
Final Environmental Impact Statement
Thacker Pass Lithium Mine Project

Appendix P, Part 6 of 8

Water Information

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APPENDIX F

Tabulated stage / lithology areas for sub-pits

Pit Wall Surface Area (ft2)									
Stage (ft)	Ash (Non-PAG)	Basalt	Claystone (Non-PAG)	Claystone (PAG)	HPZ	Qal	Tuff (Non-PAG)	Total (ft2)	
4757.4	0	9547	51204	0	174772	0	0	235523	
4773.6	0	13657	362094	0	360115	0	0	735866	
4790.0	0	17757	538553	0	598533	0	0	1154844	
4806.4	0	21059	678205	0	886449	0	0	1585713	
4822.8	517	23457	826948	0	1119773	0	0	1970695	
4839.2	41820	25774	1691970	0	1332936	0	0	3092500	
4855.6	94310	29712	2131270	228	1494414	0	0	3749934	
4872.0	152284	40441	2928026	228	1679388	0	0	4800367	
4888.5	165450	49636	3337328	228	1822920	0	0	5375563	
4904.9	167855	51243	3611754	228	1934786	0	0	5765866	
4921.3	167855	55755	3766405	228	1989176	0	0	5979419	
4937.7	167855	61179	4137669	228	2079147	0	0	6446078	
4954.1	176281	63866	4530697	228	2145604	0	0	6916675	
4970.5	441758	65482	4826046	228	2210672	0	0	7544186	
4986.9	639668	67178	5730567	228	2494240	0	0	8931880	
5003.3	650544	69448	6608184	228	2633830	0	0	9962234	
5019.7	650544	71724	7015521	228	2633830	422	0	10372269	
5036.1	650544	75438	7282087	228	2633830	5780	0	10647908	
5052.5	650544	87766	7455430	228	2633830	37483	0	10865282	
5068.9	650544	101708	7604015	228	2633830	66525	0	11056851	
5085.3	650544	109049	7749732	228	2633830	92432	0	11235816	
5101.7	650544	109049	7877238	228	2633830	122080	0	11392970	
5118.1	650544	109049	8036083	228	2633830	145725	0	11575460	
5134.5	650544	109049	8167960	228	2633830	185438	0	11747050	
5150.9	650544	109049	8222268	228	2633830	249759	0	11865679	
5167.3	650544	109049	8245232	228	2633830	339652	0	11978536	
5183.7	650544	109049	8249907	228	2633830	430965	0	12074523	
5200.1	650544	109049	8250076	228	2633830	508081	0	12151809	
5216.5	650544	109049	8250076	228	2633830	577576	0	12221303	
5232.9	650544	109049	8250076	228	2633830	1129112	0	12772839	

[illegible]

Submergence %									
Elevation (ft)	Ash (Non-PAG)	Basalt	Claystone (Non-PAG)	Claystone (PAG)	HPZ	Qal	Tuff (Non-PAG)	Sum	
4757.4	0.0%	4.1%	21.7%	0.0%	74.2%	0.0%	0.0%	100.0%	
4773.6	0.0%	1.9%	49.2%	0.0%	48.9%	0.0%	0.0%	100.0%	
4790.0	0.0%	1.5%	46.6%	0.0%	51.8%	0.0%	0.0%	100.0%	
4806.4	0.0%	1.3%	42.8%	0.0%	55.9%	0.0%	0.0%	100.0%	
4822.8	0.0%	1.2%	42.0%	0.0%	56.8%	0.0%	0.0%	100.0%	
4839.2	1.4%	0.8%	54.7%	0.0%	43.1%	0.0%	0.0%	100.0%	
4855.6	2.5%	0.8%	56.8%	0.0%	39.9%	0.0%	0.0%	100.0%	
4872.0	3.2%	0.8%	61.0%	0.0%	35.0%	0.0%	0.0%	100.0%	
4888.5	3.1%	0.9%	62.1%	0.0%	33.9%	0.0%	0.0%	100.0%	
4904.9	2.9%	0.9%	62.6%	0.0%	33.6%	0.0%	0.0%	100.0%	
4921.3	2.8%	0.9%	63.0%	0.0%	33.3%	0.0%	0.0%	100.0%	
4937.7	2.6%	0.9%	64.2%	0.0%	32.3%	0.0%	0.0%	100.0%	
4954.1	2.5%	0.9%	65.5%	0.0%	31.0%	0.0%	0.0%	100.0%	
4970.5	5.9%	0.9%	64.0%	0.0%	29.3%	0.0%	0.0%	100.0%	
4986.9	7.2%	0.8%	64.2%	0.0%	27.9%	0.0%	0.0%	100.0%	
5003.3	6.5%	0.7%	66.3%	0.0%	26.4%	0.0%	0.0%	100.0%	
5019.7	6.3%	0.7%	67.6%	0.0%	25.4%	0.0%	0.0%	100.0%	
5036.1	6.1%	0.7%	68.4%	0.0%	24.7%	0.1%	0.0%	100.0%	
5052.5	6.0%	0.8%	68.6%	0.0%	24.2%	0.3%	0.0%	100.0%	
5068.9	5.9%	0.9%	68.8%	0.0%	23.8%	0.6%	0.0%	100.0%	
5085.3	5.8%	1.0%	69.0%	0.0%	23.4%	0.8%	0.0%	100.0%	
5101.7	5.7%	1.0%	69.1%	0.0%	23.1%	1.1%	0.0%	100.0%	
5118.1	5.6%	0.9%	69.4%	0.0%	22.8%	1.3%	0.0%	100.0%	
5134.5	5.5%	0.9%	69.5%	0.0%	22.4%	1.6%	0.0%	100.0%	
5150.9	5.5%	0.9%	69.3%	0.0%	22.2%	2.1%	0.0%	100.0%	
5167.3	5.4%	0.9%	68.8%	0.0%	22.0%	2.8%	0.0%	100.0%	
5183.7	5.4%	0.9%	68.3%	0.0%	21.8%	3.6%	0.0%	100.0%	
5200.1	5.4%	0.9%	67.9%	0.0%	21.7%	4.2%	0.0%	100.0%	
5216.5	5.3%	0.9%	67.5%	0.0%	21.6%	4.7%	0.0%	100.0%	
5232.9	5.1%	0.9%	64.6%	0.0%	20.6%	8.8%	0.0%	100.0%	

Pit Wall Surface Area (ft2)									
Stage (ft)	Ash (Non-PAG)	Ash (PAG)	Claystone (Non-PAG)	Claystone (PAG)	HPZ	Qal	Tuff (Non-PAG)	Tuff (PAG)	Total (ft2)
4772.6	0	0	77806	0	21962	0	0	0	99768
4790.0	46877	0	118464	0	62565	0	0	0	227907
4806.4	80813	0	309030	0	231261	0	2151	0	623255
4822.8	91286	0	690086	0	374592	0	8170	0	1164134
4839.2	97568	554	2239681	0	992017	0	15085	0	3344904
4855.6	103581	554	2847620	0	1325044	0	43546	0	4320344
4872.0	111623	554	3654393	0	1691382	0	86695	446	5545092
4888.5	238500	554	4711024	0	1851011	0	188423	446	6989958
4904.9	374495	554	5492514	0	2758251	0	275913	446	8902173
4921.3	453965	554	6600657	0	3189604	0	375088	446	10620314
4937.7	652978	554	7539556	0	3763411	0	561091	446	12518035
4954.1	832563	554	8601327	0	3893685	0	713375	446	14041951
4970.5	1042350	4000	9384426	0	3926548	0	932153	6591	15296068
4986.9	1337251	4335	10106996	0	3934226	0	1103704	11882	16498393
5003.3	1409538	6035	10662344	603	3934226	0	1248636	11882	17273263
5019.7	1446976	6035	11143175	603	3934226	0	1414907	11882	17957803
5036.1	1494597	6035	11590498	603	3934226	2431	1585804	11882	18626075
5052.5	1533588	7284	11922751	603	3934226	15115	1715431	19945	19148942
5068.9	1554849	8875	12208178	1053	3934226	40382	1775661	34884	19558108
5085.3	1562934	8875	12462058	2416	3934226	80253	1823919	46320	19921002
5101.7	1573210	8875	12733004	3696	3934226	98197	1902894	64783	20318885
5118.1	1581498	8875	12973033	4381	3934226	105012	1985732	75009	20667766
5134.5	1581837	8875	13127130	4381	3934226	111420	2024926	93415	20886212
5150.9	1583148	8875	13273808	4768	3934226	119675	2058692	108242	21091434
5167.3	1589318	8979	13403843	14381	3934226	135712	2091175	119976	21297610
5183.7	1599350	14439	13513774	40881	3934226	150220	2116925	128982	21498797
5200.1	1624343	17679	13604986	111818	3934226	166583	2124689	143274	21727598
5216.5	1657450	36100	13699156	184318	3934226	188450	2136310	168959	22004969
5232.9	1687706	48816	13845115	222584	3934226	307609	2158344	179112	22383512

