	mg/L	< 0.0005 U	389	2.7	< 0.0005 U	372	2.58
Chromium (1312)	mg/L	< 0.01 U	976	2 B	< 0.01 U	1464	3 B
Copper (1312)	mg/L	0.02 B	4485	299	0.01 B	11040	368
Iron (1312)	mg/L	0.15	525333	3940	0.11	674545	3710
Lead (1312)	mg/L	< 0.04 U	3285	657	< 0.04 U	3600	720
Manganese (1312)	mg/L	< 0.005 U	2612736	162	< 0.005 U	2209536	137
Mercury (1312)	mg/L	< 0.0002 UH	0.19	0.08 B	< 0.0002 UH	0.26	0.11 B
Molybdenum (1312)	mg/L	0.02 B	----	8	0.02 B	----	11
Nickel (1312)	mg/L	< 0.01 U	2088	6	< 0.01 U	2088	6
Selenium (1312)	mg/L	0.029 B	308.99	97.4	0.036 B	196.78	77
Silver (1312)	mg/L	< 0.0003 U	84.27	3.16	< 0.0003 U	70.93	2.66
Uranium (1312)	mg/L	0.0263	----	612	0.0239	----	612
Vanadium (1312)	mg/L	2.74	----	3460	2.34	----	3280
Zinc (1312)	mg/L	0.02 B	39117	221	0.01 B	72570	205

Table 4.27 (cont.): Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Vanadium Queen Mine

Analyte	Units	VQ 6: 0 - 0.5			VQ 6: 3 - 5			VQ 6: 8 - 10		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.003 B	----	0.2 B	< 0.001 U	----	< 0.1 U	< 0.001 U	----	0.1 B
Arsenic (1312)	mg/L	0.572	421	63.4	0.0091	5930	14.2	0.0793	910	19
Barium (1312)	mg/L	0.024	----	219	0.048	----	486	0.021	----	84.3
Beryllium (1312)	mg/L	< 0.0005 U	----	0.57	< 0.0005 U	----	0.46	< 0.0005 U	----	0.26 B
Cadmium (1312)	mg/L	< 0.0005 U	518	3.6	< 0.0005 U	55	0.38	< 0.0005 U	37	0.26 B
Chromium (1312)	mg/L	< 0.01 U	2928	6	< 0.01 U	1464	3 B	< 0.01 U	10248	21
Copper (1312)	mg/L	0.02 B	5205	347	0.01 B	510	17	0.01 B	2250	75
Iron (1312)	mg/L	0.03 B	3213333	4820	0.17	905882	7700	0.07	800000	2800
Lead (1312)	mg/L	< 0.04 U	760	152	< 0.04 U	70	14 B	< 0.04 U	1505	301
Manganese (1312)	mg/L	< 0.005 U	2290176	142	< 0.005 U	2741760	170	< 0.005 U	2322432	144
Mercury (1312)	mg/L	< 0.0002 UH	0.17	0.07 B	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	0.17	0.07 B
Molybdenum (1312)	mg/L	0.14	----	6	0.03 B	----	< 1 U	0.03 B	----	1 B
Nickel (1312)	mg/L	< 0.01 U	4176	12	< 0.01 U	1044	3 B	< 0.01 U	1392	4 B
Selenium (1312)	mg/L	0.094	11.26	**11.5 +**	0.037 B	9.95	4 B	0.038 B	26.15	10.8
Silver (1312)	mg/L	< 0.0003 U	49.07	1.84	< 0.0003 U	4.80	0.18	< 0.0003 U	27.20	1.02
Uranium (1312)	mg/L	0.0124	----	345	0.0332	----	97.6	0.0034	----	98.1
Vanadium (1312)	mg/L	41.7	----	8840	0.295	----	202	2.7	----	1510
Zinc (1312)	mg/L	0.02 B	30267	171	0.01 B	9912	28	0.01 B	10974	31

Analyte	Units	VQ 6: 22 - 24		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	< 0.1 U
Arsenic (1312)	mg/L	0.128	704	23.7
Barium (1312)	mg/L	0.021	----	72.5
Beryllium (1312)	mg/L	< 0.0005 U	----	0.41
Cadmium (1312)	mg/L	< 0.0005 U	88	0.61
Chromium (1312)	mg/L	< 0.01 U	1952	4 B
Copper (1312)	mg/L	< 0.01 U	4440	74
Iron (1312)	mg/L	0.07	874286	3060
Lead (1312)	mg/L	< 0.04 U	645	129
Manganese (1312)	mg/L	< 0.005 U	3161088	196
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.02 B	----	4 B
Nickel (1312)	mg/L	< 0.01 U	2088	6
Selenium (1312)	mg/L	0.063	26.43	18.1
Silver (1312)	mg/L	< 0.0003 U	19.73	0.74
Uranium (1312)	mg/L	0.0198	----	106
Vanadium (1312)	mg/L	0.926	----	499
Zinc (1312)	mg/L	< 0.01 U	58764	83

Table 4.27 (cont.): Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Vanadium Queen Mine

Analyte	Units	VQ 7: 0 - 0.5			VQ 8: 0 - 0.5		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	0.3 B	< 0.001 U	----	0.1 B
Arsenic (1312)	mg/L	0.0905	2482	59.1	0.0622	868	14.2
Barium (1312)	mg/L	0.017	----	111	0.018	----	114
Beryllium (1312)	mg/L	< 0.0005 U	----	0.44	< 0.0005 U	----	0.39
Cadmium (1312)	mg/L	< 0.0005 U	160	1.11	< 0.0005 U	55	0.38
Chromium (1312)	mg/L	< 0.01 U	1952	4 B	< 0.01 U	7320	15
Copper (1312)	mg/L	0.05 B	1098	183	< 0.01 U	2880	48
Iron (1312)	mg/L	0.45	177778	4000	0.03 B	2806667	4210
Lead (1312)	mg/L	< 0.04 U	1670	334	< 0.04 U	390	78
Manganese (1312)	mg/L	< 0.005 U	2290176	142	< 0.005 U	4112640	255
Mercury (1312)	mg/L	< 0.0002 UH	0.12	0.05 B	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	< 0.01 U	----	9	< 0.01 U	----	2 B
Nickel (1312)	mg/L	< 0.01 U	2088	6	< 0.01 U	1392	4 B
Selenium (1312)	mg/L	< 0.008 U	411.70	17.9	0.008 B	120.75	10.5
Silver (1312)	mg/L	< 0.0003 U	45.60	1.71	< 0.0003 U	21.07	0.79
Uranium (1312)	mg/L	0.0556	----	436	0.0174	----	96.6
Vanadium (1312)	mg/L	0.894	----	2120	2.12	----	631
Zinc (1312)	mg/L	0.01 B	37170	105	< 0.01 U	24780	35

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Analysis exceeded method hold time

Shaded value in bold indicates level exceeds leaching RMC
+ Value exceeds RMC by 1 to 10 times
++ Value exceeds RMC by 10 to 100 times
+++ Value exceeds RMC by more than 100 times

Table 4.28: Comparison of Metals in Composite Waste-Rock Samples Collected from Face of Mine Dump to Leaching RMC at the Vanadium Queen Mine

Analyte	Units	VQ Segment 1			VQ Segment 3			VQ Segment 4			VQ Segment 5		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	0.1 B	0.002 B	----	0.4 B	< 0.001 U	----	0.2 B	0.001 B	----	< 1 U
Arsenic (1312)	mg/L	0.0505	1016	13.5	0.105	2233	61.7	0.0807	923	19.6	0.202	1338	71.1
Barium (1312)	mg/L	0.023	----	36.3	0.013	----	45.8	0.012	----	57.8	0.012	----	54.7
Beryllium (1312)	mg/L	< 0.0005 U	----	0.24 B	< 0.0005 U	----	0.5	< 0.0005 U	----	0.22 B	< 0.0005 U	----	0.33
Cadmium (1312)	mg/L	< 0.0005 U	75	0.52	< 0.0005 U	246	1.71	< 0.0005 U	92	0.64	< 0.0005 U	294	2.04
Chromium (1312)	mg/L	< 0.01 U	976	2 B	< 0.01 U	6344	13	< 0.01 U	4392	9	< 0.01 U	11224	23
Copper (1312)	mg/L	< 0.01 U	3120	52	< 0.01 U	10860	181	< 0.01 U	5700	95	< 0.01 U	9300	155
Iron (1312)	mg/L	0.03 B	1360000	2040	< 0.01 U	16480000	4120	0.03 B	1726667	2590	0.01 B	7060000	3530
Lead (1312)	mg/L	< 0.04 U	325	65	< 0.04 U	3085	617	< 0.04 U	460	92	< 0.04 U	3790	758
Manganese (1312)	mg/L	< 0.005 U	2370816	147	< 0.005 U	2403072	149	< 0.005 U	2774016	172	< 0.005 U	2112768	131
Mercury (1312)	mg/L	< 0 UH	----	< 0.05 U	< 0 UH	----	0.09 B	< 0 UH	----	0.07 B	< 0 UH	----	0.12 B
Molybdenum (1312)	mg/L	< 0.01 U	----	< 1 U	0.01 B	----	6	< 0.01 U	----	3 B	0.04 B	----	14
Nickel (1312)	mg/L	< 0.01 U	1044	3 B	< 0.01 U	2088	6	< 0.01 U	1044	3 B	< 0.01 U	1740	5 B
Selenium (1312)	mg/L	0.008 B	21.85	1.9 B	0.049	219.67	117	0.008 B	211.60	18.4	0.165	24.25	**43.5 +**
Silver (1312)	mg/L	< 0.0003 U	10.13	0.38	< 0.0003 U	59.73	2.24	< 0.0003 U	23.73	0.89	< 0.0003 U	84.53	3.17
Uranium (1312)	mg/L	0.0426	----	122	0.0007 B	----	452	0.0068	----	167	0.0114	----	398
Vanadium (1312)	mg/L	0.154	----	729	2.33	----	3240	1.72	----	689	1.92	----	1960
Zinc (1312)	mg/L	< 0.01 U	33276	47	< 0.01 U	92040	130	< 0.01 U	31860	45	< 0.01 U	109032	154

Analyte	Units	VQ Segment 6			VQ Segment 7		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.001 B	----	< 0.5 U	< 0.001 U	----	< 1 U
Arsenic (1312)	mg/L	0.248	498	32.5	0.194	705	36
Barium (1312)	mg/L	0.014	----	32	0.026	----	108
Beryllium (1312)	mg/L	< 0.0005 U	----	0.27 B	< 0.0005 U	----	0.48
Cadmium (1312)	mg/L	< 0.0005 U	81	0.56	< 0.0005 U	108	0.75
Chromium (1312)	mg/L	< 0.01 U	11224	23	< 0.01 U	3904	8
Copper (1312)	mg/L	< 0.01 U	5820	97	< 0.01 U	13140	219
Iron (1312)	mg/L	0.02 B	2770000	2770	0.04 B	2720000	5440
Lead (1312)	mg/L	< 0.04 U	680	136	< 0.04 U	545	109
Manganese (1312)	mg/L	< 0.005 U	2612736	162	< 0.005 U	3451392	214
Mercury (1312)	mg/L	< 0 UH	----	0.08 B	< 0 UH	----	0.08 B
Molybdenum (1312)	mg/L	0.02 B	----	6	0.02 B	----	4 B
Nickel (1312)	mg/L	< 0.01 U	1392	4 B	< 0.01 U	2088	6
Selenium (1312)	mg/L	0.032 B	36.51	12.7	0.019 B	67.31	13.9
Silver (1312)	mg/L	< 0.0003 U	38.67	1.45	< 0.0003 U	47.73	1.79
Uranium (1312)	mg/L	0.0085	----	176	0.0151	----	372
Vanadium (1312)	mg/L	1.02	----	868	2.17	----	1990
Zinc (1312)	mg/L	< 0.01 U	41772	59	< 0.01 U	46728	66

Note: VQ Segment 2 was not collected due to unstable dump and unsafe work conditions
Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
UH Analyte was not detected at the Method Detection Limit; analysis exceeded method hold time
Shaded value in bold indicates level exceeds leaching RMC
+ Value exceeds RMC by 1 to 10 times
++ Value exceeds RMC by 10 to 100 times
+++ Value exceeds RMC by more than 100 times

Table 4.29: Selection of COCs in Ephemeral Drainage Sediment at the Vanadium Queen Mine

Analyte	Units	Background Soil			VQ Sed 1	VQ Sed 1 (Dup 8)	VQ Sed 2	VQ Sed 3
		Min	Max	Mean				
Antimony, total (3050)	mg/Kg	<0.1 U	0.3 B	0.2	0.1 B	< 0.1 U	< 0.1 U	0.1 B
Arsenic, total (3050)	mg/Kg	1.1	25.7	9.7	6.36	5.78	6.12	4.78
Barium, total (3050)	mg/Kg	128	419	205	271	398	367	260
Beryllium, total (3050)	mg/Kg	0.41	0.86	0.64	0.26 B	0.28 B	0.29 B	0.32
Cadmium, total (3050)	mg/Kg	0.09	1.34	0.30	0.19 B	0.28 B	0.17 B	0.19 B
Chromium, total (3050)	mg/Kg	5	12	8	4 B	4 B	3 B	4 B
Copper, total (3050)	mg/Kg	3	75	15	10	34	10	7
Iron, total (3050)	mg/Kg	4790	10600	7524	2950	3360	3060	3610
Lead, total (3050)	mg/Kg	8	82	19	**83 +**	71	50	42
Manganese, total (3050)	mg/Kg	151	397	269	158	207	131	147
Mercury, total	mg/Kg	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	<1 U	7	1	2 B	< 1 U	< 1 U	< 1 U
Nickel, total (3050)	mg/Kg	3	6	5	2 B	2 B	2 B	2 B
Selenium, total (3050)	mg/Kg	<0.5 U	5.2	1.2	1.7 B	**7 +**	**7.4 +**	**9.6 +**
Silver, total (3050)	mg/Kg	<0.5 U	<0.5 U	0.3	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	0.38	15.3	3.9	**25.9 +**	**29.1 +**	10.7	8.31
Vanadium, total (3050)	mg/Kg	10.7	136	40	116	**164 +**	96	74.5
Zinc, total (3050)	mg/Kg	12	125	28	13	16	15	12
Gross Alpha	pCi/g	3.39	87.8	20.3	3.35	9.06	3.94	2.75
Gross Beta	pCi/g	3.29	38.3	13.5	1.36	3.87	1.52	1.29
Radium 226 (3050)	pCi/g	0.49	13.2	3.3	0	3.74	0	0.08
Radium 228 (3050)	pCi/g	0.68	4.15	2.66	0.13	0.07	0.2	0.08
Thorium 228	pCi/g	0.24	0.81	0.40	0.06	-0.02	0.01	0.01
Thorium 230	pCi/g	-0.36	22.3	3.1	0.75	0.86	0.37	0.3
Thorium 232	pCi/g	0.08	0.53	0.35	0.04	0	0.01	0.02
Solids, Percent	%	87.3	94.8	91.5	97.9	97.2	96.2	92.2

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
Value in bold indicates level exceeds maximum background value
\+ Media concentration >1-10 times maximum background
++ Media concentration >10-100 times maximum background
+++ Media concentration >100 times maximum background

Table 4.30: Comparison of COC Concentrations in Ephemeral Drainage Sediment at the Vanadium Queen Mine to Camper RMC, Industrial SSLs, and Elk RMC

Analyte	Units	RMC Camper	SSL Industrial	Modified Elk RMC[1]	VQ Sed 1	VQ Sed 1 (Dup 8)	VQ Sed 2	VQ Sed 3
Lead, total (3050)	mg/Kg	1,000	----	81280	83	71	50	42
Selenium, total (3050)	mg/Kg	774	----	----	1.7 B	7	7.4	9.6
Uranium, total (3050)	mg/Kg	----	3066	2126720	25.9	29.1	10.7	8.31
Vanadium, total (3050)	mg/Kg	----	7154	179200	116	164	96	74.5

[1] Modified by area use factor (RMC/[1.0 acres/640 acres]); 1 acre determined from aerial photograph
Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
Shaded value in bold indicates level exceeds RMC or SSL
\+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times
++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times
+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Table 4.31: Comparison of Metal and Radionuclide Levels in Vegetation at the Vanadium Queen Mine to Maximum Tolerable Levels and Background Values

Mine Drainage Channel

Analyte	Units	Maximum Tolerable Level[1]	Grass			Forb	
			Ref Area	Adit Drainage	Adit Drg (dup)	Ref Area	Adit Drainage
Antimony, total (3050)	mg/Kg	----	< 0.1 U	**0.3 B+**	**0.2 B+**	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	50	< 0.3 U	**1.5 +**	**1.4 +**	< 0.3 U	**1.2 +**
Barium, total (3050)	mg/Kg	20	**41.5 +**	**49.1 +**	**33.3 +**	**106 +**	**42.6 +**
Beryllium, total (3050)	mg/Kg	----	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.5	0.07 B	**0.21 B+**	**0.54 +**	0.12 B	0.09 B
Chromium, total (3050)	mg/Kg	1,000	1 B	< 1 U	1 B	2 B	< 1 U
Copper, total (3050)	mg/Kg	25	2 B	**4 B+**	**5 B+**	7	**9 +**
Iron, total (3050)	mg/Kg	500	322	120	222	252	102
Lead, total (3050)	mg/Kg	30	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	400	95	**221 +**	93.8	74.2	**145 +**
Mercury, total	mg/Kg	2	0 UH	< 0.1 U	< 0.1 U	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	10	5 B	**19 +**	**18 +**	3 B	**41 +**
Nickel, total (3050)	mg/Kg	50	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2	**2.4 B+**	**47 ++**	**39.1 ++**	**7.4 +**	**67 ++**
Silver, total (3050)	mg/Kg	100	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	----	0.03 B	**13.5 +++**	**4.24 +++**	0.07 B	**1.47 ++**
Vanadium, total (3050)	mg/Kg	10	0.7 B	**15.9 +**	**11.6 +**	0.8 B	**4.1 +**
Zinc, total (3050)	mg/Kg	300	10	**23 +**	**55 +**	30	**42 +**
Gross Alpha	pCi/g	----	1.63	**89.8 ++**	**100 ++**	0.94	**14.5 ++**
Gross Beta	pCi/g	----	7.15	**164 ++**	**256 ++**	13.6	**19.7 +**
Radium 226 (3050)	pCi/g	----	1.98	**10.1 +**	**7.85 +**	0.07	**6.1 ++**
Radium 228 (3050)	pCi/g	----	1.65	**1.83 +**	1.63	2.02	0.96
Thorium 228	pCi/g	----	-0.1	-0.06	**0.11 +**	0.14	-0.06
Thorium 230	pCi/g	----	-0.59	**1.03 +**	-0.02	-0.28	-0.21
Thorium 232	pCi/g	----	-0.17	**0.09 +**	-0.44	0.06	**0.15 +**
Moisture Content	%	----	41.4	62.2	51.2	66.6	65.9

Perimeter of Waste-Rock Dump

Analyte	Units	Maximum Tolerable Level[1]	Grass		Forb		Shrub	
			Ref Area	Perimeter	Ref Area	Perimeter	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	----	< 0.1 U	**0.3 B+**	< 0.1 U	< 0.2 U	< 0.1 U	< 0.6 U
Arsenic, total (3050)	mg/Kg	50	< 0.3 U	**4.5 ++**	< 0.3 U	**9.5 ++**	< 0.3 U	**3 B+**
Barium, total (3050)	mg/Kg	20	**41.5 +**	18.1	**106 +**	13.4	**90.8 +**	7
Beryllium, total (3050)	mg/Kg	----	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.06 U	< 0.06 U
Cadmium, total (3050)	mg/Kg	0.5	0.07 B	**1.06 +**	0.12 B	**0.43 +**	0.06 B	**0.35 +**
Chromium, total (3050)	mg/Kg	1,000	1 B	1 B	2 B	1 B	2 B	< 1 U
Copper, total (3050)	mg/Kg	25	2 B	**20 +**	7	**15 +**	7	**25 +**
Iron, total (3050)	mg/Kg	500	322	260	252	148	255	205
Lead, total (3050)	mg/Kg	30	< 4 U	**40 +**	< 4 U	< 4 U	< 4 U	**6 B+**
Manganese, total (3050)	mg/Kg	400	95	47.6	74.2	59	42.4	35.6
Mercury, total	mg/Kg	2	0 UH	< 0.1 U	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	10	5 B	**58 +**	3 B	**115 ++**	< 1 U	**21 +**
Nickel, total (3050)	mg/Kg	50	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**1 B+**
Selenium, total (3050)	mg/Kg	2	**2.4 B+**	**81.7 ++**	**7.4 +**	**519 +++**	1.3 B	**152 ++**
Silver, total (3050)	mg/Kg	100	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U
Uranium, total (3050)	mg/Kg	----	0.03 B	**17.5 +++**	0.07 B	**5.35 ++**	< 0.03 U	**2.62 ++**
Vanadium, total (3050)	mg/Kg	10	0.7 B	**53.4 +**	0.8 B	**17.1 +**	0.6 B	**13.7 +**
Zinc, total (3050)	mg/Kg	300	10	**47 +**	30	**66 +**	33	147
Gross Alpha	pCi/g	----	1.63	**40.6 ++**	0.94	**23.2 ++**	2.25	**14.1 +**
Gross Beta	pCi/g	----	7.15	**22.1 +**	13.6	**27.8 +**	9.2	**17.4 +**
Radium 226 (3050)	pCi/g	----	1.98	**9.75 +**	0.07	**6.84 ++**	0.45	**4.45 +**
Radium 228 (3050)	pCi/g	----	1.65	**2.22 +**	2.02	**3.7 +**	2.31	1.87
Thorium 228	pCi/g	----	-0.1	-0.06	0.14	-0.03	-0.13	-0.11
Thorium 230	pCi/g	----	-0.59	**3.27 +**	-0.28	**4.26 +**	-0.44	**0.08 +**
Thorium 232	pCi/g	----	-0.17	-0.14	0.06	**0.14 +**	0.05	-0.16
Moisture Content	%	----	41.4	73.6	66.6	60.6	46.1	52.2

[1] Most restrictive value reported for cattle, sheep, swine, horse, and rabbit in *Mineral Tolerance of Domestic Animals* (National Research Council, 1980)

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time was exceeded

Shaded Value in bold indicates level exceeds maximum tolerable level

\+ Media concentration exceeds criterion (shaded) or background (not shaded) by 1 to 10 times

++ Media concentration exceeds criterion (shaded) or background (not shaded) by 10 to 100 times

+++ Media concentration exceeds criterion (shaded) or background (not shaded) by more than 100 times

Table 4.32: Comparison of Surface-Water Results for La Sal Creek Near the Black Hat/Blue Cap Mine Complex to Aquatic-Life Chronic Standards

Analyte	Units	Aquatic-Life Std.		LA SAL CREEK DN4[1]				LA SAL CREEK DN5[2]			
		Colorado	Utah	04/20/04		10/12/04		04/20/04		10/12/04	
PHYSICAL (field parameters)											
Flow	cfs	-----	-----	7.0800		2.3400		7.6500		2.90905	
Temperature	°C	-----	-----	8.2		10.2		6.1		9.9	
pH	s.u.	6.5 - 9.0	6.5 - 9.0	9		8.29		8.84		8.28	
Specific Conductance	(uS/cm)	-----	-----	208		359		197.4		358	
Dissolved Oxygen	(mg/L)	5.0	6.5	nm		nm		nm		nm	
Oxidation Reduction Potential	Rmev	-----	-----	nm		nm		nm		nm	
INORGANIC											
Nitrite	(mg/L)	0.05	-----	< 0.01	U	na		< 0.01	U	na	
Nitrate	(mg/L)	10	4	0.08	B	na		0.07	B	na	
Chloride	(mg/L)	250	-----	4	B	5	B	4	B	4	B
Sulfate	(mg/L)	250	-----	20	B	30	B	20	B	30	B
Total Phosphorous as P	(mg/L)	-----	0.05	0.05		**0.57**	**++**	0.05	B	0.03	B
Total Dissolved Solids	(mg/L)	-----	-----	190		210	H	170		180	H
Total Suspended Solids	(mg/L)	-----	35	28		**116**	**+**	26		10	B
Bicarbonate as CaCO3	(mg/L)	-----	-----	134		155		138		166	
Carbonate as CaCO3	(mg/L)	-----	-----	3	B	< 2	U	< 2	U	< 2	U
Cation-Anion Balance	%	-----	-----	1.5		2.6		0		0	
Hardness as CaCO3	(mg/L)	-----	-----	143		174		144		172	
Hydroxide as CaCO3	(mg/L)	-----	-----	< 2	U	< 2	U	< 2	U	< 2	U
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----	0.08	B	na		0.07	B	na	
Sum of Anions	meq/L	-----	-----	3.2		3.8		3.3		4	
Sum of Cations	meq/L	-----	-----	3.3		4		3.3		4	
TDS (calculated)	(mg/L)	-----	-----	171		202		170		207	
TDS (ratio - measured/calculated)		-----	-----	1.11		1.04		1		0.87	
Total Alkalinity	(mg/L)	-----	-----	137		155		138		166	
METALS											
Antimony, dissolved	µg/L	-----	-----	0.3	B	< 0.2	U	0.2	B	< 0.2	U
Antimony, total	µg/L	-----	-----	< 0.2	U	< 0.2	U	< 0.2	U	< 0.2	U
Arsenic, dissolved	µg/L	-----	-----	1.3		2.3	B	1.4		2.2	B
Arsenic, total recoverable	µg/L	-----	190	1.5		< 3	U	1.5		1.9	B
Barium, dissolved	µg/L	-----	-----	142		141		144		149	
Barium, total	µg/L	-----	-----	154		138		158		145	
Beryllium, dissolved	µg/L	-----	-----	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U
Beryllium, total	µg/L	-----	-----	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U
Cadmium, dissolved	µg/L	3.5 [3]	1.8 [3]	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U
Cadmium, total	µg/L	-----	-----	< 0.1	U	< 0.1	U	< 0.1	U	< 0.1	U
Calcium, dissolved	µg/L			41600		45900		41600		44800	
Chromium, dissolved	µg/L	122 [3]	340 [3]	< 10	U	< 10	U	< 10	U	< 10	U
Chromium, total	µg/L	-----	-----	< 10	U	< 20	U	< 10	U	< 10	U
Copper, dissolved	µg/L	15 [3]	20 [3]	< 10	U	< 10	U	< 10	U	< 10	U
Copper, total	µg/L	-----	-----	< 10	U	< 20	U	< 10	U	< 10	U
Iron, dissolved	µg/L	-----	1000	60		30	B	60		30	B
Iron, total recoverable	µg/L	1000	-----	840		170		900		240	
Lead, dissolved	µg/L	5 [3]	7 [3]	< 0.1	U	0.4	B	< 0.1	U	0.4	B
Lead, total	µg/L	-----	-----	1.2		< 0.1	U	1.3		< 0.1	U
Magnesium, dissolved	µg/L			9500		14500		9800		14700	
Manganese, dissolved	µg/L	2016 [3]	-----	29	B	29	B	28	B	22	B
Manganese, total	µg/L	-----	-----	75		30	B	75		27	B
Mercury, dissolved	µg/L	-----	0.012	< 0.2	U	< 0.2	U	< 0.2	U	< 0.2	U
Mercury, total	µg/L	0.01	-----	< 0.2	U	< 0.2	U	< 0.2	U	< 0.2	U
Molybdenum, dissolved	µg/L	-----	-----	< 10	U	< 10	U	< 10	U	< 10	U
Molybdenum, total	µg/L	-----	-----	< 10	U	< 20	U	< 10	U	< 10	U
Nickel, dissolved	µg/L	87 [3]	263 [3]	< 10	U	< 10	U	< 10	U	< 10	U
Nickel, total	µg/L	-----	-----	< 10	U	< 20	U	< 10	U	< 10	U
Potassium, dissolved	µg/L			2400		2400		2200		2300	
Selenium, dissolved	µg/L	4.6 [3]	5	1.6		< 1	U	2		< 1	U
Selenium, total	µg/L	-----	-----	1.3		< 1	U	1.6		< 1	U
Silver, dissolved	µg/L	0.2 [3]	-----	< 0.05	U	< 0.05	U	< 0.05	U	< 0.05	U
Silver, total	µg/L	-----	-----	< 0.05	U	< 0.05	U	< 0.05	U	< 0.05	U
Sodium, dissolved	µg/L			9300		11400		9200		11600	
Uranium, dissolved	µg/L	-----	-----	4.1		7.09		7.25		17	
Uranium, total	µg/L	-----	-----	4.58		6.42		7.66		15.5	
Vanadium, dissolved	µg/L	-----	-----	< 5	U	< 5	U	< 5	U	< 5	U
Vanadium, total	µg/L	-----	-----	5	B	< 10	U	6	B	7	B
Zinc, dissolved	µg/L	197 [3]	177 [3]	< 10	U	< 10	U	< 10	U	< 10	U
Zinc, total	µg/L	-----	-----	< 10	U	< 20	U	< 10	U	< 10	U
RADIOLOGICAL (pCi/L)											
Gross Alpha	pCi/L	-----	15	3.53		9.3		4.84		**30.3**	**+**
Gross Beta	pCi/L	-----	50	3.35		4.45		3.41		19.1	
Radium 226 and 228 (combined)	pCi/L	-----	-----	0.32		0		0.83		0	
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.57		0		0.39		0	
Thorium 228	pCi/L	-----	-----	0.03		0.17		0.05		0	

[1] Station LA SAL CREEK DN4 located immediately upstream of mine area

[2] Station LA SAL CREEK DN5 located immediately downstream of mine area

[3] Hardness-dependent criterion calculated using hardness value of 183 mg/L

nm = not measured; na = not analyzed

Shaded value in bold indicates level exceeds aquatic-life standard

\+ Media concentration >1-10 times standard

++ Media concentration >10-100 times standard

+++ Media concentration >100 times standard

Table 4.32 B: Total Metals and Radionuclides in Stream Sediment Compared to Consensus-Based Probable Effects Concentrations at the La Sal Creek Surface-Water Stations near the Lion Canyon Creek Confluence

Analyte	Units	Consensus-Based PEL[1]	La Sal Crk DN 4 Sed	La Sal Crk DN 5 Sed
Antimony, total (3050)	mg/Kg	----	0.3 B	0.2 B
Arsenic, total (3050)	mg/Kg	33	6.2	3.7
Barium, total (3050)	mg/Kg	----	284	302
Beryllium, total (3050)	mg/Kg	----	1.06	0.3
Cadmium, total (3050)	mg/Kg	4.98	0.71	0.28 B
Chromium, total (3050)	mg/Kg	111	16	6
Copper, total (3050)	mg/Kg	149	16	14
Iron, total (3050)	mg/Kg	----	16200	5150
Lead, total (3050)	mg/Kg	128	25	20
Manganese, total (3050)	mg/Kg	----	757	233
Mercury, total	mg/Kg	1.06	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	----	1 B	< 1 U
Nickel, total (3050)	mg/Kg	48.6	10	3 B
Selenium, total (3050)	mg/Kg	----	< 0.5 U	2 B
Silver, total (3050)	mg/Kg	----	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	----	3.76	8.92
Vanadium, total (3050)	mg/Kg	----	53.2	127
Zinc, total (3050)	mg/Kg	459	49	20
Gross Alpha	pCi/g	----	20.9	30.8
Gross Beta	pCi/g	----	19.7	19.3
Radium 226 (3050)	pCi/g	----	3.64	3.81
Radium 228 (3050)	pCi/g	----	1.43	2.62
Thorium 228	pCi/g	----	0.76	0.62
Thorium 230	pCi/g	----	1.58	4.8
Thorium 232	pCi/g	----	0.79	0.19
Solids, Percent	%	----	49.9	74.5

[1] From Prediction of Sediment Toxicity Using Consensus-Based Freshwater Sediment Quality Guidelines (EPA, 2000)

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds consensus-based PEL

\+ Media concentration >1-10 times criterion

++ Media concentration >10-100 times criterion

+++ Media concentration >100 times criterion

Table 4.33: Comparison of Analytical Results for Surface Water in Lion Canyon Creek and La Sal Creek to Human-Health Risk Criteria

