

Appendix E6. Mine Baseline Groundwater Quality Sampling Results

Sample Location/ Identification	Lynx	Wolverine	Wolverine	UG Portal Face	UG Portal Face	UG Portal Face	UG Portal Face	UG Portal Face	UG Portal Face	UG Portal Face	UG Portal Face	UG Portal Face	CCME – Aquatic Life
	PZ-A	PZ-B	PZ-B										
	GW1	GW1	GW2 (Duplicate)										
Date Sampled	4/25/2005	4/21/2005	4/21/2005	6/16/2005	7/7/2005	7/11/2005	8/6/2005	8/11/2005	8/17/2005	8/27/2005	8/29/2005		
Sample Origin	Borehole	Borehole	Borehole	Decline at ~1343 m ASL	Decline at ~1340 m ASL	Decline at ~1338 m ASL	Decline at ~1327 m ASL	Decline at ~1325 m ASL	Decline at ~1322 m ASL	Decline at ~1316 m ASL	Decline at ~1314 m ASL		
Approximate Depth (m bgs)	150	108	108	4	7	9	20	22	25	31	33		
Physical Tests													
Conductivity (uS/cm)	152	145	151	389	354	-	344	352	350	328	-	-	
Total Dissolved Solids	-	-	-	-	237	-	222	231	227	256	-	-	
Hardness CaCO3	72.7	64.1	62.2	199	189	190	184	200	184	-	-	-	
Alkalinity-Total CaCO3	54	63.7	63.4	108	121	-	-	-	-	110	-	-	
pH	7.69	8.01	8.05	8.21	8.18	-	8.13	7.92	8.06	7.77	-	6.5 – 9.0	
Total Suspended Solids	-	-	-	-	80.3	-	<3.0	12.4	7.4	425	-	-	
Turbidity (NTU)	-	-	-	-	24.8	-	-	-	-	-	-	-	
Dissolved Anions													
Bromide Br	<0.050	<0.050	<0.050	<0.050	-	-	<0.050	<0.050	<0.050	-	-	-	
Chloride Cl	1.14	<0.50	0.53	0.95	<0.50	-	<0.50	<0.50	<0.50	<0.50	-	-	
Fluoride F	0.162	0.094	0.105	0.342	0.202	-	0.168	0.183	0.181	0.180	-	0.120 ¹	
Sulphate SO4	22.2	11	11	103	74.6	-	69.6	68.2	66.7	68.8	-	-	
Nutrients													
Ammonia Nitrogen* N	0.13	<0.0050	0.0067	0.134	0.059	0.039	0.032	-	0.103	0.475	-	1.04 ²	
Nitrate Nitrogen N	0.085	0.0207	0.0138	0.0333	0.0072	<0.0050	<0.0050	<0.0050	0.0266	<0.0050	-	13	
Nitrite Nitrogen N	<0.10	<0.10	<0.10	<0.10	0.0011	<0.0010	0.0036	<0.0010	0.0066	0.0011	-	0.06	
Total Phosphate P	-	-	-	-	0.0765	-	0.0120	0.0165	0.0078	2.51	-	-	
Dissolved Metals													
Aluminum D-Al	0.0407	0.0052	<0.0050	0.0194	0.0367	0.0112	<0.0050	<0.0050	0.0579	<0.20	<0.20	0.005 – 0.100	
Antimony D-Sb	0.0028	0.00164	0.00051	0.0272	0.00115	0.00268	0.00059	<0.00050	<0.00050	<0.20	<0.20	-	
Arsenic D-As	<0.00050	0.00053	0.00069	0.00053	<0.00050	0.00115	<0.00050	<0.00050	<0.00050	<0.20	<0.20	0.005	
Barium D-Ba	0.111	0.061	0.058	0.035	0.025	<0.020	<0.020	0.021	0.032	0.048	0.028	-	
Beryllium D-Be	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	-	
Bismuth D-Bi	-	-	-	-	-	-	-	-	-	<0.20	<0.20	-	
Boron D-B	<0.10	3.18	5.29	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	
Cadmium D-Cd	0.00118	<0.000050	<0.000050	<0.000050	<0.000050	0.000076	<0.000017	<0.000017	0.000079	<0.010	<0.010	0.000017	
Calcium D-Ca	23.7	17.9	17.4	66.4	56.5	58.2	51.6	56.6	51.9	49.4	45.9	-	
Chromium D-Cr	<0.0010	<0.0010	<0.0010	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.010	<0.010	0.0010 ⁶ 0.0089 ⁷	
Cobalt D-Co	0.00074	0.00052	0.0004	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.010	<0.010	0.05	