Appendix F. Tabulated Stage / Lithology Areas

West Sub-Pit

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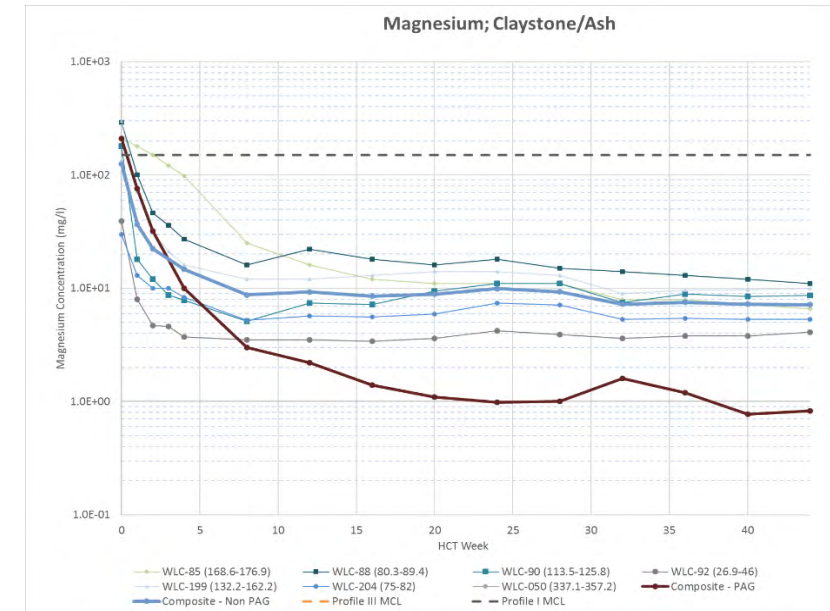
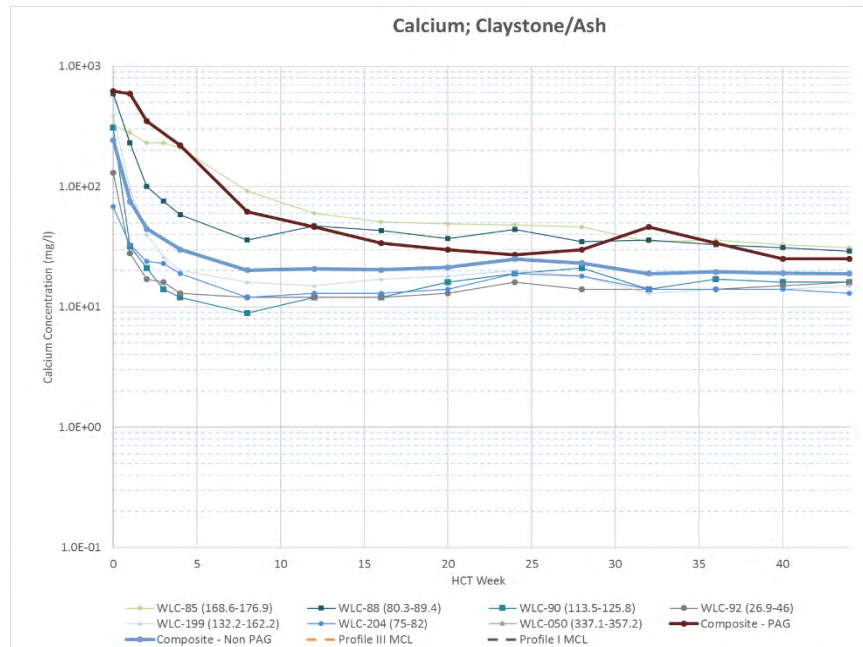
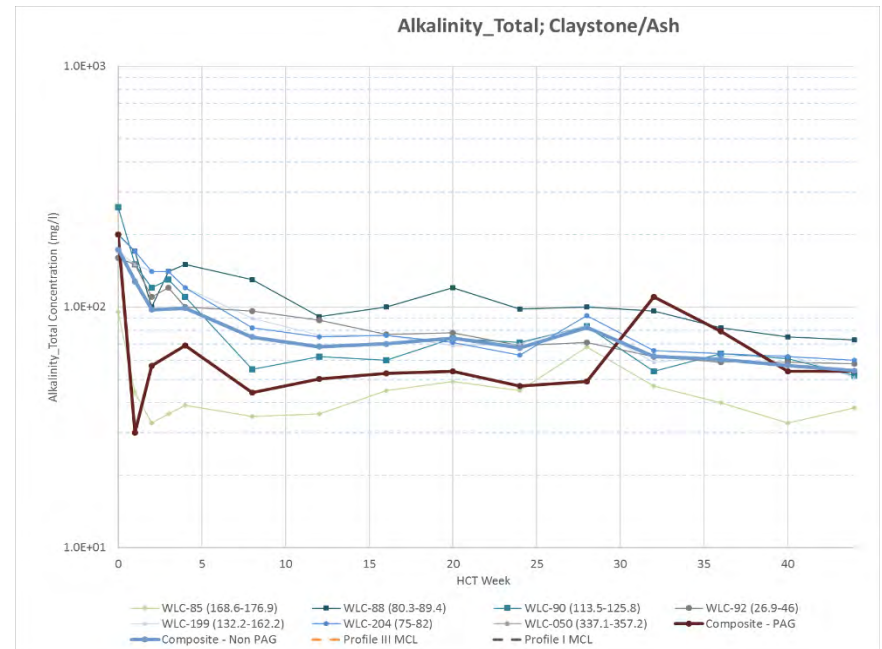
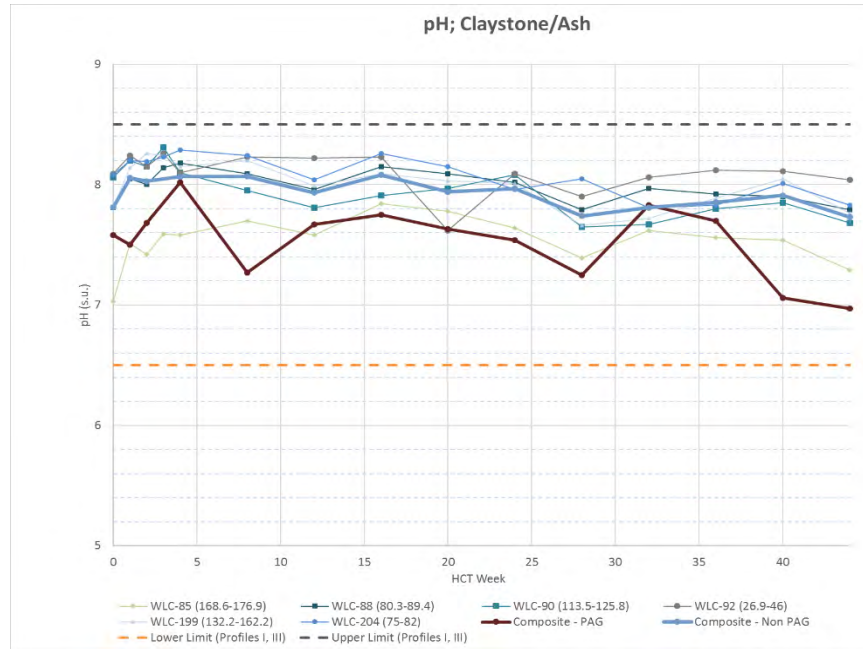
Pit Wall Surface Area (ft ²)									
Stage (ft)	Ash (Non-PAG)	Basalt	Claystone (Non-PAG)	Claystone (PAG)	HPZ	Qal	Tuff (PAG)	Tuff (Non-PAG)	Total (ft2)
4593.0	0	0	414632	0	0	0	0	0	414632
4609.6	0	0	560963	0	0	0	0	0	560963
4626.0	0	0	673280	0	0	0	0	0	673280
4642.4	0	0	919347	0	354	0	0	0	919701
4658.8	197	0	1192229	0	612	0	0	0	1193039
4675.2	4571	0	1730537	0	612	0	0	0	1735720
4691.6	9432	0	2440469	0	612	0	0	0	2450514
4708.0	9432	2511	3016071	2357	612	0	0	0	3030984
4724.4	49020	27588	3739131	18736	612	0	0	0	3835088
4740.8	53152	44096	4318451	18736	612	0	0	0	4435048
4757.2	53751	72898	5085274	24696	612	0	0	0	5237231
4773.6	92415	87049	6053821	25770	44553	0	0	0	6303607
4790.0	156197	103358	6928272	25770	86464	0	0	0	7300060
4806.4	182243	141350	7652620	25770	167539	0	0	0	8169523
4822.8	197011	224362	8087122	25770	238449	0	0	0	8772713
4839.2	209635	319274	8530079	25770	340147	0	0	0	9424904
4855.6	220874	406051	8921440	25770	384752	3554	0	10683	9973124
4872.0	229299	493656	9406061	25770	444829	24387	0	64786	10688788
4888.5	231842	607821	9978134	25770	533701	87301	0	114249	11578817
4904.9	234158	717789	10251970	25770	582956	115809	0	126712	12055164
4921.3	236006	833529	10458399	25770	616495	148567	0	143938	12462704
4937.7	238628	945865	10651813	25770	616495	184769	0	169220	12832559
4954.1	238949	1019169	11015213	25770	616495	236245	0	183847	13335687
4970.5	259590	1084940	11357010	25770	616495	325218	0	185029	13854052
4986.9	293363	1150739	11605972	25770	616495	424883	0	185029	14302252
5003.3	323738	1211817	11710968	25770	616495	457806	0	185029	14531623
5019.7	335146	1213816	11778958	25770	616495	496164	0	185029	14651379
5036.1	338405	1213816	11813699	25770	616495	547539	0	185029	14740753
5052.5	338405	1213816	11813893	25770	616495	573981	0	185029	14767390

