

## **Appendix D**

# **Geochemical Operational Monitoring Quarter of Record Data Tables**

Sample ID	Date	Cyanide mg/Kg	Weak Acid Dissociable CN mg/Kg	Total Solids %
Mill Tails	10/07/2012	23	1	85.7
Mill Tails A	10/07/2012	25	0.98	86.2
Mill Tails	10/09/2012	33	2.4	83.2
Mill Tails	10/11/2012	8.4	0.17	81.2
Mill Tails A	10/11/2012	7.7	0.51	81
Mill Tails	10/16/2012	110	9.3	81.3
Mill Tails A	10/16/2012	89	12	81.8
Mill Tails	10/19/2012	110	6.4	79.6
Mill Tails	10/23/2012	54	8.6	78.9
Mill Tails A	10/23/2012	53	2.9	78.3
Mill Tails	10/25/2012	48	5.6	81.8
Mill Tails	10/27/2012	35	1.2	79.2
Mill Tails	11/03/2012	110	13	85.4
Mill Tails A	11/03/2012	100	16	85.5
Mill Tails	11/03/2012	130	24	78.8
Mill Tails	11/16/2012	79	12	85.3
Mill Tails A	11/16/2012	87	19	84.1
Sp Mill Tails	11/16/2012	180	43	75.8
Sp Mill Tails A	11/16/2012	110	26	81.5
Mill tails	11/17/2012	130	34	81
Sp Mill Tails	11/17/2012	110	27	81.7
Mill Tails	11/21/2012	47	2.6	85.9
Mill Tails A	11/21/2012	60	5.8	85.5
Sp Mill Tails	11/21/2012	120	15	74
Sp Mill Tails A	11/21/2012	120	4.6	70.2
Mill Tails	11/23/2012	74	5.2	80.8
Sp Mill Tails	11/23/2012	92	8	78.1
Mill Tails	11/28/2012	3.5	0.79	83.6
Mill Tails A	11/28/2012	3.5	0.5	83.4
Sp Mill Tails	11/28/2012	4.5	1.2	80.1
Sp Mill Tails A	11/28/2012	6.8	1	80.1
Mill Tails	12/03/2012	19	3.2	87
Mill Tails A	12/03/2012	23	2.7	86.8
Mill Tails	12/14/2012	36	7.9	86.3
Mill Tails	12/15/2012	27	4.5	88.1
Mill Tails	12/19/2012	12	2.1	88.9
<b>4th Qt</b>	<b>82.1</b> average % Solids		4.255 mg/Kg WAD CN mean Oct	Compliance min = 85% solids
<b>OCT</b>	<b>81.5</b> average % Solids		13.3 mg/Kg WAD CN mean Nov	Compliance Monthly Mean = 10 mg/Kg WAD CN
<b>NOV</b>	<b>81.1</b> average % Solids		4.08 mg/Kg WAD CN mean Dec	
<b>DEC</b>	<b>87.4</b> average % Solids		Exceed 25 mg/kg MAX WAD CN	

<b>Analysis ABA</b>		Crystal Waste Rock #1	Crystal Waste Rock #2	Mystery Waste Rock #1	Mystery Waste Rock #2	Crystal Waste Rock #1	Crystal Waste Rock #2	Mystery Waste Rock #1	Mystery Waste Rock #2
Sample Date & Time		10/16/2012	10/16/2012	10/16/2012	10/16/2012	11/17/2012	11/17/2012	11/17/2012	11/17/2012
Paste pH (units)		8.37	8.31	8.82	8.64	8.22	8.2	9.81	9.43
Fizz Rate (---)		4	4	4	4	4	3	3	3
Sample weight (g)		1.99	2.03	2.05	2.06	2.03	2.04	2.02	2.04
HCl added (mL)		440	435.8	225.8	234.1	390	518.9	314.4	262
HCl (Normality)		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NaOH (Normality)		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NaOH to pH = 8.3 (mL)		68.74	64.7	64.08	63.11	148	156	56.41	51.27