Analyte	Units	RMC Camper	Modified MCL[1]	Max. Bkg. Value		LIONCYNCK - UP		LIONCYNCK - DN1			LIONCYNCK - DN2		LA SAL CREEK DN5	
				Apr-04	Oct-04	04/13/04	10/12/04	04/13/04	10/12/04	10/12/04 (dup)	04/13/04	10/12/04	04/20/04	10/12/04
PHYSICAL (field parameters)														
Flow	cfs	-----	-----	3.75	0.94	1.30E-03	2.31E-03	1.57E-02	~ 1.40E-02	~ 1.40E-02	2.01E-01	3.93E-02	7.6500	2.90905
Temperature	°c	-----	-----	8.20	12.7	11.3	12.4	13.2	13.3	13.3	13.1	13.7	6.1	9.9
pH	s.u.	-----	-----	9.11	8.5	8.33	8.23	8.89	8.82	8.82	8.35	8.29	8.84	8.28
Specific Conductance	(uS/cm)	-----	-----	345	557	640	691	578	593	593	280	298	197.4	358
Dissolved Oxygen	(mg/L)	-----	-----	nm	nm	7.58	6.82	8.23	7.75	7.75	8.15	8.43	nm	nm
Oxidation Reduction Potential	Rmev	-----	-----	nm	nm	81.7	107.7	46.5	64.8	64.8	32.2	16.2	nm	nm
INORGANIC														
Nitrite	(mg/L)	-----	26	< 0.01	na	< 0.01 U	na	0.07 +	na	na	< 0.01 U	na	< 0.01 U	na
Nitrate	(mg/L)	-----	260	0.15	na	0.27 +	na	< 0.76 U	na	na	0.16 +	na	0.07 B	na
Chloride	(mg/L)	-----	-----	15	11	13	7	6	6	6	1 B	2 B	4 B	4 B
Sulfate	(mg/L)	-----	-----	60	30 B	70 +	100 +	70 +	70 +	70 +	10 B	20 B	20 B	30 B
Total Phosphorous as P	(mg/L)	-----	-----	0.13	0.03 B	0.04 B	0.04 B+	0.02 B	0.02 B	0.02 B	0.01 B	0.01 B	0.05 B	0.03 B
Total Dissolved Solids	(mg/L)	-----	-----	300	330	440 +	460 H+	380 +	360 H+	390 H+	170	170 H	170	180 H
Total Suspended Solids	(mg/L)	-----	-----	326	8 B	18 B	< 5 U	8 B	6 BH	6 BH	6 B	< 5 U	26	10 B+
Bicarbonate as CaCO3	(mg/L)	-----	-----	194	264	274 +	286 +	231 +	241	252	145	156	138	166
Carbonate as CaCO3	(mg/L)	-----	-----	8 B	13	7 B	< 2 U	31 +	42 +	42 +	< 2 U	< 2 U	< 2 U	< 2 U
Cation-Anion Balance	%	-----	-----	2.0	1.9	5.1 +	2.4 +	4.8 +	0	-1.4	6.1 +	0	0	0
Hardness as CaCO3	(mg/L)	-----	-----	227	209	111	168	165	168	167	145	147	144	172
Hydroxide as CaCO3	(mg/L)	-----	-----	< 2	< 2	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----	0.15	na	0.27 +	na	0.76 +	na	na	0.16 +	na	0.07 B	na
Sum of Anions	meq/L	-----	-----	5.7	6.0	7.4 +	8 +	6.9 +	7.3 +	7.5 +	3.1	3.6	3.3	4
Sum of Cations	meq/L	-----	-----	5.5	6.1	8.2 +	8.4 +	7.6 +	7.3 +	7.3 +	3.5	3.6	3.3	4
TDS (calculated)	(mg/L)	-----	-----	305	318	433 +	455 +	404 +	412 +	418 +	163	180	170	207
TDS (ratio - measured/calculated)		-----	-----	1.10	1.12	1.02	1.01	0.94	0.87	0.93	1.04	0.94	1	0.87
Total Alkalinity	(mg/L)	-----	-----	202	277	280 +	286 +	262 +	283 +	293 +	145	156	138	166
METALS														
Antimony, dissolved	µg/L	124	-----	< 0.2	< 0.2	< 2 U	0.8 B+	< 1 U	0.5 B+	0.5 B+	< 0.4 U	< 0.2 U	0.2 B+	< 0.2 U
Antimony, total	µg/L	-----	156	< 0.4	< 0.2	0.6 B+	0.8 B+	0.5 B+	0.5 B+	0.5 B+	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Arsenic, dissolved	µg/L	93	-----	1.9	5.8	46.2 B++	46.8 +	36.7 ++	33 +	29.4 +	4.5 +	5.8	1.4	2.2 B
Arsenic, total recoverable	µg/L	-----	260	3.4	5.1	40.6 B++	44.7 +	31.7 +	28.3 +	32 +	4.5 +	5.4 +	1.5	1.9 B
Barium, dissolved	µg/L	-----	-----	146	177	75 B	93	107	133	131	209 +	214 +	144	149
Barium, total	µg/L	-----	52000	194	193	78 B	90	120	126	125	193	207 +	158	145
Beryllium, dissolved	µg/L	-----	-----	< 0.1	< 0.1	< 1 B	< 0.1 U	< 0.5 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	-----	104	<0.2	< 0.1	< 0.1 B	< 0.2 U	< 0.1 U	< 1 U	< 1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, dissolved	µg/L	155	-----	< 0.1	< 0.1	0.3 B	< 0.1 U	0.2 B+	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	-----	130	< 0.2	< 0.1	0.3 B	< 0.2 U	0.4 B+	0.1 B+	< 0.2 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Calcium, dissolved	µg/L	-----	-----	65400	64400	26100	38200	32300	34300	34000	31400	32100	41600	44800
Chromium, dissolved	µg/L	-----	-----	< 10	< 10	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	-----	2600	< 10	< 10	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	11,490	-----	< 10	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	-----	33800	< 10	< 10	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	-----	-----	110	40 B	40 B	10 B	20 B	< 10 U	< 10 U	50 B	40 B	60	30 B
Iron, total recoverable	µg/L	-----	-----	2910	200	340	130	610	70	110	240	500 +	900	240 +
Lead, dissolved	µg/L	50	-----	0.2 B	< 0.1	0.4 B+	6 +	0.2 B	< 0.1 U	7 +	< 0.1 U	0.4 B+	< 0.1 U	0.4 B+
Lead, total	µg/L	-----	390	3.3	0.3 B	1.7	< 1 U	3.7 +	< 1 U	< 1 U	0.6	< 0.1 U	1.3	< 0.1 U
Magnesium, dissolved	µg/L	-----	-----	15500	13200	11100	17700 +	20400 +	19900 +	19900 +	16300 +	16200 +	9800	14700 +
Manganese, dissolved	µg/L	1,548	-----	27 B	19 B	14 B	14 B	< 5 U	< 5 U	< 5 U	57 +	88 +	28 B+	22 B+
Manganese, total	µg/L	-----	-----	218	40	33	20 B	43	6 B	8 B	68	90 +	75	27 B
Mercury, dissolved	µg/L	93	-----	< 0.2	< 0.2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	-----	52	< 0.2	< 0.2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 1 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	-----	-----	< 10	< 10	170 ++	190 ++	120 ++	110 ++	110 ++	20 B+	10 B+	< 10 U	< 10 U
Molybdenum, total	µg/L	-----	-----	10 B	< 10	160 ++	180 ++	110 ++	110 ++	110 ++	< 10 U	20 B+	< 10 U	< 10 U
Nickel, dissolved	µg/L	6,194	-----	< 10	< 10	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	-----	-----	10 B	< 10	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	-----	-----	3100	7600	8200 +	9200 +	8900 +	8300 +	8300 +	2200	2300	2200	2300
Selenium, dissolved	µg/L	1,548	-----	0.9	1 B	274 +++	330 +++	241 +++	167 +++	162 +++	20.2 ++	9 +	2 +	< 1 U
Selenium, total	µg/L	-----	1300	0.8	1 B	260 +++	268 +++	184 +++	145 +++	131 +++	15.8 ++	11 ++	1.6 +	< 1 U
Silver, dissolved	µg/L	1,548	-----	< 0.05	< 0.05	< 0.05 U	< 0.05 U	0.07 B+	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	-----	-----	< 0.1	< 0.05	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Sodium, dissolved	µg/L	-----	-----	22700	39200	132000 +	111000 +	93200 +	86800 +	86500 +	14100	14100	9200	11600
Uranium, dissolved	µg/L	-----	-----	5.20	7.28	1200 +++	1080 +++	744 +++	754 +++	760 +++	97.2 ++	131 ++	7.25 +	17 +
Uranium, total	µg/L	-----	780	4.74	7.43	**1240 +**	**938 +**	763 +++	653 ++	652 ++	114 ++	116 ++	7.66 +	15.5 +
Vanadium, dissolved	µg/L	-----	-----	< 5	< 5	393 ++	630 +++	531 +++	533 +++	534 +++	50 +	53 ++	< 5 U	< 5 U
Vanadium, total	µg/L	-----	-----	8 B	< 5	397 ++	578 +++	558 ++	519 +++	518 +++	55 +	64 ++	6 B	7 B+
Zinc, dissolved	µg/L	92,909	-----	< 10	< 10	< 10 U	< 10 U	< 10 U	20 B+	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Zinc, total	µg/L	-----	-----	10 B	< 10	< 10 U	10 B+	20 B+	10 B+	10 B+	< 10 U	< 10 U	< 10 U	< 10 U
RADIOLOGICAL (pCi/L)														
Gross Alpha	pCi/L	-----	-----	19.00	5.13	656 ++	691 +++	353 ++	506 ++	559 +++	94.8 +	105 ++	4.84	30.3 +
Gross Alpha (excl. uranium)	pCi/L	---	390	15.82	0.15	-174.80	62.54 +++	-158.21	68.49 +++	122.16 +++	18.42 +	27.28 +++	-0.29	19.92 +++
Gross Beta	pCi/L	-----	-----	18.00	13.40	239 ++	226 ++	136 +	150 ++	137 ++	26.9 +	32.6 +	3.41	19.1 +
Radium 226 and 228 (combined)	pCi/L	-----	130	1.06	0.73	10.22 +	14.3 ++	11.38 ++	14.48 ++	13.99 ++	4.74 +	7.15 +	0.83	3.34 +
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.11	0.05	0.67 +	-0.51	1.17 ++	0.55 ++	0.86 ++	-0.05	-0.3	0.39 +	2.39 ++
Thorium 228	pCi/L	-----	-----	0.36	0.00	0.07	-0.05	-0.07	-0.05	-0.05	0.05	-0.08	0.05	0

[1] MCL modified with exposure factor of 365/14 days to better evaluate risk to campers.

Shaded value in bold indicates level exceeds human-health criterion

\+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

nm = not measured; na = not analyzed

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

Table 4.34: Comparison of Analytical Results for Surface Water in Lion Canyon Creek and La Sal Creek to Aquatic-Life Standards

Analyte	Units	Aquatic Life Std.		Max. Bkg. Value		LIONCYNCK - UP		LIONCYNCK - DN1			LIONCYNCK - DN2		LA SAL CREEK DN5	
		Colorado	Utah	Apr-04	Oct-04	04/13/04	10/12/04	04/13/04	10/12/04	10/12/04 (dup)	04/13/04	10/12/04	04/20/04	10/12/04
PHYSICAL (field parameters)														
Flow	cfs	-----	-----	3.75	0.94	1.30E-03	2.31E-03	1.57E-02	~ 1.40E-02	~ 1.40E-02	2.01E-01	3.93E-02	7.6500	2.90905
Temperature	°c	-----	-----	8.20	12.7	11.3	12.4	13.2	13.3	13.3	13.1	13.7	6.1	9.9
pH	s.u.	6.5 - 9.0	6.5 - 9.0	9.11	8.5	8.33	8.23	8.89	8.82	8.82	8.35	8.29	8.84	8.28
Specific Conductance	(uS/cm)	-----	-----	345	557	640	691	578	593	593	280	298	197.4	358
Dissolved Oxygen	(mg/L)	5.0	6.5	nm	nm	7.58	6.82	8.23	7.75	7.75	8.15	8.43	nm	nm
Oxidation Reduction Potential	Rmev	-----	-----	nm	nm	81.7	107.7	46.5	64.8	64.8	32.2	16.2	nm	nm
INORGANIC														
Nitrite	(mg/L)	0.05	-----	< 0.01	na	< 0.01 U	na	**0.07 +**	na	na	< 0.01 U	na	< 0.01 U	na
Nitrate	(mg/L)	10	4	0.15	na	0.27 +	na	< 0.76 U	na	na	0.16 +	na	0.07 B	na
Chloride	(mg/L)	250	-----	15	11	13	7	6	6	6	1 B	2 B	4 B	4 B
Sulfate	(mg/L)	250	-----	60	30 B	70 +	100 +	70 +	70 +	70 +	10 B	20 B	20 B	30 B
Total Phosphorous as P	(mg/L)	-----	0.05	0.13	0.03 B	0.04 B	0.04 B+	0.02 B	0.02 B	0.02 B	0.01 B	0.01 B	0.05 B	0.03 B
Total Dissolved Solids	(mg/L)	-----	-----	300	330	440 +	460 H+	380 +	360 H+	390 H+	170	170 H	170	180 H
Total Suspended Solids	(mg/L)	-----	35	326	8 B	18 B	< 5 U	8 B	6 BH	6 BH	6 B	< 5 U	26	10 B+
Bicarbonate as CaCO3	(mg/L)	-----	-----	194	264	274 +	286 +	231 +	241	252	145	156	138	166
Carbonate as CaCO3	(mg/L)	-----	-----	8 B	13	7 B	< 2 U	31 +	42 +	42 +	< 2 U	< 2 U	< 2 U	< 2 U
Cation-Anion Balance	%	-----	-----	2.0	1.9	5.1 +	2.4 +	4.8 +	0	-1.4	6.1 +	0	0	0
Hardness as CaCO3	(mg/L)	-----	-----	227	209	111	168	165	168	167	145	147	144	172
Hydroxide as CaCO3	(mg/L)	-----	-----	< 2	< 2	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----	0.15	na	0.27 +	na	0.76 +	na	na	0.16 +	na	0.07 B	na
Sum of Anions	meq/L	-----	-----	5.7	6.0	7.4 +	8 +	6.9 +	7.3 +	7.5 +	3.1	3.6	3.3	4
Sum of Cations	meq/L	-----	-----	5.5	6.1	8.2 +	8.4 +	7.6 +	7.3 +	7.3 +	3.5	3.6	3.3	4
TDS (calculated)	(mg/L)	-----	-----	305	318	433 +	455 +	404 +	412 +	418 +	163	180	170	207
TDS (ratio - measured/calculated)		-----	-----	1.10	1.12	1.02	1.01	0.94	0.87	0.93	1.04	0.94	1	0.87
Total Alkalinity	(mg/L)	-----	-----	202	277	280 +	286 +	262 +	283 +	293 +	145	156	138	166
METALS														
Antimony, dissolved	µg/L	-----	-----	< 0.2	< 0.2	< 2 U	0.8 B+	< 1 U	0.5 B+	0.5 B+	< 0.4 U	< 0.2 U	0.2 B+	< 0.2 U
Antimony, total	µg/L	-----	-----	< 0.4	< 0.2	0.6 B+	0.8 B+	0.5 B+	0.5 B+	0.5 B+	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Arsenic, dissolved	µg/L	-----	-----	1.9	5.8	46.2 B++	46.8 +	36.7 ++	33 +	29.4 +	4.5 +	5.8	1.4	2.2 B
Arsenic, total recoverable	µg/L	-----	190	3.4	5.1	40.6 B++	44.7 +	31.7 +	28.3 +	32 +	4.5 +	5.4 +	1.5	1.9 B
Barium, dissolved	µg/L	-----	-----	146	177	75 B	93	107	133	131	209 +	214 +	144	149
Barium, total	µg/L	-----	-----	194	193	78 B	90	120	126	125	193	207 +	158	145
Beryllium, dissolved	µg/L	-----	-----	< 0.1	< 0.1	< 1 B	< 0.1 U	< 0.5 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	-----	-----	<0.2	< 0.1	< 0.1 B	< 0.2 U	< 0.1 U	< 1 U	< 1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, dissolved	µg/L	3.5 [1]	1.8 [1]	< 0.1	< 0.1	0.3 B	< 0.1 U	0.2 B+	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	-----	-----	< 0.2	< 0.1	0.3 B	< 0.2 U	0.4 B+	0.1 B+	< 0.2 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Calcium, dissolved	µg/L	-----	-----	65400	64400	26100	38200	32300	34300	34000	31400	32100	41600	44800
Chromium, dissolved	µg/L	122 [1]	340 [1]	< 10	< 10	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	-----	-----	< 10	< 10	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	15 [1]	20 [1]	< 10	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	-----	-----	< 10	< 10	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	-----	1000	110	40 B	40 B	10 B	20 B	< 10 U	< 10 U	50 B	40 B	60	30 B
Iron, total recoverable	µg/L	1000	-----	2910	200	340	130	610	70	110	240	500 +	900	240 +
Lead, dissolved	µg/L	5 [1]	7 [1]	0.2 B	< 0.1	0.4 B+	**6 +**	0.2 B	< 0.1 U	**7 +**	< 0.1 U	0.4 B+	< 0.1 U	0.4 B+
Lead, total	µg/L	-----	-----	3.3	0.3 B	1.7	< 1 U	3.7 +	< 1 U	< 1 U	0.6	< 0.1 U	1.3	< 0.1 U
Magnesium, dissolved	µg/L	-----	-----	15500	13200	11100	17700 +	20400 +	19900 +	19900 +	16300 +	16200 +	9800	14700 +
Manganese, dissolved	µg/L	2016 [1]	-----	27 B	19 B	14 B	14 B	< 5 U	< 5 U	< 5 U	57 +	88 +	28 B+	22 B+
Manganese, total	µg/L	-----	-----	218	40	33	20 B	43	6 B	8 B	68	90 +	75	27 B
Mercury, dissolved	µg/L	-----	0.012	< 0.2	< 0.2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	0.01	-----	< 0.2	< 0.2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 1 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	-----	-----	< 10	< 10	170 ++	190 ++	120 ++	110 ++	110 ++	20 B+	10 B+	< 10 U	< 10 U
Molybdenum, total	µg/L	-----	-----	10 B	< 10	160 ++	180 ++	110 ++	110 ++	110 ++	< 10 U	20 B+	< 10 U	< 10 U
Nickel, dissolved	µg/L	87 [1]	263 [1]	< 10	< 10	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	-----	-----	10 B	< 10	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	-----	-----	3100	7600	8200 +	9200 +	8900 +	8300 +	8300 +	2200	2300	2200	2300
Selenium, dissolved	µg/L	4.6 [1]	5	0.9	1 B	**274 ++**	**330 ++**	**241 ++**	**167 ++**	**162 ++**	**20.2 +**	**9 +**	2 +	< 1 U
Selenium, total	µg/L	-----	-----	0.8	1 B	260 +++	268 +++	184 +++	145 +++	131 +++	15.8 ++	11 ++	1.6 +	< 1 U
Silver, dissolved	µg/L	0.2 [1]	-----	< 0.05	< 0.05	< 0.05 U	< 0.05 U	0.07 B+	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	-----	-----	< 0.1	< 0.05	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Sodium, dissolved	µg/L	-----	-----	22700	39200	132000 +	111000 +	93200 +	86800 +	86500 +	14100	14100	9200	11600
Uranium, dissolved	µg/L	-----	-----	5.20	7.28	1200 +++	1080 +++	744 +++	754 +++	760 +++	97.2 ++	131 ++	7.25 +	17 +
Uranium, total	µg/L	-----	-----	4.74	7.43	1240 +++	938 +++	763 +++	653 +++	652 ++	114 +	116 +	7.66 +	15.5 +
Vanadium, dissolved	µg/L	-----	-----	< 5	< 5	393 ++	630 +++	531 +++	533 +++	534 +++	50 +	53 ++	< 5 U	< 5 U
Vanadium, total	µg/L	-----	-----	8 B	< 5	397 ++	578 +++	558 ++	519 +++	518 +++	55 +	64 ++	6 B	7 B+
Zinc, dissolved	µg/L	197 [1]	177 [1]	< 10	< 10	< 10 U	< 10 U	< 10 U	20 B+	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Zinc, total	µg/L	-----	-----	10 B	< 10	< 10 U	10 B+	20 B+	10 B+	10 B+	< 10 U	< 10 U	< 10 U	< 10 U
RADIOLOGICAL (pCi/L)														
Gross Alpha	pCi/L	-----	15	19.00	5.13	**656 ++**	**691 ++**	**353 ++**	**506 ++**	**559 ++**	**94.8 +**	**105 +**	4.84	**30.3 +**
Gross Beta	pCi/L	-----	50	18.00	13.40	**239 +**	**226 +**	**136 +**	**150 +**	**137 +**	26.9 +	32.6 +	3.41	19.1 +
Radium 226 and 228 (combined)	pCi/L	-----	-----	1.06	0.73	10.22 +	14.3 ++	11.38 ++	14.48 ++	13.99 ++	4.74 +	7.15 ++	0.83	3.34 +
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.11	0.05	0.67 +	-0.51	1.17 ++	0.55 ++	0.86 ++	-0.05	-0.3	0.39 +	2.39 ++
Thorium 228	pCi/L	-----	-----	0.36	0.00	0.07	-0.05	-0.07	-0.05	-0.05	0.05	-0.08	0.05	0

[1] Hardness-dependent criterion calculated using hardness value of 183 mg/L
Shaded value in bold indicates level exceeds human-health criterion
+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times
++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times
+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times
nm = not measured; na = not analyzed

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Holding time not met

Table 4.35: Selection of Contaminants of Concern in Surface Water at the Blue Cap Mine

Analyte	Units	Ref Areas 1, 2, & 3 (April 04)			Ref Areas 1, 2, & 3 (Oct 04)			BLUE CAP ADIT		BLUE CAP DRAINAGE		
		Min	Max	Mean	Min	Max	Mean	04/14/04	10/13/04	04/14/04	04/14/04 (dup)	10/12/04
PHYSICAL (field parameters)												
Flow	cfs	1.08	3.75	2.24	0.01	0.94	0.47	~ 3.03E-03	~ 4.56E-03	3.03E-03	3.03E-03	~ 4.56E-03
Temperature	°C	4.90	8.20	6.0	6.2	12.7	9.6	6.1	8	9.5	9.5	9
pH	s.u.	8.76	9.11	8.9	8.4	8.5	8.4	8.21	8.67	8.37	8.37	8.59
Specific Conductance	(uS/cm)	146	345	214	261	557	419	**515 +**	526	**505 +**	**505 +**	514
Dissolved Oxygen	(mg/L)	nm	nm	nm	nm	nm	nm	8.83	8.89	9.38	9.38	8.16
Oxidation Reduction Potential	Rmev	nm	nm	nm	nm	nm	nm	72.1	151.4	67.6	67.6	94.9
INORGANIC												
Nitrite	(mg/L)	0.00	< 0.01	0.005	na	na	na	< 0.01 U	na	< 0.01 U	< 0.01 U	na
Nitrate	(mg/L)	<0.02	0.15	0.07	na	na	na	**0.54 +**	na	**0.39 +**	**0.49 +**	na
Chloride	(mg/L)	2 B	15	6	2 B	11	6	1 B	2 B	2 B	1 B	2 BH
Sulfate	(mg/L)	10 B	60	30	10 B	30 B	20	60	**70 +**	**70 +**	**70 +**	**50 +**
Total Phosphorous as P	(mg/L)	0.01 B	0.13	0.06	0.01 B	0.03 B	0.02	< 0.01 U	0.01 B	< 0.01 U	< 0.01 U	0.01 B
Total Dissolved Solids	(mg/L)	140	300	193	150	330	250	**340 +**	320	**330 +**	320	320 H
Total Suspended Solids	(mg/L)	< 5	326	112	< 5	8 B	6	< 5 U	< 5 U	< 5 U	< 5 U	0 UH
Bicarbonate as CaCO3	(mg/L)	107	194	138	118	264	188	**214 +**	207	**203 +**	**203 +**	189
Carbonate as CaCO3	(mg/L)	< 2	8 B	3	< 2	13	6	**16 +**	12	**25 +**	**25 +**	**21 +**
Cation-Anion Balance	%	-1.9	2.0	-0.6	0	1.9	0.9	**4.8 +**	-2.6	**2.4 +**	**2.4 +**	**7 +**
Hardness as CaCO3	(mg/L)	104	227	150	123	209	173	125	111	123	123	119
Hydroxide as CaCO3	(mg/L)	< 2	< 2	1	< 2	< 2	1	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	0	0.15	0.10	na	na	na	**0.54 H+**	na	**0.39 H+**	**0.39 H+**	na
Sum of Anions	meq/L	2.4	5.7	3.6	2.6	6.0	4.4	**5.9 +**	5.9	**6.1 +**	**6.1 +**	5.3
Sum of Cations	meq/L	2.5	5.5	3.5	2.7	6.1	4.5	**6.5 +**	5.6	**6.4 +**	**6.4 +**	6.1
TDS (calculated)	(mg/L)	127	305	191	134	318	232	**341 +**	**323 +**	**352 +**	**352 +**	312
TDS (ratio - measured/calculated)		0.98	1.10	1.02	1.04	1.12	1.09	1	0.99	0.94	0.94	1.03
Total Alkalinity	(mg/L)	107	202	140	118	277	194	**229 +**	219	**228 +**	**228 +**	210
METALS												
Antimony, dissolved	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	< 1 U	**0.8 B+**	< 1 U	< 1 U	**0.8 B+**
Antimony, total	µg/L	< 0.2	< 0.4	0.1	< 0.2	< 0.2	0.1	**0.8 B+**	**1 B+**	**0.8 B+**	**0.8 B+**	**0.7 B+**
Arsenic, dissolved	µg/L	0.4 B	1.9	1.3	< 0.5	5.8	2.7	**70.3 ++**	**67.8 ++**	**71.4 ++**	**71.8 ++**	**59.5 ++**
Arsenic, total recoverable	µg/L	0.6	3.4	1.8	< 0.5	5.1	2.5	**58.1 ++**	**59 ++**	**59.1 ++**	**58.2 ++**	**55.3 ++**
Barium, dissolved	µg/L	110	146	127	100	177	127	**176 +**	155	**173 +**	**175 +**	175
Barium, total	µg/L	110	194	154	107	193	139	150	164	150	151	168
Beryllium, dissolved	µg/L	< 0.1	< 0.1	0.05	< 0.1	< 0.1	0.05	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	< 0.1	<0.2	0.07	< 0.1	< 0.1	0.05	< 0.1 U	< 0.5 U	< 0.1 U	< 0.1 U	< 0.5 U
Cadmium, dissolved	µg/L	< 0.1	< 0.1	0.05	< 0.1	< 0.1	0.05	**0.2 B+**	**0.2 B+**	**0.2 B+**	**0.2 B+**	< 0.1 U
Cadmium, total	µg/L	< 0.1	< 0.2	0.07	< 0.1	< 0.1	0.05	**0.3 B+**	< 0.5 U	**0.2 B+**	**0.2 B+**	< 0.1 U
Calcium, dissolved	µg/L	32400	65400	45667	39600	64400	52467	19000	16900	18900	19200	18200
Chromium, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	< 10	< 10	5	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	< 10	< 10	5	< 10	10 B	7	< 10 U	10 B	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	< 10	< 10	5	< 10	< 10	5	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	20 B	110	57	10 B	40 B	20	< 10 U	10 B	20 B	< 10 U	< 10 U
Iron, total recoverable	µg/L	290	2910	1190	110	200	163	50	100 B	30 B	30 B	70
Lead, dissolved	µg/L	< 0.1	0.2 B	0.10	< 0.1	< 0.1	0.05	< 0.1 U	< 0.1 U	0.2 B	0.2 B	**0.2 B+**
Lead, total	µg/L	0.2 B	3.3	1.3	0.1 B	0.3 B	0.2	0.9	**0.7 B+**	0.2 B	0.1 B	**0.7 B+**
Magnesium, dissolved	µg/L	5300	15500	8800	5800	13200	10233	**18800 +**	**16700 +**	**18400 +**	**18800 +**	**18000 +**
Manganese, dissolved	µg/L	15 B	27 B	21	< 5	19 B	12	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Manganese, total	µg/L	30	218	105	6 B	40	20	< 5 U	< 5 U	< 5 U	< 5 U	10 B
Mercury, dissolved	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	**130 ++**	**120 ++**	**130 ++**	**130 ++**	**120 ++**
Molybdenum, total	µg/L	< 10	10 B	7	< 10	< 10	5	**110 ++**	**120 ++**	**110 ++**	**110 ++**	**120 ++**

Table 4.35 (cont.): Selection of Contaminants of Concern in Surface Water at the Blue Cap Mine

Analyte	Units	Ref Areas 1, 2, & 3 (April 04)			Ref Areas 1, 2, & 3 (Oct 04)			BLUE CAP ADIT			BLUE CAP DRAINAGE								
		Min	Max	Mean	Min	Max	Mean	04/21/04		10/18/04		04/21/04		4/21/04 (dup)		10/18/04			
Nickel, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U
Nickel, total	µg/L	< 10	10 B	7	< 10	< 10	5	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U	< 10	U
Potassium, dissolved	µg/L	1800	3100	2300	1200	7600	3800	**8200**	**+**	7100		**8100**	**+**	**8200**	**+**	7300			
Selenium, dissolved	µg/L	0.3 B	0.9	0.6	< 1	1 B	0.7	**213**	**+++**	**251**	**+++**	**222**	**+++**	**214**	**+++**	**219**	**+++**		
Selenium, total	µg/L	0.2 B	0.8	0.6	< 1	1 B	0.7	**193**	**+++**	**228**	**+++**	**191**	**+++**	**188**	**+++**	**173**	**+++**		
Silver, dissolved	µg/L	< 0.05	< 0.05	0.025	< 0.05	< 0.05	0.025	< 0.05	U	< 0.3	U	< 0.05	U	< 0.05	U	< 0.05	U	< 0.05	U
Silver, total	µg/L	0.050	< 0.1	0.033	< 0.05	< 0.05	0.025	< 0.05	U	< 0.3	U	< 0.05	U	< 0.05	U	< 0.05	U	< 0.05	U
Sodium, dissolved	µg/L	4400	22700	12200	5000	39200	21000	**87300**	**+**	**74400**	**+**	**86300**	**+**	**87700**	**+**	**82100**	**+**		
Uranium, dissolved	µg/L	0.58	5.20	2.56	0.35	7.28	3.69	**521**	**+++**	**523**	**++**	**518**	**++**	**522**	**++**	**548**	**++**		
Uranium, total	µg/L	0.51	4.74	2.42	0.35	7.43	3.76	**589**	**+++**	**565**	**++**	**590**	**+++**	**592**	**+++**	**507**	**++**		
Vanadium, dissolved	µg/L	< 5	< 5	2.5	< 5	< 5	2.5	**324**	**++**	**298**	**++**	**335**	**++**	**335**	**++**	**302**	**++**		
Vanadium, total	µg/L	<5	8 B	4.3	< 5	< 5	2.5	**288**	**++**	**308**	**++**	**299**	**++**	**294**	**++**	**298**	**++**		
Zinc, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	< 10	U	< 10	U	< 10	U	< 10	U	30	B		
Zinc, total	µg/L	< 10	10 B	7	< 10	< 10	5	< 10	U	10	B	< 10	U	< 10	U	< 10	U		
RADIOLOGICAL (pCi/L)																			
Gross Alpha	pCi/L	3.42	19.00	10.08	0.00	5.13	3.23	**404**	**++**	**420**	**++**	**382**	**++**	**382**	**++**	**414**	**++**		
Gross Beta	pCi/L	3.20	18.00	9.10	1.83	13.40	6.25	**122**	**+**	**171**	**++**	**115**	**+**	**116**	**+**	**96**	**+**		
Radium 226 and 228 (combined)	pCi/L	0.28	1.06	0.69	0.05	0.73	0.44	**12.46**	**++**	**28.2**	**++**	**14.27**	**++**	**12.95**	**++**	**15.24**	**++**		
Thorium 230 and 232 (combined)	pCi/L	-0.09	0.11	0.06	-0.95	0.05	0.02	0.07		-0.02		**0.22**	**+**	0.05		**1.51**	**++**		
Thorium 228	pCi/L	-0.02	0.36	0.15	-0.17	0.00	0.00	0.05		-0.07		0.16		0.08		**0.07**	**+**		

Value in bold indicates level exceeds background and analyte considered a COC
+ Value exceeds background level by 1 to 10 times
++ Value exceeds background level by 10 to 100 times
+++ Value exceeds background level by more than 100 times
nm = not measured; na = not analyzed

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Holding time not met

Table 4.36: Comparison of COC Concentrations in Surface Water at the Blue Cap Mine to Human-Health Risk Criteria