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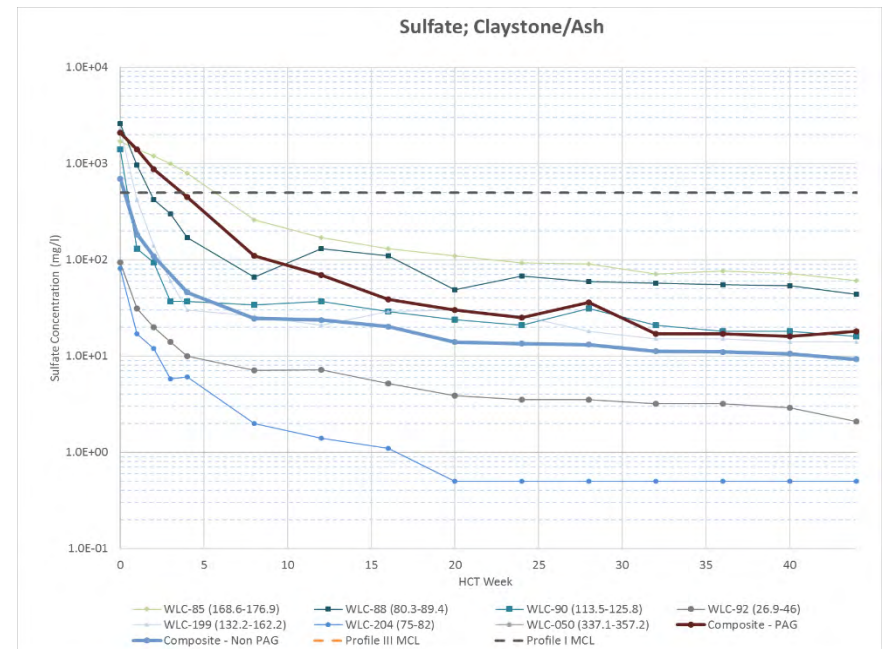
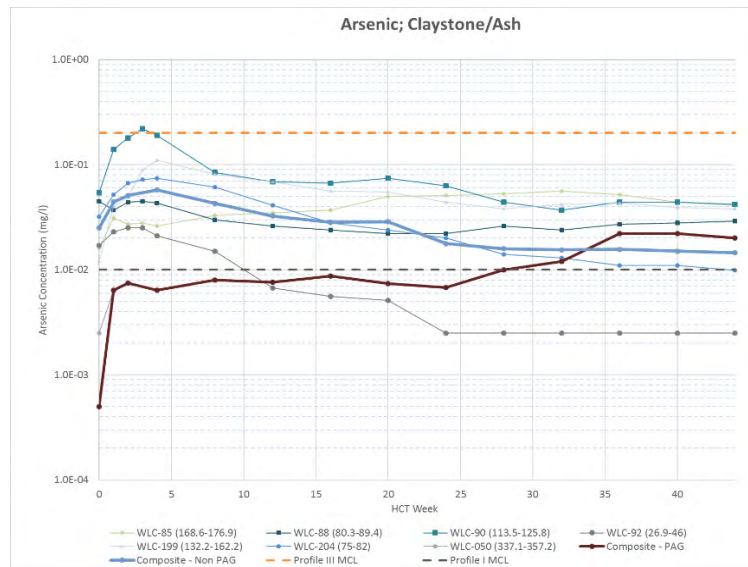
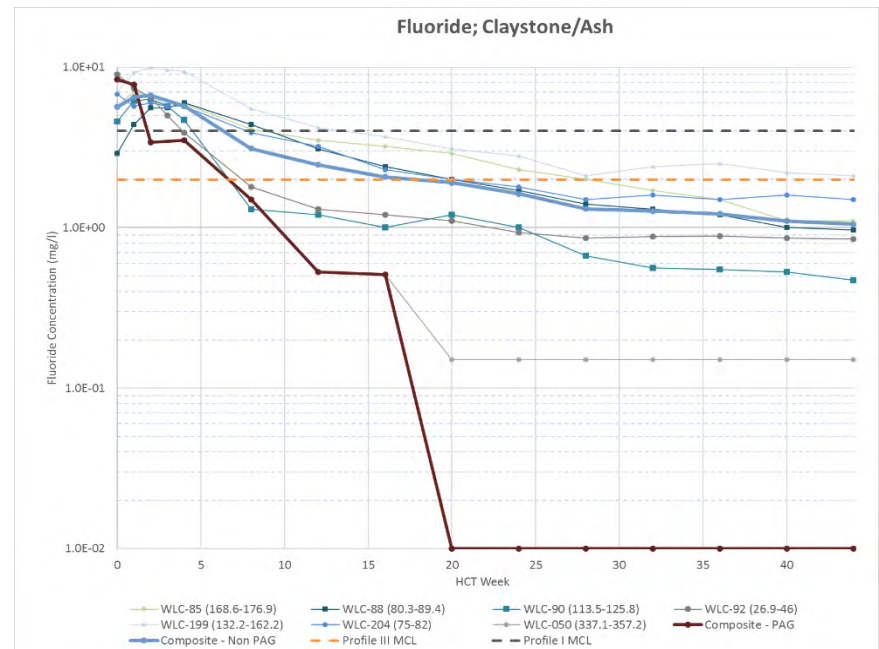
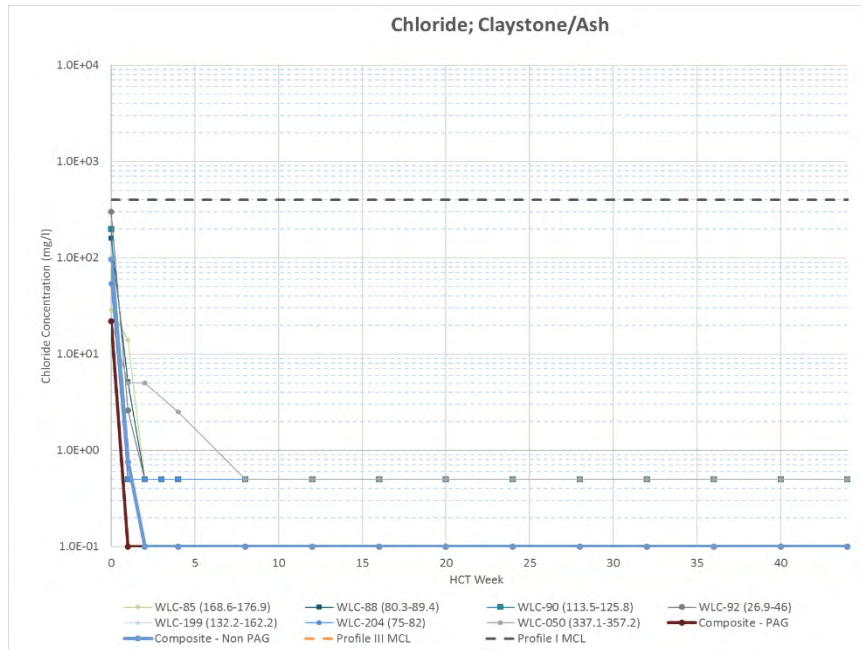
Submergence %									
Elevation (ft)	Ash (Non-PAG)	Basalt	Claystone (Non-PAG)	Claystone (PAG)	HPZ	Qal	Tuff (PAG)	Tuff (Non-PAG)	Sum
4593.0	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
4609.6	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
4626.0	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
4642.4	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
4658.8	0.0%	0.0%	99.9%	0.0%	0.1%	0.0%	0.0%	0.0%	100%
4675.2	0.3%	0.0%	99.7%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
4691.6	0.4%	0.0%	99.6%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
4708.0	0.3%	0.1%	99.5%	0.1%	0.0%	0.0%	0.0%	0.0%	100%
4724.4	1.3%	0.7%	97.5%	0.5%	0.0%	0.0%	0.0%	0.0%	100%
4740.8	1.2%	1.0%	97.4%	0.4%	0.0%	0.0%	0.0%	0.0%	100%
4757.2	1.0%	1.4%	97.1%	0.5%	0.0%	0.0%	0.0%	0.0%	100%
4773.6	1.5%	1.4%	96.0%	0.4%	0.7%	0.0%	0.0%	0.0%	100%
4790.0	2.1%	1.4%	94.9%	0.4%	1.2%	0.0%	0.0%	0.0%	100%
4806.4	2.2%	1.7%	93.7%	0.3%	2.1%	0.0%	0.0%	0.0%	100%
4822.8	2.2%	2.6%	92.2%	0.3%	2.7%	0.0%	0.0%	0.0%	100%
4839.2	2.2%	3.4%	90.5%	0.3%	3.6%	0.0%	0.0%	0.0%	100%
4855.6	2.2%	4.1%	89.5%	0.3%	3.9%	0.0%	0.0%	0.1%	100%
4872.0	2.1%	4.6%	88.0%	0.2%	4.2%	0.2%	0.0%	0.6%	100%
4888.5	2.0%	5.2%	86.2%	0.2%	4.6%	0.8%	0.0%	1.0%	100%
4904.9	1.9%	6.0%	85.0%	0.2%	4.8%	1.0%	0.0%	1.1%	100%
4921.3	1.9%	6.7%	83.9%	0.2%	4.9%	1.2%	0.0%	1.2%	100%
4937.7	1.9%	7.4%	83.0%	0.2%	4.8%	1.4%	0.0%	1.3%	100%
4954.1	1.8%	7.6%	82.6%	0.2%	4.6%	1.8%	0.0%	1.4%	100%
4970.5	1.9%	7.8%	82.0%	0.2%	4.4%	2.3%	0.0%	1.3%	100%
4986.9	2.1%	8.0%	81.1%	0.2%	4.3%	3.0%	0.0%	1.3%	100%
5003.3	2.2%	8.3%	80.6%	0.2%	4.2%	3.2%	0.0%	1.3%	100%
5019.7	2.3%	8.3%	80.4%	0.2%	4.2%	3.4%	0.0%	1.3%	100%
5036.1	2.3%	8.2%	80.1%	0.2%	4.2%	3.7%	0.0%	1.3%	100%
5052.5	2.3%	8.2%	80.0%	0.2%	4.2%	3.9%	0.0%	1.3%	100%

APPENDIX G
Graphical HCT leachate concentrations through testing

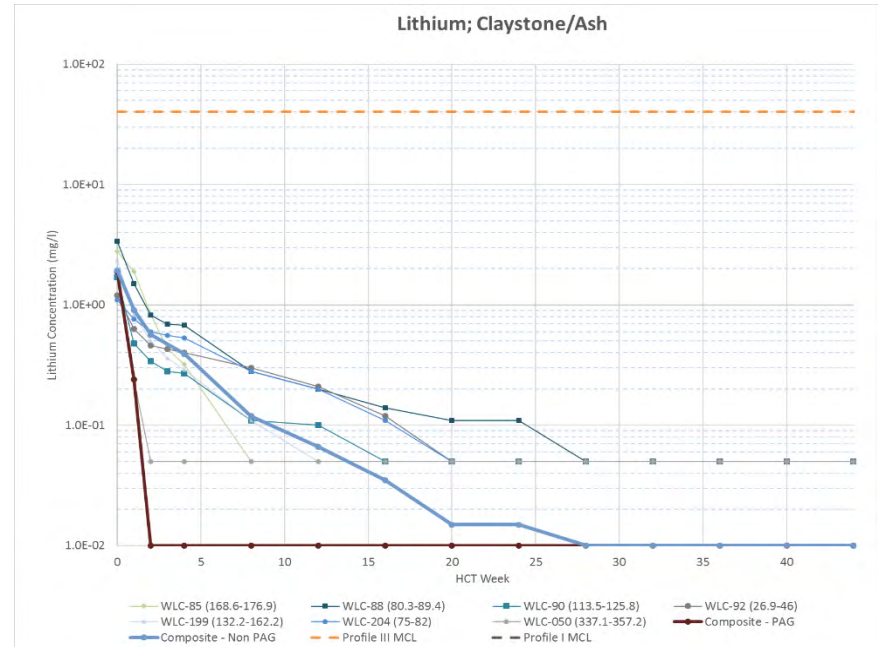
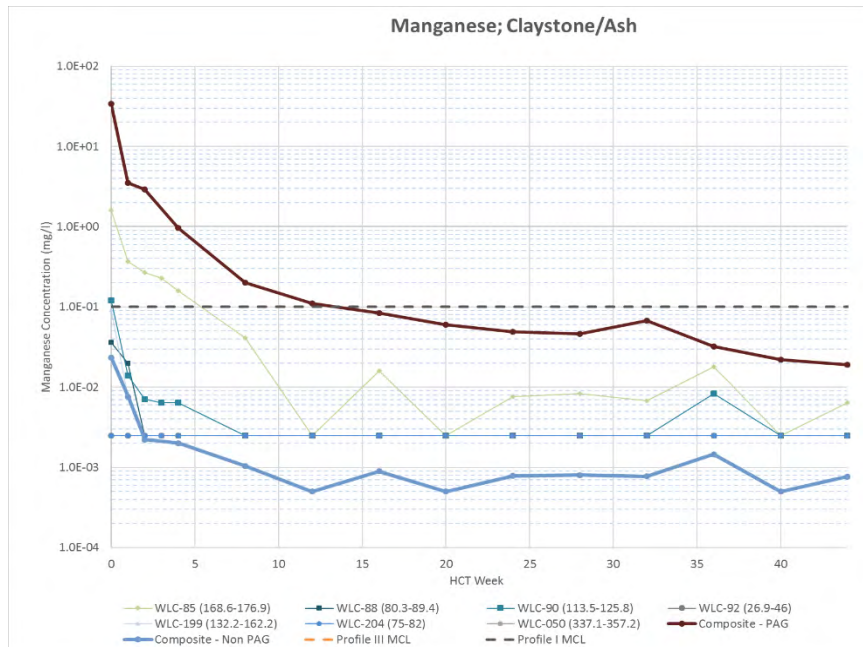
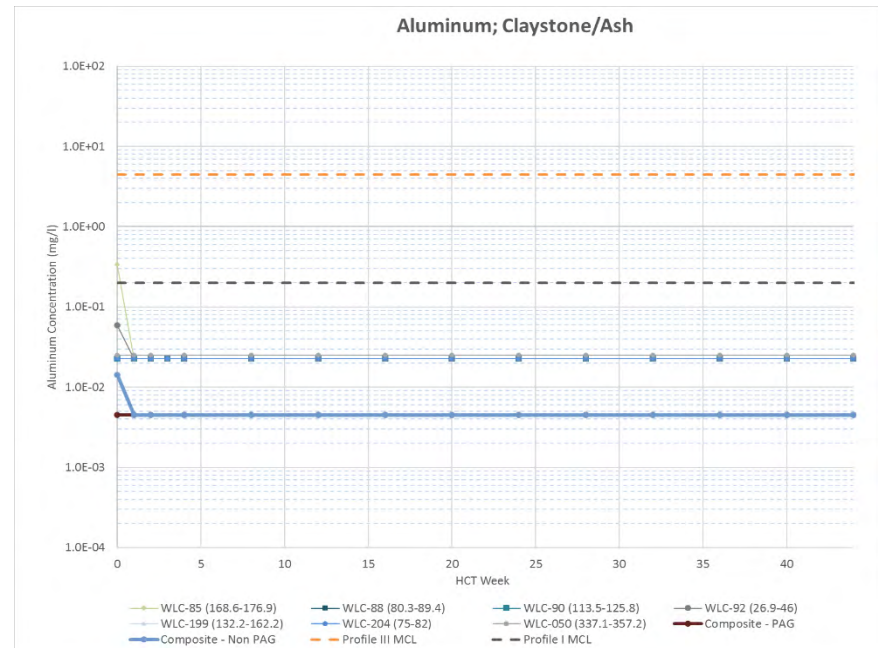
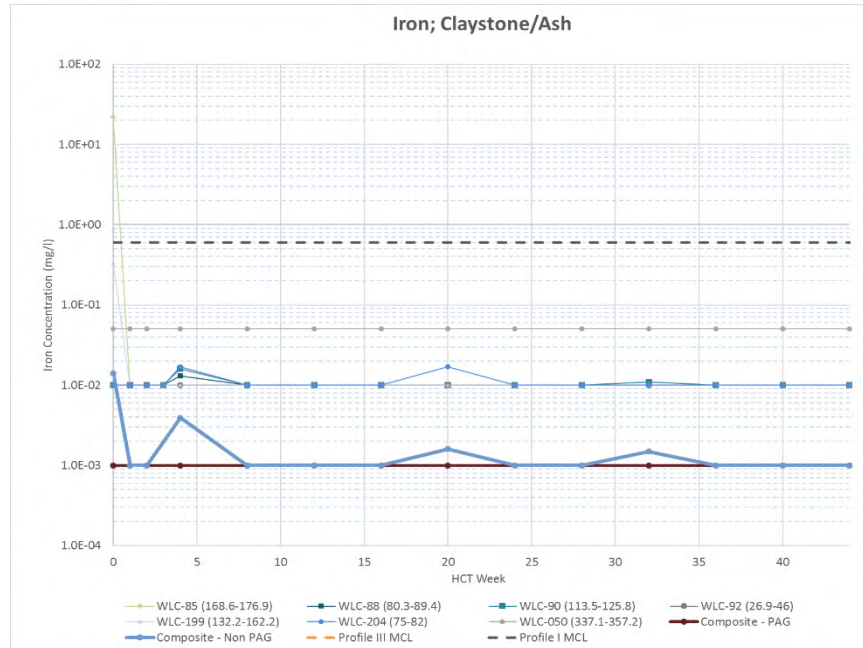
Appendix G. Graphical HCT leachate concentrations through testing