Final pH (Units)		1.91	1.92	1.69	1.76	1.57	1.59	1.91	1.89
NP (t CaCO3/1000 t)		933	914	394	415	597	890	639	516
AP (t CaCO3/1000 t)		0.47	0.37	11.4	26.3	0.31	0.31	11.2	10.6
Net NP (t CaCO3/1000t)		932	914	383	389	596	890	627	506
NP/AP (ratio)		1990	2480	34.5	15.8	1920	2870	56.8	48.6
Sulphur (total) [%]		0.01	0.008	0.439	0.987	0.01	0.012	0.355	0.34
Acid Leachable SO4-S [%]		< 0.01	< 0.01	0.07	0.14	0.01	0.01	< 0.01	< 0.01
Sulphide [%]		0.02	0.01	0.37	0.84	< 0.01	< 0.01	0.36	0.34
Carbon (total) [%]		10.6	10.3	4.59	4.4	9.54	9.86	5.83	5.65
Carbonate [%]		53.9	50.7	18.4	18.7	47.5	47.3	28.4	26.9
	Mystery Mill Tails #1	Mystery Mill Tails #2	Mystery Mill Tails	Mystery Mill Tails A	Mill Tails	Mill Tails A	Mill Tails	Mill Tails A	Larox Tails
Sample Date & Time	10/08/2012	10/08/2012	10/16/2012	10/16/2012	10/27/2012	10/27/2012	11/17/2012	11/17/2012	12/14/2012
Paste pH [s.u.]	8.94	8.97	8.86	8.89	8.89	8.88	8.87	8.88	8.88
Fizz Rate	4	4	4	4	4	4	3	3	4
Sample Weight [g]	1.99	2.08	2.17	2.03	2.06	2.01	2.04	2.01	2.01
HCl added [mL]	154.3	142	185.6	175	152.2	149.2	186.3	187.9	190
HCl [Normality]	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NaOH [Normality]	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NaOH to pH= 8.3 [mL]	36.97	23.76	46.41	44.33	32.9	29.53	52.96	56.36	65.68
Final pH [s.u.]	1.75	1.96	1.68	1.68	1.82	1.81	1.64	1.63	1.58
Neutralizing Potential [t CaCO3/1000 t]	295	294	321	322	290	298	327	327	309
Acid Generating Potential [t CaCO3/1000 t]	5.71	6.87	4.32	5.11	2.72	2.2	1.25	0.94	17.5
Net NP [t CaCO3/1000 t]	289	277	316	317	287	296	326	326	292
NP/AP [ratio]	51.6	41.4	74.3	63	106	135	261	349	17.7
Sulphur (total) [%]	0.349	0.358	0.221	0.25	0.207	0.221	0.102	0.098	0.682
Acid Leachable SO4-S [%]	0.17	0.14	0.08	0.09	0.12	0.15	0.06	0.07	0.12
Sulphide [%]	0.18	0.22	0.14	0.16	0.09	0.07	0.04	0.03	0.56
Carbon (total) [%]	3.46	3.26	3.89	3.43	3.05	3.18	3.79	3.92	3.57
Carbonate [%]	14.7	13.8	17.6	16	15.6	15.6	18	17.6	16.1

Analysis MWMP	Potential Regulatory Criteria	Mystery Mill	Mystery Mill	Mystery Mill	Mystery Mill	Mill Tails	Mill Tails A	Mill Tails	Mill Tails A	Larox Tails
		Tails 1	Tails 2	Tails	Tails A					
		10/08/2012	10/08/2012	10/16/2012	10/16/2012	10/27/2012	10/27/2012	11/17/2012	11/17/2012	12/14/2012
Sample Weight [g]		5000	5000	1000	1000	1000	1000	1000	1000	1000
Volume D.I. Water [mL]		5000	5000	1000	1000	1000	1000	1000	1000	1000
Initial pH [units]		9.25	9.46	9.68	9.52	9	9.02	9.54	9.54	9.7
Final pH [units]		9.23	9.47	9.53	9.36	8.71	8.83	9.48	9.51	9.53