Copper D-Cu	0.0165	0.0024	0.0029	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.010	<0.010	0.002 – 0.004	
Iron D-Fe	1.5	0.656	0.836	0.142	<0.030	0.032	0.433	<0.030	0.937	0.142	0.076	0.3	
Lead D-Pb	0.00136	0.0108	0.0233	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00112	<0.050	<0.050	0.001 – 0.007	
Lithium D-Li	0.008	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	-	
Magnesium D-Mg	3.27	4.68	4.56	8.16	11.6	10.9	13.5	14.3	13.2	13.4	13.9	-	
Manganese D-Mn	0.173	0.129	0.119	0.0606	0.0736	0.0528	0.0499	0.0282	0.0642	0.0618	0.0421	-	
Mercury D-Hg	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.00010	<0.00010	-	-	0.000026	
Molybdenum D-Mo	0.0017	0.0028	0.0022	0.0033	<0.0010	0.0019	<0.0010	<0.0010	<0.0010	<0.030	<0.030	0.073	
Nickel D-Ni	0.0076	0.0046	0.0041	0.0018	0.0017	0.0019	<0.0010	<0.0010	<0.0010	<0.050	<0.050	0.025 – 0.150	
Phosphorus D-P	-	-	-	-	-	-	-	-	-	<0.30	<0.30	-	
Potassium D-K	2	<2.0	<2.0	4.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	
Selenium D-Se	0.0107	<0.0010	<0.0010	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.20	<0.20	0.001	
Silicon D-Si	-	-	-	-	-	-	-	-	-	4.55	4.91	-	
Silver D-Ag	0.000029	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.010	<0.010	0.0001	
Sodium D-Na	<2.0	7	10	12.7	<2.0	4.4	<2.0	<2.0	<2.0	<2.0	<2.0	-	
Strontium D-Sr	-	-	-	-	-	-	-	-	-	0.465	0.473	-	
Thallium D-Tl	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.20	<0.20	0.0008	
Tin D-Sn	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.030	<0.030	-	
Titanium D-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	
Uranium D-U	0.00028	0.0003	0.0002	0.0021	0.00120	0.00139	0.00197	0.00124	0.00193	-	-	-	
Vanadium D-V	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-	
Zinc D-Zn	0.211	0.0227	0.0176	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0193	0.0214	<0.0050	0.03	
Total Metals													
Aluminum T-Al	1.17	0.357	0.161	1.32	0.899	0.190	<0.0050	0.0495	0.0896	345	-	-	

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	GW1	GW1	GW2 (Duplicate)										
Date Sampled	4/25/2005	4/21/2005	4/21/2005	6/16/2005	7/7/2005	7/11/2005	8/6/2005	8/11/2005	8/17/2005	8/27/2005	8/29/2005		
Sample Origin	Borehole	Borehole	Borehole	Decline at ~1343 m ASL	Decline at ~1340 m ASL	Decline at ~1338 m ASL	Decline at ~1327 m ASL	Decline at ~1325 m ASL	Decline at ~1322 m ASL	Decline at ~1316 m ASL	Decline at ~1314 m ASL		
Approximate Depth (m bgs)	150	108	108	4	7	9	20	22	25	31	33		
Antimony T-Sb	0.00583	0.00120	0.00115	0.0245	0.00126	0.00260	0.00059	<0.00050	<0.00050	<0.20	-	-	
Arsenic T-As	0.00500	0.00167	0.00138	0.00104	0.00064	0.00119	<0.00050	<0.00050	<0.00050	<0.20	-	-	
Barium T-Ba	0.274	0.139	0.112	0.086	0.047	0.026	0.023	0.036	0.037	11.2	-	-	
Beryllium T-Be	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0336	-	-	
Bismuth T-Bi	-	-	-	-	-	-	-	-	-	<0.20	-	-	
Boron T-B	<0.10	2.99	3.72	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	-	
Cadmium T-Cd	0.00413	0.00088	0.00056	0.000225	0.000108	0.00084	<0.000017	0.000026	<0.000017	0.527	-	-	