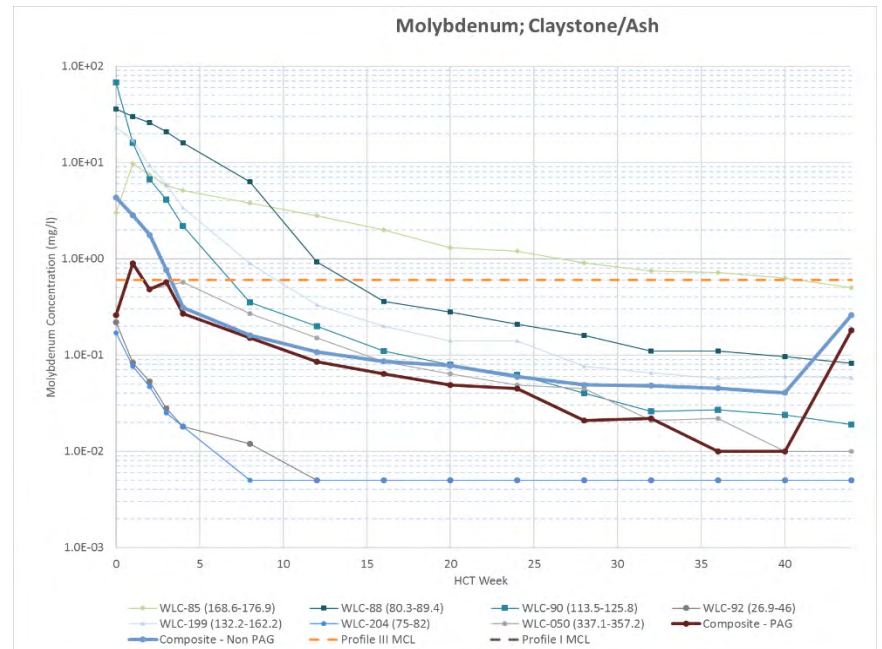
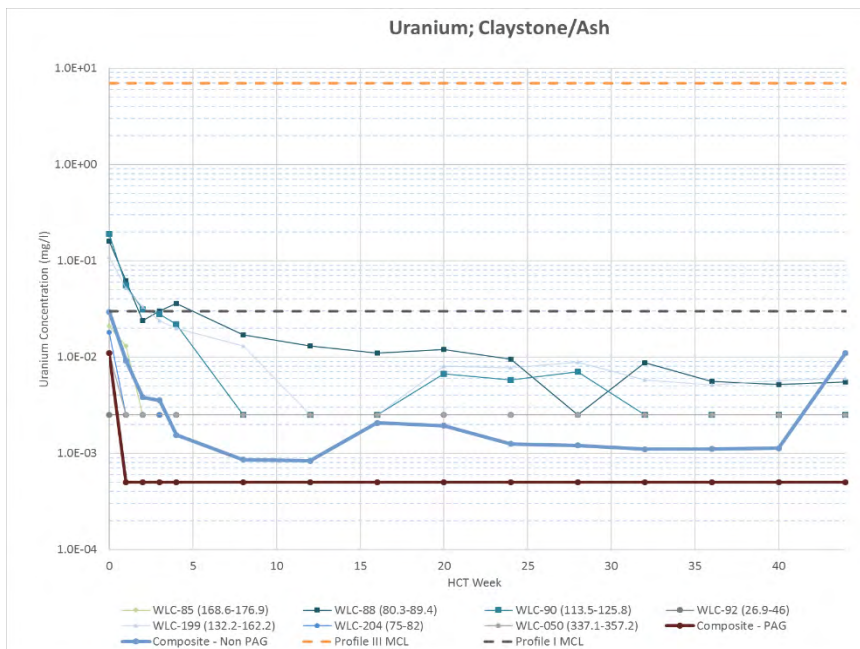
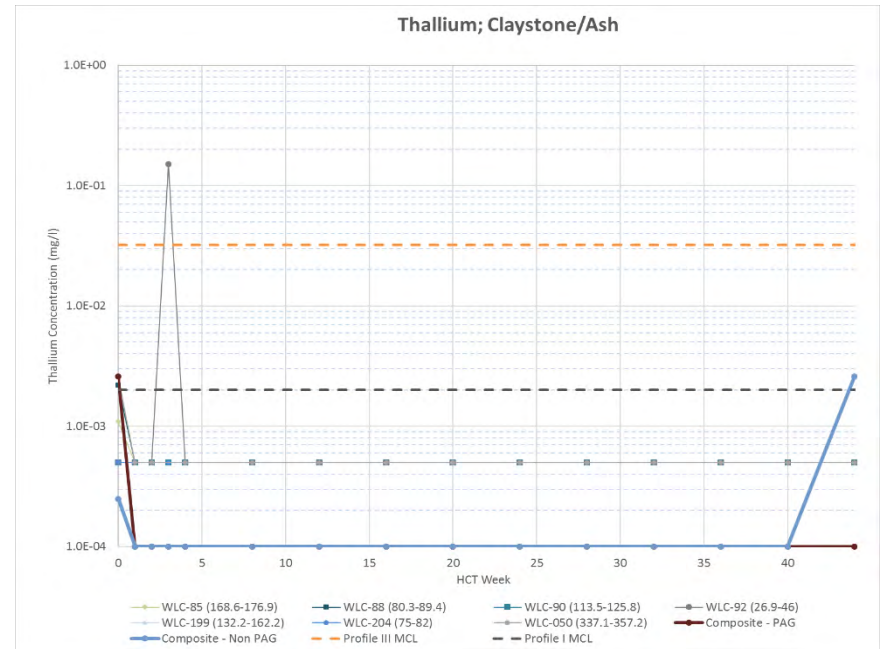
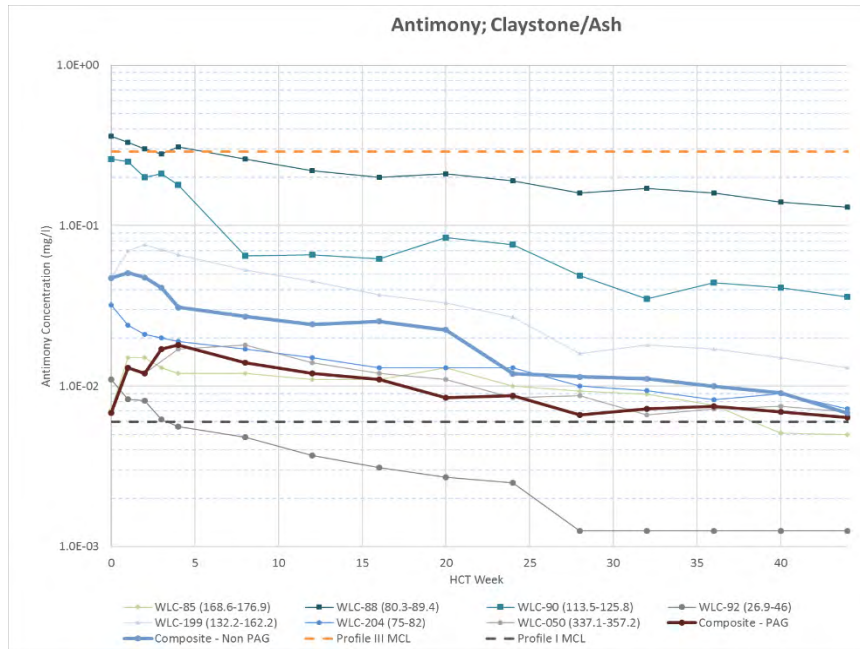
Appendix G. Graphical HCT leachate concentrations through testing