Volume Leachate [mL]		3240	2637	505	518	639	613	531	527	734
pH [units]	6.5-8.5	8.24	8.39	8.89	8.8	8.5	7.7	8.42	8.57	9.3
Alkalinity [mg/L as CaCO <sub>3</sub> ]		112	113	149	137	129	137	201	195	149
Bicarbonate [mg/L as CaCO <sub>3</sub> ]		112	111	127	120	118	137	196	185	92
Conductivity [µS/cm]		7320	7260	6940	7070	7340	7140	5670	5520	5670
Total Dissolved Solids [mg/L]		5040	5620	6340	5490	5510	5700	4040	4070	4350
Fluoride [mg/L]	1 mg/L	0.4	0.37	0.44	0.43	0.52	0.5	0.55	0.54	0.33
Sulphate [mg/L]	chloride and sulfate cannot exceed 250 mg/L	2700	2300	2800	2700	2400	2600	1700	1600	1800
Chloride [mg/L]		19	19	24	23	20	20	15	13	15
Nitrite (as N) [mg/L]	1 mg/L	< 0.6	< 0.6	1.34	1.33	1.71	1.66	< 0.06	< 0.06	1.09
Nitrate (as N) [mg/L]	10 mg/L	26.1	25.5	36	35.2	44.4	43.8	41	39.3	34.5
Cyanide (WAD) [mg/L]	0.0052 mg/L	0.04	0.08	69.8	40.3	6.95	8.76	104	112	0.04
Mercury [mg/L]	0.00005 mg/L	0.0039	0.0033	0.00542	0.0062	0.03577	0.03653	0.00855	0.00826	0.00067
Silver [mg/L]	0.00087 mg/L*	0.00471	0.00487	0.00326	0.125	0.0446	0.0443	0.014	0.0234	0.0109
Aluminum [mg/L]	0.087 mg/L*	0.02	0.03	0.04	0.04	0.01	0.02	0.06	0.06	0.06
Arsenic [mg/L]	0.010 mg/L	0.1	0.106	0.0743	0.0678	0.0465	0.0483	0.0584	0.0594	0.216
Boron [mg/L]		0.577	0.571	0.511	0.511	0.579	0.546	1.75	1.85	1.2
Beryllium [mg/L]		< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Bismuth [mg/L]		< 0.00001	< 0.00001	< 0.00001	0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00007
Calcium [mg/L]		238	252	280	280	206	196	139	140	93.8
Cadmium [mg/L]	0.00014 mg/L*	< 0.000003	< 0.000003	0.000068	0.000065	0.000092	0.000089	0.000077	0.000085	< 0.000003
Chromium [mg/L]	0.1 mg/L	0.0022	0.0026	0.0009	0.0009	< 0.0005	0.0006	0.0049	0.0046	0.0014
Copper [mg/L]	0.00451 mg/L*	0.0782	0.0764	64.6	55.1	14.9	18.3	96.5	119	0.0144
Iron [mg/L]	1 mg/L	0.054	0.065	0.023	0.043	0.018	0.014	0.018	0.033	0.085
Potassium [mg/L]		36.2	37.7	41.3	41.4	46	43.5	25.3	25.3	42.7
Magnesium [mg/L]		5.8	4.6	4.24	6.02	13.5	12.4	5.69	5.7	1.99
Manganese [mg/L]	0.05 mg/L*	0.0089	0.00423	0.00341	0.00316	0.122	0.108	0.00324	0.00283	0.00122
Sodium [mg/L]		1700	1620	1690	1650	1750	1770	1270	1160	1250
Nickel [mg/L]	0.02639 mg/L*	0.0018	0.0018	0.0713	0.1	0.0018	0.0017	0.434	0.447	0.0024
Lead [mg/L]	0.00104 mg/L*	< 0.00002	< 0.00002	0.00035	< 0.00002	0.00039	< 0.00002	0.00011	0.00008	0.00003
Antimony [mg/L]	0.006 mg/L	0.0131	0.0129	0.0104	0.0095	0.0082	0.0079	0.009	0.0093	0.0365
Selenium [mg/L]	0.0046 mg/L*	0.008	0.009	0.023	0.029	0.017	0.017	0.008	0.008	0.011