Calcium T-Ca	25.5	17.5	17.2	64.5	57.8	57.0	51.7	54.7	51.7	238	-	-	
Chromium T-Cr	0.0152	0.0042	0.0039	0.0059	0.0015	0.0010	<0.0010	<0.0010	<0.0010	0.981	-	-	
Cobalt T-Co	0.00282	0.00134	0.00137	0.00137	0.00121	0.00052	<0.00030	<0.00030	<0.00030	0.427	-	-	
Copper T-Cu	0.319	0.0451	0.0491	0.0058	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	4.61	-	-	
Iron T-Fe	26.1	10.2	10.5	7.01	3.90	0.791	0.509	0.965	0.893	1100	-	-	
Lead T-Pb	0.0639	0.265	0.391	0.00334	0.00131	0.00066	<0.00050	<0.00050	0.00075	5.03	-	-	
Lithium T-Li	0.0160	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.342	-	-	
Magnesium T-Mg	4.05	4.50	4.38	8.30	11.8	10.5	13.5	13.6	13.2	252	-	-	
Manganese T-Mn	0.423	0.195	0.204	0.211	0.151	0.0659	0.0514	0.0671	0.0596	31.1	-	-	
Mercury T-Hg	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.00010	<0.00010	-	-	-	
Molybdenum T-Mo	0.0044	0.0022	0.0016	0.0039	<0.0010	0.0015	<0.0010	<0.0010	<0.0010	<0.030	-	-	
Nickel T-Ni	0.0259	0.0098	0.0102	0.0093	0.0052	0.0029	<0.0010	<0.0010	<0.0010	1.54	-	-	
Phosphorus T-P	-	-	-	-	-	-	-	-	-	14.5	-	-	
Potassium T-K	<2.0	<2.0	<2.0	4.6	<2.0	<2.0	<2.0	<2.0	<2.0	36.9	-	-	
Selenium T-Se	0.0107	<0.0010	<0.0010	0.0019	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.20	-	-	
Silicon T-Si	-	-	-	-	-	-	-	-	-	151	-	-	
Silver T-Ag	0.000487	0.000054	<0.000020	0.000066	0.000049	<0.000020	<0.000020	<0.000020	<0.000020	0.038	-	-	
Sodium T-Na	<2.0	5.8	7.1	13.2	<2.0	2.5	<2.0	<2.0	<2.0	2.1	-	-	
Strontium T-Sr	-	-	-	-	-	-	-	-	-	1.67	-	-	
Thallium T-Tl	0.00028	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.20	-	-	
Tin T-Sn	0.00079	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.030	-	-	
Titanium T-Ti	0.038	<0.010	<0.010	0.014	0.019	0.014	<0.010	<0.010	<0.010	11.1	-	-	
Uranium T-U	0.00097	0.00046	0.00040	0.00277	0.00134	0.00141	0.00197	0.00187	0.00201	-	-	-	
Vanadium T-V	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	1.19	-	-	
Zinc T-Zn	0.780	0.209	0.249	0.125	0.0170	0.0083	<0.0050	0.0167	0.0164	42.1	-	-	
Organic Parameters													
Total Organic Carbon	14.7	6.25	3.94	7.42	-	-	-	-	-	-	-	-	
Dissolved Organic Carbon	-	-	-	-	0.65	0.89	0.99	-	<0.50	-	0.81	-	

- Notes:**
 "mbgs" refers to metres below ground surface.
 "<" indicates result is less than the detection limit.
 "italics" Exceeds CCME guidelines for the protection of aquatic life.
 All results are expressed as milligrams per litre except where noted.
 PZ-B GW2 is a blind duplicate of PZ-B GW1. Discussion of variances?
 1 Guideline for inorganic fluoride.
 2 Based on temperature of 10 degrees and a pH of 8.0.
 3 Based on pH between 7.5 and 8.0.
 4 Based on chloride <2 mg/L.
 5 Based on hardness between 30 and 90 mg/L.
 6 Standard for chromium (+6).
 7 Standard for chromium (+3).
 8 Based on hardness between 50 and 75 mg/L.
 9 Based on hardness between 50 and 100 mg/L.
 10 Based on hardness between 60 and 120 mg/L.
 11 Based on hardness <100 mg/L.
 12 Based on hardness <90 mg/L.