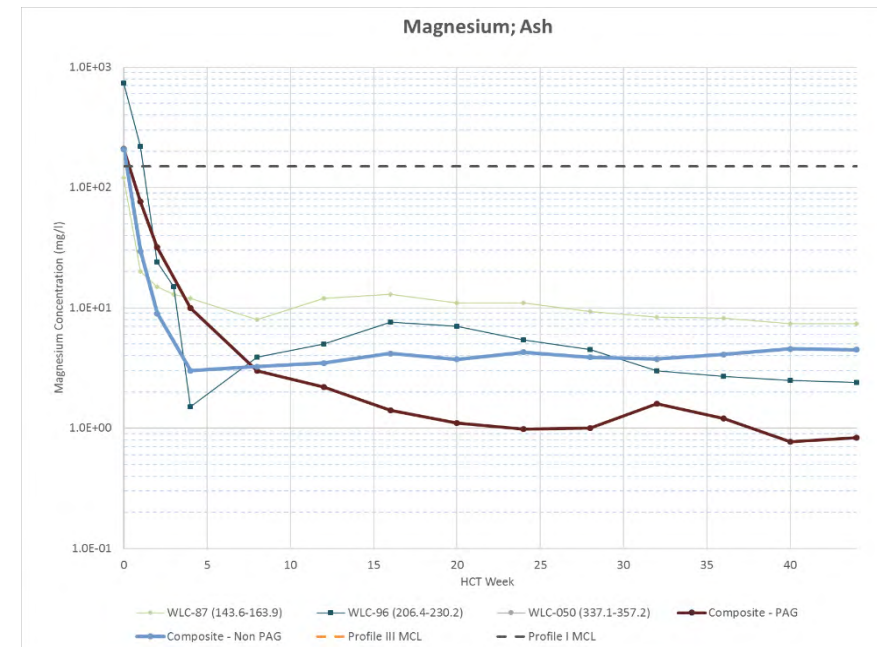
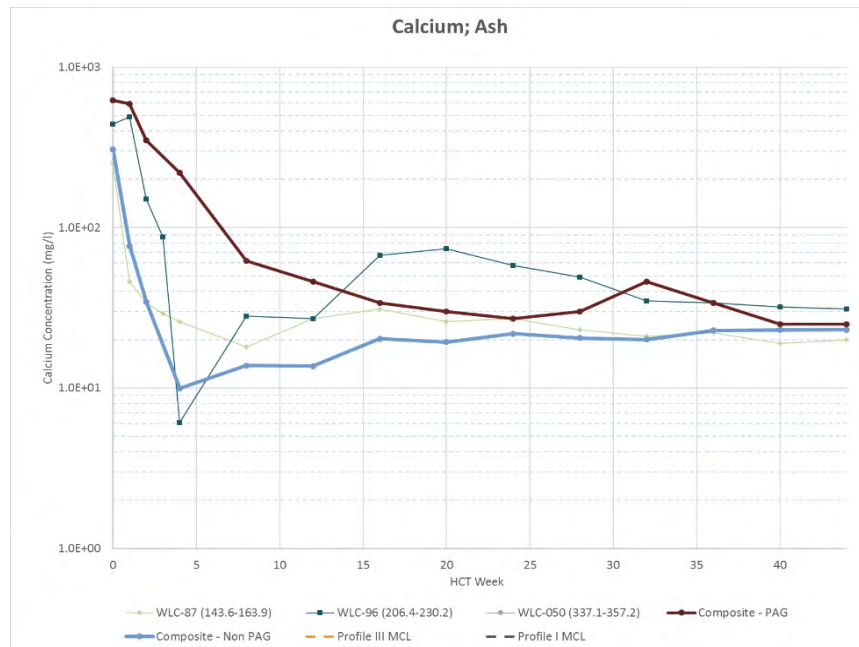
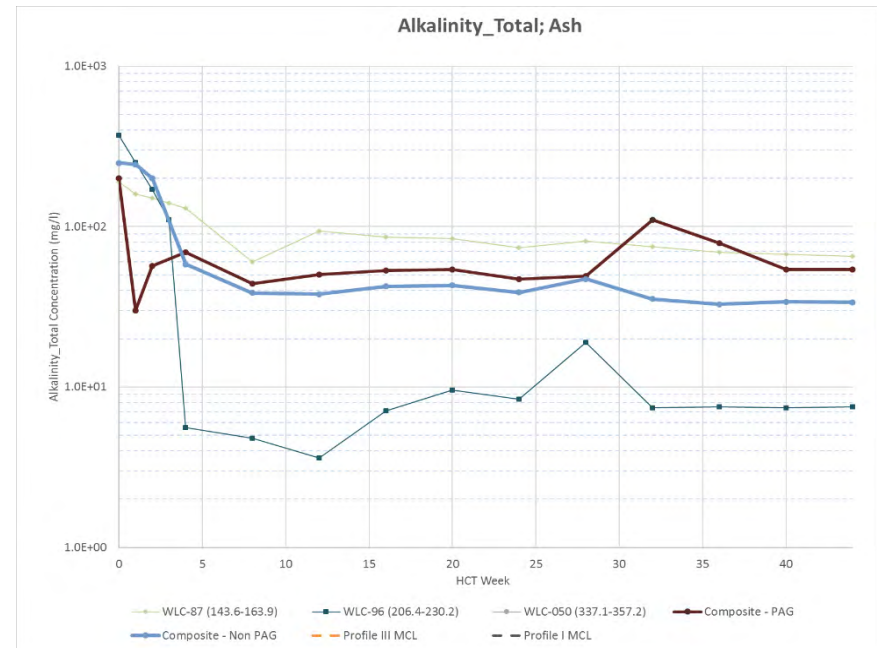
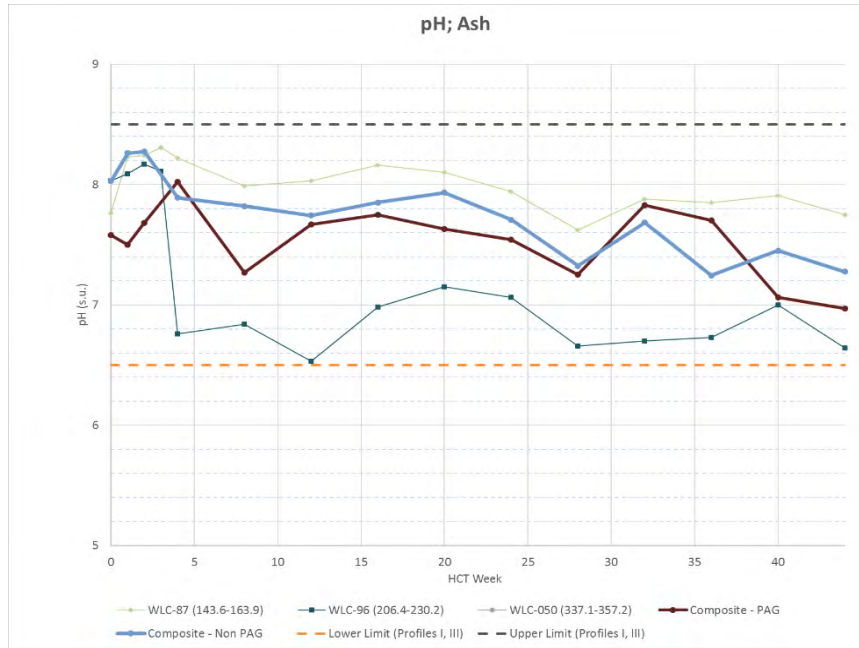
Appendix G. Graphical HCT leachate concentrations through testing