Analyte	Units	RMC Camper	Modified MCL[1]	Max. Bkg. Value		BLUE CAP ADIT				BLUE CAP DRAINAGE					
				Apr-04	Oct-04	04/14/04		10/13/04		04/14/04		04/14/04 (dup)		10/12/04	
PHYSICAL (field parameters)															
Flow	cfs	-----	-----	3.75	0.94	~ 3.03E-03		~ 4.56E-03		3.03E-03		3.03E-03		~ 4.56E-03	
Temperature	°C	-----	-----	8.20	12.7	6.1		8		9.5		9.5		9	
pH	s.u.	-----	-----	9.11	8.5	8.21		8.67		8.37		8.37		8.59	
Specific Conductance	(uS/cm)	-----	-----	345	557	515	+	526		505	+	505	+	514	
Dissolved Oxygen	(mg/L)	-----	-----	nm	nm	8.83		8.89		9.38		9.38		8.16	
Oxidation Reduction Potential	Rmev	-----	-----	nm	nm	72.1		151.4		67.6		67.6		94.9	
INORGANIC															
Nitrate	(mg/L)	-----	260	0.15	na	0.54	+	na		0.39	+	0.49	+	na	
Sulfate	(mg/L)	-----	-----	60	30 B	60		70	+	70	+	70	+	50	+
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----	0.15	na	0.54	H+	na		0.39	H+	0.39	H+	na	
METALS															
Antimony, dissolved	µg/L	124	-----	< 0.2	< 0.2	< 1	U	0.8	B+	< 1	U	< 1	U	0.8	B+
Antimony, total	µg/L	-----	156	< 0.4	< 0.2	0.8	B+	1	B+	0.8	B+	0.8	B+	0.7	B+
Arsenic, dissolved	µg/L	93	-----	1.9	5.8	70.3	++	67.8	++	71.4	++	71.8	++	59.5	++
Arsenic, total recoverable	µg/L	-----	260	3.4	5.1	58.1	++	59	++	59.1	++	58.2	++	55.3	++
Barium, dissolved	µg/L	-----	-----	146	177	176	+	155		173	+	175	+	175	
Cadmium, dissolved	µg/L	155	-----	< 0.1	< 0.1	0.2	B+	0.2	B+	0.2	B+	0.2	B+	< 0.1	U
Cadmium, total	µg/L	-----	130	< 0.2	< 0.1	0.3	B+	< 0.5	U	0.2	B+	0.2	B+	< 0.1	U
Lead, dissolved	µg/L	50	-----	0.2 B	< 0.1	< 0.1	U	< 0.1	U	0.2	B	0.2	B	0.2	B+
Lead, total	µg/L	-----	390	3.3	0.3 B	0.9		0.7	B+	0.2	B	0.1	B	0.7	B+
Magnesium, dissolved	µg/L	-----	-----	15500	13200	18800	+	16700	+	18400	+	18800	+	18000	+
Molybdenum, dissolved	µg/L	-----	-----	< 10	< 10	130	++	120	++	130	++	130	++	120	++
Molybdenum, total	µg/L	-----	-----	10 B	< 10	110	++	120	++	110	++	110	++	120	++
Potassium, dissolved	µg/L	-----	-----	3100	7600	8200	+	7100		8100	+	8200	+	7300	
Selenium, dissolved	µg/L	1,548	-----	0.9	1 B	213	+++	251	+++	222	+++	214	+++	219	+++
Selenium, total	µg/L	-----	1300	0.8	1 B	193	+++	228	+++	191	+++	188	+++	173	+++
Sodium, dissolved	µg/L	-----	-----	22700	39200	87300	+	74400	+	86300	+	87700	+	82100	+
Uranium, dissolved	µg/L	-----	-----	5.20	7.28	521	+++	523	++	518	++	522	++	548	++
Uranium, total	µg/L	-----	780	4.74	7.43	589	+++	565	++	590	+++	592	+++	507	++
Vanadium, dissolved	µg/L	-----	-----	< 5	< 5	324	++	298	++	335	++	335	++	302	++
Vanadium, total	µg/L	-----	-----	8 B	< 5	288	++	308	++	299	++	294	++	298	++
RADIOLOGICAL (pCi/L)															
Gross Alpha	pCi/L	-----	-----	19.00	5.13	404	++	420	++	382	++	382	++	414	++
Gross Alpha (excl. uranium)	pCi/L	---	390	15.82	0.15	9.37		41.45	+	-13.30		-14.64		74.31	+++
Gross Beta	pCi/L	-----	-----	18.00	13.40	122	+	171	++	115	+	116	+	96	+
Radium 226 and 228 (combined)	pCi/L	-----	130	1.06	0.73	12.46	++	28.2	++	14.27	++	12.95	++	15.24	++
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.11	0.05	0.07		-0.02		0.22	+	0.05		1.51	++
Thorium 228	pCi/L	-----	-----	0.36	0.00	0.05		-0.07		0.16		0.08		0.07	+

[1] MCL modified with exposure factor of 365/14 days to better evaluate risk to campers.
Shaded value in bold indicates level exceeds human-health criterion
+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times
++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times
+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

nm = not measured; na = not analyzed
Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Holding time not met

Table 4.37: Comparison of COC Concentrations in Surface Water at the Blue Cap Mine to Aquatic-life Standards

Analyte	Units	Aquatic Life Std.		Max. Bkg. Value		BLUE CAP ADIT				BLUE CAP DRAINAGE					
		Colorado	Utah	Apr-04	Oct-04	04/14/04		10/13/04		04/14/04		04/14/04 (dup)		10/12/04	
PHYSICAL (field parameters)															
Flow	cfs	-----	-----	3.75	0.94	~ 3.03E-03		~ 4.56E-03		3.03E-03		3.03E-03		~ 4.56E-03	
Temperature	°C	-----	-----	8.20	12.7	6.1		8		9.5		9.5		9	
pH	s.u.	6.5 - 9.0	6.5 - 9.0	9.11	8.5	8.21		8.67		8.37		8.37		8.59	
Specific Conductance	(uS/cm)	-----	-----	345	557	515	+	526		505	+	505	+	514	
Dissolved Oxygen	(mg/L)	5.0	6.5	nm	nm	8.83		8.89		9.38		9.38		8.16	
Oxidation Reduction Potential	Rmev	-----	-----	nm	nm	72.1		151.4		67.6		67.6		94.9	
INORGANIC															
Nitrate	(mg/L)	10	4	0.15	na	0.54	+	na		0.39	+	0.49	+	na	
Sulfate	(mg/L)	250	-----	60	30 B	60		70	+	70	+	70	+	50	+
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----	0.15	na	0.54	H+	na		0.39	H+	0.39	H+	na	
METALS															
Antimony, dissolved	µg/L	-----	-----	< 0.2	< 0.2	< 1	U	0.8	B+	< 1	U	< 1	U	0.8	B+
Antimony, total	µg/L	-----	-----	< 0.4	< 0.2	0.8	B+	1	B+	0.8	B+	0.8	B+	0.7	B+
Arsenic, dissolved	µg/L	-----	-----	1.9	5.8	70.3	++	67.8	++	71.4	++	71.8	++	59.5	++
Arsenic, total recoverable	µg/L	-----	190	3.4	5.1	58.1	++	59	++	59.1	++	58.2	++	55.3	++
Barium, dissolved	µg/L	-----	-----	146	177	176	+	155		173	+	175	+	175	
Cadmium, dissolved	µg/L	3.5 [1]	1.8 [1]	< 0.1	< 0.1	0.2	B+	0.2	B+	0.2	B+	0.2	B+	< 0.1	U
Cadmium, total	µg/L	-----	-----	< 0.2	< 0.1	0.3	B+	< 0.5	U	0.2	B+	0.2	B+	< 0.1	U
Lead, dissolved	µg/L	5 [1]	7 [1]	0.2 B	< 0.1	< 0.1	U	< 0.1	U	0.2	B	0.2	B	0.2	B+
Lead, total	µg/L	-----	-----	3.3	0.3 B	0.9		0.7	B+	0.2	B	0.1	B	0.7	B+
Magnesium, dissolved	µg/L			15500	13200	18800	+	16700	+	18400	+	18800	+	18000	+
Molybdenum, dissolved	µg/L	-----	-----	< 10	< 10	130	++	120	++	130	++	130	++	120	++
Molybdenum, total	µg/L	-----	-----	10 B	< 10	110	++	120	++	110	++	110	++	120	++
Potassium, dissolved	µg/L			3100	7600	8200	+	7100		8100	+	8200	+	7300	
Selenium, dissolved	µg/L	4.6 [1]	5	0.9	1 B	**213**	**++**	**251**	**++**	**222**	**++**	**214**	**++**	**219**	**++**
Selenium, total	µg/L	-----	-----	0.8	1 B	193	+++	228	+++	191	+++	188	+++	173	+++
Sodium, dissolved	µg/L			22700	39200	87300	+	74400	+	86300	+	87700	+	82100	+
Uranium, dissolved	µg/L	-----	-----	5.20	7.28	521	+++	523	++	518	++	522	++	548	++
Uranium, total	µg/L	-----	-----	4.74	7.43	589	+++	565	++	590	+++	592	+++	507	++
Vanadium, dissolved	µg/L	-----	-----	< 5	< 5	324	++	298	++	335	++	335	++	302	++
Vanadium, total	µg/L	-----	-----	8 B	< 5	288	++	308	++	299	++	294	++	298	++
RADIOLOGICAL (pCi/L)															
Gross Alpha	pCi/L	-----	15	19.00	5.13	**404**	**++**	**420**	**++**	**382**	**++**	**382**	**++**	**414**	**++**
Gross Beta	pCi/L	-----	50	18.00	13.40	**122**	**+**	**171**	**+**	**115**	**+**	**116**	**+**	**96**	**+**
Radium 226 and 228 (combined)	pCi/L	-----	-----	1.06	0.73	12.46	++	28.2	++	14.27	++	12.95	++	15.24	++
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.11	0.05	0.07		-0.02		0.22	+	0.05		1.51	++
Thorium 228	pCi/L	-----	-----	0.36	0.00	0.05		-0.07		0.16		0.08		0.07	+

[1] Hardness-dependent criterion calculated using hardness value of 183 mg/L
Shaded value in bold indicates level exceeds aquatic life standard
+ Value exceeds standard (shaded) or maximum background (not shaded) by 1 to 10 times
++ Value exceeds standard (shaded) or maximum background (not shaded) by 10 to 100 times
+++ Value exceeds standard (shaded) or maximum background (not shaded) by more than 100 time
nm = not measured; na = not analyzed

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Holding time not met

Table 4.38: Selection of Contaminants of Concern in Surface Water at Alcove Spring

Analyte	Units	Ref Areas 1, 2, & 3 (April 04)			Ref Areas 1, 2, & 3 (Oct 04)			ALCOVE SPRING					
		Min	Max	Mean	Min	Max	Mean	04/14/04			10/12/04		
PHYSICAL (field parameters)													
Flow	cfs	1.08	3.75	2.24	0.01	0.94	0.47		2.87E-04			3.24E-04	
Temperature	°C	4.90	8.20	6.0	6.2	12.7	9.6		10.5			13.1	
pH	s.u.	8.76	9.11	8.9	8.4	8.5	8.4		8.2			8.58	
Specific Conductance	(uS/cm)	146	345	214	261	557	419		579			564	
Dissolved Oxygen	(mg/L)	nm	nm	nm	nm	nm	nm		7.47			6.51	
Oxidation Reduction Potential	Rmev	nm	nm	nm	nm	nm	nm		68.6			101.8	
INORGANIC													
Nitrite	(mg/L)	0.00	< 0.01	0.005	na	na	na	<	0.01	U		na	
Nitrate	(mg/L)	<0.02	0.15	0.07	na	na	na		0.45			na	
Chloride	(mg/L)	2 B	15	6	2 B	11	6		16			13	
Sulfate	(mg/L)	10 B	60	30	10 B	30 B	20		70			60	
Total Phosphorous as P	(mg/L)	0.01 B	0.13	0.06	0.01 B	0.03 B	0.02	<	0.01	U	<	0.01	U
Total Dissolved Solids	(mg/L)	140	300	193	150	330	250		410			350	H
Total Suspended Solids	(mg/L)	< 5	326	112	< 5	8 B	6	<	5	U		0	UH
Bicarbonate as CaCO3	(mg/L)	107	194	138	118	264	188		230			220	
Carbonate as CaCO3	(mg/L)	< 2	8 B	3	< 2	13	6		12			21	
Cation-Anion Balance	%	-1.9	2.0	-0.6	0	1.9	0.9		3.6			0.8	
Hardness as CaCO3	(mg/L)	104	227	150	123	209	173		49			46	
Hydroxide as CaCO3	(mg/L)	< 2	< 2	1	< 2	< 2	1	<	2	U	<	2	U
Nitrate/Nitrite as N, dissolve	(mg/L)	0	0.15	0.10	na	na	na		0.45	H		na	
Sum of Anions	meq/L	2.4	5.7	3.6	2.6	6.0	4.4		6.7			6.4	
Sum of Cations	meq/L	2.5	5.5	3.5	2.7	6.1	4.5		7.2			6.5	
TDS (calculated)	(mg/L)	127	305	191	134	318	232		398			372	
TDS (ratio - measured/calculated)		0.98	1.10	1.02	1.04	1.12	1.09		1.03			0.94	
Total Alkalinity	(mg/L)	107	202	140	118	277	194		242			241	
METALS													
Antimony, dissolved	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	<	2	U		0.5	B
Antimony, total	µg/L	< 0.2	< 0.4	0.1	< 0.2	< 0.2	0.1		0.5			0.5	B
Arsenic, dissolved	µg/L	0.4 B	1.9	1.3	< 0.5	5.8	2.7		48.9			37	
Arsenic, total recoverable	µg/L	0.6	3.4	1.8	< 0.5	5.1	2.5		**40.8**	**++**		**39.8**	**+**
Barium, dissolved	µg/L	110	146	127	100	177	127		74			74	
Barium, total	µg/L	110	194	154	107	193	139		65			70	
Beryllium, dissolved	µg/L	< 0.1	< 0.1	0.05	< 0.1	< 0.1	0.05	<	0.1	U	<	0.1	U
Beryllium, total	µg/L	< 0.1	<0.2	0.07	< 0.1	< 0.1	0.05	<	0.1	U	<	0.1	U
Cadmium, dissolved	µg/L	< 0.1	< 0.1	0.05	< 0.1	< 0.1	0.05		0.2		<	0.1	U
Cadmium, total	µg/L	< 0.1	< 0.2	0.07	< 0.1	< 0.1	0.05		0.3		<	0.1	U
Calcium, dissolved	µg/L	32400	65400	45667	39600	64400	52467		9100			8500	
Chromium, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	<	10	U	<	10	U
Chromium, total	µg/L	< 10	< 10	5	< 10	< 10	5	<	10	U	<	10	U
Copper, dissolved	µg/L	< 10	< 10	5	< 10	10 B	7	<	10	U	<	10	U
Copper, total	µg/L	< 10	< 10	5	< 10	< 10	5	<	10	U	<	10	U
Iron, dissolved	µg/L	20 B	110	57	10 B	40 B	20		20		<	10	U
Iron, total recoverable	µg/L	290	2910	1190	110	200	163		40			200	
Lead, dissolved	µg/L	< 0.1	0.2 B	0.10	< 0.1	< 0.1	0.05		0.1			**7**	**++**
Lead, total	µg/L	0.2 B	3.3	1.3	0.1 B	0.3 B	0.2	<	0.1	U	<	1	U
Magnesium, dissolved	µg/L	5300	15500	8800	5800	13200	10233		6300			5900	
Manganese, dissolved	µg/L	15 B	27 B	21	< 5	19 B	12	<	5	U	<	5	U
Manganese, total	µg/L	30	218	105	6 B	40	20	<	5	U	<	5	U
Mercury, dissolved	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	<	0.2	U	<	0.2	U
Mercury, total	µg/L	< 0.2	< 0.2	0.1	< 0.2	< 0.2	0.1	<	0.2	U	<	0.2	U
Molybdenum, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5		**180**	**++**		**170**	**++**
Molybdenum, total	µg/L	< 10	10 B	7	< 10	< 10	5		**160**	**++**		**170**	**++**

Table 4.38 (cont.): Selection of Contaminants of Concern in Surface Water at Alcove Spring

Analyte	Units	Ref Areas 1, 2, & 3 (April 04)			Ref Areas 1, 2, & 3 (Oct 04)			ALCOVE SPRING					
		Min	Max	Mean	Min	Max	Mean	04/21/04			10/18/04		
Nickel, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	<	10	U	<	10	U
Nickel, total	µg/L	< 10	10 B	7	< 10	< 10	5	<	10	U	<	10	U
Potassium, dissolved	µg/L	1800	3100	2300	1200	7600	3800		**7500**	**+**		6800	
Selenium, dissolved	µg/L	0.3 B	0.9	0.6	< 1	1 B	0.7		**382**	**+++**		**395**	**+++**
Selenium, total	µg/L	0.2 B	0.8	0.6	< 1	1 B	0.7		**334**	**+++**		**318**	**+++**
Silver, dissolved	µg/L	< 0.05	< 0.05	0.025	< 0.05	< 0.05	0.025	<	0.05	U	<	0.05	U
Silver, total	µg/L	0.050	< 0.1	0.033	< 0.05	< 0.05	0.025	<	0.05	U	<	0.05	U
Sodium, dissolved	µg/L	4400	22700	12200	5000	39200	21000		**137000**	**+**		**125000**	**+**
Uranium, dissolved	µg/L	0.58	5.20	2.56	0.35	7.28	3.69		**1170**	**+++**		**1210**	**+++**
Uranium, total	µg/L	0.51	4.74	2.42	0.35	7.43	3.76		**1300**	**+++**		**1010**	**+++**
Vanadium, dissolved	µg/L	< 5	< 5	2.5	< 5	< 5	2.5		**374**	**++**		**356**	**++**
Vanadium, total	µg/L	<5	8 B	4.3	< 5	< 5	2.5		**337**	**++**		**348**	**++**
Zinc, dissolved	µg/L	< 10	< 10	5	< 10	< 10	5	<	10	U	<	10	U
Zinc, total	µg/L	< 10	10 B	7	< 10	< 10	5	<	10	U	<	10	U
RADIOLOGICAL (pCi/L)													
Gross Alpha	pCi/L	3.42	19.00	10.08	0.00	5.13	3.23		**1130**	**++**		**1020**	**+++**
Gross Beta	pCi/L	3.20	18.00	9.10	1.83	13.40	6.25		**255**	**++**		**523**	**++**
Radium 226 and 228 (combined)	pCi/L	0.28	1.06	0.69	0.05	0.73	0.44		**6.81**	**+**		0	
Thorium 230 and 232 (combined)	pCi/L	-0.09	0.11	0.06	-0.95	0.05	0.02		**0.25**	**+**		0	
Thorium 228	pCi/L	-0.02	0.36	0.15	-0.17	0.00	0.00		-0.02			**0.02**	**+**

Value in bold indicates level exceeds background and analyte considered a COC
+ Value exceeds background level by 1 to 10 times
++ Value exceeds background level by 10 to 100 times
+++ Value exceeds background level by more than 100 times
nm = not measured; na = not analyzed

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Holding time not met

Table 4.39: Comparison of COC Concentrations in Surface Water at Alcove Spring to Human-Health Risk Criteria

Analyte	Units	RMC Camper	Modified MCL[1]	Max. Bkg. Value		ALCOVE SPRING			
				Apr-04	Oct-04	04/14/04		10/12/04	
PHYSICAL (field parameters)									
Flow	cfs	-----	-----	3.75	0.94	2.87E-04		3.24E-04	
Temperature	°C	-----	-----	8.20	12.7	10.5		13.1	
pH	s.u.	-----	-----	9.11	8.5	8.2		8.58	
Specific Conductance	(uS/cm)	-----	-----	345	557	579		564	
Dissolved Oxygen	(mg/L)	-----	-----	nm	nm	7.47		6.51	
Oxidation Reduction Potential	Rmev	-----	-----	nm	nm	68.6		101.8	
METALS									
Arsenic, total recoverable	µg/L	-----	260	3.4	5.1	40.8	++	39.8	+
Lead, dissolved	µg/L	50	-----	0.2 B	< 0.1	0.1		7	++
Molybdenum, dissolved	µg/L	-----	-----	< 10	< 10	180	++	170	++
Molybdenum, total	µg/L	-----	-----	10 B	< 10	160	++	170	++
Potassium, dissolved	µg/L	-----	-----	3100	7600	7500	+	6800	
Selenium, dissolved	µg/L	1,548	-----	0.9	1 B	382	+++	395	+++
Selenium, total	µg/L	-----	1300	0.8	1 B	334	+++	318	+++
Sodium, dissolved	µg/L	-----	-----	22700	39200	137000	+	125000	+
Uranium, dissolved	µg/L	-----	-----	5.20	7.28	1170	+++	1210	+++
Uranium, total	µg/L	-----	780	4.74	7.43	**1300**	**+**	**1010**	**+**
Vanadium, dissolved	µg/L	-----	-----	< 5	< 5	374	++	356	++
Vanadium, total	µg/L	-----	-----	8 B	< 5	337	++	348	++
RADIOLOGICAL (pCi/L)									
Gross Alpha	pCi/L	-----	-----	19.00	5.13	1130	++	1020	+++
Gross Alpha (excl. uranium)	pCi/L	---	390	15.82	0.15	259	++	343	+++
Gross Beta	pCi/L	-----	-----	18.00	13.40	255	++	523	++
Radium 226 and 228 (combined)	pCi/L	-----	130	1.06	0.73	6.81	+	0	
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.11	0.05	0.25	+	0	
Thorium 228	pCi/L	-----	-----	0.36	0.00	-0.02		0.02	+

[1] MCL modified with exposure factor of 365/14 days to better evaluate risk to campers.
Shaded value in bold indicates level exceeds human-health criterion
+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times
++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times
+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times
nm = not measured; na = not analyzed

Table 4.40: Comparison of COC Concentrations in Surface Water at Alcove Spring to Aquatic-life Standards

Analyte	Units	Aquatic Life Std.		Max. Bkg. Value		ALCOVE SPRING			
		Colorado	Utah	Apr-04	Oct-04	04/14/04		10/12/04	
PHYSICAL (field parameters)									
Flow	cfs	-----	-----	3.75	0.94	2.87E-04		3.24E-04	
Temperature	°C	-----	-----	8.20	12.7	10.5		13.1	
pH	s.u.	6.5 - 9.0	6.5 - 9.0	9.11	8.5	8.2		8.58	
Specific Conductance	(uS/cm)	-----	-----	345	557	579		564	
Dissolved Oxygen	(mg/L)	5.0	6.5	nm	nm	7.47		6.51	
Oxidation Reduction Potential	Rmev	-----	-----	nm	nm	68.6		101.8	
METALS									
Arsenic, total recoverable	µg/L	-----	190	3.4	5.1	40.8	++	39.8	+
Lead, dissolved	µg/L	5 [1]	7 [1]	0.2 B	< 0.1	0.1		**7**	**+**
Molybdenum, dissolved	µg/L	-----	-----	< 10	< 10	180	++	170	++
Molybdenum, total	µg/L	-----	-----	10 B	< 10	160	++	170	++
Potassium, dissolved	µg/L			3100	7600	7500	+	6800	
Selenium, dissolved	µg/L	4.6 [1]	5	0.9	1 B	**382**	**++**	**395**	**++**
Selenium, total	µg/L	-----	-----	0.8	1 B	334	+++	318	+++
Sodium, dissolved	µg/L			22700	39200	137000	+	125000	+
Uranium, dissolved	µg/L	-----	-----	5.20	7.28	1170	+++	1210	+++
Uranium, total	µg/L	-----	-----	4.74	7.43	1300	+++	1010	+++
Vanadium, dissolved	µg/L	-----	-----	< 5	< 5	374	++	356	++
Vanadium, total	µg/L	-----	-----	8 B	< 5	337	++	348	++
RADIOLOGICAL (pCi/L)									
Gross Alpha	pCi/L	-----	15	19.00	5.13	**1130**	**++**	**1020**	**+++**
Gross Beta	pCi/L	-----	50	18.00	13.40	**255**	**+**	**523**	**++**
Radium 226 and 228 (combined)	pCi/L	-----	-----	1.06	0.73	6.81	+	0	
Thorium 230 and 232 (combined)	pCi/L	-----	-----	0.11	0.05	0.25	+	0	
Thorium 228	pCi/L	-----	-----	0.36	0.00	-0.02		0.02	+

[1] Hardness-dependent criterion calculated using hardness value of 183 mg/L

Shaded value in bold indicates level exceeds aquatic life standard

+ Value exceeds standard (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds standard (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds standard (shaded) or maximum background (not shaded) by more than 100 times

nm = not measured; na = not analyzed

Table 4.41: Comparison of COCs in Borehole Waste-Rock Samples at the Blue Cap Mine to Human-Health Risk Criteria

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			BC 1			BC 2		BC 3		
				Min	Max	Mean	0 - 0.5	2 - 4	8 - 9	0 - 0.5	2 - 4.5	0 - 0.5	2 - 4	10 - 12
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	0.2 B	0.2 B	0.1 B	0.1 B	0.2 B	0.6 +	0.3 B	0.2 B
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	**48 +**	**70 +**	**26 +**	11.5	15.2	**74 +**	**25.5 +**	3.59
Barium, total (3050)	mg/Kg	---	71540	128	419	205	42.2	55.6	63.9	43.1	35.4	25.6	44.8	168
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	< 0.5 U	0.4 B	0.3 B	0.4 B	0.4 B	< 0.3 U	0.2 B	0.58
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	1.4	1.21	1.18	0.31	0.21 B	1.59 +	2.49 +	0.11 B
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	4 B	7	7	5 B	9	1 B	3 B	7
Copper, total (3050)	mg/Kg	5000	---	3	75	15	103 +	134 +	37	28	18	66	34	5
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	3410	4480	5050	3650	2420	2840	2530	8530
Lead, total (3050)	mg/Kg	1000	---	8	82	19	293 +	247 +	157 +	123 +	43	699 +	100 +	36
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	163	178	205	233	168	117	97	205
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	0.07 B+	< 0.05 U
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	18 +	17 +	7	5 B	3 B	41 +	15 +	3 B
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	4 B	4 B	3 B	3 B	3 B	4 B	1 B	4 B
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	35 B+	62 ++	37 +	25 +	10 +	10 B+	8 +	6.51 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	1.6 +	1.2 +	0.6 +	0.44	0.43	1.5 +	0.89 +	0.15
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	351 ++	306 ++	262 ++	103 +	117 +	127 +	75.6 +	27.9 +
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	1330 +	1260 +	1290 +	509 +	517 +	319 +	282 +	105
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	125	115	120	35	19	98	136 +	22
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	474 +	331 +	351 +	126 +	109 +	218 +	145 +	27.2
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	323 +	267 +	247 +	94.5 +	78.9 +	161 +	107 +	23.8
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	139 ++	105 +	113 +	45.8 +	45.2 +	56.9 +	28.8 +	5.32
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	2.19	2.06	1.25	1.84	0.39	0.27	2.05	0.23
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.91 +	0.36	0.24	0.26	0.32	0.68	0.41	0.47
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	96.2 +	70.3 +	74.7 +	22.5 +	29.2 +	41.9 +	33.8 +	3.58
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	1.34 +	0.18	0.65 +	-0.21	0.4	0.95 +	0.41	0.58 +
Solids, Percent	%	---	---	87.3	94.8	91.5	92.3	89.5	91.9	92.4	92.4	91.8	92.2	87.9

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			BC 4			
				Min	Max	Mean	0 - 0.5	2 - 4	8 - 10	26.5 - 28.5
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	< 1 U	< 0.2 U	< 0.5 U	0.1 B
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	19.1	10.2	15.9	**24.4 +**
Barium, total (3050)	mg/Kg	---	71540	128	419	205	85.4	62.6	38.6	29.9
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.76	0.26 B	0.18 B	0.19 B
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	0.65	0.17 B	0.51	0.23 B
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	5 B	59	10	17 +
Copper, total (3050)	mg/Kg	5000	---	3	75	15	49	28	42	19
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	7290	2850	2460	3030
Lead, total (3050)	mg/Kg	1000	---	8	82	19	100 +	130 +	142 +	90 +
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	238	181	161	197
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	7	2 B	2 B	3 B
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	3 B	2 B	2 B	3 B
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	21.5 +	25.5 +	19.6 +	25.4 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	0.55 +	0.44	0.55 +	0.47
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	344 ++	112 +	244 ++	38.2 +
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	843 +	1170 +	1210 +	477 +
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	78	21	51	36
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	330 +	233 +	451 +	52.7
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	176 +	106 +	206 +	41.4
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	40.9 +	44.1 +	68.2 +	21.1 +
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	1.48	0	14.5 +	0.58
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.85 +	0.46	0.02	0.04
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	45.6 +	48.7 +	52.2 +	13.4
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.81 +	-1.63	0.13	0.07
Solids, Percent	%	---	---	87.3	94.8	91.5	82.3	91.6	92.2	91

Table 4.41 (cont.): Comparison of COCs in Borehole Waste-Rock Samples at the Blue Cap Mine to Human-Health Risk Criteria

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			BC 5					BC 6
				Min	Max	Mean	0 - 0.5	0 - 0.5 (Dup 1)	2 - 4	7 - 9	18.5 - 20.5	0 - 0.5
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	0.1 B	0.1 B	0.2 B	0.2 B	0.2 B	0.1 B
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	16	14	**38 +**	**35.3 +**	**27 +**	**52 +**
Barium, total (3050)	mg/Kg	---	71540	128	419	205	96.2	105	90.8	72.7	45.3	63.3
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.4 B	0.3 B	0.6 B	0.4 B	< 0.3 U	0.5 B
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	1.01	1.32	0.93	0.51	2.75 +	1.36
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	10	10	2 B	8	35 +	38 +
Copper, total (3050)	mg/Kg	5000	---	3	75	15	49	50	22	23	49	31
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	3590	3580	4340	4550	3130	5710
Lead, total (3050)	mg/Kg	1000	---	8	82	19	129 +	131 +	53	52	186 +	227 +
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	130	127	237	226	114	213
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	8 +	4 B	21 +	26 +	11 +	6
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	3 B	3 B	2 B	3 B	3 B	6
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	30 +	21 +	9 B+	6 B+	34 +	63 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	1 +	0.6 +	0.6 B+	0.6 +	0.7 +	0.7 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	267 ++	245 ++	191 ++	109 +	233 ++	311 ++
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	1280 +	1060 +	594 +	192 +	1180 +	1460 ++
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	90	112	110	93	281 +	146 +
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	334 +	326 +	288 +	114 +	251 +	352 +
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	225 +	224 +	224 +	90.7 +	209 +	271 +
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	89.6 +	115 +	77.1 +	76.1 +	85.9 +	132 +
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	1.7	2.04	1.75	1.97	1.96	2.88
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.19	0.85 +	0.28	0.35	0.29	0.27
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	290 ++	86.7 +	60.5 +	115 +	54.6 +	92 +
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	1.01 +	2.17 +	0.62 +	0.44	0.25	0.51
Solids, Percent	%	---	---	87.3	94.8	91.5	93.5	92.7	88.3	92.6	94.5	91.7

Shaded value in bold indicates level exceeds human-health criterion

+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Table 4.42: Comparison of COCs in Waste Rock from Composite Surface Samples at the Blue Cap Mine to Human-Health Risk Criteria

Analyte	Units	RMC	SSL	Background Soil			BC Segment 1	BC Segment 2	BC Segment 3	BC Segment 4	BC Segment 5	BC Segment 6
		Camper	Industrial	Min	Max	Mean						
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	< 1 U	< 0.5 U	< 0.5 U	< 1 U	< 1 U	< 0.5 U
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	18.6	**33.3 +**	18.5	**57.2 +**	**40.9 +**	**50.6 +**
Barium, total (3050)	mg/Kg	---	71540	128	419	205	60.2	80	26.8	56	45.2	44.3
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.39	0.46	0.2 B	0.34	0.3	0.29 B
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	0.52	2.85 +	0.79	2.83 +	1.69 +	1.94 +
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	44 +	36 +	3 B	8	10	7
Copper, total (3050)	mg/Kg	5000	---	3	75	15	50	83 +	68	85 +	107 +	60
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	3460	5080	2020	3970	3050	3780
Lead, total (3050)	mg/Kg	1000	---	8	82	19	176 +	210 +	114 +	425 +	275 +	374 +
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	167	175	88.7	190	144	205
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	3 B	7	2 B	17 +	8 +	13 +
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	4 B	6	2 B	5	4 B	5
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	48.5 +	35.7 +	23.3 +	38 +	30.8 +	28.4 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	1.08 +	1.14 +	0.99 +	1.64 +	1.04 +	1.25 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	298 ++	257 ++	198 ++	403 ++	346 ++	262 ++
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	1450 ++	1650 ++	783 +	1320 +	1480 ++	1140 +
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	55	225 +	125	324 +	125	166 +
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	490 +	453 +	251 +	442 +	586 +	685 +
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	189 +	189 +	98.2 +	206 +	253 +	254 +
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	96.9 +	71.2 +	35.8 +	79.7 +	96.6 +	85.5 +
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	0.44	13.1 +	1.15	1.42	1.33	3.08
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.49	0.15	0.16	0.07	0.08	0.08
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	86.9 +	59.2 +	27.2 +	76.5 +	29.3 +	83.5 +
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.32	0.22	-0.5	0.24	0	0.59 +
Solids, Percent	%	---	---	87.3	94.8	91.5	91.2	92.7	93.8	94.1	92.5	93.4

Shaded value in bold indicates level exceeds human-health criterion

+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Table 4.43: Sample Sites at Blue Cap Mine Where Radionuclide Activities in Near-Surface Samples Exceeded Maximum Background Levels

Radionuclide	Borehole Samples (BC)						Composite Surface Samples (Seg)						Factor Exceeded Background			
	1	2	3	4	5	6	1	2	3	4	5	6	Min	Max	Mean	Median
Gross alpha	○	○	○	○	○	○	○	○	○	○	○	○	1.44	7.80	4.44	4.01
Gross beta	○	○	○	○	○	○	○	○	○	○	○	○	2.47	8.43	5.35	5.38
Radium 226	○	○	○	○	○	○	○	○	○	○	○	○	2.71	10.53	6.32	6.48
Radium 228								○					3.16	3.16	3.16	3.16
Thorium 228	○			○	○								1.05	1.12	1.07	1.05
Thorium 230	○	○	○	○	○	○	○	○	○	○	○	○	1.01	13.00	3.58	3.43
Thorium 232	○		○	○	○							○	1.11	4.09	2.16	1.85

Table 4.44: Comparison of COCs in Borehole Waste-Rock Samples at the Blue Cap Mine to Ecological Risk Criteria