Thallium [mg/L]		0.00102	0.00091	0.00127	0.00133	0.00254	0.00231	0.00092	0.0009	0.00054
Zinc [mg/L]	0.05989 mg/L*	0.009	0.008	0.002	0.002	0.006	0.004	0.002	0.002	0.002

		Crystal Waste Rock #1	Crystal Waste Rock #2	Mystery Waste Rock #1	Mystery Waste Rock #2	Crystal Waste Rock #1	Crystal Waste Rock #2	Mystery Waste Rock #1	Mystery Waste Rock #2
<b>Analysis ABA</b>									
Sample Date & Time		10/16/2012	10/16/2012	10/16/2012	10/16/2012	11/17/2012	11/17/2012	11/17/2012	11/17/2012
Paste pH (units)		8.37	8.31	8.82	8.64	8.22	8.2	9.81	9.43
Fizz Rate (---)		4	4	4	4	4	3	3	3
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NaOH (Normality)		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NaOH to pH = 8.3 (mL)		68.74	64.7	64.08	63.11	148	156	56.41	51.27
Final pH (Units)		1.91	1.92	1.69	1.76	1.57	1.59	1.91	1.89
NP (t CaCO3/1000 t)		933	914	394	415	597	890	639	516
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Acid Leachable SO4-S [%]		< 0.01	< 0.01	0.07	0.14	0.01	0.01	< 0.01	< 0.01
Sulphide [%]		0.02	0.01	0.37	0.84	< 0.01	< 0.01	0.36	0.34
Carbon (total) [%]		10.6	10.3	4.59	4.4	9.54	9.86	5.83	5.65
Carbonate [%]		53.9	50.7	18.4	18.7	47.5	47.3	28.4	26.9
	Mystery Mill Tails #1	Mystery Mill Tails #2	Mystery Mill Tails	Mystery Mill Tails A	Mill Tails	Mill Tails A	Mill Tails	Mill Tails A	Larox Tails
Sample Date & Time	10/08/2012	10/08/2012	10/16/2012	10/16/2012	10/27/2012	10/27/2012	11/17/2012	11/17/2012	12/14/2012
Paste pH [s.u.]	8.94	8.97	8.86	8.89	8.89	8.88	8.87	8.88	8.88
Fizz Rate	4	4	4	4	4	4	3	3	4
Sample Weight [g]	1.99	2.08	2.17	2.03	2.06	2.01	2.04	2.01	2.01
HCl added [mL]	154.3	142	185.6	175	152.2	149.2	186.3	187.9	190
HCl [Normality]	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NaOH [Normality]	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NaOH to pH= 8.3 [mL]	36.97	23.76	46.41	44.33	32.9	29.53	52.96	56.36	65.68
Final pH [s.u.]	1.75	1.96	1.68	1.68	1.82	1.81	1.64	1.63	1.58
Neutralizing Potential [t CaCO3/1000 t]	295	294	321	322	290	298	327	327	309
Acid Generating Potential [t CaCO3/1000 t]	5.71	6.87	4.32	5.11	2.72	2.2	1.25	0.94	17.5
Net NP [t CaCO3/1000 t]	289	277	316	317	287	296	326	326	292
NP/AP [ratio]	51.6	41.4	74.3	63	106	135	261	349	17.7
Sulphur (total) [%]	0.349	0.358	0.221	0.25	0.207	0.221	0.102	0.098	0.682
Acid Leachable SO4-S [%]	0.17	0.14	0.08	0.09	0.12	0.15	0.06	0.07	0.12
Sulphide [%]	0.18	0.22	0.14	0.16	0.09	0.07	0.04	0.03	0.56
Carbon (total) [%]	3.46	3.26	3.89	3.43	3.05	3.18	3.79	3.92	3.57
Carbonate [%]	14.7	13.8	17.6	16	15.6	15.6	18	17.6	16.1