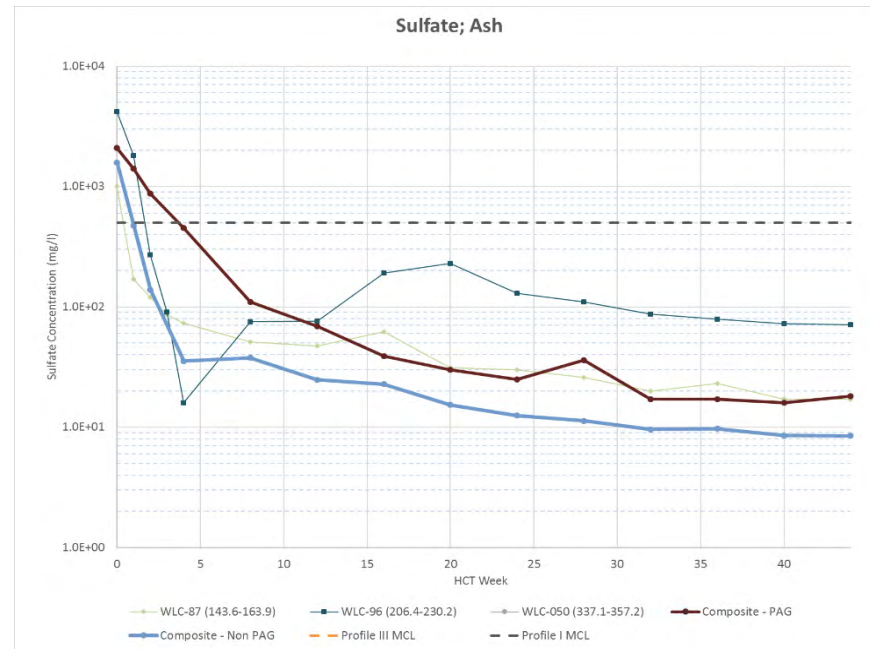
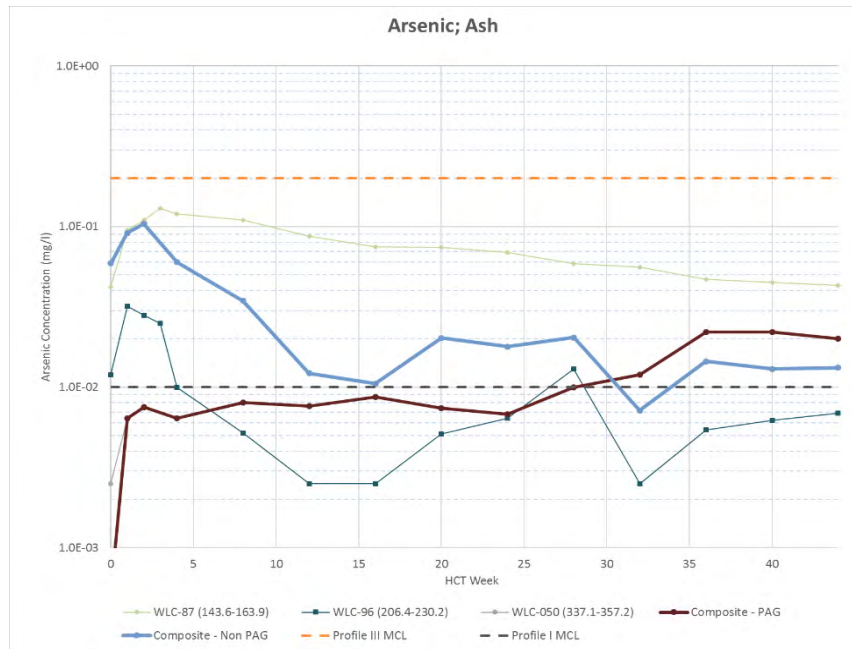
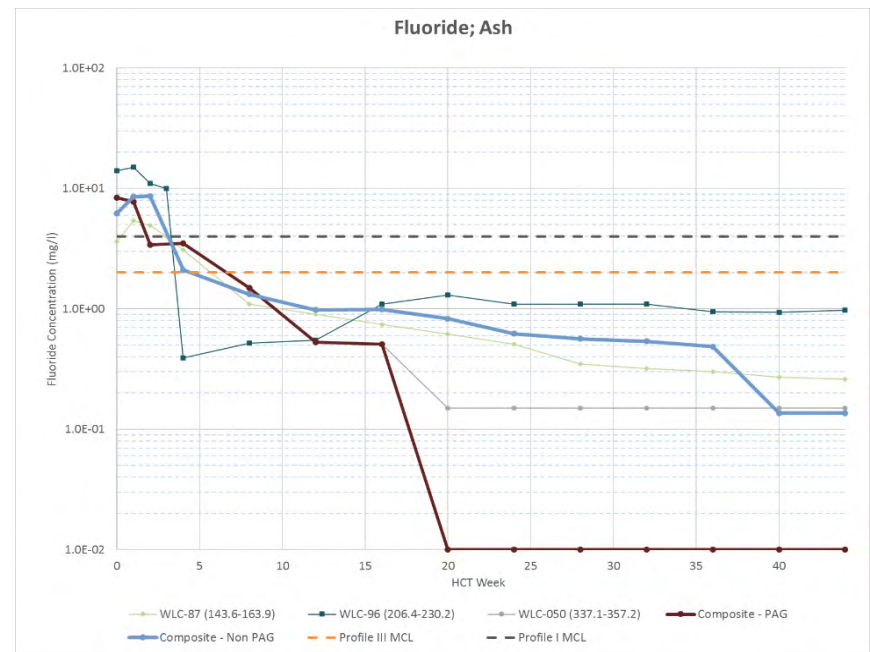
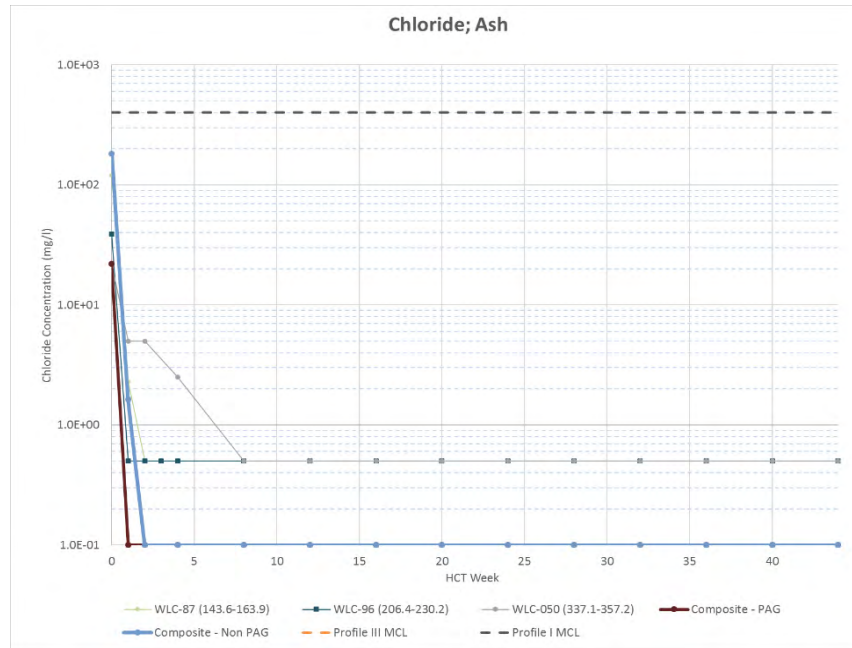
Appendix G. Graphical HCT leachate concentrations through testing



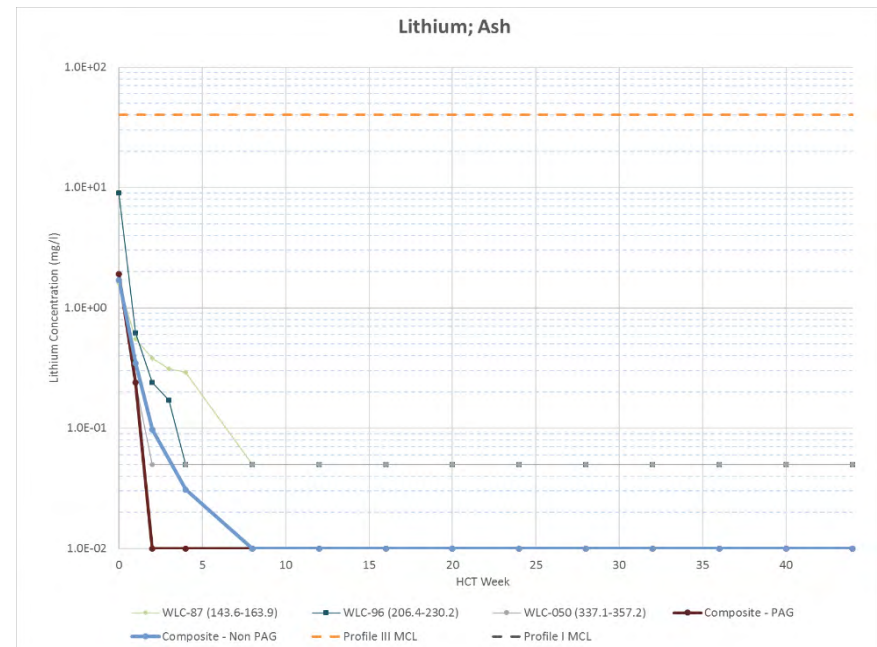
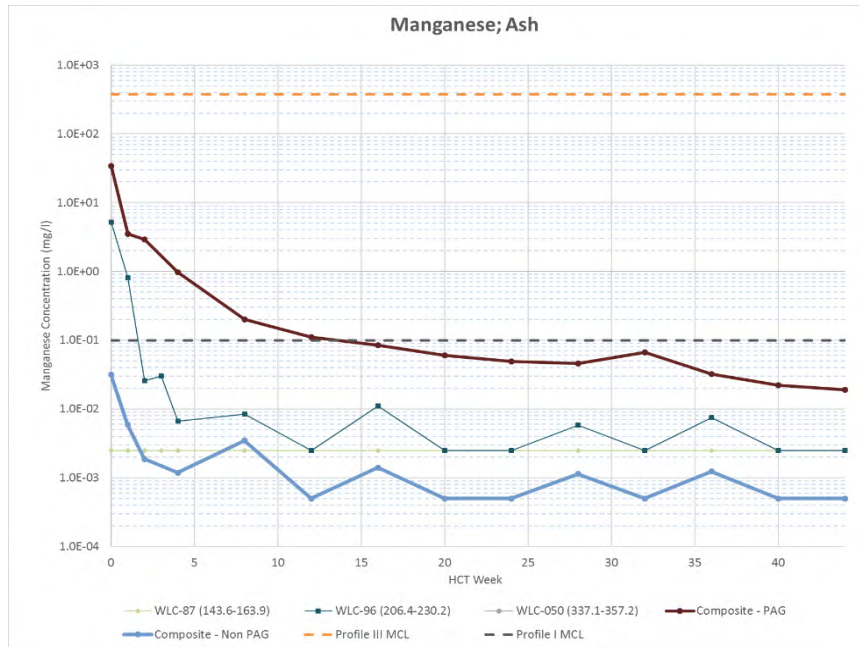
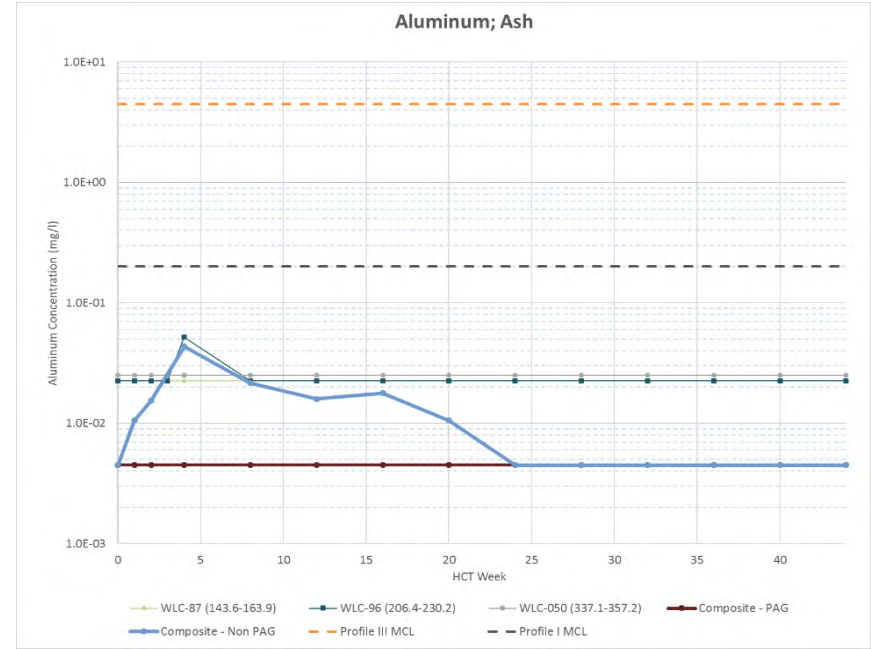
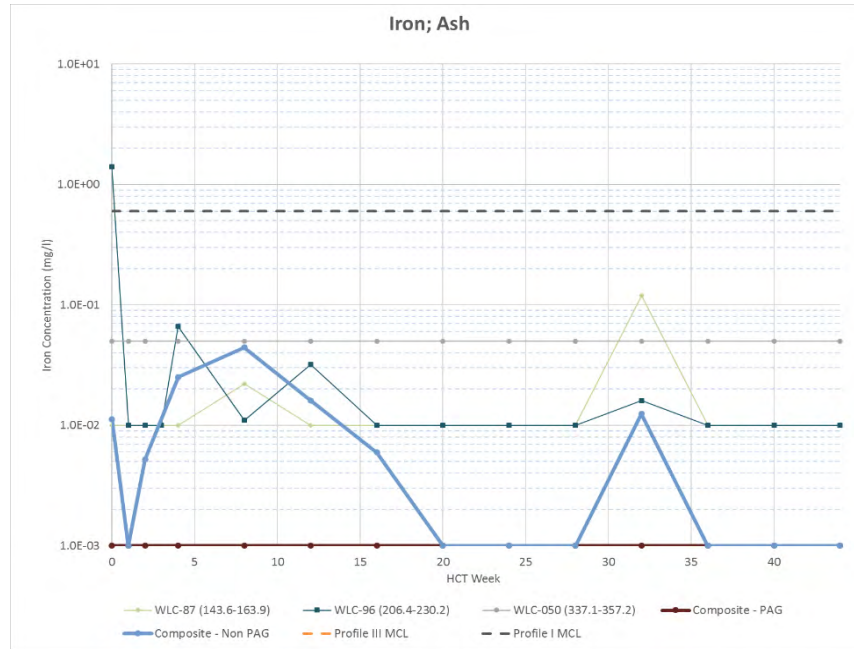
Appendix G. Graphical HCT leachate concentrations through testing