Analyte	Units	Modified Elk RMC[1]	Background Soil			BC 1			BC 2		BC 3		
			Min	Max	Mean	0 - 0.5	2 - 4	8 - 9	0 - 0.5	2 - 4.5	0 - 0.5	2 - 4	10 - 12
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	0.2 B	0.2 B	0.1 B	0.1 B	0.2 B	0.6 +	0.3 B	0.2 B
Arsenic, total (3050)	mg/Kg	108767	1.1	25.7	9.7	48 +	70 +	26 +	11.5	15.2	74 +	25.5	3.59
Barium, total (3050)	mg/Kg	----	128	419	205	42.2	55.6	63.9	43.1	35.4	25.6	44.8	168
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	< 0.5 U	0.4 B	0.3 B	0.4 B	0.4 B	< 0.3 U	0.2 B	0.58
Cadmium, total (3050)	mg/Kg	995	0.09	1.34	0.30	1.4	1.21	1.18	0.31	0.21 B	1.59 +	2.49 +	0.11 B
Chromium, total (3050)	mg/Kg	----	5	12	8	4 B	7	7	5 B	9	1 B	3 B	7
Copper, total (3050)	mg/Kg	43440	3	75	15	103 +	134 +	37	28	18	66	34	5
Iron, total (3050)	mg/Kg	----	4790	10600	7524	3410	4480	5050	3650	2420	2840	2530	8530
Lead, total (3050)	mg/Kg	42114	8	82	19	293 +	247 +	157 +	123 +	43	699 +	100 +	36
Manganese, total (3050)	mg/Kg	----	151	397	269	163	178	205	233	168	117	97	205
Mercury, total	mg/Kg	3648	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	0.07 B+	< 0.05 U
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	18 +	17 +	7	5 B	3 B	41 +	15 +	3 B
Nickel, total (3050)	mg/Kg	----	3	6	5	4 B	4 B	3 B	3 B	3 B	4 B	1 B	4 B
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	35 B+	62 ++	37 +	25 +	10 +	10 B+	8 +	6.51 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	1.6 +	1.2 +	0.6 +	0.44	0.43	1.5 +	0.89 +	0.15
Uranium, total (3050)	mg/Kg	1101927	0.38	15.3	3.9	351 ++	306 ++	262 ++	103 +	117 +	127 +	75.6 +	27.9 +
Vanadium, total (3050)	mg/Kg	92850	10.7	136	40	1330 +	1260 +	1290 +	509 +	517 +	319 +	282 +	105
Zinc, total (3050)	mg/Kg	91192	12	125	28	125	115	120	35	19	98	136 +	22
Gross Alpha	pCi/g	----	3.39	87.8	20.3	474 +	331 +	351 +	126 +	109 +	218 +	145 +	27.2
Gross Beta	pCi/g	----	3.29	38.3	13.5	323 +	267 +	247 +	94.5 +	78.9 +	161 +	107 +	23.8
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	139 ++	105 +	113 +	45.8 +	45.2 +	56.9 +	28.8 +	5.32
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	2.19	2.06	1.25	1.84	0.39	0.27	2.05	0.23
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.91 +	0.36	0.24	0.26	0.32	0.68	0.41	0.47
Thorium 230	pCi/g	----	-0.36	22.3	3.1	96.2 +	70.3 +	74.7 +	22.5 +	29.2 +	41.9 +	33.8 +	3.58
Thorium 232	pCi/g	----	0.08	0.53	0.35	1.34 +	0.18	0.65 +	-0.21	0.4	0.95 +	0.41	0.58 +
Solids, Percent	%	----	87.3	94.8	91.5	92.3	89.5	91.9	92.4	92.4	91.8	92.2	87.9

Analyte	Units	Modified Elk RMC[1]	Background Soil			BC 4			
			Min	Max	Mean	0 - 0.5	2 - 4	8 - 10	26.5 - 28.5
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	< 1 U	< 0.2 U	< 0.5 U	0.1 B
Arsenic, total (3050)	mg/Kg	108767	1.1	25.7	9.7	19.1	10.2	15.9	24.4
Barium, total (3050)	mg/Kg	----	128	419	205	85.4	62.6	38.6	29.9
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.76	0.26 B	0.18 B	0.19 B
Cadmium, total (3050)	mg/Kg	995	0.09	1.34	0.30	0.65	0.17 B	0.51	0.23 B
Chromium, total (3050)	mg/Kg	----	5	12	8	5 B	59	10	17 +
Copper, total (3050)	mg/Kg	43440	3	75	15	49	28	42	19
Iron, total (3050)	mg/Kg	----	4790	10600	7524	7290	2850	2460	3030
Lead, total (3050)	mg/Kg	42114	8	82	19	100 +	130 +	142 +	90 +
Manganese, total (3050)	mg/Kg	----	151	397	269	238	181	161	197
Mercury, total	mg/Kg	3648	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	7	2 B	2 B	3 B
Nickel, total (3050)	mg/Kg	----	3	6	5	3 B	2 B	2 B	3 B
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	21.5 +	25.5 +	19.6 +	25.4 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	0.55 +	0.44	0.55 +	0.47
Uranium, total (3050)	mg/Kg	1101927	0.38	15.3	3.9	344 ++	112 +	244 ++	38.2 +
Vanadium, total (3050)	mg/Kg	92850	10.7	136	40	843 +	1170 +	1210 +	477 +
Zinc, total (3050)	mg/Kg	91192	12	125	28	78	21	51	36
Gross Alpha	pCi/g	----	3.39	87.8	20.3	330 +	233 +	451 +	52.7
Gross Beta	pCi/g	----	3.29	38.3	13.5	176 +	106 +	206 +	41.4
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	40.9 +	44.1 +	68.2 +	21.1 +
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	1.48	0	14.5 +	0.58
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.85 +	0.46	0.02	0.04
Thorium 230	pCi/g	----	-0.36	22.3	3.1	45.6 +	48.7 +	52.2 +	13.4
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.81 +	-1.63	0.13	0.07
Solids, Percent	%	----	87.3	94.8	91.5	82.3	91.6	92.2	91

Table 4.44 (cont.): Comparison of COCs in Borehole Waste-Rock Samples at the Blue Cap Mine to Ecological Risk Criteria

Analyte	Units	Modified Elk RMC[1]	Background Soil			BC 5					BC 6
			Min	Max	Mean	0 - 0.5	0 - 0.5 (Dup 1)	2 - 4	7 - 9	18.5 - 20.5	0 - 0.5
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	0.1 B	0.1 B	0.2 B	0.2 B	0.2 B	0.1 B
Arsenic, total (3050)	mg/Kg	108767	1.1	25.7	9.7	16	14	38 +	35.3 +	27 +	52 +
Barium, total (3050)	mg/Kg	----	128	419	205	96.2	105	90.8	72.7	45.3	63.3
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.4 B	0.3 B	0.6 B	0.4 B	< 0.3 U	0.5 B
Cadmium, total (3050)	mg/Kg	995	0.09	1.34	0.30	1.01	1.32	0.93	0.51	2.75 +	1.36
Chromium, total (3050)	mg/Kg	----	5	12	8	10	10	2 B	8	35 +	38 +
Copper, total (3050)	mg/Kg	43440	3	75	15	49	50	22	23	49	31
Iron, total (3050)	mg/Kg	----	4790	10600	7524	3590	3580	4340	4550	3130	5710
Lead, total (3050)	mg/Kg	42114	8	82	19	129 +	131 +	53	52	186 +	227 +
Manganese, total (3050)	mg/Kg	----	151	397	269	130	127	237	226	114	213
Mercury, total	mg/Kg	3648	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	8 +	4 B	21 +	26 +	11 +	6
Nickel, total (3050)	mg/Kg	----	3	6	5	3 B	3 B	2 B	3 B	3 B	6
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	30 +	21 +	9 B+	6 B+	34 +	63 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	1 +	0.6 +	0.6 B+	0.6 +	0.7 +	0.7 +
Uranium, total (3050)	mg/Kg	----	0.38	15.3	3.9	267 ++	245 ++	191 ++	109 +	233 ++	311 ++
Vanadium, total (3050)	mg/Kg	----	10.7	136	40	1280 +	1060 +	594 +	192 +	1180 +	1460 ++
Zinc, total (3050)	mg/Kg	91192	12	125	28	90	112	110	93	281 +	146 +
Gross Alpha	pCi/g	----	3.39	87.8	20.3	334 +	326 +	288 +	114 +	251 +	352 +
Gross Beta	pCi/g	----	3.29	38.3	13.5	225 +	224 +	224 +	90.7 +	209 +	271 +
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	89.6 +	115 +	77.1 +	76.1 +	85.9 +	132 +
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	1.7	2.04	1.75	1.97	1.96	2.88
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.19	0.85 +	0.28	0.35	0.29	0.27
Thorium 230	pCi/g	----	-0.36	22.3	3.1	290 ++	86.7 +	60.5 +	115 +	54.6 +	92 +
Thorium 232	pCi/g	----	0.08	0.53	0.35	1.01 +	2.17 +	0.62 +	0.44	0.25	0.51
Solids, Percent	%	----	87.3	94.8	91.5	93.5	92.7	88.3	92.6	94.5	91.7

[1] Modified by area use factor (RMC/[1.93 acres/640 acres])

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Li

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds human-health criterion

+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Table 4.45: Comparison of COCs in Waste Rock from Composite Surface Samples at the Blue Cap Mine to Ecological Risk Criteria

Analyte	Units	Modified Elk RMC[1]	Background Soil			BC Segment 1	BC Segment 2	BC Segment 3	BC Segment 4	BC Segment 5	BC Segment 6
			Min	Max	Mean						
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	< 1 U	< 0.5 U	< 0.5 U	< 1 U	< 1 U	< 0.5 U
Arsenic, total (3050)	mg/Kg	108767	1.1	25.7	9.7	18.6	33.3 +	18.5	57.2 +	40.9 +	50.6 +
Barium, total (3050)	mg/Kg	----	128	419	205	60.2	80	26.8	56	45.2	44.3
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.39	0.46	0.2 B	0.34	0.3	0.29 B
Cadmium, total (3050)	mg/Kg	995	0.09	1.34	0.30	0.52	2.85 +	0.79	2.83 +	1.69 +	1.94 +
Chromium, total (3050)	mg/Kg	----	5	12	8	44 +	36 +	3 B	8	10	7
Copper, total (3050)	mg/Kg	43440	3	75	15	50	83 +	68	85 +	107 +	60
Iron, total (3050)	mg/Kg	----	4790	10600	7524	3460	5080	2020	3970	3050	3780
Lead, total (3050)	mg/Kg	42114	8	82	19	176 +	210 +	114 +	425 +	275 +	374 +
Manganese, total (3050)	mg/Kg	----	151	397	269	167	175	88.7	190	144	205
Mercury, total	mg/Kg	3648	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	3 B	7	2 B	17 +	8 +	13 +
Nickel, total (3050)	mg/Kg	----	3	6	5	4 B	6	2 B	5	4 B	5
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	48.5 +	35.7 +	23.3 +	38 +	30.8 +	28.4 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	1.08 +	1.14 +	0.99 +	1.64 +	1.04 +	1.25 +
Uranium, total (3050)	mg/Kg	1101927	0.38	15.3	3.9	298 ++	257 ++	198 ++	403 ++	346 ++	262 ++
Vanadium, total (3050)	mg/Kg	92850	10.7	136	40	1450 ++	1650 ++	783 +	1320 +	1480 ++	1140 +
Zinc, total (3050)	mg/Kg	91192	12	125	28	55	225 +	125	324 +	125	166 +
Gross Alpha	pCi/g	----	3.39	87.8	20.3	490 +	453 +	251 +	442 +	586 +	685 +
Gross Beta	pCi/g	----	3.29	38.3	13.5	189 +	189 +	98.2 +	206 +	253 +	254 +
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	96.9 +	71.2 +	35.8 +	79.7 +	96.6 +	85.5 +
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	0.44	13.1 +	1.15	1.42	1.33	3.08
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.49	0.15	0.16	0.07	0.08	0.08
Thorium 230	pCi/g	----	-0.36	22.3	3.1	86.9 +	59.2 +	27.2 +	76.5 +	29.3 +	83.5 +
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.32	0.22	-0.5	0.24	0	0.59 +
Solids, Percent	%	----	87.3	94.8	91.5	91.2	92.7	93.8	94.1	92.5	93.4

[1] Modified by area use factor (RMC/[1.93 acres/640 acres])

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds human-health criterion

+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Table 4.46: Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Blue Cap Mine

Analyte	Units	BC 1: 0 - 0.5			BC 1: 2 - 4			BC 1: 8 - 9		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.001 B	----	0.2 B	< 0.001 U	----	0.2 B	< 0.001 U	----	0.1 B
Arsenic (1312)	mg/L	0.19	960.00	48	0.0731	3638.85	70	0.0471	2097.66	26
Barium (1312)	mg/L	0.01	----	42.2	0.011	----	55.6	0.016	----	63.9
Beryllium (1312)	mg/L	< 0.0005 U	----	< 0.5 U	< 0.0005 U	----	0.4 B	< 0.0005 U	----	0.3 B
Cadmium (1312)	mg/L	< 0.0005 U	201.60	1.4	< 0.0005 U	174.24	1.21	< 0.0005 U	169.92	1.18
Chromium (1312)	mg/L	< 0.01 U	1952.00	4 B	< 0.01 U	3416.00	7	< 0.01 U	3416.00	7
Copper (1312)	mg/L	< 0.01 U	6180.00	103	< 0.01 U	8040.00	134	< 0.01 U	2220.00	37
Iron (1312)	mg/L	0.06	1136666.67	3410	0.03 B	2986666.67	4480	0.1	1010000.00	5050
Lead (1312)	mg/L	< 0.04 U	1465.00	293	< 0.04 U	1235.00	247	< 0.04 U	785.00	157
Manganese (1312)	mg/L	< 0.005 U	2628864.00	163	< 0.005 U	2870784.00	178	< 0.005 U	3306240.00	205
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.04 B	----	18	0.02 B	----	17	0.03 B	----	7
Nickel (1312)	mg/L	< 0.01 U	1392.00	4 B	< 0.01 U	1392.00	4 B	< 0.01 U	1044.00	3 B
Selenium (1312)	mg/L	0.034 B	94.71	35 B	0.036 B	158.44	62	0.098	34.73	**37 +**
Silver (1312)	mg/L	< 0.0003 U	42.67	1.6	< 0.0003 U	32.00	1.2	< 0.0003 U	16.00	0.6
Uranium (1312)	mg/L	0.0162	----	351	0.0029	----	306	0.0118	----	262
Vanadium (1312)	mg/L	2.68	----	1330	7.81	----	1260	3	----	1290
Zinc (1312)	mg/L	0.01 B	44250.00	125	0.01 B	40710.00	115	0.01 B	42480.00	120

Analyte	Units	BC 2: 0 - 0.5			BC 2: 2- 4.5		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	0.1 B	< 0.001 U	----	0.2 B
Arsenic (1312)	mg/L	0.0563	776.20	11.5	0.0685	843.21	15.2
Barium (1312)	mg/L	0.03	----	43.1	0.038	----	35.4
Beryllium (1312)	mg/L	< 0.0005 U	----	0.4 B	< 0.0005 U	----	0.4 B
Cadmium (1312)	mg/L	< 0.0005 U	44.64	0.31	< 0.0005 U	30.24	0.21 B
Chromium (1312)	mg/L	< 0.01 U	2440.00	5 B	< 0.01 U	4392.00	9
Copper (1312)	mg/L	< 0.01 U	1680.00	28	0.01 B	540.00	18
Iron (1312)	mg/L	0.15	486666.67	3650	0.13	372307.69	2420
Lead (1312)	mg/L	< 0.04 U	615.00	123	< 0.04 U	215.00	43
Manganese (1312)	mg/L	< 0.005 U	3757824.00	233	< 0.005 U	2709504.00	168
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	< 0.01 U	----	5 B	0.16	----	3 B
Nickel (1312)	mg/L	< 0.01 U	1044.00	3 B	< 0.01 U	1044.00	3 B
Selenium (1312)	mg/L	< 0.008 U	575.00	25	0.131	7.02	**10 +**
Silver (1312)	mg/L	< 0.0003 U	11.73	0.44	< 0.0003 U	11.47	0.43
Uranium (1312)	mg/L	0.0071	----	103	0.0098	----	117
Vanadium (1312)	mg/L	1.93	----	509	1.43	----	517
Zinc (1312)	mg/L	< 0.01 U	24780.00	35	< 0.01 U	13452.00	19

Table 4.46 (cont.): Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Blue Cap Mine

Analyte	Units	BC 3: 0 - 0.5			BC 3: 2 - 4			BC 3: 10- 12		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	0.6	< 0.001 U	----	0.3 B	< 0.001 U	----	0.2 B
Arsenic (1312)	mg/L	0.115	2445.22	74	0.0672	1441.96	25.5	0.0196	696.02	3.59
Barium (1312)	mg/L	0.03	----	25.6	0.085	----	44.8	0.038	----	168
Beryllium (1312)	mg/L	< 0.0005 U	----	< 0.3 U	< 0.0005 U	----	0.2 B	< 0.0005 U	----	0.58
Cadmium (1312)	mg/L	< 0.0005 U	228.96	1.59	< 0.0005 U	358.56	2.49	< 0.0005 U	15.84	0.11 B
Chromium (1312)	mg/L	< 0.01 U	488.00	1 B	< 0.01 U	1464.00	3 B	< 0.01 U	3416.00	7
Copper (1312)	mg/L	0.02 B	990.00	66	< 0.01 U	2040.00	34	< 0.01 U	300.00	5
Iron (1312)	mg/L	0.41	138536.59	2840	0.13	389230.77	2530	0.03 B	5686666.67	8530
Lead (1312)	mg/L	0.08 B	873.75	699	< 0.04 U	500.00	100	< 0.04 U	180.00	36
Manganese (1312)	mg/L	< 0.005 U	1886976.00	117	< 0.005 U	1564416.00	97	< 0.005 U	3306240.00	205
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	0.17	0.07 B	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.07	----	41	0.04 B	----	15	0.04 B	----	3 B
Nickel (1312)	mg/L	< 0.01 U	1392.00	4 B	< 0.01 U	348.00	1 B	< 0.01 U	1392.00	4 B
Selenium (1312)	mg/L	0.017 B	54.12	10 B	0.012 B	61.33	8	0.128	4.68	**6.51 +**
Silver (1312)	mg/L	< 0.0003 U	40.00	1.5	< 0.0003 U	23.73	0.89	< 0.0003 U	4.00	0.15
Uranium (1312)	mg/L	0.0192	----	127	0.0044	----	75.6	0.0026	----	27.9
Vanadium (1312)	mg/L	0.074	----	319	0.785	----	282	0.196	----	105
Zinc (1312)	mg/L	0.02 B	17346.00	98	0.01 B	48144.00	136	< 0.01 U	15576.00	22

Table 4.46 (cont.): Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Blue Cap Mine

Analyte	Units	BC 4: 0 - 0.5			BC 4: 2 - 4			BC 4: 8 - 10		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/L)
Antimony (1312)	mg/L	< 0.001 U	----	< 1 U	< 0.001 U	----	< 0.2 U	< 0.001 U	----	< 0.5 U
Arsenic (1312)	mg/L	0.0509	1425.93	19.1	0.0357	1085.71	10.2	0.0363	1664.46	15.9
Barium (1312)	mg/L	< 0.003 U	----	85.4	0.01	----	62.6	0.007 B	----	38.6
Beryllium (1312)	mg/L	< 0.0005 U	----	0.76	< 0.0005 U	----	0.26 B	< 0.0005 U	----	0.18 B
Cadmium (1312)	mg/L	< 0.0005 U	93.60	0.65	< 0.0005 U	24.48	0.17 B	< 0.0005 U	73.44	0.51
Chromium (1312)	mg/L	< 0.01 U	2440.00	5 B	< 0.01 U	28792.00	59	< 0.01 U	4880.00	10
Copper (1312)	mg/L	< 0.01 U	2940.00	49	< 0.01 U	1680.00	28	< 0.01 U	2520.00	42
Iron (1312)	mg/L	0.04 B	3645000.00	7290	0.02 B	2850000.00	2850	0.02 B	2460000.00	2460
Lead (1312)	mg/L	< 0.04 U	500.00	100	< 0.04 U	650.00	130	< 0.04 U	710.00	142
Manganese (1312)	mg/L	< 0.005 U	3838464.00	238	< 0.005 U	2919168.00	181	< 0.005 U	2596608.00	161
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.11	----	7	< 0.01 U	----	2 B	0.02 B	----	2 B
Nickel (1312)	mg/L	< 0.01 U	1044.00	3 B	< 0.01 U	696.00	2 B	< 0.01 U	696.00	2 B
Selenium (1312)	mg/L	0.097	20.39	**21.5 +**	0.025 B	93.84	25.5	0.023 B	78.40	19.6
Silver (1312)	mg/L	< 0.0003 U	14.67	0.55	< 0.0003 U	11.73	0.44	< 0.0003 U	14.67	0.55
Uranium (1312)	mg/L	0.0328	----	344	0.007	----	112	0.007	----	244
Vanadium (1312)	mg/L	1.84	----	843	3.7	----	1170	3.33	----	1210
Zinc (1312)	mg/L	< 0.01 U	55224.00	78	< 0.01 U	14868.00	21	< 0.01 U	36108.00	51

Analyte	Units	BC 4: 26.5 - 28.5		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	0.1 B
Arsenic (1312)	mg/L	0.0587	1579.56	24.4
Barium (1312)	mg/L	0.103	----	29.9
Beryllium (1312)	mg/L	< 0.0005 U	----	0.19 B
Cadmium (1312)	mg/L	< 0.0005 U	33.12	0.23 B
Chromium (1312)	mg/L	< 0.01 U	8296.00	17
Copper (1312)	mg/L	< 0.01 U	1140.00	19
Iron (1312)	mg/L	< 0.01 U	12120000	3030
Lead (1312)	mg/L	< 0.04 U	450.00	90
Manganese (1312)	mg/L	< 0.005 U	3177216.00	197
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.01 B	----	3 B
Nickel (1312)	mg/L	< 0.01 U	1044.00	3 B
Selenium (1312)	mg/L	0.076	30.75	25.4
Silver (1312)	mg/L	< 0.0003 U	12.53	0.47
Uranium (1312)	mg/L	0.0052	----	38.2
Vanadium (1312)	mg/L	0.116	----	477
Zinc (1312)	mg/L	< 0.01 U	25488.00	36

Table 4.46 (cont.): Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Blue Cap Mine

Analyte	Units	BC 5: 0 - 0.5			BC 5: 0 - 0.5 (Dup 1)			BC 5: 2 - 4		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	0.1 B	< 0.001 U	----	0.1 B	0.002 B	----	0.2 B
Arsenic (1312)	mg/L	0.0561	1083.78	16	0.0501	1061.88	14	0.129	1119.38	38
Barium (1312)	mg/L	0.019	----	96.2	0.019	----	105	0.023	----	90.8
Beryllium (1312)	mg/L	< 0.0005 U	----	0.4 B	< 0.0005 U	----	0.3 B	< 0.0005 U	----	0.6 B
Cadmium (1312)	mg/L	< 0.0005 U	145.44	1.01	< 0.0005 U	190.08	1.32	< 0.0005 U	133.92	0.93
Chromium (1312)	mg/L	< 0.01 U	4880.00	10	< 0.01 U	4880.00	10	< 0.01 U	976.00	2 B
Copper (1312)	mg/L	< 0.01 U	2940.00	49	< 0.01 U	3000.00	50	< 0.01 U	1320.00	22
Iron (1312)	mg/L	0.08	897500.00	3590	0.15	477333.33	3580	0.09	964444.44	4340
Lead (1312)	mg/L	< 0.04 U	645.00	129	< 0.04 U	655.00	131	< 0.04 U	265.00	53
Manganese (1312)	mg/L	< 0.005 U	2096640.00	130	< 0.005 U	2048256.00	127	< 0.005 U	3822336.00	237
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	< 0.01 U	----	8	< 0.01 U	----	4 B	0.14	----	21
Nickel (1312)	mg/L	< 0.01 U	1044.00	3 B	< 0.01 U	1044.00	3 B	< 0.01 U	696.00	2 B
Selenium (1312)	mg/L	< 0.008 U	690.00	30	< 0.008 U	483.00	21	0.014 B	59.14	9 B
Silver (1312)	mg/L	< 0.0003 U	26.67	1	< 0.0003 U	16.00	0.6	< 0.0003 U	16.00	0.6 B
Uranium (1312)	mg/L	0.0094	----	267	0.0122	----	245	0.0065	----	191
Vanadium (1312)	mg/L	1.9	----	1280	1.79	----	1060	5.42	----	594
Zinc (1312)	mg/L	< 0.01 U	63720.00	90	0.02 B	19824.00	112	< 0.01 U	77880.00	110

Analyte	Units	BC 5: 7 - 9			BC 5: 18.5 - 20.5			BC 6: 0 - 0.5		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	0.2 B	< 0.001 U	----	0.2 B	< 0.001 U	----	0.1 B
Arsenic (1312)	mg/L	0.0743	1805.38	35.3	0.0541	1896.49	27	0.154	1283.12	52
Barium (1312)	mg/L	0.074	----	72.7	0.074	----	45.3	0.008 B	----	63.3
Beryllium (1312)	mg/L	< 0.0005 U	----	0.4 B	< 0.0005 U	----	< 0.3 U	< 0.0005 U	----	0.5 B
Cadmium (1312)	mg/L	< 0.0005 U	73.44	0.51	< 0.0005 U	396.00	2.75	< 0.0005 U	195.84	1.36
Chromium (1312)	mg/L	< 0.01 U	3904.00	8	< 0.01 U	17080.00	35	< 0.01 U	18544.00	38
Copper (1312)	mg/L	< 0.01 U	1380.00	23	< 0.01 U	2940.00	49	0.01 B	930.00	31
Iron (1312)	mg/L	0.01 B	9100000.00	4550	0.01 B	6260000.00	3130	0.08	1427500.00	5710
Lead (1312)	mg/L	< 0.04 U	260.00	52	< 0.04 U	930.00	186	< 0.04 U	1135.00	227
Manganese (1312)	mg/L	< 0.005 U	3644928.00	226	< 0.005 U	1838592.00	114	< 0.005 U	3435264.00	213
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.24	----	26	0.06	----	11	< 0.01 U	----	6
Nickel (1312)	mg/L	< 0.01 U	1044.00	3 B	< 0.01 U	1044.00	3 B	< 0.01 U	2088.00	6
Selenium (1312)	mg/L	0.064	8.63	6 B	0.09	34.76	34	0.016 B	362.25	63
Silver (1312)	mg/L	< 0.0003 U	16.00	0.6	< 0.0003 U	18.67	0.7	< 0.0003 U	18.67	0.7
Uranium (1312)	mg/L	0.0089	----	109	0.0088	----	233	0.0149	----	311
Vanadium (1312)	mg/L	0.554	----	192	1.16	----	1180	7.72	----	1460
Zinc (1312)	mg/L	< 0.01 U	65844.00	93	< 0.01 U	198948.00	281	0.02 B	25842.00	146

Table 4.46 (cont.): Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Blue Cap Mine

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Analysis exceeded method hold time
Shaded value in bold indicates level exceeds leaching RMC
+ Value exceeds RMC by 1 to 10 times
++ Value exceeds RMC by 10 to 100 times
+++ Value exceeds RMC by more than 100 times
+++ Media concentration >100 times the RMC: extremely high risk

Table 4.47: Comparison of Metals in Waste-Rock Samples Collected from Face of Mine Dump to Leaching RMC at the Blue Cap Mine

Analyte	Units	BC Segment 1			BC Segment 2			BC Segment 3			BC Segment 4		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	< 1 U	< 0.001 U	----	< 0.5 U	< 0.001 U	----	< 0.5 U	< 0.001 U	----	< 1 U
Arsenic (1312)	mg/L	0.0627	1127.27	18.6	0.0743	1703.10	33.3	0.0753	933.60	18.5	0.103	2110.29	57.2
Barium (1312)	mg/L	0.015	----	60.2	0.023	----	80	0.003 B	----	26.8	0.048	----	56
Beryllium (1312)	mg/L	< 0.0005 U	----	0.39	< 0.0005 U	----	0.46	< 0.0005 U	----	0.2 B	< 0.0005 U	----	0.34
Cadmium (1312)	mg/L	< 0.0005 U	74.88	0.52	< 0.0005 U	410.40	2.85	< 0.0005 U	113.76	0.79	< 0.0005 U	407.52	2.83
Chromium (1312)	mg/L	< 0.01 U	21472.00	44	< 0.01 U	17568.00	36	< 0.01 U	1464.00	3 B	< 0.01 U	3904.00	8
Copper (1312)	mg/L	< 0.01 U	3000.00	50	< 0.01 U	4980.00	83	< 0.01 U	4080.00	68	< 0.01 U	5100.00	85
Iron (1312)	mg/L	0.02 B	3460000.00	3460	0.02 B	5080000.00	5080	0.03 B	1346666.67	2020	< 0.01 U	15880000	3970
Lead (1312)	mg/L	< 0.04 U	880.00	176	< 0.04 U	1050.00	210	< 0.04 U	570.00	114	< 0.04 U	2125.00	425
Manganese (1312)	mg/L	< 0.005 U	2693376.00	167	< 0.005 U	2822400.00	175	< 0.005 U	1430553.60	88.7	< 0.005 U	3064320.00	190
Mercury (1312)	mg/L	< 0 UH	----	< 0.05 U	< 0 UH	----	< 0.05 U	< 0 UH	----	< 0.05 U	< 0 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.02 B	----	3 B	0.02 B	----	7	0.02 B	----	2 B	0.04 B	----	17
Nickel (1312)	mg/L	< 0.01 U	1392.00	4 B	< 0.01 U	2088.00	6	< 0.01 U	696.00	2 B	< 0.01 U	1740.00	5
Selenium (1312)	mg/L	0.021 B	212.48	48.5	0.02 B	164.22	35.7	0.027 B	79.39	23.3	0.044	79.45	38
Silver (1312)	mg/L	< 0.0003 U	28.80	1.08	< 0.0003 U	30.40	1.14	< 0.0003 U	26.40	0.99	< 0.0003 U	43.73	1.64
Uranium (1312)	mg/L	0.0086	----	298	0.0064	----	257	0.0072	----	198	0.0028	----	403
Vanadium (1312)	mg/L	1.92	----	1450	2.1	----	1650	2.61	----	783	0.772	----	1320
Zinc (1312)	mg/L	< 0.01 U	38940.00	55	< 0.01 U	159300.00	225	< 0.01 U	88500.00	125	< 0.01 U	229392.00	324

Analyte	Units	BC Segment 5			BC Segment 6		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.002 B	----	< 1 U	< 0.001 U	----	< 0.5 U
Arsenic (1312)	mg/L	0.149	1043.09	40.9	0.094	2045.53	50.6
Barium (1312)	mg/L	0.007 B	----	45.2	0.045	----	44.3
Beryllium (1312)	mg/L	< 0.0005 U	----	0.3	< 0.0005 U	----	0.29 B
Cadmium (1312)	mg/L	< 0.0005 U	243.36	1.69	< 0.0005 U	279.36	1.94
Chromium (1312)	mg/L	< 0.01 U	4880.00	10	< 0.01 U	3416.00	7
Copper (1312)	mg/L	< 0.01 U	6420.00	107	< 0.01 U	3600.00	60
Iron (1312)	mg/L	0.02 B	3050000.00	3050	< 0.01 U	15120000	3780
Lead (1312)	mg/L	< 0.04 U	1375.00	275	< 0.04 U	1870.00	374
Manganese (1312)	mg/L	< 0.005 U	2322432.00	144	< 0.005 U	3306240.00	205
Mercury (1312)	mg/L	< 0 UH	----	< 0.05 U	< 0 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.02 B	----	8	0.04 B	----	13
Nickel (1312)	mg/L	< 0.01 U	1392.00	4 B	< 0.01 U	1740.00	5
Selenium (1312)	mg/L	0.025 B	113.34	30.8	0.043	60.76	28.4
Silver (1312)	mg/L	< 0.0003 U	27.73	1.04	< 0.0003 U	33.33	1.25
Uranium (1312)	mg/L	0.0145	----	346	0.0038	----	262
Vanadium (1312)	mg/L	3.03	----	1480	0.727	----	1140
Zinc (1312)	mg/L	< 0.01 U	88500.00	125	< 0.01 U	117528.00	166

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit
H Analysis exceeded method hold time
Shaded value in bold indicates level exceeds leaching RMC
+ Value exceeds RMC by 1 to 10 times
++ Value exceeds RMC by 10 to 100 times
+++ Value exceeds RMC by more than 100 times
+++ Media concentration >100 times the RMC: extremely high risk

Table 4.48: Comparison of Total Metals and Radionuclides in Stream Sediment Along Lion Canyon Creek to Camper RMC, Elk RMC, and Background Sediment

Analyte	Units	Camper RMC	Modified Elk RMC[1,2]	Background Sediment			Lion Cyn Crk UP Sed	Lion Cyn Crk DN 1 Sed	Lion Cyn Crk DN 2 Sed
				Min	Max	Mean			
Antimony, total (3050)	mg/Kg	62	----	0.1B	0.2B	0.2	0.2 B	0.1 B	0.1 B
Arsenic, total (3050)	mg/Kg	46	72386	3	5.9	4.0	13.8 +	10 +	4.7
Barium, total (3050)	mg/Kg	----	----	166	318	252	103	70.8	216
Beryllium, total (3050)	mg/Kg	----	----	0.75	0.79	0.77	0.42	0.28 B	0.5
Cadmium, total (3050)	mg/Kg	155	662	0.34	0.5	0.44	0.95 +	0.62 +	0.31
Chromium, total (3050)	mg/Kg	----	----	6	12	9	25 +	10	6
Copper, total (3050)	mg/Kg	5,745	28910	5	10	7	34 +	29 +	7
Iron, total (3050)	mg/Kg	----	----	8820	12400	10840	4510	3110	7090
Lead, total (3050)	mg/Kg	1,000	28028	9B	16B	12	109 +	112 +	36 +
Manganese, total (3050)	mg/Kg	21,679	----	524	890	650	162	129	363
Mercury, total	mg/Kg	46	2428	<0.04U	<0.05U	0.02	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	----	----	<1U	<1U	0.5	5 B+	4 B+	< 1 U
Nickel, total (3050)	mg/Kg	3,094	----	3B	8	5	4 B	2 B	3 B
Selenium, total (3050)	mg/Kg	774	----	<0.5U	2.8B	1.1	25.5 +	22.8 +	3.2 +
Silver, total (3050)	mg/Kg	774	----	<0.5U	<0.5U	0.25	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	----	733352	0.62	4.86	2.08	151 ++	86.8 ++	14.5 +
Vanadium, total (3050)	mg/Kg	----	61793	15.4	24.5	21.3	972 ++	776 ++	167 +
Zinc, total (3050)	mg/Kg	46,455	60690	23	37	30	88 +	51 +	132 +
Gross Alpha	pCi/g	----	----	5.47	11.2	7.8	323 ++	325 ++	49.6 +
Gross Beta	pCi/g	----	----	6.18	12.3	10.2	157 ++	130 ++	24.6 +
Radium 226 (3050)	pCi/g	----	----	0.5	1.07	0.79	45.2 ++	38.3 ++	0.84
Radium 228 (3050)	pCi/g	----	----	0	1.84	1.09	2.33 +	2.25 +	1.12
Thorium 228	pCi/g	----	----	0.27	0.58	0.47	0.6 +	0.21	0.27
Thorium 230	pCi/g	----	----	-0.02	0.74	0.35	45.6 ++	45.8 ++	7.96 ++
Thorium 232	pCi/g	----	----	0.51	0.73	0.61	0.5	0.24	0.25
Solids, Percent	%	----	----	44.9	73	59.5	77.2	77.6	72.6

[1] Elk RMC in sediment have not been established; elk RMC in soil used for purpose of comparison.