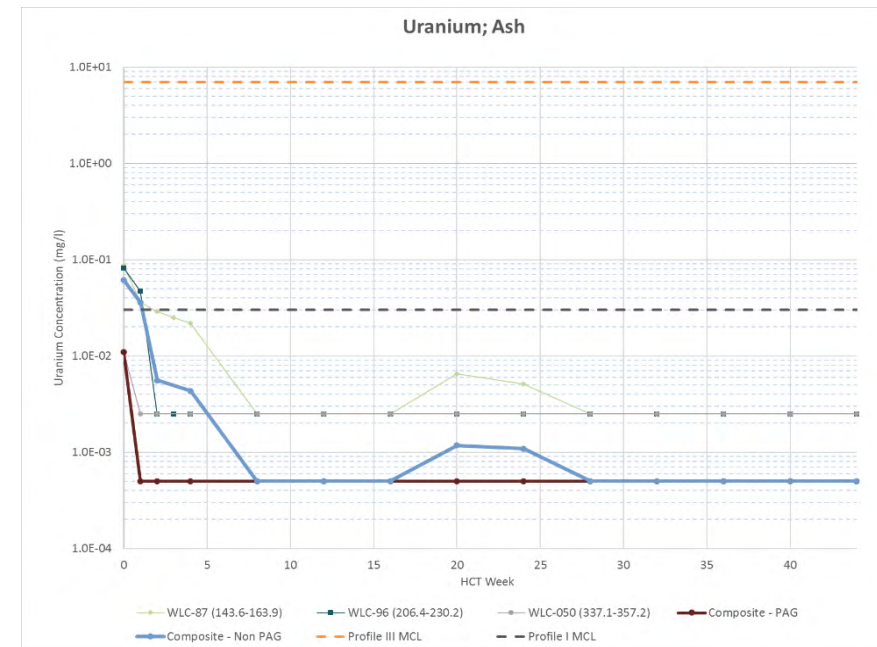
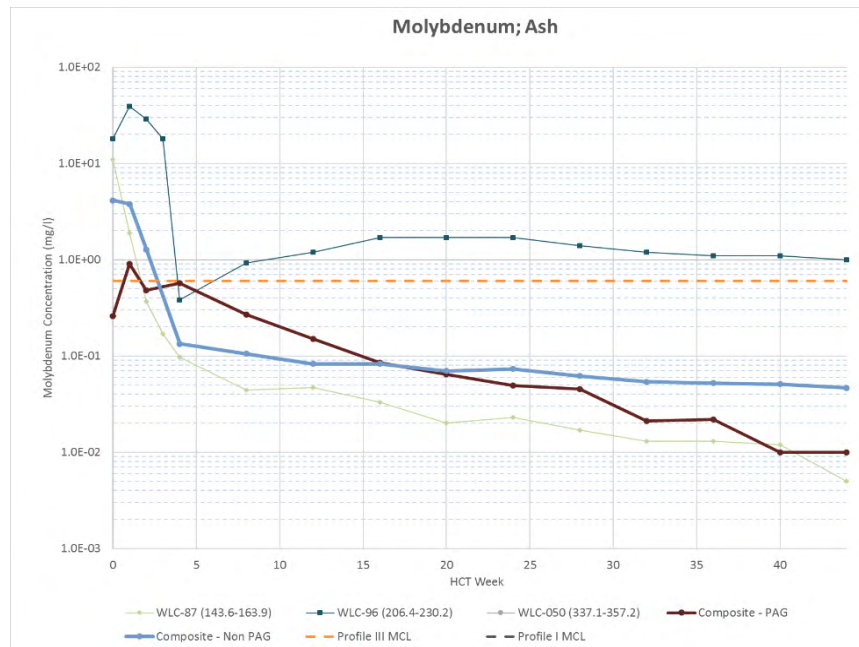
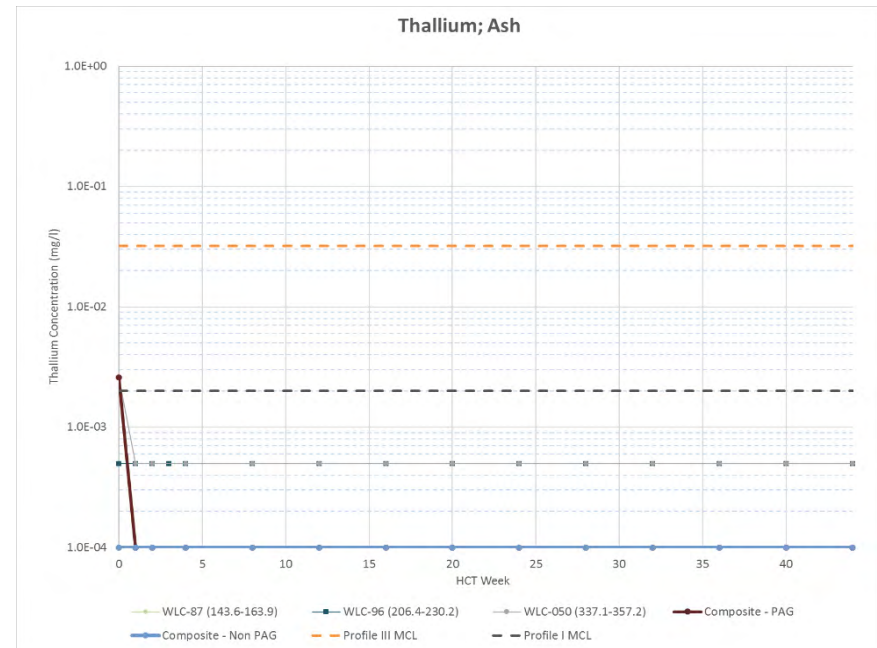
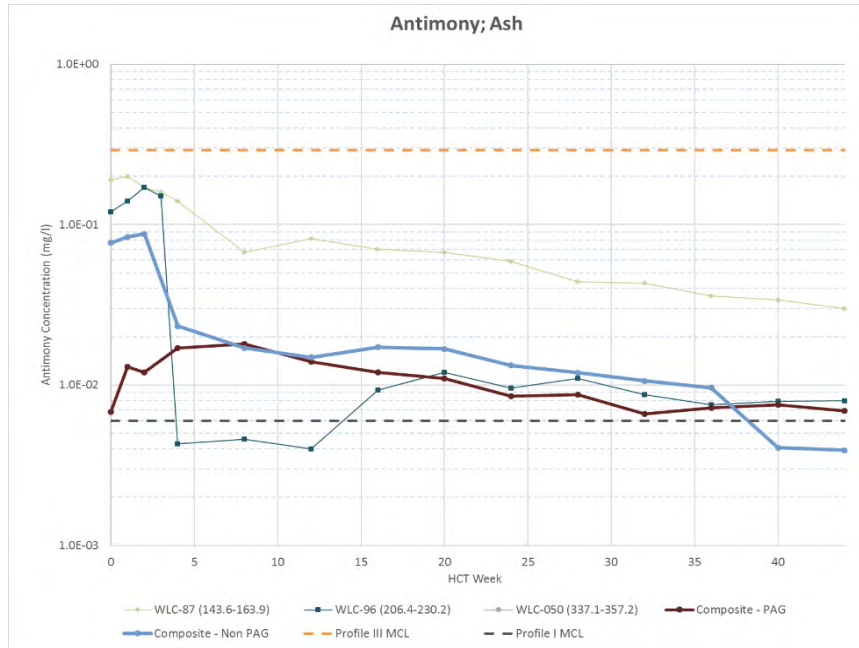
Appendix G. Graphical HCT leachate concentrations through testing