[2] Modified by area use factor (RMC/[2.9 acres/640 acres]); drainage area determined from aerial photograph

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds camper or elk RMC

+ Value exceeds RMC (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds RMC (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds RMC (shaded) or maximum background (not shaded) by more than 100 times

Table 4.49: Comparison of Metal and Radionuclide Levels in Vegetation at the Blue Cap Mine to Maximum Tolerable Levels and Background Values

Mine Drainage Channel

Analyte	Units	Maximum Tolerable Level[1]	Grass		Forb		Shrub	
			Ref Area	Adit Drainage	Ref Area	Adit Drainage	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	----	< 0.1 U	**0.2 B+**	< 0.1 U	< 0.1 U	< 0.1 U	0.1 B
Arsenic, total (3050)	mg/Kg	50	< 0.3 U	**1.2 +**	< 0.3 U	**0.8 B+**	< 0.3 U	**1 B+**
Barium, total (3050)	mg/Kg	20	**41.5 +**	**39.6 +**	**106 +**	**44.6 +**	**90.8 +**	**76.7 +**
Beryllium, total (3050)	mg/Kg	----	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.06 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.5	0.07 B	**0.45 +**	0.12 B	**0.4 +**	0.06 B	**2.63 +**
Chromium, total (3050)	mg/Kg	1,000	1 B	1 B	2 B	< 1 U	2 B	< 1 U
Copper, total (3050)	mg/Kg	25	2 B	**3 B+**	7	**8 +**	7	6
Iron, total (3050)	mg/Kg	500	322	**371 +**	252	77	255	134
Lead, total (3050)	mg/Kg	30	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	400	95	**171 +**	74.2	**80.3 +**	42.4	**67.9 +**
Mercury, total	mg/Kg	2	0 UH	< 0.1 U	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	10	5 B	**16 +**	3 B	**22 +**	< 1 U	**5 B+**
Nickel, total (3050)	mg/Kg	50	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2	**2.4 B+**	**22.5 ++**	**7.4 +**	**15.9 +**	1.3 B	**19.1 +**
Silver, total (3050)	mg/Kg	100	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.5 U
Uranium, total (3050)	mg/Kg	----	0.03 B	**7.1 +++**	0.07 B	**1 ++**	< 0.03 U	**1.75 ++**
Vanadium, total (3050)	mg/Kg	10	0.7 B	**7.3 ++**	0.8 B	**1.5 B+**	0.6 B	**0.8 B+**
Zinc, total (3050)	mg/Kg	300	10	**36 +**	30	**63 +**	33	**251 +**
Gross Alpha	pCi/g	----	1.63	**18.1 ++**	0.94	**18.8 ++**	2.25	**9.51 +**
Gross Beta	pCi/g	----	7.15	**19.3 +**	13.6	**21.2 +**	9.2	6.84
Radium 226 (3050)	pCi/g	----	1.98	**4.9 +**	0.07	**6.68 ++**	0.45	**9.25 ++**
Radium 228 (3050)	pCi/g	----	1.65	1.32	2.02	**2.32 +**	2.31	**4 +**
Thorium 228	pCi/g	----	-0.1	-0.05	0.14	0.06	-0.13	**0.37 +**
Thorium 230	pCi/g	----	-0.59	0	-0.28	-0.09	-0.44	-0.28
Thorium 232	pCi/g	----	-0.17	-0.13	0.06	0.03	0.05	0
Moisture Content	%	----	41.4	55.4	66.6	62.9	46.1	58.5

Perimeter of Waste-Rock Dump

Analyte	Units	Maximum Tolerable Level[1]	Grass		Forb		Shrub	
			Ref Area	Perimeter	Ref Area	Perimeter	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	----	< 0.1 U	**0.5 B+**	< 0.1 U	< 0.5 U	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	50	< 0.3 U	**4.5 ++**	< 0.3 U	**11 ++**	< 0.3 U	**1.2 +**
Barium, total (3050)	mg/Kg	20	**41.5 +**	**20.6 +**	**106 +**	10.9	**90.8 +**	11.2
Beryllium, total (3050)	mg/Kg	----	< 0.05 U	0.05 B	< 0.05 U	< 0.05 U	< 0.06 U	< 0.06 U
Cadmium, total (3050)	mg/Kg	0.5	0.07 B	**2.42 +**	0.12 B	**1.23 +**	0.06 B	**0.68 +**
Chromium, total (3050)	mg/Kg	1,000	1 B	**4 B+**	2 B	1 B	2 B	1 B
Copper, total (3050)	mg/Kg	25	2 B	**7 +**	7	**10 +**	7	**10 +**
Iron, total (3050)	mg/Kg	500	322	**526 +**	252	111	255	149
Lead, total (3050)	mg/Kg	30	< 4 U	**15 B+**	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	400	95	21.6	74.2	31.7	42.4	25.8
Mercury, total	mg/Kg	2	0 UH	< 0.1 U	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	10	5 B	**69 +**	3 B	**183 ++**	< 1 U	**10 +**
Nickel, total (3050)	mg/Kg	50	< 1 U	**2 B+**	< 1 U	< 1 U	< 1 U	**2 B+**
Selenium, total (3050)	mg/Kg	2	**2.4 B+**	**68.2 ++**	**7.4 +**	**467 +++**	1.3 B	**107 ++**
Silver, total (3050)	mg/Kg	100	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U
Uranium, total (3050)	mg/Kg	----	0.03 B	**14.2 +++**	0.07 B	**2.23 ++**	< 0.03 U	**0.44 ++**
Vanadium, total (3050)	mg/Kg	10	0.7 B	**65.7 +**	0.8 B	**10.8 +**	0.6 B	**3.7 +**
Zinc, total (3050)	mg/Kg	300	10	**53 +**	30	**92 +**	33	**70 +**
Gross Alpha	pCi/g	----	1.63	**39.8 ++**	0.94	**15.1 ++**	2.25	**7.69 +**
Gross Beta	pCi/g	----	7.15	**23 +**	13.6	**21.3 +**	9.2	**22.9 +**
Radium 226 (3050)	pCi/g	----	1.98	**7.62 +**	0.07	**5.28 ++**	0.45	**5.32 ++**
Radium 228 (3050)	pCi/g	----	1.65	**3.14 +**	2.02	**2.62 +**	2.31	**2.38 +**
Thorium 228	pCi/g	----	-0.1	-0.08	0.14	-0.09	-0.13	**0.15 +**
Thorium 230	pCi/g	----	-0.59	**4.43 +**	-0.28	-0.27	-0.44	**1.16 +**
Thorium 232	pCi/g	----	-0.17	0	0.06	**0.27 +**	0.05	**0.36 +**
Moisture Content	%	----	41.4	63	66.6	62.6	46.1	50.9

[1] Most restrictive value reported for cattle, sheep, swine, horse, and rabbit in *Mineral Tolerance of Domestic Animals* (National Research Council, 1980)

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time was exceeded

Shaded Value in bold indicates level exceeds maximum tolerable level

\+ Media concentration exceeds criterion (shaded) or background (not shaded) by 1 to 10 times

++ Media concentration exceeds criterion (shaded) or background (not shaded) by 10 to 100 times

+++ Media concentration exceeds criterion (shaded) or background (not shaded) by more than 100 times

Table 4.50: Comparison of COCs in Borehole Waste-Rock Samples at the Black Hat Mine to Human-Health Risk Criteria

Analyte	Units	RMC	SSL	Background Soil			BH 1				BH 2		
		Camper	Industrial	Min	Max	Mean	0 - 0.5	2 - 4	8 - 10	11 - 13	0 - 0.5	2 - 4	5.5 - 7.5
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	0.1 B	< 0.1 U	0.1 B
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	9	10	8.7	2.1 B	11	17	**30 +**
Barium, total (3050)	mg/Kg	---	71540	128	419	205	48.5	32.7	16.9	279	67	37.7	44.1
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.4 B	< 0.3 U	0.2 B	0.7	0.4 B	< 0.5 U	0.4 B
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	0.39	0.35	0.2 B	0.21 B	0.41	0.39	0.42
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	12	48 +	35 +	4 B	5	5	12
Copper, total (3050)	mg/Kg	5000	---	3	75	15	16	52	30	6	13	35	62
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	2450	2380	2630	5900	2860	2600	3620
Lead, total (3050)	mg/Kg	1000	---	8	82	19	120 +	206 +	141 +	11 B	102 +	235 +	164 +
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	132	132	210	617 +	136	160	173
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	< 1 U	2 B	< 1 U	< 1 U	2 B	< 1 U	5
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	3 B	2 B	2 B	3 B	3 B	3 B	3 B
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	21 +	50 +	41 +	< 2 U	20 B+	61 ++	30 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	0.4 B	0.6 +	0.52 +	< 0.05 U	0.4 B	0.8 B+	1 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	303 ++	182 ++	106 +	3.67	344 ++	387 ++	303 ++
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	798 +	863 +	750 +	26.4	1170 +	1130 +	1340 +
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	45	43	23	17	43	50	56
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	301 +	232 +	206 +	8.16	383 +	361 +	262 +
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	227 +	164 +	145 +	8.3	246 +	262 +	185 +
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	90.5 +	91.8 +	42 +	1.45	139 ++	184 ++	89.5 +
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	2.7	1.23	1.47	1.42	1.73	1.1	0.27
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.4	0.52	0.18	0.45	0.27	0.56	0.21
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	48.3 +	83.7 +	46.2 +	2.12	134 +	66.1 +	56.5 +
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.34	0.39	0.5	0.39	0.59 +	0.56 +	0.21
Solids, Percent	%	---	---	87.3	94.8	91.5	93.7	92.9	91.3	91.4	95.4	93	92.3

Shaded value in bold indicates level exceeds human-health criterion
+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times
++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times
+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit

Table 4.51: Comparison of COCs in Waste Rock from Composite Surface Samples at the Black Hat Mine to Human-Health Risk Criteria

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			BH Segment 1	BH Segment 2
				Min	Max	Mean		
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	< 1 U	< 1 U
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	**30.5 +**	16.9
Barium, total (3050)	mg/Kg	---	71540	128	419	205	41.4	73.1
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.43	0.37
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	0.54	0.63
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	34 +	14 +
Copper, total (3050)	mg/Kg	5000	---	3	75	15	36	108 +
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	3310	3150
Lead, total (3050)	mg/Kg	1000	---	8	82	19	251 +	190 **+**
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	152	175
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	< 0.05 U	< 0.04 U
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	4 B	6
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	6	4 B
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	55.6 ++	36.8 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	1.2 +	1.1 +
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	349 ++	313 ++
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	1580 ++	954 +
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	72	83
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	819 +	563 +
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	265 +	233 +
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	78.7 +	83.6 +
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	1.7	1.29
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0.17	0.36
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	110 +	71.8 +
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.22	0.27
Solids, Percent	%	---	---	87.3	94.8	91.5	93.1	95.5

Shaded value in bold indicates level exceeds human-health criterion
+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times
++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times
+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times
Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit

Table 4.52: Sample Sites at Black Hat Mine Where Radionuclide Activities in Near-Surface Samples Exceeded Maximum Background Levels

Radionuclide	Borehole Samples		Composite Surface		Factor Exceeded Background			
	1	2	1	2	Min	Max	Mean	Median
Gross alpha	○	○	○	○	3.43	9.33	5.88	5.39
Gross beta	○	○	○	○	5.93	6.92	6.34	6.25
Radium 226	○	○	○	○	5.96	10.53	7.42	6.59
Radium 228					----	----	----	----
Thorium 228					----	----	----	----
Thorium 230	○	○	○	○	2.17	6.01	4.08	4.08
Thorium 232		○			1.11	1.11	1.11	1.11

Table 4.53: Comparison of COCs in Borehole Waste-Rock Samples at the Black Hat Mine to Ecological Risk Criteria

Analyte	Units	Modified Elk RMC[1]	Background Soil			BH 1				BH 2		
			Min	Max	Mean	0 - 0.5	2 - 4	8 - 10	11 - 13	0 - 0.5	2 - 4	5.5 - 7.5
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	0.1 B	< 0.1 U	0.1 B
Arsenic, total (3050)	mg/Kg	699733	1.1	25.7	9.7	9	10	8.7	2.1 B	11	17	30 +
Barium, total (3050)	mg/Kg	----	128	419	205	48.5	32.7	16.9	279	67	37.7	44.1
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.4 B	< 0.3 U	0.2 B	0.7	0.4 B	< 0.5 U	0.4 B
Cadmium, total (3050)	mg/Kg	6400	0.09	1.34	0.30	0.39	0.35	0.2 B	0.21 B	0.41	0.39	0.42
Chromium, total (3050)	mg/Kg	----	5	12	8	12	48 +	35 +	4 B	5	5	12
Copper, total (3050)	mg/Kg	279467	3	75	15	16	52	30	6	13	35	62
Iron, total (3050)	mg/Kg	----	4790	10600	7524	2450	2380	2630	5900	2860	2600	3620
Lead, total (3050)	mg/Kg	270933	8	82	19	120 +	206 +	141 +	11 B	102 +	235 +	164 +
Manganese, total (3050)	mg/Kg	----	151	397	269	132	132	210	617 +	136	160	173
Mercury, total	mg/Kg	23467	<0.04 U	0.02	0.02	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	< 1 U	2 B	< 1 U	< 1 U	2 B	< 1 U	5
Nickel, total (3050)	mg/Kg	----	3	6	5	3 B	2 B	2 B	3 B	3 B	3 B	3 B
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	21 +	50 +	41 +	< 2 U	20 B+	61 ++	30 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	0.4 B	0.6 +	0.52 +	< 0.05 U	0.4 B	0.8 B+	1 +
Uranium, total (3050)	mg/Kg	7089067	0.38	15.3	3.9	303 ++	182 ++	106 +	3.67	344 ++	387 ++	303 ++
Vanadium, total (3050)	mg/Kg	597333	10.7	136	40	798 +	863 +	750 +	26.4	1170 +	1130 +	1340 +
Zinc, total (3050)	mg/Kg	586667	12	125	28	45	43	23	17	43	50	56
Gross Alpha	pCi/g	----	3.39	87.8	20.3	301 +	232 +	206 +	8.16	383 +	361 +	262 +
Gross Beta	pCi/g	----	3.29	38.3	13.5	227 +	164 +	145 +	8.3	246 +	262 +	185 +
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	90.5 +	91.8 +	42 +	1.45	139 ++	184 ++	89.5 +
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	2.7	1.23	1.47	1.42	1.73	1.1	0.27
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.4	0.52	0.18	0.45	0.27	0.56	0.21
Thorium 230	pCi/g	----	-0.36	22.3	3.1	48.3 +	83.7 +	46.2 +	2.12	134 +	66.1 +	56.5 +
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.34	0.39	0.5	0.39	0.59 +	0.56 +	0.21
Solids, Percent	%	----	87.3	94.8	91.5	93.7	92.9	91.3	91.4	95.4	93	92.3

[1] Modified by area use factor (RMC/[0.3 acres/640 acres])

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds human-health criterion

+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Table 4.54: Comparison of COCs in Waste Rock from Composite Surface Samples at the Black Hat Mine to Ecological Risk Criteria

Analyte	Units	Modified Elk RMC[1]	Background Soil			BH Segment 1	BH Segment 2
			Min	Max	Mean		
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	< 1 U	< 1 U
Arsenic, total (3050)	mg/Kg	699733	1.1	25.7	9.7	30.5 +	16.9
Barium, total (3050)	mg/Kg	----	128	419	205	41.4	73.1
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.43	0.37
Cadmium, total (3050)	mg/Kg	6400	0.09	1.34	0.30	0.54	0.63
Chromium, total (3050)	mg/Kg	----	5	12	8	34 +	14 +
Copper, total (3050)	mg/Kg	279467	3	75	15	36	108 +
Iron, total (3050)	mg/Kg	----	4790	10600	7524	3310	3150
Lead, total (3050)	mg/Kg	270933	8	82	19	251 +	190 +
Manganese, total (3050)	mg/Kg	----	151	397	269	152	175
Mercury, total	mg/Kg	23467	<0.04 U	0.02	0.02	< 0.05 U	< 0.04 U
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	4 B	6
Nickel, total (3050)	mg/Kg	----	3	6	5	6	4 B
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	55.6 ++	36.8 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	1.2 +	1.1 +
Uranium, total (3050)	mg/Kg	7089067	0.38	15.3	3.9	349 ++	313 ++
Vanadium, total (3050)	mg/Kg	597333	10.7	136	40	1580 ++	954 +
Zinc, total (3050)	mg/Kg	586667	12	125	28	72	83
Gross Alpha	pCi/g	----	3.39	87.8	20.3	819 +	563 +
Gross Beta	pCi/g	----	3.29	38.3	13.5	265 +	233 +
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	78.7 +	83.6 +
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	1.7	1.29
Thorium 228	pCi/g	----	0.24	0.81	0.40	0.17	0.36
Thorium 230	pCi/g	----	-0.36	22.3	3.1	110 +	71.8 +
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.22	0.27
Solids, Percent	%	----	87.3	94.8	91.5	93.1	95.5

[1] Modified by area use factor (RMC/[0.3 acres/640 acres])

Shaded value in bold indicates level exceeds human-health criterion

+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Table 4.55: Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Black Hat Mine

Analyte	Units	BH 1: 0 - 0.5			BH 1: 2 - 4			BH 1: 8 - 10		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	< 0.1 U	< 0.001 U	----	< 0.1 U	0.001 B	----	< 0.1 U
Arsenic (1312)	mg/L	0.0151	2264.90	9	0.0478	794.98	10	0.033	1001.82	8.7
Barium (1312)	mg/L	0.007 B	----	48.5	0.012	----	32.7	< 0.003 U	----	16.9
Beryllium (1312)	mg/L	< 0.0005 U	----	0.4 B	< 0.0005 U	----	< 0.3 U	< 0.0005 U	----	0.2 B
Cadmium (1312)	mg/L	< 0.0005 U	56.16	0.39	< 0.0005 U	50.40	0.35	< 0.0005 U	28.80	0.2 B
Chromium (1312)	mg/L	< 0.01 U	5856.00	12	< 0.01 U	23424.00	48	< 0.01 U	17080.00	35
Copper (1312)	mg/L	< 0.01 U	960.00	16	0.01 B	1560.00	52	< 0.01 U	1800.00	30
Iron (1312)	mg/L	0.1	490000.00	2450	0.17	280000.00	2380	0.03 B	1753333.33	2630
Lead (1312)	mg/L	< 0.04 U	600.00	120	< 0.04 U	1030.00	206	< 0.04 U	705.00	141
Manganese (1312)	mg/L	< 0.005 U	2128896.00	132	< 0.005 U	2128896.00	132	< 0.005 U	3386880.00	210
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	< 0.01 U	----	< 1 U	< 0.01 U	----	2 B	< 0.01 U	----	< 1 U
Nickel (1312)	mg/L	< 0.01 U	1044.00	3 B	< 0.01 U	696.00	2 B	< 0.01 U	696.00	2 B
Selenium (1312)	mg/L	< 0.008 U	483.00	21	0.014 B	328.57	50	0.058	65.03	41
Silver (1312)	mg/L	< 0.0003 U	10.67	0.4 B	< 0.0003 U	16.00	0.6	< 0.0003 U	13.87	0.52
Uranium (1312)	mg/L	0.0124	----	303	0.0141	----	182	0.0056	----	106
Vanadium (1312)	mg/L	1.74	----	798	2.36	----	863	5.19	----	750
Zinc (1312)	mg/L	< 0.01 U	31860.00	45	0.01 B	15222.00	43	< 0.01 U	16284.00	23

Analyte	Units	BH 1: 11 - 13		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.002 B	----	< 0.1 U
Arsenic (1312)	mg/L	0.039	204.62	2.1 B
Barium (1312)	mg/L	< 0.003 U	----	279
Beryllium (1312)	mg/L	< 0.0005 U	----	0.7
Cadmium (1312)	mg/L	< 0.0005 U	30.24	0.21 B
Chromium (1312)	mg/L	< 0.01 U	1952.00	4 B
Copper (1312)	mg/L	< 0.01 U	360.00	6
Iron (1312)	mg/L	0.05 B	2360000.00	5900
Lead (1312)	mg/L	< 0.04 U	55.00	11 B
Manganese (1312)	mg/L	< 0.005 U	9950976.00	617
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	0.01 B	----	< 1 U
Nickel (1312)	mg/L	< 0.01 U	1044.00	3 B
Selenium (1312)	mg/L	0.051	3.61	< 2 U
Silver (1312)	mg/L	< 0.0003 U	1.33	< 0.05 U
Uranium (1312)	mg/L	0.0072	----	3.67
Vanadium (1312)	mg/L	3.97	----	26.4
Zinc (1312)	mg/L	< 0.01 U	12036.00	17

Table 4.55 (cont.): Comparison of Metals in Waste-Rock Samples Collected from Boreholes to Leaching RMC at the Black Hat Mine

Analyte	Units	BH 2: 0 - 0.5			BH 2: 2 - 4			BH 2: 5.5 - 7.5		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	0.1 B	< 0.001 U	----	< 0.1 U	< 0.001 U	----	0.1 B
Arsenic (1312)	mg/L	0.0183	2284.15	11	0.0695	929.50	17	0.101	1128.71	30
Barium (1312)	mg/L	0.016	----	67	0.006 B	----	37.7	0.003 B	----	44.1
Beryllium (1312)	mg/L	< 0.0005 U	----	0.4 B	< 0.0005 U	----	< 0.5 U	< 0.0005 U	----	0.4 B
Cadmium (1312)	mg/L	< 0.0005 U	59.04	0.41	< 0.0005 U	56.16	0.39	< 0.0005 U	60.48	0.42
Chromium (1312)	mg/L	< 0.01 U	2440.00	5	< 0.01 U	2440.00	5	< 0.01 U	5856.00	12
Copper (1312)	mg/L	0.02 B	195.00	13	< 0.01 U	2100.00	35	< 0.01 U	3720.00	62
Iron (1312)	mg/L	0.46	124347.83	2860	0.07	742857.14	2600	0.08	905000.00	3620
Lead (1312)	mg/L	< 0.04 U	510.00	102	< 0.04 U	1175.00	235	< 0.04 U	820.00	164
Manganese (1312)	mg/L	0.007 B	783360.00	136	< 0.005 U	2580480.00	160	< 0.005 U	2790144.00	173
Mercury (1312)	mg/L	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U	< 0.0002 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	< 0.01 U	----	2 B	< 0.01 U	----	< 1 U	0.03 B	----	5
Nickel (1312)	mg/L	< 0.01 U	1044.00	3 B	< 0.01 U	1044.00	3 B	< 0.01 U	1044.00	3 B
Selenium (1312)	mg/L	< 0.008 U	460.00	20 B	0.012 B	467.67	61	0.043	64.19	30
Silver (1312)	mg/L	< 0.0003 U	10.67	0.4 B	< 0.0003 U	21.33	0.8 B	< 0.0003 U	26.67	1
Uranium (1312)	mg/L	0.0966	----	344	0.0143	----	387	0.0064	----	303
Vanadium (1312)	mg/L	1.31	----	1170	3.75	----	1130	4.33	----	1340
Zinc (1312)	mg/L	0.02 B	7611.00	43	0.01 B	17700.00	50	0.01 B	19824.00	56

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Analysis exceeded method hold time

Shaded value in bold indicates level exceeds leaching RMC

+ Value exceeds RMC by 1 to 10 times

++ Value exceeds RMC by 10 to 100 times

+++ Value exceeds RMC by more than 100 times

Table 4.56: Comparison of Metals in Composite Waste-Rock Samples Collected from Face of Mine Dump to Leaching RMC at the Black Hat Mine

Analyte	Units	BH Segment 1			BH Segment 2		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	0.0004 B	----	< 1 U	0.0004 B	----	< 1 U
Arsenic (1312)	mg/L	0.0614	1887.62	30.5	0.0556	1155.04	16.9
Barium (1312)	mg/L	< 0.003 U	----	41.4	0.04	----	73.1
Beryllium (1312)	mg/L	< 0.0001 U	----	0.43	< 0.0001 U	----	0.37
Cadmium (1312)	mg/L	< 0.0001 U	388.80	0.54	< 0.0001 U	453.60	0.63
Chromium (1312)	mg/L	< 0.01 U	16592.00	34	< 0.01 U	6832.00	14
Copper (1312)	mg/L	< 0.01 U	2160.00	36	< 0.01 U	6480.00	108
Iron (1312)	mg/L	0.05	1324000.00	3310	< 0.01 U	12600000.00	3150
Lead (1312)	mg/L	< 0.04 U	1255.00	251	< 0.04 U	950.00	190
Manganese (1312)	mg/L	< 0.005 U	2451456.00	152	< 0.005 U	2822400.00	175
Mercury (1312)	mg/L	< 0.0002 U	----	< 0.05 U	< 0.0002 U	----	< 0.04 U
Molybdenum (1312)	mg/L	0.02 B	----	4 B	0.01 B	----	6
Nickel (1312)	mg/L	< 0.01 U	2088.00	6	< 0.01 U	1392.00	4 B
Selenium (1312)	mg/L	0.0244	209.64	55.6	0.074	45.75	36.8
Silver (1312)	mg/L	0.00007 B	68.57	1.2	< 0.00005 U	176.00	1.1
Uranium (1312)	mg/L	0.00915	----	349	0.0134	----	313
Vanadium (1312)	mg/L	2.92	----	1580	1.07	----	954
Zinc (1312)	mg/L	< 0.01 U	50976.00	72	< 0.01 U	58764.00	83

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Analysis exceeded method hold time

Shaded value in bold indicates level exceeds leaching RMC

+ Value exceeds RMC by 1 to 10 times

++ Value exceeds RMC by 10 to 100 times

+++ Value exceeds RMC by more than 100 times

Table 4.57: Comparison of Metal and Radionuclide Levels in Vegetation at the Black Hat Mine to Maximum Tolerable Levels and Background Values

Perimeter of Waste-Rock Dump

Analyte	Units	Maximum Tolerable Level[1]	Grass		Forb		Shrub	
			Ref Area	Perimeter	Ref Area	Perimeter	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	----	< 0.1 U	**0.4 B+**	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	50	< 0.3 U	**3.4 ++**	< 0.3 U	**14.7 ++**	< 0.3 U	< 0.3 U
Barium, total (3050)	mg/Kg	20	**41.5 +**	**50.3 +**	**106 +**	**41.6 +**	**90.8 +**	12.4
Beryllium, total (3050)	mg/Kg	----	< 0.05 U	**0.13 B+**	< 0.05 U	< 0.05 U	< 0.06 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.5	0.07 B	**0.73 +**	0.12 B	**0.58 +**	0.06 B	**0.41 +**
Chromium, total (3050)	mg/Kg	1,000	1 B	**3 B+**	2 B	< 1 U	2 B	< 1 U
Copper, total (3050)	mg/Kg	25	2 B	**9 +**	7	**12 +**	7	**17 +**
Iron, total (3050)	mg/Kg	500	322	**755 +**	252	172	255	119
Lead, total (3050)	mg/Kg	30	< 4 U	**13 B+**	< 4 U	**4 B+**	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	400	95	49.4	74.2	61.6	42.4	**46.4 +**
Mercury, total	mg/Kg	2	0 UH	< 0.1 U	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	10	5 B	**42 +**	3 B	**145 ++**	< 1 U	**9 +**
Nickel, total (3050)	mg/Kg	50	< 1 U	**2 B+**	< 1 U	**1 B+**	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2	**2.4 B+**	**66.6 ++**	**7.4 +**	**660 +++**	1.3 B	**50.9 ++**
Silver, total (3050)	mg/Kg	100	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.5 U
Uranium, total (3050)	mg/Kg	----	0.03 B	**29 +++**	0.07 B	**2.87 ++**	< 0.03 U	**0.56 ++**
Vanadium, total (3050)	mg/Kg	10	0.7 B	**78.6 +**	0.8 B	**17.1 +**	0.6 B	**2 B+**
Zinc, total (3050)	mg/Kg	300	10	**77 +**	30	**43 +**	33	**74 +**
Gross Alpha	pCi/g	----	1.63	**47.6 ++**	0.94	**48.4 ++**	2.25	**3.27 +**
Gross Beta	pCi/g	----	7.15	**26.7 +**	13.6	**27.9 +**	9.2	**15.9 +**
Radium 226 (3050)	pCi/g	----	1.98	**12.9 +**	0.07	**15.2 +++**	0.45	**1.71 +**
Radium 228 (3050)	pCi/g	----	1.65	**2.43 +**	2.02	1.98	2.31	**8.19 +**
Thorium 228	pCi/g	----	-0.1	-0.03	0.14	0	-0.13	-0.03
Thorium 230	pCi/g	----	-0.59	**3.33 +**	-0.28	**0.6 +**	-0.44	-0.45
Thorium 232	pCi/g	----	-0.17	0	0.06	**0.14 +**	0.05	**0.12 +**
Moisture Content	%	----	41.4	61.8	66.6	68.3	46.1	56.6

[1] Most restrictive value reported for cattle, sheep, swine, horse, and rabbit in *Mineral Tolerance of Domestic Animals* (National Research Council, 1980)

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time was exceeded

Shaded Value in bold indicates level exceeds maximum tolerable level

\+ Media concentration exceeds criterion (shaded) or background (not shaded) by 1 to 10 times

++ Media concentration exceeds criterion (shaded) or background (not shaded) by 10 to 100 times

+++ Media concentration exceeds criterion (shaded) or background (not shaded) by more than 100 times

Table 4.58: Comparison of COCs in Waste Rock from Composite Surface Samples at the Saint Patrick Mine to Human-Health Risk Criteria

Analyte	Units	RMC Camper	SSL Industrial	Background Soil			SP Segment 1	SP Segment 1 (Dup 9)	SP Segment 2
				Min	Max	Mean			
Antimony, total (3050)	mg/Kg	50	---	<0.1 U	0.3 B	0.2	0.1 B	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	20	---	1.1	25.7	9.7	10	7.96	10.1
Barium, total (3050)	mg/Kg	---	71540	128	419	205	123	73.3	54.1
Beryllium, total (3050)	mg/Kg	---	2044	0.41	0.86	0.64	0.29 B	0.27 B	0.23 B
Cadmium, total (3050)	mg/Kg	70	---	0.09	1.34	0.30	0.76	0.8	0.77
Chromium, total (3050)	mg/Kg	---	1533000	5	12	8	18 +	13 +	16 +
Copper, total (3050)	mg/Kg	5000	---	3	75	15	23	29	22
Iron, total (3050)	mg/Kg	---	306600	4790	10600	7524	3150	2740	2340
Lead, total (3050)	mg/Kg	1000	---	8	82	19	167 +	154 +	173 +
Manganese, total (3050)	mg/Kg	19000	---	151	397	269	134	101	128
Mercury, total	mg/Kg	40	---	<0.04 U	0.02	0.02	< 0.05 U	< 0.04 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	---	5110	<1 U	7	1	< 1 U	< 1 U	< 1 U
Nickel, total (3050)	mg/Kg	2700	---	3	6	5	3 B	3 B	3 B
Selenium, total (3050)	mg/Kg	700	---	<0.5 U	5.2	1.2	19.7 +	21.9 +	14.5 +
Silver, total (3050)	mg/Kg	700	---	<0.5 U	<0.5 U	0.3	0.45	0.51 +	0.37
Uranium, total (3050)	mg/Kg	---	3066	0.38	15.3	3.9	373 ++	474 ++	219 ++
Vanadium, total (3050)	mg/Kg	---	7154	10.7	136	40	2770 ++	2690 ++	1240 +
Zinc, total (3050)	mg/Kg	40000	---	12	125	28	81	81	76
Gross Alpha	pCi/g	---	---	3.39	87.8	20.3	92.2 +	89.6 +	35.2
Gross Beta	pCi/g	---	---	3.29	38.3	13.5	33.9	32.5	13.6
Radium 226 (3050)	pCi/g	---	---	0.49	13.2	3.3	45.5 +	5.25	20.1 +
Radium 228 (3050)	pCi/g	---	---	0.68	4.15	2.66	0.1	0.04	0.03
Thorium 228	pCi/g	---	---	0.24	0.81	0.40	0	0.02	-0.01
Thorium 230	pCi/g	---	---	-0.36	22.3	3.1	16.2	15.4	7.96
Thorium 232	pCi/g	---	---	0.08	0.53	0.35	0.03	-0.02	0
Solids, Percent	%	---	---	87.3	94.8	91.5	94.5	94.4	94.6

Shaded value in bold indicates level exceeds human-health criterion
+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times
++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times
+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times
Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at the Method Detection Limit

Table 4.59: Comparison of COCs in Waste Rock from Composite Surface Samples at the Saint Patrick Mine to Ecological Risk Criteria

Analyte	Units	Modified Elk RMC[1]	Background Soil			SP Segment 1	SP Segment 1 (Dup 9)	SP Segment 2
			Min	Max	Mean			
Antimony, total (3050)	mg/Kg	----	<0.1 U	0.3 B	0.2	0.1 B	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	209920	1.1	25.7	9.7	10	7.96	10.1
Barium, total (3050)	mg/Kg	----	128	419	205	123	73.3	54.1
Beryllium, total (3050)	mg/Kg	----	0.41	0.86	0.64	0.29 B	0.27 B	0.23 B
Cadmium, total (3050)	mg/Kg	1920	0.09	1.34	0.30	0.76	0.8	0.77
Chromium, total (3050)	mg/Kg	----	5	12	8	18 +	13 +	16 +
Copper, total (3050)	mg/Kg	83840	3	75	15	23	29	22
Iron, total (3050)	mg/Kg	----	4790	10600	7524	3150	2740	2340
Lead, total (3050)	mg/Kg	81280	8	82	19	167 +	154 +	173 +
Manganese, total (3050)	mg/Kg	----	151	397	269	134	101	128
Mercury, total	mg/Kg	7040	<0.04 U	0.02	0.02	< 0.05 U	< 0.04 U	< 0.05 U
Molybdenum, total (3050)	mg/Kg	----	<1 U	7	1	< 1 U	< 1 U	< 1 U
Nickel, total (3050)	mg/Kg	----	3	6	5	3 B	3 B	3 B
Selenium, total (3050)	mg/Kg	----	<0.5 U	5.2	1.2	19.7 +	21.9 +	14.5 +
Silver, total (3050)	mg/Kg	----	<0.5 U	<0.5 U	0.3	0.45	0.51 +	0.37
Uranium, total (3050)	mg/Kg	2126720	0.38	15.3	3.9	373 ++	474 ++	219 ++
Vanadium, total (3050)	mg/Kg	179200	10.7	136	40	2770 ++	2690 ++	1240 +
Zinc, total (3050)	mg/Kg	176000	12	125	28	81	81	76
Gross Alpha	pCi/g	----	3.39	87.8	20.3	92.2 +	89.6 +	35.2
Gross Beta	pCi/g	----	3.29	38.3	13.5	33.9	32.5	13.6
Radium 226 (3050)	pCi/g	----	0.49	13.2	3.3	45.5 +	5.25	20.1 +
Radium 228 (3050)	pCi/g	----	0.68	4.15	2.66	0.1	0.04	0.03
Thorium 228	pCi/g	----	0.24	0.81	0.40	0	0.02	-0.01
Thorium 230	pCi/g	----	-0.36	22.3	3.1	16.2	15.4	7.96
Thorium 232	pCi/g	----	0.08	0.53	0.35	0.03	-0.02	0
Solids, Percent	%	----	87.3	94.8	91.5	94.5	94.4	94.6

[1] Modified by area use factor (RMC/[1.0 acre/640 acres])

Shaded value in bold indicates level exceeds human-health criterion

+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Table 4.60: Comparison of Metals in Composite Waste-Rock Samples Collected from Face of Mine Dump to Leaching RMC at the Saint Patrick Mine

Analyte	Units	SP Segment 1			SP Segment 1 (Dup 9)			SP Segment 2		
		SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)	SPLP (mg/L)	Leaching RMC (mg/Kg)	Total Metals (mg/Kg)
Antimony (1312)	mg/L	< 0.001 U	----	0.1 B	< 0.001 U	----	< 0.1 U	< 0.001 U	----	< 0.1 U
Arsenic (1312)	mg/L	0.0216	1759.26	10	0.0113	2676.81	7.96	0.0181	2120.44	10.1
Barium (1312)	mg/L	0.004 B	----	123	0.009 B	----	73.3	0.004 B	----	54.1
Beryllium (1312)	mg/L	< 0.0005 U	----	0.29 B	< 0.0005 U	----	0.27 B	< 0.0005 U	----	0.23 B
Cadmium (1312)	mg/L	< 0.0005 U	109.44	0.76	< 0.0005 U	115.20	0.8	< 0.0005 U	110.88	0.77
Chromium (1312)	mg/L	< 0.01 U	8784.00	18	< 0.01 U	6344.00	13	< 0.01 U	7808.00	16
Copper (1312)	mg/L	< 0.01 U	1380.00	23	< 0.01 U	1740.00	29	< 0.01 U	1320.00	22
Iron (1312)	mg/L	0.09	700000.00	3150	0.09	608888.89	2740	0.09	520000.00	2340
Lead (1312)	mg/L	< 0.04 U	835.00	167	< 0.04 U	770.00	154	< 0.04 U	865.00	173
Manganese (1312)	mg/L	< 0.005 U	2161152.00	134	< 0.005 U	1628928.00	101	< 0.005 U	2064384.00	128
Mercury (1312)	mg/L	< 0 UH	----	< 0.05 U	< 0 UH	----	< 0.04 U	< 0 UH	----	< 0.05 U
Molybdenum (1312)	mg/L	< 0.01 U	----	< 1 U	< 0.01 U	----	< 1 U	< 0.01 U	----	< 1 U
Nickel (1312)	mg/L	< 0.01 U	1044.00	3 B	< 0.01 U	1044.00	3 B	< 0.01 U	1044.00	3 B
Selenium (1312)	mg/L	0.018 B	100.69	19.7	< 0.008 U	503.70	21.9	0.013 B	102.62	14.5
Silver (1312)	mg/L	< 0.0003 U	12.00	0.45	< 0.0003 U	13.60	0.51	< 0.0003 U	9.87	0.37
Uranium (1312)	mg/L	0.0086	----	373	0.0119	----	474	0.0099	----	219
Vanadium (1312)	mg/L	6.43	----	2770	1.44	----	2690	5.99	----	1240
Zinc (1312)	mg/L	< 0.01 U	57348.00	81	< 0.01 U	57348.00	81	< 0.01 U	53808.00	76

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Analysis exceeded method hold time

Shaded value in bold indicates level exceeds leaching RMC

+ Value exceeds RMC by 1 to 10 times

++ Value exceeds RMC by 10 to 100 times

+++ Value exceeds RMC by more than 100 times

Table 4.61: Comparison of Metal and Radionuclide Levels in Vegetation at the Saint Patrick Mine to Maximum Tolerable Levels and Background Values

Perimeter of Waste-Rock Dump

Analyte	Units	Maximum Tolerable Level[1]	Grass		Forb			Shrub	
			Ref Area	Perimeter	Ref Area	Perimeter	Duplicate	Ref Area	Perimeter
Antimony, total (3050)	mg/Kg	----	< 0.1 U	**0.2 B+**	< 0.1 U	**0.2 B+**	< 0.1 U	< 0.1 U	**0.1 B+**
Arsenic, total (3050)	mg/Kg	50	< 0.3 U	**0.7 B+**	< 0.3 U	**1.5 +**	**1.5 +**	< 0.3 U	< 0.3 U
Barium, total (3050)	mg/Kg	20	**41.5 +**	**26.6 +**	**106 +**	**74.3 +**	**71.3 +**	**90.8 +**	**28.8 +**
Beryllium, total (3050)	mg/Kg	----	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.06 U	< 0.06 U
Cadmium, total (3050)	mg/Kg	0.5	0.07 B	**0.1 B+**	0.12 B	**0.34 +**	**0.25 B+**	0.06 B	**0.07 B+**
Chromium, total (3050)	mg/Kg	1,000	1 B	< 1 U	2 B	1 B	1 B	2 B	**2 B**
Copper, total (3050)	mg/Kg	25	2 B	**5 B+**	7	6	**9 +**	7	**8 +**
Iron, total (3050)	mg/Kg	500	322	181	252	114	110	255	208
Lead, total (3050)	mg/Kg	30	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	400	95	60	74.2	32.5	33.1	42.4	40.2
Mercury, total	mg/Kg	2	0 UH	< 0.1 U	0 UH	0 UH	0 UH	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	10	5 B	**8 +**	3 B	**20 +**	**29 +**	< 1 U	**2 B+**
Nickel, total (3050)	mg/Kg	50	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2	**2.4 B+**	**9.6 +**	**7.4 +**	**67.9 ++**	**101 ++**	1.3 B	**13.2 +**
Silver, total (3050)	mg/Kg	100	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U
Uranium, total (3050)	mg/Kg	----	0.03 B	**1.42 ++**	0.07 B	**1.33 ++**	**1.93 ++**	< 0.03 U	**0.95 ++**
Vanadium, total (3050)	mg/Kg	10	0.7 B	**8.1 ++**	0.8 B	**14 +**	**15.5 +**	0.6 B	**12.1 +**
Zinc, total (3050)	mg/Kg	300	10	**20 +**	30	**37 +**	**39 +**	33	**58 +**
Gross Alpha	pCi/g	----	1.63	**6.08 +**	0.94	**26.6 ++**	**32.2 ++**	2.25	**6.06 +**
Gross Beta	pCi/g	----	7.15	**12.1 +**	13.6	**19.2 +**	**22.7 +**	9.2	9.03
Radium 226 (3050)	pCi/g	----	1.98	1.7	0.07	**8.5 +++**	**11.7 +++**	0.45	**1.56 +**
Radium 228 (3050)	pCi/g	----	1.65	**1.8 +**	2.02	2.02	**2.52 +**	2.31	1.86
Thorium 228	pCi/g	----	-0.1	-0.13	0.14	0.12	0.03	-0.13	**0.07 +**
Thorium 230	pCi/g	----	-0.59	**0.38 +**	-0.28	-0.52	**3.33 +**	-0.44	**0.87 +**
Thorium 232	pCi/g	----	-0.17	**0.1 +**	0.06	**0.28 +**	**1.4 +**	0.05	**3.06 ++**
Moisture Content	%	----	41.4	60.6	66.6	68	63.7	46.1	91.2

[1] Most restrictive value reported for cattle, sheep, swine, horse, and rabbit in *Mineral Tolerance of Domestic Animals* (National Research Council, 1980)

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time was exceeded

Shaded Value in bold indicates level exceeds maximum tolerable level

\+ Media concentration exceeds criterion (shaded) or background (not shaded) by 1 to 10 times

++ Media concentration exceeds criterion (shaded) or background (not shaded) by 10 to 100 times

+++ Media concentration exceeds criterion (shaded) or background (not shaded) by more than 100 times

Table 4.62: Comparison of Residence 1 Spring Water Quality to Maximum Contaminant Levels and Secondary Standards

Analyte	Units	Criteria		RESIDENCE NO. 1								
		MCL	Secondary Std.	04/27/04			4/27/04 (dup)			10/18/04		
PHYSICAL (field parameters)												
Flow	cfs	-----	-----	nm			nm			nm		
Temperature	°C	-----	-----	9.8			9.8			11.5		
pH	s.u.	-----	6.5 - 8.5	7.07			7.07			**6.45**		
Specific Conductance	(uS/cm)	-----	-----	234			234			265		
Dissolved Oxygen	(mg/L)	-----	-----	1.14			1.14			0.75		
Oxidation Reduction Potential	(rmV)	-----	-----	159.3			159.3			190.6		
INORGANIC												
Nitrite	(mg/L)	1	-----	<	0.01	U	<	0.01	U		na	
Nitrate	(mg/L)	10	-----		0.11			0.11			na	
Chloride	(mg/L)	-----	250.0		1	B		1	B		1	B
Sulfate	(mg/L)	-----	250.0		20	B		20	B		40	B
Total Phosphorous as P	(mg/L)	-----	-----	<	0.01	U	<	0.01	U	<	0.01	U
Total Dissolved Solids	(mg/L)	-----	500.0		140			100			150	
Total Suspended Solids (mg/L)	(mg/L)	-----	-----	<	5	U	<	5	U	<	5	U
Bicarbonate as CaCO3	(mg/L)	-----	-----		108			108			109	H
Carbonate as CaCO3	(mg/L)	-----	-----	<	2	U	<	2	U		0	UH
Cation-Anion Balance	%	-----	-----		0			0			-3.4	
Hardness as CaCO3	(mg/L)	-----	-----		117			116			126	
Hydroxide as CaCO3	(mg/L)	-----	-----	<	2	U	<	2	U		0	UH
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----		0.11			0.11			na	
Sum of Anions	meq/L	-----	-----		2.6			2.6			3	
Sum of Cations	meq/L	-----	-----		2.6			2.6			2.8	
TDS (calculated)	(mg/L)	-----	-----		133			132			157	
TDS (ratio - measured/calculated)		-----	-----		1.05			0.76			0.96	
Total Alkalinity	(mg/L)	-----	-----		108			108			109	H
METALS												
Antimony, dissolved	µg/L	-----	-----	<	0.2	U	<	0.2	U	<	0.2	U
Antimony, total	µg/L	6	-----	<	0.2	U	<	0.2	U	<	0.2	U
Arsenic, dissolved	µg/L	-----	-----		0.5	B		0.4	B	<	0.5	U
Arsenic, total recoverable	µg/L	10	-----		0.5			0.4	B	<	0.5	U
Barium, dissolved	µg/L	-----	-----		41			40			44	
Barium, total	µg/L	2000	-----		39			39			46	
Beryllium, dissolved	µg/L	-----	-----	<	0.1	U	<	0.1	U	<	0.1	U
Beryllium, total	µg/L	4	-----	<	0.1	U	<	0.1	U	<	0.1	U
Cadmium, dissolved	µg/L	-----	-----	<	0.1	U	<	0.1	U	<	0.1	U
Cadmium, total	µg/L	5	-----	<	0.1	U	<	0.1	U	<	0.1	U
Calcium, dissolved	µg/L	-----	-----		24300			24300			25900	
Chromium, dissolved	µg/L	-----	-----	<	10	U	<	10	U	<	10	U
Chromium, total	µg/L	100	-----	<	10	U	<	10	U	<	10	U
Copper, dissolved	µg/L	-----	-----	<	10	U	<	10	U	<	10	U
Copper, total	µg/L	1300	1000	<	10	U	<	10	U	<	10	U
Iron, dissolved	µg/L	-----	-----	<	10	U	<	10	U	<	10	U
Iron, total recoverable	µg/L	-----	300		20	B		20	B		160	
Lead, dissolved	µg/L	-----	-----		0.1	B	<	0.1	U		0.4	B
Lead, total	µg/L	15	-----	<	0.1	U	<	0.1	U	<	0.1	U
Magnesium, dissolved	µg/L	-----	-----		13700			13500			14800	
Manganese, dissolved	µg/L	-----	-----		6	B		7	B		23	B
Manganese, total	µg/L	-----	50		6	B		8	B		**123**	**+**
Mercury, dissolved	µg/L	-----	-----	<	0.2	U	<	0.2	U	<	0.2	U
Mercury, total	µg/L	2	-----	<	0.2	U	<	0.2	U	<	0.2	U
Molybdenum, dissolved	µg/L	-----	-----	<	10	U	<	10	U	<	10	U
Molybdenum, total	µg/L	-----	-----	<	10	U	<	10	U	<	10	U
Nickel, dissolved	µg/L	-----	-----	<	10	U	<	10	U	<	10	U
Nickel, total	µg/L	-----	-----	<	10	U	<	10	U	<	10	U
Potassium, dissolved	µg/L	-----	-----		2000			2000			2200	
Selenium, dissolved	µg/L	-----	-----		16.4			16.3			14	
Selenium, total	µg/L	50	-----		12.4			12.4			10	
Silver, dissolved	µg/L	-----	-----	<	0.05	U	<	0.05	U	<	0.05	U
Silver, total	µg/L	-----	100	<	0.05	U	<	0.05	U	<	0.05	U
Sodium, dissolved	µg/L	-----	-----		6400			6200			7400	
Uranium, dissolved	µg/L	-----	-----		1.38			1.34			1.57	
Uranium, total	µg/L	30	-----		1.53			1.48			1.48	
Vanadium, dissolved	µg/L	-----	-----	<	5	U	<	5	U	<	5	U
Vanadium, total	µg/L	-----	-----	<	5	U	<	5	U	<	5	U
Zinc, dissolved	µg/L	-----	-----	<	10	U	<	10	U	<	10	U
Zinc, total	µg/L	-----	5000	<	10	U	<	10	U	<	10	U
RADIOLOGICAL (pCi/L)												
Gross Alpha	pCi/L	-----	-----		4.58			0			3.94	
Gross Alpha (excl. uranium)	pCi/L	15	-----		3.55			-0.99			2.95	
Gross Beta	pCi/L	4 mrem/yr	-----		2.13			2.02			4.65	
Radium 226 and 228 (combined)	pCi/L	5	-----		0.31			0.32			0.75	
Thorium 230 and 232 (combined)	pCi/L	-----	-----		0.01			0.28			-0.02	
Thorium 228	pCi/L	-----	-----		0.13			0.38			0.05	

Shaded value in bold indicates level exceeds MCL or secondary standard
+ Value exceeds MCL or secondary standard by 1 to 10 times
++ Value exceeds MCL or secondary standard by 10 to 100 times
+++ Value exceeds MCL or secondary standard by more than 100 times
nm = not measured; na = not analyzed

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at Method Detection Limit
H Holding time was exceeded

Table 4.63: Comparison of Total Metals and Radionuclides in Soil at Residence 1 to BLM Resident RMC, EPA Residential SSLs, and Background Soil and Summary of Vegetation Sample Results

Soil

Analyte	Units	BLM RMC Resident	EPA SSL Resident	Background Soil			Garden Soil	Garden Soil (dup)	Pasture Soil
				Min	Max	Mean			
Antimony, total (3050)	mg/Kg	3	-----	<0.1 U	0.3 B	0.2	0.3 B	0.3 B	0.2 B
Arsenic, total (3050)	mg/Kg	1	-----	1.1	25.7	9.7	**17.5 +**	**21.5 +**	**12.4 +**
Barium, total (3050)	mg/Kg	-----	5,475	128	419	205	211	315	153
Beryllium, total (3050)	mg/Kg	-----	156	0.41	0.86	0.64	0.85	0.8	0.92 +
Cadmium, total (3050)	mg/Kg	3	-----	0.09	1.34	0.30	0.39	0.41	0.17 B
Chromium, total (3050)	mg/Kg	-----	117,321	5	12	8	6	6	5
Copper, total (3050)	mg/Kg	250	-----	3	75	15	18	18	11
Iron, total (3050)	mg/Kg	-----	23,464	4790	10600	7524	6680	6580	6110
Lead, total (3050)	mg/Kg	400	-----	8	82	19	28	32	15 B
Manganese, total (3050)	mg/Kg	960	-----	151	397	269	393	391	240
Mercury, total	mg/Kg	2	-----	<0.04 U	0.02	0.02	< 0.04 U	0.06 B+	< 0.04 U
Molybdenum, total (3050)	mg/Kg	-----	391	<1 U	7	1	2 B	1 B	1 B
Nickel, total (3050)	mg/Kg	135	-----	3	6	5	5 B	5 B	4 B
Selenium, total (3050)	mg/Kg	35	-----	<0.5 U	5.2	1.2	3 B	3.3	3.7
Silver, total (3050)	mg/Kg	35	-----	<0.5 U	<0.5 U	0.3	< 0.5 U	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	-----	13.9	0.38	15.3	3.9	7.07	8.38	8.53
Vanadium, total (3050)	mg/Kg	-----	548	10.7	136	40	73	78.3	77.3
Zinc, total (3050)	mg/Kg	2000	-----	12	125	28	49	48	19
Gross Alpha	pCi/g	-----	-----	3.39	87.8	20.3	17.7	20.4	17.9
Gross Beta	pCi/g	-----	-----	3.29	38.3	13.5	13.2	14.6	11.2
Radium 226 (3050)	pCi/g	-----	0.07 / 1.1[1]	0.49	13.2	3.3	**6.43 +++**	**6.75 +++**	**4.84 ++**
Radium 228 (3050)	pCi/g	-----	0.09 / 1.3[2]	0.68	4.15	2.66	**0.87 +**	0	**0.73 +**
Thorium 228	pCi/g	-----	-----	0.24	0.81	0.40	0.08	0.41	0.12
Thorium 230	pCi/g	-----	-----	-0.36	22.3	3.1	4.81	4.27	4.49
Thorium 232	pCi/g	-----	-----	0.08	0.53	0.35	0.48	0.36	0.58 +
Solids, percent	%	-----	-----	87.3	94.8	91.5	87.8	87.9	89.1

Vegetation

Analyte	Units	Garden Produce	Garden Produce Dup	Maximum Tol. Level[3]	Ref Area Grass	Pasture Grass
Antimony, total (3050)	mg/Kg	< 0.2 U	< 0.2 U	----	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	< 0.4 U	< 0.5 U	50	< 0.3 U	< 0.3 U
Barium, total (3050)	mg/Kg	6.8	8.8	20	**41.5 +**	**55.4 +**
Beryllium, total (3050)	mg/Kg	< 0.08 U	< 0.1 U	----	< 0.05 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.15 B	0.2 B	0.5	0.07 B	0.05 B
Chromium, total (3050)	mg/Kg	< 2 U	< 2 U	1,000	1 B	< 1 U
Copper, total (3050)	mg/Kg	13	14	25	2 B	10 +
Iron, total (3050)	mg/Kg	54	70	500	322	76
Lead, total (3050)	mg/Kg	< 6 U	< 9 U	30	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	15.1	20	400	95	73.9
Mercury, total	mg/Kg	0 UH	0 UH	2	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	4 B	3 B	10	5 B	5 B
Nickel, total (3050)	mg/Kg	< 2 U	< 2 U	50	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	1.9 B	3 B	2	**2.4 B+**	**4 +**
Silver, total (3050)	mg/Kg	< 0.8 U	< 1 U	100	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	< 0.04 U	< 0.05 U	----	0.03 B	0.16 +
Vanadium, total (3050)	mg/Kg	< 0.8 U	< 1 U	10	0.7 B	< 0.5 U
Zinc, total (3050)	mg/Kg	31	26	300	10	28 +
Gross Alpha	pCi/g	1.23	1.83	----	1.63	2.02 +
Gross Beta	pCi/g	42	37.8	----	7.15	22.4 +
Radium 226 (3050)	pCi/g	0.41	0.83	----	1.98	0.67
Radium 228 (3050)	pCi/g	4.45	2.7	----	1.65	3.32 +
Thorium 228	pCi/g	-0.07	0.2	----	-0.1	0.05 +
Thorium 230	pCi/g	-0.07	-0.75	----	-0.59	-0.24
Thorium 232	pCi/g	0.43	0.2	----	-0.17	-0.05
Solids, percent	%	94.7	94.6	----	41.4	70.2

[1] Radium-226 level of 0.07 pCi/g for ingestion of homegrown vegetables
Radium-226 level of 1.1 pCi/g for ingestion of soil

[2] Radium-228 level of 0.09 pCi/g for ingestion of homegrown vegetables
Radium-228 level of 1.3 pCi/g for ingestion of soil

[3] Most restrictive value reported for cattle, sheep, swine, horse, and rabbit in Mineral Tolerance of Domestic Animals (National Research Council, 1980)

Qualifiers are defined as follows:

B Analyte detected value between Method Detection Limit & Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds human-health criterion (soil) or maximum tolerable level (vegetation)

+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Table 4.64: Comparison of Analytical Results for Surface-Water Samples at Stations LA SAL CREEK DN2 and HOP CREEK DN to Background Levels and Utah Agriculture Standards

Analyte	Units	Utah Ag. Std	REFERENCE AREA 1		LA SAL CREEK DN2		REFERENCE AREA 3		HOP CREEK DN	
			04/23/04	10/13/04	04/21/04	10/12/04	04/22/04	10/14/04	04/22/04	10/13/04
PHYSICAL (field parameters)										
Flow	cfs	----	1.0800	0.4657	6.7900	1.7126	1.9	0.0134	1.84	0.0263
Temperature	°c	----	8.2	9.9	7.5	11	4.9	12.7	4.9	11.4
pH	s.u.	6.5 - 9.0	**9.11**	8.47	**9.02**	8.31	8.76	8.35	8.98	8.23
Specific Conductance	(uS/cm)	----	345*	439	201	361	146	557	151	396
Dissolved Oxygen	(mg/L)	----	nm	nm	nm	nm	nm	nm	nm	nm
Oxidation Reduction Potential	(rmV)	----	nm	nm	nm	nm	nm	nm	nm	nm
INORGANIC										
Nitrite	(mg/L)	----	0 UH	na	< 0.01 U	na	< 0.01 U	na	< 0.01 U	na
Nitrate	(mg/L)	----	< 0.02 U	na	0.07 B+	na	0.05 B	na	< 0.02 U	na
Chloride	(mg/L)	----	15	11	4 B	5	2 B	4 B	2 B	2 B
Sulfate	(mg/L)	----	60	30 B	40 B	40 B+	10 B	20 B	20 B+	10 B
Total Phosphorous as P	(mg/L)	----	0.03 B	0.03 B	0.05 +	0.01 B	0.13	0.01 B	0.13	0.04 B+
Total Dissolved Solids	(mg/L)	1200	300	270	170 H	220 H	140	330	150 +	230
Total Suspended Solids	(mg/L)	----	< 5 U	8 B	24 +	< 5 U	326	8 B	138	6 B
Bicarbonate as CaCO3	(mg/L)	----	194	181	131	158	107	264	113 +	200
Carbonate as CaCO3	(mg/L)	----	8 B	5 B	< 2 U	< 2 U	< 2 U	13	< 2 U	< 2 U
Cation-Anion Balance	%	----	-1.8	0	-4.5	-1.2	2	0.8	0	1.2
Hardness as CaCO3	(mg/L)	----	227	188	138	172	104	209	108	175
Hydroxide as CaCO3	(mg/L)	----	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	----	0 UH	na	0.07 B+	na	0.05 B	na	< 0.02 U	na
Sum of Anions	meq/L	----	5.7	4.6	3.5	4.1	2.4	6	2.7	4.2
Sum of Cations	meq/L	----	5.5	4.6	3.2	4	2.5	6.1	2.7	4.3
TDS (calculated)	(mg/L)	----	305	243	184	215	127	318	143	214
TDS (ratio - measured/calculated)		----	0.98	1.11	0.92	1.02	1.1	1.04	1.05	1.07
Total Alkalinity	(mg/L)	----	202	186	131	158	107	277	113 +	200
METALS		----								
Antimony, dissolved	µg/L	----	< 0.2 U	< 0.2 U	0.3 B+	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Antimony, total	µg/L	----	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.4 U	< 0.2 U	< 0.2 U	< 1 U
Arsenic, dissolved	µg/L	100	1.6	2.1 B	1.2	1.8 B	1.9	5.8	2.1 +	2.7 B
Arsenic, total recoverable	µg/L	----	1.4	2 B	1.6 +	1.2 B	3.4	5.1	4.5 +	3 B
Barium, dissolved	µg/L	----	110	104	139 +	123 +	126	177	128 +	170
Barium, total	µg/L	----	110	116	146 +	118 +	194	193	207 +	184
Beryllium, dissolved	µg/L	----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	0.2 B+	< 0.5 U
Cadmium, dissolved	µg/L	10	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.2 U	< 0.1 U	0.1 B	< 0.5 U
Calcium, dissolved	µg/L	----	65400	53400	41500	46800	32400	64400	33100 +	45300
Chromium, dissolved	µg/L	100	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	200	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	10 B	< 10 U	< 10 U
Copper, total	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	----	20 B	10 B	60 +	40 B+	110	10 B	110	50 +
Iron, total recoverable	µg/L	----	290	200	820 +	120	2910	110	3170 +	420 +
Lead, dissolved	µg/L	100	< 0.1 U	< 0.1 U	< 0.1 U	0.3 B+	0.2 B	< 0.1 U	0.2 B	< 0.1 U
Lead, total	µg/L	----	0.2 B	0.3 B	1.1 +	< 0.1 U	3.3	0.1 B	4.8 +	< 0.5 U
Magnesium, dissolved	µg/L	----	15500	13200	8300	13300 +	5600	11700	6200 +	15000 +
Manganese, dissolved	µg/L	----	20 B	19 B	17 B	25 B+	27 B	14 B	19 B	141 ++
Manganese, total	µg/L	----	68	40	77 +	31	218	15 B	253 +	147 +
Mercury, dissolved	µg/L	----	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	----	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Molybdenum, total	µg/L	----	< 10 U	< 10 U	10 B+	< 10 U	10 B	< 10 U	10 B	< 10 U
Nickel, dissolved	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	----	10 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	----	2000	2600	2200 +	2300	3100	7600	3300 +	4300
Selenium, dissolved	µg/L	50	0.9	1 B	1.5 +	< 1 U	0.6	< 1 U	1 +	2 B+
Selenium, total	µg/L	----	0.8	1 B	1.1 +	< 1 U	0.7 B	< 1 U	0.8 +	< 5 U
Silver, dissolved	µg/L	----	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	----	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.1 U	< 0.05 U	< 0.05 U	< 0.3 U
Sodium, dissolved	µg/L	----	22700	18800	9100	13200	9500	39200	10200 +	17000
Uranium, dissolved	µg/L	----	5.2	7.28	4.39	7.43 +	1.91	3.45	3.97 +	14.8 +
Uranium, total	µg/L	----	4.74	7.43	4.12	6.56	2	3.5	3.35 +	14.3 +
Vanadium, dissolved	µg/L	----	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	5 B+
Vanadium, total	µg/L	----	< 5 U	< 5 U	< 5 U	< 5 U	8 B	< 5 U	7 B	< 5 U
Zinc, dissolved	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Zinc, total	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	10 B	< 10 U	20 B+	< 10 U
RADIOLOGICAL (pCi/L)										
Gross Alpha	pCi/L	15	7.81	5.13	6.72	9.19 +	19	4.55	12.8	8.9 +
Gross Beta	pCi/L	50	3.2	1.83	5.6 +	5.2 +	18	13.4	16.3	10.7
Radium 226 and 228 (combined)	pCi/L	----	1.06	0.05	4.22 +	0	0.73	0.73	0.89 +	0.83 +
Thorium 230 and 232 (combined)	pCi/L	----	0.08	-0.95	0.19 +	0	0.11	-0.45	0.32 +	0.18 +
Thorium 228	pCi/L	----	0.08	-0.17	-0.03	0.18 +	0.36	0	0.09	-0.08

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

H Holding time not met

nm = not measured, na = not analyzed

Shaded value in bold indicates level exceeds Utah agriculture standard

+ Value exceeds standard (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds standard (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds standard (shaded) or maximum background (not shaded) by more than 100 times

Table 4.65: Comparison of Residence 2 Spring Water Quality to Maximum Contaminant Levels and Secondary Standards

Analyte	Units	Criteria		RESIDENCE NO. 2					
		MCL	Secondary Std.	04/27/04			10/18/04		
PHYSICAL (field parameters)									
Flow	cfs	-----	-----	nm			~ 3.53E-03		
Temperature	°C	-----	-----	10.9			10.7		
pH	s.u.	-----	6.5 - 8.5	7.52			6.79		
Specific Conductance	(uS/cm)	-----	-----	308			305		
Dissolved Oxygen	(mg/L)	-----	-----	7.4			5.2		
Oxidation Reduction Potential	(rmV)	-----	-----	146.6			250		
INORGANIC									
Nitrite	(mg/L)	1	-----	<	0.01	U		na	
Nitrate	(mg/L)	10	-----		0.08	B		na	
Chloride	(mg/L)	-----	250.0		4	B		3	B
Sulfate	(mg/L)	-----	250.0		30	B		30	B
Total Phosphorous as P	(mg/L)	-----	-----	<	0.01	U	<	0.01	U
Total Dissolved Solids	(mg/L)	-----	500.0		150			180	
Total Suspended Solids (mg/L)	(mg/L)	-----	-----	<	5	U	<	5	U
Bicarbonate as CaCO3	(mg/L)	-----	-----		140			142	H
Carbonate as CaCO3	(mg/L)	-----	-----	<	2	U		0	UH
Cation-Anion Balance	%	-----	-----		0			-1.4	
Hardness as CaCO3	(mg/L)	-----	-----		153			147	
Hydroxide as CaCO3	(mg/L)	-----	-----	<	2	U		0	UH
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----		0.08	B		na	
Sum of Anions	meq/L	-----	-----		3.5			3.5	
Sum of Cations	meq/L	-----	-----		3.5			3.4	
TDS (calculated)	(mg/L)	-----	-----		178			177	
TDS (ratio - measured/calculated)		-----	-----		0.84			1.02	
Total Alkalinity	(mg/L)	-----	-----		140			142	H
METALS									
Antimony, dissolved	µg/L	-----	-----	<	0.2	U	<	0.2	U
Antimony, total	µg/L	6	-----	<	0.2	U	<	0.2	U
Arsenic, dissolved	µg/L	-----	-----		0.3	B	<	0.5	U
Arsenic, total recoverable	µg/L	10	-----		0.3	B	<	0.5	U
Barium, dissolved	µg/L	-----	-----		146			140	
Barium, total	µg/L	2000	-----		143			145	
Beryllium, dissolved	µg/L	-----	-----	<	0.1	U	<	0.1	U
Beryllium, total	µg/L	4	-----	<	0.1	U	<	0.1	U
Cadmium, dissolved	µg/L	-----	-----	<	0.1	U	<	0.1	U
Cadmium, total	µg/L	5	-----	<	0.1	U	<	0.1	U
Calcium, dissolved	µg/L	-----	-----		28000			27200	
Chromium, dissolved	µg/L	-----	-----	<	10	U	<	10	U
Chromium, total	µg/L	100	-----	<	10	U	<	10	U
Copper, dissolved	µg/L	-----	-----	<	10	U	<	10	U
Copper, total	µg/L	1300	1000	<	10	U	<	10	U
Iron, dissolved	µg/L	-----	-----	<	10	U	<	10	U
Iron, total recoverable	µg/L	-----	300		50			40	B
Lead, dissolved	µg/L	-----	-----		0.1	B		0.3	B
Lead, total	µg/L	15	-----	<	0.1	U	<	0.1	U
Magnesium, dissolved	µg/L	-----	-----		20100			19100	
Manganese, dissolved	µg/L	-----	-----	<	5	U	<	5	U
Manganese, total	µg/L	-----	50	<	5	U	<	5	U
Mercury, dissolved	µg/L	-----	-----	<	0.2	U	<	0.2	U
Mercury, total	µg/L	2	-----	<	0.2	U	<	0.2	U
Molybdenum, dissolved	µg/L	-----	-----	<	10	U	<	10	U
Molybdenum, total	µg/L	-----	-----	<	10	U	<	10	U
Nickel, dissolved	µg/L	-----	-----	<	10	U	<	10	U
Nickel, total	µg/L	-----	-----	<	10	U	<	10	U
Potassium, dissolved	µg/L	-----	-----		2200			2200	
Selenium, dissolved	µg/L	-----	-----		5			4	B
Selenium, total	µg/L	50	-----		3.4			4	B
Silver, dissolved	µg/L	-----	-----	<	0.05	U	<	0.05	U
Silver, total	µg/L	-----	100	<	0.05	U	<	0.05	U
Sodium, dissolved	µg/L	-----	-----		9700			10200	
Uranium, dissolved	µg/L	-----	-----		18.1			19.3	
Uranium, total	µg/L	30	-----		19.2			16.5	
Vanadium, dissolved	µg/L	-----	-----	<	5	U	<	5	U
Vanadium, total	µg/L	-----	-----	<	5	U	<	5	U
Zinc, dissolved	µg/L	-----	-----	<	10	U	<	10	U
Zinc, total	µg/L	-----	5000	<	10	U		10	B
RADIOLOGICAL (pCi/L)									
Gross Alpha	pCi/L	-----	-----		9.75			16.5	
Gross Alpha (excl. uranium)	pCi/L	15	-----		-3.11			5.45	
Gross Beta	pCi/L	4 mrem/yr	-----		3.82			4.66	
Radium 226 and 228 (combined)	pCi/L	5	-----		0.51			0.85	
Thorium 230 and 232 (combined)	pCi/L	-----	-----		0			-0.11	
Thorium 228	pCi/L	-----	-----		0.02			0.09	

Shaded value in bold indicates level exceeds MCL or secondary standard
+ Value exceeds MCL or secondary standard by 1 to 10 times
++ Value exceeds MCL or secondary standard by 10 to 100 times
+++ Value exceeds MCL or secondary standard by more than 100 times
nm = not measured; na = not analyzed

Qualifiers are defined as follows:
B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit
U Analyte was not detected at Method Detection Limit
H Holding time was exceeded

Table 4.66: Comparison of Total Metals and Radionuclides in Soil at Residence 2 to BLM Resident RMC, EPA Residential SSLs, and Background Soil and Summary of Vegetation Sample Results

Soil

Analyte	Units	BLM RMC Resident	EPA SSL Resident	Background Soil			Pasture Soil
				Min	Max	Mean	
Antimony, total (3050)	mg/Kg	3	-----	<0.1 U	0.3 B	0.2	0.3 B
Arsenic, total (3050)	mg/Kg	1	-----	1.1	25.7	9.7	**7.1 +**
Barium, total (3050)	mg/Kg	-----	5,475	128	419	205	192
Beryllium, total (3050)	mg/Kg	-----	156	0.41	0.86	0.64	1 +
Cadmium, total (3050)	mg/Kg	3	-----	0.09	1.34	0.30	0.24 B
Chromium, total (3050)	mg/Kg	-----	117,321	5	12	8	7
Copper, total (3050)	mg/Kg	250	-----	3	75	15	8
Iron, total (3050)	mg/Kg	-----	23,464	4790	10600	7524	8610
Lead, total (3050)	mg/Kg	400	-----	8	82	19	10 B
Manganese, total (3050)	mg/Kg	960	-----	151	397	269	283
Mercury, total	mg/Kg	2	-----	<0.04 U	0.02	0.02	< 0.05 U
Molybdenum, total (3050)	mg/Kg	-----	391	<1 U	7	1	2 B
Nickel, total (3050)	mg/Kg	135	-----	3	6	5	6
Selenium, total (3050)	mg/Kg	35	-----	<0.5 U	5.2	1.2	0.9 B
Silver, total (3050)	mg/Kg	35	-----	<0.5 U	<0.5 U	0.3	< 0.5 U
Uranium, total (3050)	mg/Kg	-----	13.9	0.38	15.3	3.9	2.33
Vanadium, total (3050)	mg/Kg	-----	548	10.7	136	40	24.5
Zinc, total (3050)	mg/Kg	2000	-----	12	125	28	29
Gross Alpha	pCi/g	-----	-----	3.39	87.8	20.3	14.6
Gross Beta	pCi/g	-----	-----	3.29	38.3	13.5	16
Radium 226 (3050)	pCi/g	-----	0.07 / 1.1[1]	0.49	13.2	3.3	**1.59 ++**
Radium 228 (3050)	pCi/g	-----	0.09 / 1.3[2]	0.68	4.15	2.66	0
Thorium 228	pCi/g	-----	-----	0.24	0.81	0.40	0.53
Thorium 230	pCi/g	-----	-----	-0.36	22.3	3.1	-0.07
Thorium 232	pCi/g	-----	-----	0.08	0.53	0.35	0.12
Solids, percent	%	-----	-----	87.3	94.8	91.5	85.8

Vegetation

Analyte	Units	Maximum Tol. Level[3]	Ref Area Grass	Pasture Grass
Antimony, total (3050)	mg/Kg	----	< 0.1 U	< 0.1 U
Arsenic, total (3050)	mg/Kg	50	< 0.3 U	< 0.3 U
Barium, total (3050)	mg/Kg	20	**41.5 +**	**31 +**
Beryllium, total (3050)	mg/Kg	----	< 0.05 U	< 0.05 U
Cadmium, total (3050)	mg/Kg	0.5	0.07 B	0.05 B
Chromium, total (3050)	mg/Kg	1,000	1 B	< 1 U
Copper, total (3050)	mg/Kg	25	2 B	10 +
Iron, total (3050)	mg/Kg	500	322	100
Lead, total (3050)	mg/Kg	30	< 4 U	< 4 U
Manganese, total (3050)	mg/Kg	400	95	42.1
Mercury, total	mg/Kg	2	0 UH	0 UH
Molybdenum, total (3050)	mg/Kg	10	5 B	5 B
Nickel, total (3050)	mg/Kg	50	< 1 U	< 1 U
Selenium, total (3050)	mg/Kg	2	**2.4 B+**	**2.8 B+**
Silver, total (3050)	mg/Kg	100	< 0.5 U	< 0.5 U
Uranium, total (3050)	mg/Kg	----	0.03 B	0.08 B+
Vanadium, total (3050)	mg/Kg	10	0.7 B	< 0.5 U
Zinc, total (3050)	mg/Kg	300	10	29 +
Gross Alpha	pCi/g	----	1.63	1.01
Gross Beta	pCi/g	----	7.15	31.1 +
Radium 226 (3050)	pCi/g	----	1.98	0
Radium 228 (3050)	pCi/g	----	1.65	0.87
Thorium 228	pCi/g	----	-0.1	-0.13
Thorium 230	pCi/g	----	-0.59	-0.79
Thorium 232	pCi/g	----	-0.17	-0.05
Solids, percent	%	----	41.4	76.9

[1] Radium-226 level of 0.07 pCi/g for ingestion of homegrown vegetables
Radium-226 level of 1.1 pCi/g for ingestion of soil

[2] Radium-228 level of 0.09 pCi/g for ingestion of homegrown vegetables
Radium-228 level of 1.3 pCi/g for ingestion of soil

[3] Most restrictive value reported for cattle, sheep, swine, horse, and rabbit in Mineral Tolerance of Domestic Animals (National Research Council, 1980)

Qualifiers are defined as follows:

B Analyte detected value between Method Detection Limit & Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds human-health criterion (soil) or maximum tolerable level (vegetation)

\+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Table 4.67: Comparison of Residence 3 Spring Water Quality to Maximum Contaminant Levels and Secondary Standards

Analyte	Units	Criteria		RESIDENCE 3U		RESIDENCE 3L	
		MCL	Secondary Std.	04/28/04	10/18/04	04/27/04	10/19/04
PHYSICAL (field parameters)							
Flow	cfs	-----	-----	1.59E-02	1.77E-02	nm	5.77E-03
Temperature	°C	-----	-----	13.1	13.9	12.7	13.2
pH	s.u.	-----	6.5 - 8.5	7.9	7.43	7.83	7.72
Specific Conductance	(uS/cm)	-----	-----	159.5	165.3	173.9	182.7
Dissolved Oxygen	(mg/L)	-----	-----	7.66	7.22	6.83	6.87
Oxidation Reduction Potential	(rmV)	-----	-----	121.2	122.8	104.4	130.8
INORGANIC							
Nitrite	(mg/L)	1	-----	< 0.01 U	na	< 0.01 U	na
Nitrate	(mg/L)	10	-----	0.27	na	0.26	na
Chloride	(mg/L)	-----	250.0	1 B	1 B	1 B	1 B
Sulfate	(mg/L)	-----	250.0	20 B	10 B	20 B	20 B
Total Phosphorous as P	(mg/L)	-----	-----	< 0.01 U	0.01 B	< 0.01 U	0.01 B
Total Dissolved Solids	(mg/L)	-----	500.0	60	70	90	90
Total Suspended Solids (mg/L)	(mg/L)	-----	-----	< 5 U	< 5 U	< 5 U	< 5 U
Bicarbonate as CaCO3	(mg/L)	-----	-----	63	64	69	72
Carbonate as CaCO3	(mg/L)	-----	-----	< 2 U	< 2 U	< 2 U	< 2 U
Cation-Anion Balance	%	-----	-----	-6.3	-3.4	-2.9	-5.9
Hardness as CaCO3	(mg/L)	-----	-----	67	64	74	70
Hydroxide as CaCO3	(mg/L)	-----	-----	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	-----	-----	0.27	na	0.26	na
Sum of Anions	meq/L	-----	-----	1.7	1.5	1.8	1.8
Sum of Cations	meq/L	-----	-----	1.5	1.4	1.7	1.6
TDS (calculated)	(mg/L)	-----	-----	86	74	92	92
TDS (ratio - measured/calculated)		-----	-----	0.7	0.95	0.98	0.98
Total Alkalinity	(mg/L)	-----	-----	63	64	69	72
METALS							
Antimony, dissolved	µg/L	-----	-----	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Antimony, total	µg/L	6	-----	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Arsenic, dissolved	µg/L	-----	-----	< 0.1 U	< 0.5 U	< 0.1 U	< 0.5 U
Arsenic, total recoverable	µg/L	10	-----	< 0.2 U	< 0.5 U	< 0.1 U	< 0.5 U
Barium, dissolved	µg/L	-----	-----	79	81	90	88
Barium, total	µg/L	2000	-----	77	22	87	93
Beryllium, dissolved	µg/L	-----	-----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Beryllium, total	µg/L	4	-----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, dissolved	µg/L	-----	-----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	5	-----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Calcium, dissolved	µg/L	-----	-----	11800	11400	12800	12200
Chromium, dissolved	µg/L	-----	-----	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	100	-----	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	-----	-----	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	1300	1000	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	-----	-----	< 10 U	< 10 U	< 10 U	< 10 U
Iron, total recoverable	µg/L	-----	300	< 10 U	100	10 B	20 B
Lead, dissolved	µg/L	-----	-----	< 0.1 U	< 0.1 U	0.1 B	0.4 B
Lead, total	µg/L	15	-----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Magnesium, dissolved	µg/L	-----	-----	9200	8700	10200	9600
Manganese, dissolved	µg/L	-----	-----	< 5 U	< 5 U	< 5 U	< 5 U
Manganese, total	µg/L	-----	50	< 5 U	< 5 U	< 5 U	< 5 U
Mercury, dissolved	µg/L	-----	-----	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	2	-----	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	-----	-----	< 10 U	< 10 U	< 10 U	< 10 U
Molybdenum, total	µg/L	-----	-----	40 B	< 10 U	< 10 U	< 10 U
Nickel, dissolved	µg/L	-----	-----	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	-----	-----	< 10 U	< 10 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	-----	-----	900 B	800 B	1000	1200
Selenium, dissolved	µg/L	-----	-----	0.6	< 1 U	1.3	1 B
Selenium, total	µg/L	50	-----	0.3 B	< 1 U	1.1	< 1 U
Silver, dissolved	µg/L	-----	-----	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	-----	100	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Sodium, dissolved	µg/L	-----	-----	4000	3600	4600	4700
Uranium, dissolved	µg/L	-----	-----	0.39	0.36	0.66	0.64
Uranium, total	µg/L	30	-----	0.4	0.31	0.73	0.64
Vanadium, dissolved	µg/L	-----	-----	< 5 U	< 5 U	< 5 U	< 5 U
Vanadium, total	µg/L	-----	-----	< 5 U	< 5 U	< 5 U	< 5 U
Zinc, dissolved	µg/L	-----	-----	< 10 U	< 10 U	< 10 U	< 10 U
Zinc, total	µg/L	-----	5000	< 10 U	< 10 U	< 10 U	< 10 U
RADIOLOGICAL (pCi/L)							
Gross Alpha	pCi/L	-----	-----	-0.8	1.45	0.55	2.01
Gross Alpha (excl. uranium)	pCi/L	15	-----	-1.07	1.24	0.06	1.58
Gross Beta	pCi/L	4 mrem/yr	-----	-0.38	3.32	-0.67	0.78
Radium 226 and 228 (combined)	pCi/L	5	-----	0.54	0.06	0.24	1.48
Thorium 230 and 232 (combined)	pCi/L	-----	-----	-0.05	-0.52	0.06	-0.5
Thorium 228	pCi/L	-----	-----	0.07	-0.1	-0.02	-0.02

Note: Station Residence 3W is a flowing well adjacent to highway and is not used as a drinking water source.

Shaded value in bold indicates level exceeds MCL or secondary standard

+ Value exceeds MCL or secondary standard by 1 to 10 times

++ Value exceeds MCL or secondary standard by 10 to 100 times

+++ Value exceeds MCL or secondary standard by more than 100 times

nm = not measured; na = not analyzed

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at Method Detection Limit

H Holding time was exceeded

Table 4.68: Comparison of Total Metals and Radionuclides in Soil at Residence 3 to BLM Resident RMC, EPA Residential SSLs, and Background Soil and Summary of Vegetation Sample Results

Soil

Analyte	Units	BLM RMC Resident	EPA SSL Resident	Background Soil			Garden Soil
				Min	Max	Mean	
Antimony, total (3050)	mg/Kg	3	-----	<0.1 U	0.3 B	0.2	0.3 B
Arsenic, total (3050)	mg/Kg	1	-----	1.1	25.7	9.7	**4.4 +**
Barium, total (3050)	mg/Kg	-----	5,475	128	419	205	156
Beryllium, total (3050)	mg/Kg	-----	156	0.41	0.86	0.64	0.91 +
Cadmium, total (3050)	mg/Kg	3	-----	0.09	1.34	0.30	0.2 B
Chromium, total (3050)	mg/Kg	-----	117,321	5	12	8	10
Copper, total (3050)	mg/Kg	250	-----	3	75	15	5
Iron, total (3050)	mg/Kg	-----	23,464	4790	10600	7524	7950
Lead, total (3050)	mg/Kg	400	-----	8	82	19	< 4 U
Manganese, total (3050)	mg/Kg	960	-----	151	397	269	352
Mercury, total	mg/Kg	2	-----	<0.04 U	0.02	0.02	< 0.04 U
Molybdenum, total (3050)	mg/Kg	-----	391	<1 U	7	1	< 1 U
Nickel, total (3050)	mg/Kg	135	-----	3	6	5	6
Selenium, total (3050)	mg/Kg	35	-----	<0.5 U	5.2	1.2	< 0.5 U
Silver, total (3050)	mg/Kg	35	-----	<0.5 U	<0.5 U	0.3	< 0.5 U
Uranium, total (3050)	mg/Kg	-----	13.9	0.38	15.3	3.9	0.91
Vanadium, total (3050)	mg/Kg	-----	548	10.7	136	40	19.2
Zinc, total (3050)	mg/Kg	2000	-----	12	125	28	23
Gross Alpha	pCi/g	-----	-----	3.39	87.8	20.3	3.56
Gross Beta	pCi/g	-----	-----	3.29	38.3	13.5	6.21
Radium 226 (3050)	pCi/g	-----	0.07 / 1.1[1]	0.49	13.2	3.3	**0.73 ++**
Radium 228 (3050)	pCi/g	-----	0.09 / 1.3[2]	0.68	4.15	2.66	0
Thorium 228	pCi/g	-----	-----	0.24	0.81	0.40	0.13
Thorium 230	pCi/g	-----	-----	-0.36	22.3	3.1	0.5
Thorium 232	pCi/g	-----	-----	0.08	0.53	0.35	0.55 +
Solids, percent	%	-----	-----	87.3	94.8	91.5	88.1

Vegetation

Analyte	Units	Fruit Produce
Antimony, total (3050)	mg/Kg	< 0.2 U
Arsenic, total (3050)	mg/Kg	< 0.4 U
Barium, total (3050)	mg/Kg	7.1
Beryllium, total (3050)	mg/Kg	< 0.08 U
Cadmium, total (3050)	mg/Kg	< 0.08 U
Chromium, total (3050)	mg/Kg	< 2 U
Copper, total (3050)	mg/Kg	6 B
Iron, total (3050)	mg/Kg	14
Lead, total (3050)	mg/Kg	< 6 U
Manganese, total (3050)	mg/Kg	1.7 B
Mercury, total	mg/Kg	0 UH
Molybdenum, total (3050)	mg/Kg	< 2 U
Nickel, total (3050)	mg/Kg	< 2 U
Selenium, total (3050)	mg/Kg	0.8 B
Silver, total (3050)	mg/Kg	< 0.8 U
Uranium, total (3050)	mg/Kg	< 0.04 U
Vanadium, total (3050)	mg/Kg	< 0.8 U
Zinc, total (3050)	mg/Kg	2 B
Gross Alpha	pCi/g	1.08
Gross Beta	pCi/g	10.7
Radium 226 (3050)	pCi/g	0
Radium 228 (3050)	pCi/g	1.43
Thorium 228	pCi/g	-0.07
Thorium 230	pCi/g	-0.59
Thorium 232	pCi/g	-0.22
Solids, percent	%	83.3

[1] Radium-226 level of 0.07 pCi/g for ingestion of homegrown vegetables
Radium-226 level of 1.1 pCi/g for ingestion of soi

[2] Radium-228 level of 0.09 pCi/g for ingestion of homegrown vegetables
Radium-228 level of 1.3 pCi/g for ingestion of soil

Qualifiers are defined as follows:

B Analyte detected value between Method Detection Limit & Practical Quantitation Limit

U Analyte was not detected at the Method Detection Limit

Shaded value in bold indicates level exceeds human-health criterion

+ Value exceeds criterion (shaded) or maximum background (not shaded) by 1 to 10 times

++ Value exceeds criteria (shaded) or maximum background (not shaded) by 10 to 100 times

+++ Value exceeds criteria (shaded) or maximum background (not shaded) by more than 100 times

Table 4.69: Comparison of Residence 3 Irrigation Water Sources to Utah Agriculture Standards

Analyte	Units	Utah Ag. Std	RESIDENCE 3U		RESIDENCE 3L		RESIDENCE 3W [1]		
			04/28/04	10/18/04	04/27/04	10/19/04	04/28/04	10/19/04	10/19/04 (dup)
PHYSICAL (field parameters)									
Flow	cfs	----	1.59E-02	1.77E-02	nm	5.77E-03	nm	~ 5.34E-02	~ 5.34E-02
Temperature	°C	----	13.1	13.9	12.7	13.2	14.3	14.1	14.1
pH	s.u.	6.5 - 9.0	7.9	7.43	7.83	7.72	7.36	7.41	7.41
Specific Conductance	(uS/cm)	----	159.5	165.3	173.9	182.7	275	275	275
Dissolved Oxygen	(mg/L)	----	7.66	7.22	6.83	6.87	2.12	0.62	0.62
Oxidation Reduction Potential	(rmV)	----	121.2	122.8	104.4	130.8	-58.2	-58.1	-58.1
INORGANIC									
Nitrite	(mg/L)	----	< 0.01 U	na	< 0.01 U	na	< 0.01 U	na	na
Nitrate	(mg/L)	----	0.27	na	0.26	na	< 0.02 U	na	na
Chloride	(mg/L)	----	1 B	1 B	1 B	1 B	1 B	< 1 U	< 1 U
Sulfate	(mg/L)	----	20 B	10 B	20 B	20 B	20 B	20 B	20 B
Total Phosphorous as P	(mg/L)	----	< 0.01 U	0.01 B	< 0.01 U	0.01 B	< 0.01 U	0.01 B	< 0.01 U
Total Dissolved Solids	(mg/L)	1200	60	70	90	90	150	160	170
Total Suspended Solids (mg/L)	(mg/L)	----	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	8 B	< 5 U
Bicarbonate as CaCO3	(mg/L)	----	63	64	69	72	142	140	141
Carbonate as CaCO3	(mg/L)	----	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Cation-Anion Balance	%	----	-6.3	-3.4	-2.9	-5.9	0	-1.6	-1.6
Hardness as CaCO3	(mg/L)	----	67	64	74	70	149	145	144
Hydroxide as CaCO3	(mg/L)	----	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Nitrate/Nitrite as N, dissolve	(mg/L)	----	0.27	na	0.26	na	< 0.02 U	na	na
Sum of Anions	meq/L	----	1.7	1.5	1.8	1.8	3.2	3.2	3.2
Sum of Cations	meq/L	----	1.5	1.4	1.7	1.6	3.2	3.1	3.1
TDS (calculated)	(mg/L)	----	86	74	92	92	162	159	159
TDS (ratio - measured/calculated)		----	0.7	0.95	0.98	0.98	0.93	1.01	1.07
Total Alkalinity	(mg/L)	----	63	64	69	72	142	140	141
METALS		----							
Antimony, dissolved	µg/L	----	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.3 B	< 0.2 U	< 0.2 U
Antimony, total	µg/L	----	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 1 U
Arsenic, dissolved	µg/L	100	< 0.1 U	< 0.5 U	< 0.1 U	< 0.5 U	< 0.1 U	< 0.5 U	< 0.5 U
Arsenic, total recoverable	µg/L	----	< 0.2 U	< 0.5 U	< 0.1 U	< 0.5 U	< 0.2 U	< 0.5 U	< 3 U
Barium, dissolved	µg/L	----	79	81	90	88	167	166	164
Barium, total	µg/L	----	77	22	87	93	163	167	165
Beryllium, dissolved	µg/L	----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	0.1 B	< 0.1 U	0.1 B
Beryllium, total	µg/L	----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.5 U
Cadmium, dissolved	µg/L	10	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Cadmium, total	µg/L	----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.5 U
Calcium, dissolved	µg/L	----	11800	11400	12800	12200	32100	31400	31300
Chromium, dissolved	µg/L	100	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chromium, total	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, dissolved	µg/L	200	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Copper, total	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Iron, dissolved	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	550	560	560
Iron, total recoverable	µg/L	----	< 10 U	100	10 B	20 B	580	600	590
Lead, dissolved	µg/L	100	< 0.1 U	< 0.1 U	0.1 B	0.4 B	< 0.1 U	0.3 B	0.4 B
Lead, total	µg/L	----	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.5 U
Magnesium, dissolved	µg/L	----	9200	8700	10200	9600	16700	16100	15900
Manganese, dissolved	µg/L	----	< 5 U	< 5 U	< 5 U	< 5 U	290	309	301
Manganese, total	µg/L	----	< 5 U	< 5 U	< 5 U	< 5 U	292	289	287
Mercury, dissolved	µg/L	----	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Mercury, total	µg/L	----	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Molybdenum, dissolved	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Molybdenum, total	µg/L	----	40 B	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, dissolved	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Nickel, total	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Potassium, dissolved	µg/L	----	900 B	800 B	1000	1200	2400	2400	2300
Selenium, dissolved	µg/L	50	0.6	< 1 U	1.3	1 B	< 0.1 U	< 1 U	< 1 U
Selenium, total	µg/L	----	0.3 B	< 1 U	1.1	< 1 U	< 0.1 U	< 1 U	< 5 U
Silver, dissolved	µg/L	----	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver, total	µg/L	----	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.3 U
Sodium, dissolved	µg/L	----	4000	3600	4600	4700	3800	3800	3700
Uranium, dissolved	µg/L	----	0.39	0.36	0.66	0.64	0.08 B	0.17 B	< 0.1 U
Uranium, total	µg/L	----	0.4	0.31	0.73	0.64	0.08 B	0.26 B	< 0.3 U
Vanadium, dissolved	µg/L	----	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Vanadium, total	µg/L	----	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Zinc, dissolved	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	40 B	< 10 U
Zinc, total	µg/L	----	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	70	< 10 U
RADIOLOGICAL (pCi/L)									
Gross Alpha	pCi/L	15	-0.8	1.45	0.55	2.01	-1.01	2.59	6.02
Gross Beta	pCi/L	50	-0.38	3.32	-0.67	0.78	1.36	4.43	6.86
Radium 226 and 228 (combined)	pCi/L	----	0.54	0.06	0.24	1.48	0.82	0.42	0.28
Thorium 230 and 232 (combined)	pCi/L	----	-0.05	-0.52	0.06	-0.5	0.07	-0.05	-0.3
Thorium 228	pCi/L	----	0.07	-0.1	-0.02	-0.02	0.2	0.05	0.06

[1] Residence 3W is a flowing well adjacent to highway and is used only periodically as an irrigation source.

Shaded value in bold indicates level exceeds Utah agriculture standard

+ Value exceeds standard by 1 to 10 times

++ Value exceeds standard by 10 to 100 times

+++ Value exceeds standard by more than 100 times

nm = not measured; na = not analyzed

Qualifiers are defined as follows:

B Analyte detected at a value between Method Detection Limit and Practical Quantitation Limit

U Analyte was not detected at Method Detection Limit

H Holding time was exceeded

Table 4.70: Summary of Human-Health Risk Evaluation Results for the Mines Comprising the La Sal Creek Watershed Project

Medium	Firefly/Pygmy Mine		Vanadium Queen Mine		Blue Cap Mine	
	Contaminant	Rationale	Contaminant	Rationale	Contaminant	Rationale
Surface Water	Analyte levels pose low risk to campers		Analyte levels pose low risk to campers		Analyte levels pose low risk to campers	
Waste Rock	Metals	Arsenic poses moderate risk to campers in isolated areas of mine bench and terrace	Metals	Arsenic poses moderate risk to campers in areas of mine bench, terrace, and dump	Metals	Arsenic poses moderate risk to campers in isolated areas of mine bench
	Radionuclides	No RMC or SSL: gross alpha, gross beta, radium-226, and thorium-230 in near-surface samples on mine bench and terrace exceed background 2 to 35 times	Radionuclides	No RMC or SSL: gross alpha, gross beta, radium-226, and thorium-230 in near-surface samples on mine bench and terrace slightly exceed background < 2 times	Radionuclides	No RMC or SSL: gross alpha, gross beta, radium-226, and thorium-230 in near-surface samples on mine bench and terrace exceed background 2 to 13 times
	Gamma Exposure	Expected to exceeds 100 mRem/yr exclusive of background on mine bench, terrace, and ancillary dump	Gamma Exposure	Expected to exceeds 100 mRem/yr exclusive of background on mine bench and ore loadout terrace	Gamma Exposure	Expected to exceeds 100 mRem/yr exclusive of background on portions of mine bench

Medium	Black Hat Mine		Saint Patrick Mine	
	Contaminant	Rationale	Contaminant	Rationale
Surface Water	No Mine Drainage		No Mine Drainage	
Waste Rock	Metals	Pose low risk to campers	Metals	Pose low risk to campers
	Radionuclides	No RMC or SSL: gross alpha, gross beta, radium-226, and thorium-230 in near-surface samples on mine bench and terrace exceed background 4 to 11 times	Radionuclides	No RMC or SSL: radium-226 in near-surface samples exceed background by up to 3 times
	Gamma Exposure	Expected to be less than 100 mRem/yr exclusive of background	Gamma Exposure	Expected to be less than 100 mRem/yr exclusive of background

Table 4.71: Summary of Ecological Risk Evaluation for the Mines Comprising the La Sal Creek Watershed Project

Medium	Firefly/Pygmy Mine		Vanadium Queen Mine		Blue Cap Mine	
	Contaminant	Rationale	Contaminant	Rationale	Contaminant	Rationale
Surface Water	Selenium Gross Alpha	Adit & drainage: 9.8 to 12.9 times Aq. Life Adit & drainage: 3.1 to 7.0 times Aq. Life	pH Total phosphorus Total recoverable iron Selenium Gross Alpha Gross Beta	Slightly above Aq. Life Adit: 5 times Aq. Life Drainage: 1.1 to 2.4 times Aq. Life Adit: 70 to 81 times Aq. Life Drainage & adit: 35 to 53 times Aq. Life Adit & drainage: 2.5 to 5.5 times Aq. Life	Selenium Gross Alpha Gross Beta Uranium Radium-226/228	Adit & drainage: 46 to 55 times Aq. Life Adit & drainage: 25 to 28 times Aq. Life Adit & drainage: 1.9 to 3.4 times Aq. Life Adit & drainage: 68 to 125 time max. background Adit & drainage: 12 to 39 times max. background
Waste Rock	Selenium Uranium Vanadium	No RMC: 10-100 x background in near-surface samples <RMC but 10-100 x background in near-surface samples <RMC but 10-100 x background in near-surface samples	Selenium Uranium Vanadium	No RMC: 10-100 x background in near-surface samples <RMC but 10-100 x background in near-surface samples <RMC but 10-100 x background in near-surface samples	Uranium	<RMC but 10-100 x background in near-surface samples
	Radionuclides	No RMC: gross alpha, gross beta, radium-226, and thorium-230 in near-surface samples on mine bench and terrace exceed background 2 to 35 times	Radionuclides	No RMC: gross alpha, gross beta, radium-226, and thorium-230 in near-surface samples on mine bench and terrace slightly exceed background < 2 times	Radionuclides	No RMC: gross alpha, gross beta, radium-226, and thorium-230 in near-surface samples on mine bench and terrace exceed background 2 to 13 times
	Gamma Exposure	Expected to be sess than IAEA standard of 0.1 Rad per da	Gamma Exposure	Expected to be sess than IAEA standard of 0.1 Rad per da	Gamma Exposure	Expected to be sess than IAEA standard of 0.1 Rad per da

Medium	Black Hat Mine		Saint Patrick Mine	
	Contaminant	Rationale	Contaminant	Rationale
Surface Water	No surface water		No surface water	
Waste Rock	Selenium Uranium Vanadium radium-226	No RMC: 10-100 x background in near-surface samples <RMC but 10-100 x background in near-surface samples <RMC but 10-100 x background in near-surface samples No RMC: 10-100 x background in near-surface samples	Uranium Vanadium	<RMC but 10-100 x background in near-surface samples <RMC but 10-100 x background in near-surface samples
	Radionuclides	No RMC or SSL: gross alpha, gross beta, radium-226, and thorium-230 in near-surface samples on mine bench and terrace exceed background 4 to 11 times	Radionuclides	No RMC or SSL: radium-226 in near-surface samples exceed background by up to 3 times
	Gamma Exposure	Expected to be sess than IAEA standard of 0.1 Rad per da	Gamma Exposure	Expected to be sess than IAEA standard of 0.1 Rad per day

Table 5.1 (cont.): Identification and Summary of Potential ARARs Specific to the La Sal Creek Watershed Project

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR Status
Chemical-Specific Requirements			
UMTRCA Standard for radium-226	40 CFR Part 192	Standard established for cleanup of uranium mill tailings at Title I Sites	Relevant and Appropriate
Gamma-Exposure Rate of 25 mRem/yr	10 CFR Part 20.1402	Establishes dose limit for unrestricted use upon license termination	Relevant and Appropriate
Gamma-Exposure Rate of 100 mRem/yr	10 CFR Part 20.1301-1302	Established dose limit for the general public under active licenses	Relevant and Appropriate
National Primary Drinking Water Regulation	40 CFR Part 141	Health-based standards (MCLs) for public water systems	Relevant and Appropriate
National Secondary Drinking Water Regulation	40 CFR Part 143	Welfare-based standards (secondary MCLs) for public water systems	Relevant and Appropriate
Primary and Secondary Ambient Air Quality Standards	40 CFR Part 50	Sets standards for air emissions	Relevant and Appropriate
Emissions Standards for Hazardous Air Pollutants	40 CFR Part 61	Regulates emission of hazardous chemical to the atmosphere	Relevant and Appropriate
Utah Radiation Control Rules	Rule R313	Requirements applied to the use of radiation, radiation machine, and radiation materials to ensure safety to all persons at or in the vicinity of the place of use, storage, or disposal	Applicable
Basic Standards and Methodologies for Surface Water	5 CCR 1002-31	Establishes basic standards and methodologies for surface water in Colorado	Applicable
Stream Classifications and Numeric Standards for Gunnison and Dolores River Basins	5 CCR 1002-35	Establishes Colorado stream classifications and numeric standards for Gunnison and Lower Dolores River Basins	Applicable

Table 5.1 (cont.): Identification and Summary of Potential ARARs Specific to the La Sal Creek Watershed Project

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR Status
Chemical-Specific Requirements (continued)			
Standards of Water Quality for Waters of the State of Utah	Rule R317-2	Establishes stream classifications and numeric standards for waters of the State of Utah	Applicable
Location-Specific Requirements			
National Historic Preservation Act	16 USC § 470; 36 CFR Part 800; 40 CFR Part 6.310(b)	Requires federal agencies to take into account the effect of any federally-assisted undertaking or licensing on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places and to minimize harm to any National Historic Landmark adversely or directly affected by an undertaking	Applicable
Archaeological and Historic Preservation Act	16 USC § 469; 40 CFR 6.301(c)	Establishes procedures to provide preservation of historical and archaeological data which might be destroyed through alteration of terrain as a result of a federal construction project or a federally-licensed activity or program	Applicable
Historic Sites, Buildings and Antiquities Act	36 CFR § 62.6(d)	Requires federal agencies to consider the existence and location of landmarks on the National Register of Natural Landmarks to avoid undesirable impacts on such landmarks	Applicable
Archaeological Resources Protection Act	16 USC §§ 470aa-47011	Regulates removal of archaeological resources from public or tribal lands	Applicable
Protection of Wetlands Order	40 CFR Part 6	Avoid adverse impacts to wetlands	Applicable
Wetlands	EO 11990	Protection of wetlands	To Be Considered

Table 5.1 (cont.): Identification and Summary of Potential ARARs Specific to the La Sal Creek Watershed Project

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR Status
Location-Specific Requirements (continued)			
Native Species	EO 13112	Requires use of native species	To Be Considered
Fish and Wildlife Coordination Act	16 USC § 661 et seq.; 40 CFR Part 6.302(g)	Requires consultation when federal department or agency proposed or authorizes any modification of any stream or other water body and adequate provision for protection of fish and wildlife resources	Applicable
Floodplain Management Order	40 CFR Part 6	Requires federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid the adverse impacts associated with direct and indirect development of a floodplain, to the extent possible	Applicable
Section 404, Clean Water Act	33USC §§ 1251 et seq.; 33 CFR Part 330	Regulates discharge of dredge or fill materials into water of the U.S.	Applicable
Endangered Species Act	16 USC §§ 1531-1543; 40 CFR Part 6.302(h) 50 CFR Part 402	Requires action to conserve endangered species with critical habitat upon which species depend. Requires consultation with Department of Interior	Applicable
Wild and Scenic Rivers Act	16 USC §§ 1271-1287; 40 CFR § 6.302(e); 36 CFR Part 297	Establishes requirements to protect wild, scenic, or recreational rivers	Not ARAR
Review of Historic Structures	Sec. 9-8-404, UCA	Requires state agencies to “take into account” how their activities will affect historic structures	Applicable

Table 5.1 (cont.): Identification and Summary of Potential ARARs Specific to the La Sal Creek Watershed Project

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR Status
Action-Specific Requirements			
National Environmental Policy Act	42 USC § 4332	Requires federal agencies to integrate environmental values into their decision-making process by considering the environmental impacts of their proposed actions	Not ARAR
National Pollution Discharge Elimination System	40 CFR Parts 121, 122, 125	Requires permits for the discharge of pollutants from any point source into waters of the U.S.	Applicable
Effluent Limitation	40 CFR Part 440, pursuant to 33 USC § 1311	Sets standards for discharge of treated effluent to water of the U.S.	Applicable
RCRA Subtitle C	40 CFR Part 261.4(b)(7) and RCRA Section 3001(b) (Beville Amendment)	Regulates disposal of hazardous materials. Applicable for disposal of listed wastes and sludges and relevant and appropriate for hazardous mine waste	Applicable
Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976	40 CFR Part 257, Subpart A: § 257.1-1 Floodplains, paragraph (a); § 257.3-7 Air, paragraph (b)	Regulates the storage and handling of hazardous waste	Applicable
Hazardous Materials Transportation Act	49 USC § 1801-1813; 40 CFR 107, 171-177	Regulates the transportation of hazardous waste	Applicable
Guidelines for the Land Disposal of Solid Waste	40 CFR Part 241, pursuant to 42 USC § 6901 et seq.	Regulates the land disposal of solid waste	Applicable

Table 5.1 (cont.): Identification and Summary of Potential ARARs Specific to the La Sal Creek Watershed Project

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR Status
Action-Specific Requirements (continued)			
Identification and Listing of Hazardous Waste	40 CFR Part 261, pursuant to 42 USC § 6921	Establishes the procedures and process for listing and determining hazardous waste	Applicable
Standards Applicable to Generation of Hazardous Waste	40 CFR Part 262, pursuant to 42 USC § 6922	Establishes standards for the generation of hazardous waste	Applicable
Standards Applicable to Transporters of Hazardous Waste	40 CFR Part 263, pursuant to 42 USC § 6823	Regulates the transportation of hazardous waste	Applicable
Hazardous Waste Permit Program	40 CFR Part 270	Establishes procedures for obtaining US EPA permit for hazardous waste management program	Relevant and Appropriate
Toxic Pollutant Effluent Standards	40 CFR Part 129, pursuant to 33 USC § 1317	Establishes standards or sets prohibitions for certain hazardous constituents	Relevant and Appropriate
Federal Mine Safety Act	30 USC §§ 801-962	Regulates worker safety at active mine sites	Relevant and Appropriate
Occupational Safety and Health Act	29 USC § 655	Defines standards for employees' protection during initial site characterization and analysis, monitoring activities, materials, handling activities, training and emergency response	Applicable
Utah Emissions Standards – Fugitive Dust	Rule R307-205-3	Establishes controls to minimize emission of fugitive dust from construction activities	Applicable

Table 5.1 (cont.): Identification and Summary of Potential ARARs Specific to the La Sal Creek Watershed Project

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR Status
Action-Specific Requirements (continued)			
Utah Solid and Hazardous Waste Rule	Rule R313	Establishes rules for management and disposal of hazardous waste	Relevant and Appropriate
Utah Abandoned Mine Reclamation	Rule R643	Establishes rules for reclamation of abandoned mine lands	Relevant and Appropriate
Utah Pollutant Discharge Elimination System	Rule R317.8	Regulates stormwater discharge	Applicable
Colorado Identification and Listing of Hazardous Waste	6 CCR 1007-3 Part 261, pursuant to § 25-15-302 C.R.S.	Establishes the procedures and process for listing and determining hazardous waste	Applicable
Colorado Standards Applicable to Generation of Hazardous Waste	6 CCR 1007-3 Part 262, pursuant to § 25-15-302 C.R.S.	Establishes standards for the generation of hazardous waste	Applicable
Colorado Standards Applicable to Transporters of Hazardous Waste	6 CCR 1007-3 Part 263, pursuant to § 25-15-302 C.R.S.; 4 CCR 723-18	Regulates the transportation of hazardous waste	Applicable
Colorado Discharge Permit System	5 CCR 1002-2, §§ 6.1.0 to 6.18.0, pursuant to § 25-8-501 C.R.S.	Requires permits for the discharge of pollutants from any point source into waters of the State	Applicable

Table 5.1 (cont.): Identification and Summary of Potential ARARs Specific to the La Sal Creek Watershed Project

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR Status
Action-Specific Requirements (continued)			
Colorado Effluent Limitations	5 CCR 1002-3, §§ 10.1 to 10.1.7, pursuant to § 25-8-503 C.R.S.	Sets standards for discharge of treated effluent to water of the State	Applicable
Colorado Noise Abatement Statute	§§ 25-12-101, et seq. C.R.S.	Establishes standards to controlling noise	Relevant and Appropriate
Colorado Mined Land Reclamation Act	§§ 34-32-101 to 125, C.R.S.; Rule 3 of Mineral Rules and Regulations	Regulates all aspects of mining	Applicable
Colorado Water Quality Control Act – Stormwater Discharge Regulations	5 CCR 1002-2	Regulates discharge of stormwater during construction operations	Applicable
Colorado Protection of Fishing Streams	§§ 33-5-101 to 107, C.R.S.	Establishes notification requirements for modifications to streams	Applicable
Colorado Air Pollution Prevention and Control Act	5 CCR 1001-3; Section III.D.1.b.c.d; Sections II.D.2.b.c.e.f.g.; Regulation 1	Regulates fugitive emissions during construction	Applicable
Colorado Air Pollution Prevention and Control Act	5 CCR 1001-5, Regulation 3 APENS	Establishes requirements for obtaining permits	Applicable
Colorado Air Pollution Prevention and Control Act	5 CCR 1001-4, Regulation 2 Odors	Regulates the generation of odors	Applicable

Table 5.1 (cont.): Identification and Summary of Potential ARARs Specific to the La Sal Creek Watershed Project

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR Status
Action-Specific Requirements (continued)			
Risk Management Criteria for Metals at BLM Mining Sites	Technical Note 390 (Ford, 2004)	Establishes risk management criteria for application at mine sites on BLM lands	To Be Considered
BLM CERCLA Response Actions Handbook	H-1703-1	Procedural guidance for implementing CERCLA response actions on BLM lands	To Be Considered

Table 6.1: Waste-Rock Technologies Retained on the Basis of Preliminary Screening

Technology		Process Option	Basis for Retention
Institutional Controls	Access Restrictions	Fencing/Signage	Potentially effective when used in conjunction with other technologies and readily implementable.
		Land Use Controls	Potentially effective when used in conjunction with other technologies and readily implementable
Engineering Source Controls	Surface Controls	Consolidation	Potentially effective option for management of waste rock comprising the ancillary dump and bank of adjacent drainage at the Firefly/Pygmy Mine and waste rock deposited within the Lion Canyon Creek channel along the toe of the dumps at the Blue Cap and Black Hat Mines; readily implementable.
		Erosion Protection	Potentially effective at reducing migration of surface materials via wind and surface water; readily implementable.
		Run-on and Run-off Controls	Potentially effective at reducing migration of surface materials via surface water; readily implementable.
		Revegetation	Potentially effective at reducing fluvial and wind erosion, minimizing infiltration within reclaimed areas, and stabilizing the mine dumps; imported soil and amendments likely required to support revegetation efforts; readily implementable provided sufficient soil available from a nearby source.
		Grading	Potentially effective at reducing fluvial erosion and stabilizing the mine dumps; readily implementable on portions of the dumps, not implementable on steep sections of the dumps.
	Containment	Soil Cover	Potentially effective at reducing direct contact with and gamma radiation from waste rock; readily implementable in areas suitable for camping at the mines provided sufficient soil available from on-site or nearby source.

Table 6.2: Response Action Alternatives Developed for Waste Rock

Alternative	Description
1. No Action	Site conditions remain unaltered.
2. Consolidation of off-dump waste and containment of areas suitable for camping with vegetated soil cover in combination with erosion control and containment (physical stabilization) of dump materials with option “a” or “b” as described below.	Consolidation of off-dump waste includes waste rock at ancillary dump and forming slope of adjacent drainage at Firefly/Pygmy Mine and waste rock in Lion Canyon Creek channel at the Blue Cap and Black Hat Mines. Material on mine benches will be contained with vegetated soil cover. Erosion control (e.g., jute logs in combination with revegetation) will be used to reduce erosion of dump.
2a. Containment of dump materials with permeable silt retention features (reinforced silt fence). Includes engineered waste-rock containment structure at Blue Cap Mine.	Durable, reinforced silt fence will be installed along the perimeter of the dump. An engineered waste-rock containment structure at Blue Cap Mine.
2b. Containment of dump materials with earthen berm in combination with sediment retention pond/features. Includes waste-rock containment with retention structure at Blue Cap Mine.	An earthen berm will be constructed along the perimeter of the dump to contain waste rock and convey surface water runoff. Sediment retention pond/features will be incorporated in berm/channel design. An engineered retention structure will be installed at the Blue Cap Mine.
3. Consolidation of off-dump waste in combination with regrading dump (where possible) to form more stable configuration, containment of areas suitable for camping with soil cover, and containment (physical stabilization) of dump materials and erosion protection of regraded areas as described below.	Consolidation of off-dump waste includes waste rock at ancillary dump and forming slope of adjacent drainage at Firefly/Pygmy Mine and waste rock in Lion Canyon Creek channel at the Blue Cap and Black Hat Mines. Slopes forming upper dumps at Firefly/Pygmy, Vanadium Queen, and Black Hat Mines will be regraded to form more stable configuration and lower slope of all dumps regraded where feasible. Material on mine benches will be contained with vegetated soil cover.
3a. Containment of dump materials with permeable silt retention features (reinforced silt fence) in combination with erosion control and revegetation in regraded areas. Includes waste-rock containment structure at Blue Cap Mine.	Durable, reinforced silt fence will be installed along the perimeter of the dump. Erosion control (e.g., jute logs in combination with revegetation) will be used to reduce erosion in regraded areas. An engineered waste-rock containment structure will be installed at the Blue Cap Mine.
3b. Containment of dump materials with permeable silt retention features (reinforced silt fence) in combination with revegetation matting on regraded areas. Includes waste-rock containment structure at Blue Cap Mine.	Durable, reinforced silt fence will be installed along the perimeter of the dump. Vegetation matting on placed on surface of dump in regraded areas. An engineered waste-rock containment structure will be installed at the Blue Cap Mine.

Table 6.2 (cont.): Response Action Alternatives Developed for Waste Rock

Alternative	Description
3c. Containment of dump materials with earthen berm in combination with erosion control and revegetation in regraded areas. Includes waste-rock containment structure at Blue Cap Mine.	An earthen berm will be constructed along perimeter of dump to contain waste rock and convey surface water runoff. Sediment retention pond/features will be incorporated in berm/channel design. Erosion control (e.g., jute logs in combination with revegetation) will be used to reduce erosion in regraded areas. An engineered waste-rock containment structure will be installed at the Blue Cap Mine.
3d. Containment of dump materials with earthen berm in combination with sediment retention pond/features and revegetation matting on regraded areas. Includes waste-rock containment structure at Blue Cap Mine.	An earthen berm will be constructed along perimeter of dump to contain waste rock and convey surface water runoff. Sediment retention pond/features will be incorporated in berm/channel design. Vegetation matting on placed on surface of dump in regraded areas. An engineered waste-rock containment structure will be installed at the Blue Cap Mine.

Table 6.3: Detailed Analysis of Alternatives - Cost Estimate Summary for Waste Rock

Cost Category[1]	Alternative 1	Alternative 2a	Alternative 2b	Alternative 3a	Alternative 3b	Alternative 3c	Alternative 3d
Firefly/Pygmy Mine							
Total Capital Cost	$ -	$ 147,149	$ 159,859	$ 243,012	$ 305,207	$ 255,722	$ 317,917
Operation & Maintenance							
Year 1	$ -	2,409	2,555	2,440	2,094	2,586	2,240
Year 2	$ -	3,521	2,605	3,553	3,200	2,637	2,284
Year 3	$ -	2,503	2,655	2,536	2,176	2,688	2,328
Year 4	$ -	3,657	2,705	3,690	3,323	2,739	2,372
Year 5	$ -	2,598	2,755	2,632	2,258	2,789	2,416
Year 6	$ -	3,792	2,805	3,827	3,446	2,840	2,460
Year 7	$ -	2,692	2,856	2,727	2,341	2,891	2,504
Year 8	$ -	3,927	2,906	3,963	3,570	2,941	2,548
Year 9	$ -	2,787	2,956	2,823	2,423	2,992	2,592
Year 10	$ -	4,063	30,546	4,100	3,693	25,796	25,389
NPV (O&M)	$ -	$ 24,386	$ 38,221	$ 24,649	$ 21,761	$ 35,545	$ 32,658
TOTAL NPV	$ -	$ 171,535	$ 198,080	$ 267,661	$ 326,968	$ 291,267	$ 350,575
Vanadium Queen Mine							
Total Capital Cost	$ -	$ 105,367	$ 113,839	$ 108,981	$ 152,754	$ 115,577	$ 159,350
Operation & Maintenance							
Year 1	$ -	1,685	1,784	2,105	1,685	2,204	$1,784
Year 2	$ -	2,401	1,819	2,829	2,401	2,247	$1,819
Year 3	$ -	1,751	1,854	2,188	1,751	2,290	$1,854
Year 4	$ -	2,493	1,889	2,938	2,493	2,333	$1,889
Year 5	$ -	1,818	1,924	2,270	1,818	2,377	$1,924
Year 6	$ -	2,585	1,959	3,046	2,585	2,420	$1,959
Year 7	$ -	1,884	1,994	2,353	1,884	2,463	$1,994
Year 8	$ -	2,678	2,029	3,155	2,678	2,506	$2,029
Year 9	$ -	1,950	2,064	2,436	1,950	2,549	$2,064
Year 10	$ -	2,770	20,086	3,264	2,770	20,580	$20,086
NPV (O&M)	$ -	$ 16,808	$ 25,923	$ 20,311	$ 16,808	$ 29,427	$ 25,923
TOTAL NPV	$ -	$ 122,175	$ 139,762	$ 129,292	$ 169,562	$ 145,004	$ 185,273
Blue Cap Mine							
Total Capital Cost	$ -	$293,610		$ 359,225	$ 386,460	NA	NA
Operation & Maintenance							
Year 1	$ -	1,176		1,127	739	NA	NA
Year 2	$ -	3,079		3,029	2,633	NA	NA
Year 3	$ -	1,223		1,172	768	NA	NA
Year 4	$ -	3,197		3,146	2,734	NA	NA
Year 5	$ -	24,171		24,590	24,171	NA	NA
Year 6	$ -	3,316		3,262	2,835	NA	NA
Year 7	$ -	1,315		1,260	826	NA	NA
Year 8	$ -	3,434		3,379	2,937	NA	NA
Year 9	$ -	1,361		1,304	855	NA	NA
Year 10	$ -	28,537		28,994	28,537	NA	NA
NPV (O&M)	$ -	$50,668		$ 50,945	$ 47,703	NA	NA
TOTAL NPV	$ -	$344,278		$ 410,170	$ 434,163	NA	NA
Black Hat Mine							
Total Capital Cost	$ -	$36,691		$ 58,912	NA	NA	$ 67,041
Operation & Maintenance							
Year 1	$ -	1,100		1,226	NA	NA	1,174
Year 2	$ -	1,122		1,202	NA	NA	1,151
Year 3	$ -	1,143		1,202	NA	NA	1,151
Year 4	$ -	1,165		1,298	NA	NA	1,243
Year 5	$ -	1,187		1,322	NA	NA	1,266
Year 6	$ -	1,208		1,346	NA	NA	1,289
Year 7	$ -	1,230		1,370	NA	NA	1,312
Year 8	$ -	1,251		1,394	NA	NA	1,335
Year 9	$ -	1,273		1,418	NA	NA	1,358
Year 10	$ -	1,294		1,442	NA	NA	1,381
NPV (O&M)	$ -	$9,179		$ 10,119	NA	NA	$ 9,690
TOTAL NPV	$ -	$45,870		$ 69,031	NA	NA	$ 76,731

[1] Cost Categories are defined as follows:
Total Capital Cost includes construction labor, materials, management, and associated indirect costs.
Annual Operation and Maintenance Cost includes post-reclamation maintenance; assumes inspections by BLM (no cost projected).
Net Present Value calculated as present worth of annual operation and maintenance cost (assuming an interest rate of 5 percent over the 10-year period) plus the total capital cost.

Table 7.1: Mine Drainage Technologies Retained on the Basis of Preliminary Screening for Mitigation of Infiltration at the Firefly-Pygmy and Vanadium Queen Mines

Technology		Process Option	Basis for Retention
Institutional Controls	Access Restrictions	Fencing/Signage	Potentially effective when used in conjunction with other technologies and readily implementable.
		Land Use Controls	Potentially effective when used in conjunction with other technologies and readily implementable
Engineering Source Controls	Surface Controls	Re-aligned Channel	Potentially effective option for reducing mine drainage infiltration and leachate production and readily implementable.
		Lined Channel	Potentially effective option for reducing mine drainage infiltration and leachate production and readily implementable.
		Piped Drainage	Potentially effective option for reducing mine drainage infiltration and leachate production and readily implementable.
		Transpiration	Potentially effective option for reducing mine drainage infiltration and leachate production and readily implementable.

Table 7.2: Mine Drainage Technologies Retained on the Basis of Preliminary Screening for Mine Drainage Treatment at the Blue Cap Mine

Technology		Process Option	Basis for Retention
Institutional Controls	Access Restrictions	Fencing/Signage	Potentially effective when used in conjunction with other technologies and readily implementable.
		Land Use Controls	Potentially effective when used in conjunction with other technologies and readily implementable.
In Situ Treatment	In Situ Physical/Chemical Treatment	Anaerobic Wetland	Potentially effective option for removal of COCs in mine drainage and readily implementable.
		Bioreactor	Potentially effective option for removal of COCs in mine drainage and readily implementable.
		ZVI Cell	Potentially effective option for removal of COCs in mine drainage and readily implementable.

Table 7.3: Response Action Alternatives Developed for Mine Drainage at Firefly-Pygmy and Vanadium Queen Mines

Alternative	Description
1. No Action	Site conditions remain unaltered.
2. Re-alignment of mine drainage channel away from waste rock areas to reduce infiltration of mine drainage.	Construct a re-aligned mine drainage channel near interface of upper bench and upslope collivium along mine access road.
2a. Sub-Alternative A: Transpiration by planting of phreatophytes along the re-aligned channel.	Plant phreatophytes along the re-aligned channel where some metal uptake by plants may occur and water consumption will reduce overall flows during the growing season by transpiration. Species that may be effective in phytoextraction and transpiration include cattail, reed, willow, and cottonwood.
3. Lined Channel. Use the same re-aligned route and install a non-woven geosynthetic liner to provide an infiltration barrier and reduce infiltration of mine drainage.	Construct a re-aligned channel in same location as proposed in Alternative 2 and also install a geosynthetic liner such as EPDM, or reinforced PVC.
3a. Clay Liner. Use the same re-aligned route and install a milled clay (bentonite) liner to provide an infiltration barrier and reduce infiltration of mine drainage.	Construct a re-aligned channel in same location as proposed in Alternative 2 and also install a milled clay (bentonite) liner using a bulk bentonite product.
3b. Lined Channel with planted phreatophytes in unlined segment at Vanadium Queen Mine. Use the same re-aligned route with lined upper segment and plant phreatophytes along the lower unlined segment.	Construct a re-aligned channel in same location as proposed in Alternative 2 at the Vanadium Queen Mine. The upper segment leading from the portal to the upper switchback in the mine access road would be lined. The lined segment will discharge into an unlined segment that extends to the ephemeral drainage and is planted with phreatophytes to partially consume mine drainage.
4. Piped Drainage. Use the same re-aligned route and install a buried pipe to provide an infiltration barrier and reduce infiltration of mine drainage. The lower segment is unlined open channel.	Construct a buried 3-inch SDR PVC plastic pipeline from the portal to the intersection of the upper bench road and lower bench road at the Firefly-Pygmy Mine and to the upper switchback on the access road to the upper bench at the Vanadium Queen Mine. At the Vanadium Queen Mine, the pipe discharge will outfall into an unlined open channel at the upper switchback.
4a. Piped Drainage. Use the same re-aligned route and install a buried pipe to provide an infiltration barrier and reduce infiltration of mine drainage. The lower segment is unlined open channel with planted phreatophytes.	Construct a buried 3-inch SDR PVC plastic pipeline from the portal to the intersection of the upper bench road and lower bench road at the Firefly-Pygmy Mine and to the upper switchback on the access road to the upper bench at the Vanadium Queen Mine. At the Vanadium Queen Mine, the pipe discharge will outfall into an unlined open channel at the upper switchback. This segment will also be planted with phreatophytes to partially consume mine drainage.

Table 7.4: Response Action Alternatives Developed for Mine Drainage Treatment at the Blue Cap Mine

Alternative	Description
1. No Action	Site conditions remain unaltered.
2. Anaerobic Wetland.	Construct an on site anaerobic treatment wetland near the existing wetland area. Wetland is estimated to be 50 ft long by 50 ft wide by 3 ft deep and contained within a bermed and lined cell. Soil substrate and organic media will be place in the cell and wetland plants will be established. Establishment of plants will provide a long-term source of organic media. Internal berms will increase contact time with the media. A security fence will be installed around the cell. It is estimated that the wetland will require media replenishment of 30 percent in a 10-year period.
3. Bioreactor.	Construct an on site bioreactor cell near the existing wetland area. Bioreactor is estimated to be 50 ft long by 50 ft wide by 3 ft deep and contained within a bermed and lined cell. Organic media will be place in the cell. Biomass materials may consist of materials such as certified straw mulch, sawdust, wood chips, corn husks, composted leaves, grass, or manure, and peat. Internal berms will increase contact time with the media. A security fence will be installed around the cell. It is estimated that the bioreactor will require media replenishment of 50 percent in a 10-year period.
3. ZVI Cell	Construct on on-site ZVI treatment cell. The cell will be constructed of a prefabricated steel tank, approximately 12 ft wide by 12 ft long by 2.5 ft deep (or equivalent volume). The cell will contain 5 internal baffles to increase contact time with the ZVI material. The ZVI material will consist of commercial grade granular zero valent iron product or equivalent. The cell will be partially buried in the bench material and covered with a steel cover and soil. A security fence will be installed around the cell. It is estimated that the ZVI cell will require media replenishment of 100 percent in a 5-year period.

Table 7.5: Detailed Analysis of Alternatives - Cost Estimate Summary for Mine Drainage

Firefly/Pygmy and Vanadium Queen Mines

Cost Category[1]	Alternative 1	Alternative 2	Alternative 2A	Alternative 3	Alternative 3A	Alternative 3B	Alternative 4	Alternative 4A
Firefly/Pygmy Mine								
Total Capital Cost	**$ -**	**$ 17,691**	**$ 25,493**	**$ 25,338**	**$ 36,383**	**NA**	**$ 17,889**	**NA**
Operation & Maintenance								
Year 1	**$ -**	-	-	-	-	-	-	-
Year 2	**$ -**	-	-	-	-	-	-	-
Year 3	**$ -**	-	-	-	-	-	-	-
Year 4	**$ -**	-	-	-	-	-	-	-
Year 5	**$ -**	5,283	6,861	6,914	9,220	-	5,328	-
Year 6	**$ -**	-	-	-	-	-	-	-
Year 7	**$ -**	-	-	-	-	-	-	-
Year 8	**$ -**	-	-	-	-	-	-	-
Year 9	**$ -**	-	-	-	-	-	-	-
Year 10	**$ -**	5,764	7,485	7,542	10,058	-	5,812	-
NPV (O&M)	**$ -**	**$ 7,678**	**$ 9,971**	**$ 10,047**	**$ 13,399**	**$ -**	**$ 7,743**	**$ -**
TOTAL NPV	**$ -**	**$ 25,369**	**$ 35,464**	**$ 35,385**	**$ 49,782**	**NA**	**$ 25,632**	**NA**
Vanadium Queen Mine								
Total Capital Cost	**$ -**	**$ 18,436**	**$ 27,034**	**$ 23,778**	**$ 32,551**	**$ 29,676**	**$ 17,565**	**$ 23,463**
Operation & Maintenance								
Year 1	**$ -**	-	-	-	-	-	-	-
Year 2	**$ -**	-	-	-	-	-	-	-
Year 3	**$ -**	-	-	-	-	-	-	-
Year 4	**$ -**	-	-	-	-	-	-	-
Year 5	**$ -**	5,472	7,228	6,803	8,687	7,953	5,451	6,601
Year 6	**$ -**	-	-	-	-	-	-	-
Year 7	**$ -**	-	-	-	-	-	-	-
Year 8	**$ -**	-	-	-	-	-	-	-
Year 9	**$ -**	-	-	-	-	-	-	-
Year 10	**$ -**	5,969	7,885	7,422	9,476	8,676	5,947	7,201
NPV (O&M)	**$ -**	**$ 7,952**	**$ 10,504**	**$ 9,887**	**$ 12,624**	**$ 11,558**	**$ 7,922**	**$ 9,593**
TOTAL NPV	**$ -**	**$ 26,388**	**$ 37,538**	**$ 33,665**	**$ 45,175**	**$ 41,234**	**$ 25,487**	**$ 33,056**

Blue Cap Mine

Cost Category[1]	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Blue Cap Mine				
Pilot-Scale Testing	**$ -**	**$ 25,052**	**$ 25,052**	**$ 25,052**
Total Capital Cost	**$ -**	**$ 105,957**	**$ 103,172**	**$ 136,450**
Operation & Maintenance				
Year 1	**$ -**	$ 2,243	$ 2,243	$ 2,243
Year 2	**$ -**	$ 2,287	$ 2,287	$ 2,287
Year 3	**$ -**	$ 2,331	$ 2,331	$ 2,331
Year 4	**$ -**	$ 2,375	$ 2,375	$ 2,375
Year 5	**$ -**	$ 2,419	$ 2,419	$ 90,170
Year 6	**$ -**	$ 2,463	$ 2,463	$ 2,463
Year 7	**$ -**	$ 2,507	$ 2,507	$ 2,507
Year 8	**$ -**	$ 2,551	$ 2,551	$ 2,551
Year 9	**$ -**	$ 2,595	$ 2,595	$ 2,595
Year 10	**$ -**	$ 31,163	$ 37,279	$ 98,366
NPV (O&M)	**$ -**	**$ 36,223**	**$ 39,979**	**$ 146,236**
TOTAL NPV	**$ -**	**$ 167,232**	**$ 168,203**	**$ 307,738**

[1] Cost Categories are defined as follows:
Total Capital Cost includes construction labor, materials, management, and associated indirect costs.
Annual Operation and Maintenance Cost includes post-reclamation inspection and maintenance .
Net Present Value calculated as present worth of annual operation and maintenance cost (assuming an interest rate of 5 percent over the 10-year period) plus the total capital cost.

Table 8.1: Comparative Analysis Summary for Waste Rock

Mine/Criterion	Alternative 1	Alternative 2		Alternative 3			
		2A	2B	3A	3B	3C	3D
Firefly/Pygmy Mine							
Effectiveness	Low (1)	Moderate (2)	Moderate (3)	High (1)	High (2)	High (2)	High (3)
Implementability	Moderate (2)	Moderate (2)	Moderate (2)	High (3)	High (1)	High (3)	High (1)
Cost	Low (1)	Moderate (1)	Moderate (1)	Moderate (3)	High (2)	Moderate (3)	High (2)
Vanadium Queen Mine							
Effectiveness	Low (1)	Moderate (2)	Moderate (3)	High (1)	High (2)	High (2)	High (3)
Implementability	Moderate (2)	Moderate (2)	Moderate (2)	High (3)	High (1)	High (3)	High (1)
Cost	Low (1)	Moderate (1)	Moderate (2)	Moderate (2)	High (1)	Moderate (2)	High (2)
Blue Cap Mine							
Effectiveness	Low (1)	Moderate (1)		High (2)	High (3)	NA	NA
Implementability	Moderate (2)	Moderate (2)		High (3)	High (2)	NA	NA
Cost	Low (1)	Moderate (2)		High (2)	High(2)	NA	NA
Black Hat Mine							
Effectiveness	Low (1)	Moderate (2)		High (1)	NA	NA	High (3)
Implementability	Moderate (2)	High (2)		High (2)	NA	NA	High(1)
Cost	Low (1)	Moderate (1)		Moderate (2)	NA	NA	Moderate (2)

Note: Numerical ratings defined as (1) - low end of narrative rank; (2) middle of narrative rank; (3) high end of narrative rank.

Table 8.2: Comparative Analysis Summary for Mine Drainage

Firefly/Pygmy and Vanadium Queen Mines

Mine/Criterion	Alternative 1	Alternative 2		Alternative 3			Alternative 4	
		2	2A	3	3A	3B	4	4A
Firefly/Pygmy Mine								
Effectiveness	Low (1)	Moderate (1)	Moderate (2)	High (1)	High (1)	NA	High (2)	NA
Implementability	Moderate (2)	Moderate (3)	Moderate (3)	Moderate (3)	Moderate (3)	NA	Moderate (2)	NA
Cost	Low (1)							
Vanadium Queen Mine								
Effectiveness	Low (1)	Moderate (1)	Moderate (2)	High (1)	High (1)	High (1)	High (2)	High (1)
Implementability	Moderate (2)	Moderate (3)	Moderate (3)	Moderate (3)	Moderate (3)	Moderate (2)	Moderate (2)	Moderate (2)
Cost	Low (1)							

Note: Numerical ratings defined as (1) - low end of narrative rank; (2) middle of narrative rank; (3) high end of narrative rank.

Alternative 2: Re-Aligned Unlined Channel
Alternative 2A: Re-Aligned Unlined Channel w/ Plants
Alternative 3: Re-Aligned Lined Channel
Alternative 3A: Re-Aligned Lined Channel Lined w/ Clay
Alternative 3B: Re-Aligned Lined Channel w/ Plants in Unlined Segment
Alternative 4: Re-Aligned Pipe w/ Unlined channel
Alternative 4A: Re-Aligned Pipe w/ Unlined Channel w/ Plants

Blue Cap Mine

Mine/Criterion	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Blue Cap Mine				
Effectiveness	Low (1)	Moderate (3)	Moderate (2)	High(2)
Implementability	Moderate (2)	Moderate (2)	Moderate (2)	Moderate (2)
Cost	Low (1)			

Note: Numerical ratings defined as (1) - low end of narrative rank; (2) middle of narrative rank;
(3) high end of narrative rank.

Alternative 1: No Action
Alternative 2: Anerobic Wetland
Alternative 3: Bioreactor
Alternative 4: ZVI Cell