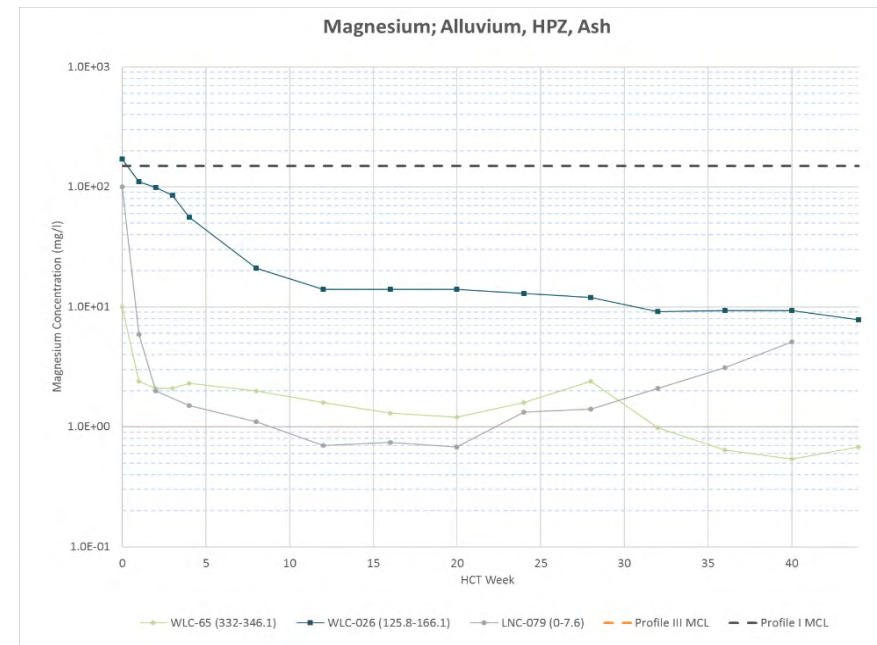
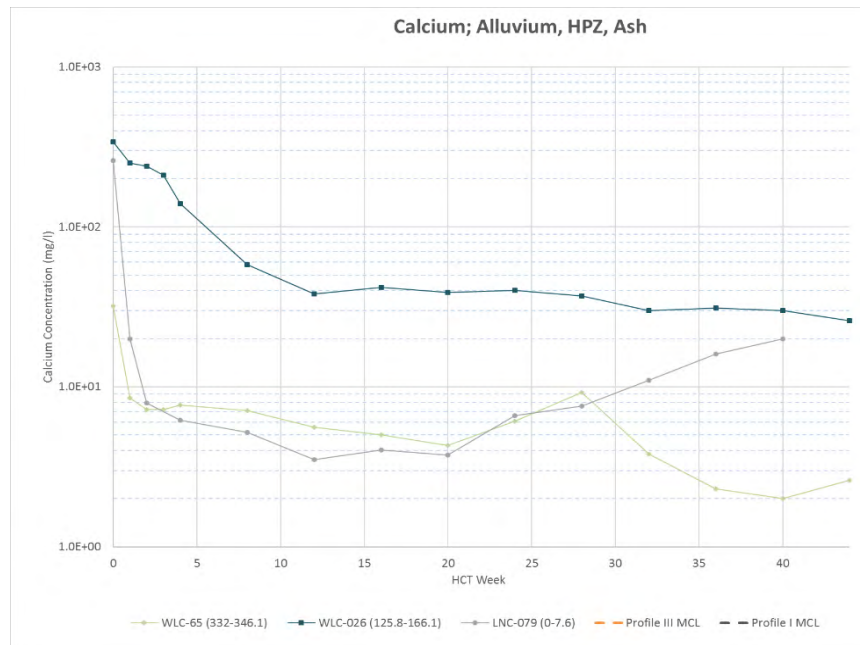
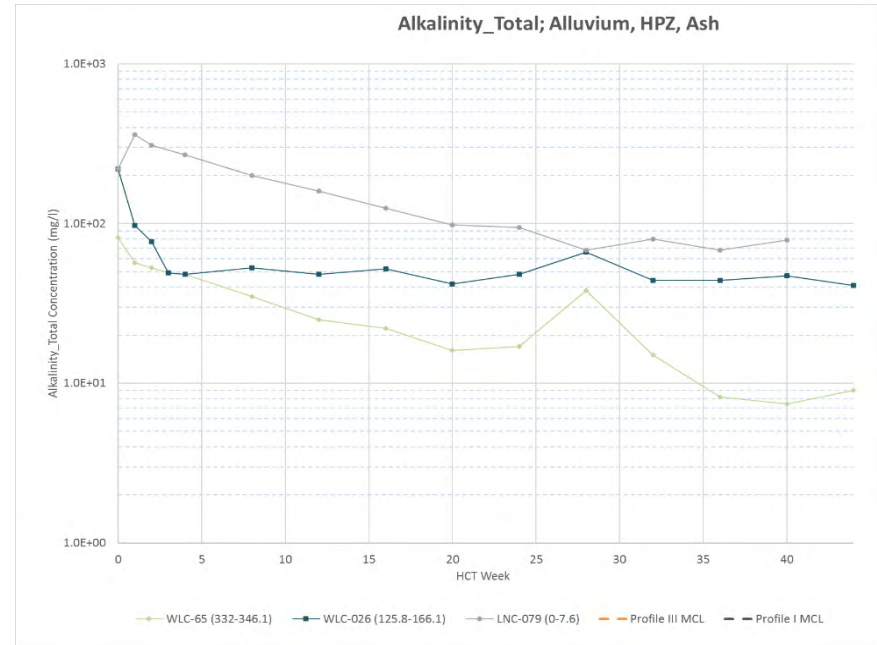
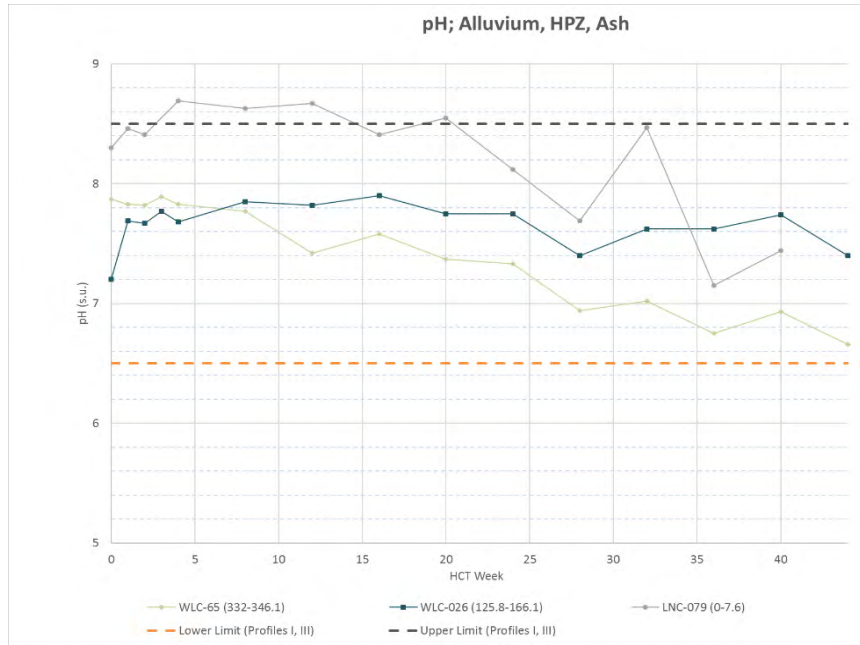
Appendix G. Graphical HCT leachate concentrations through testing



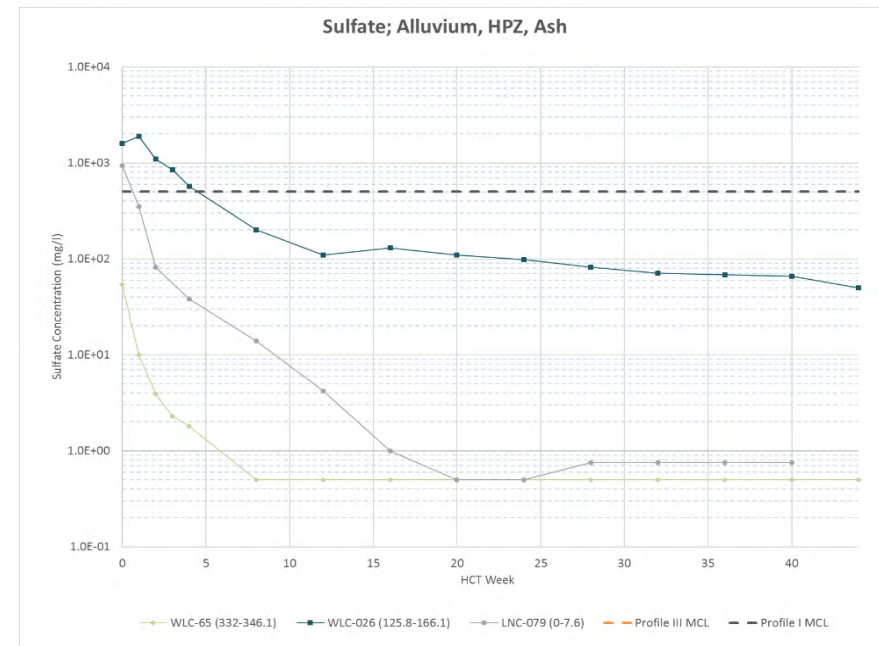
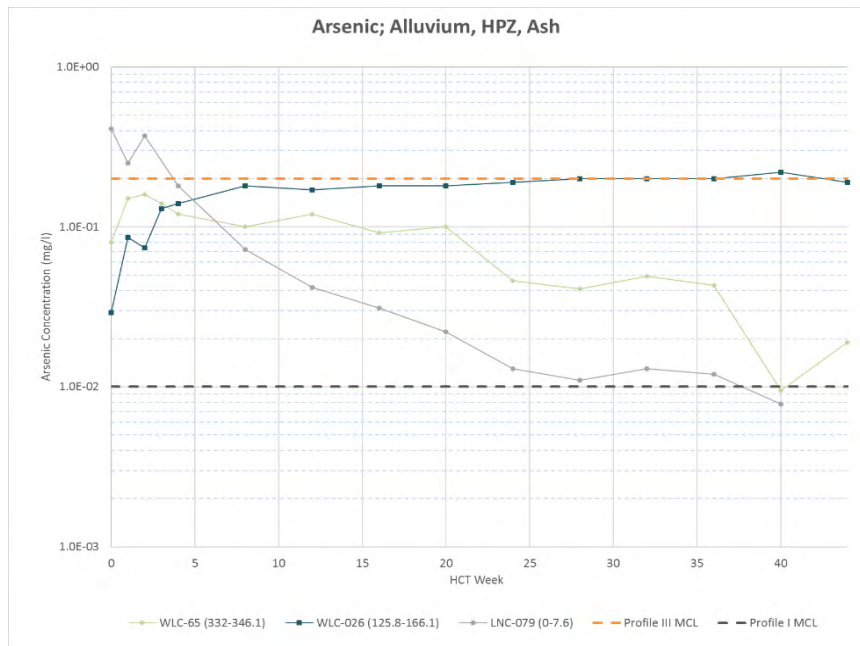
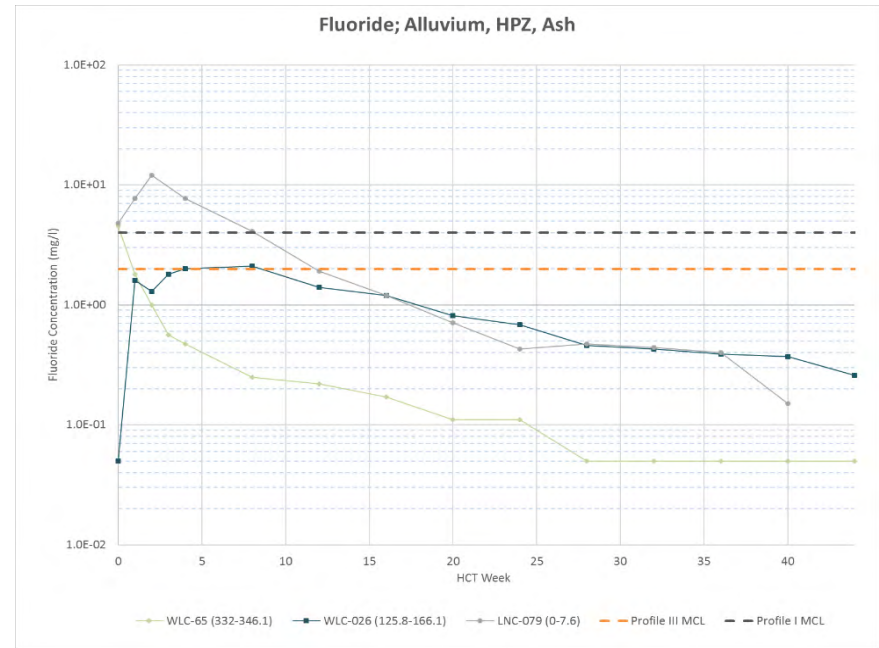
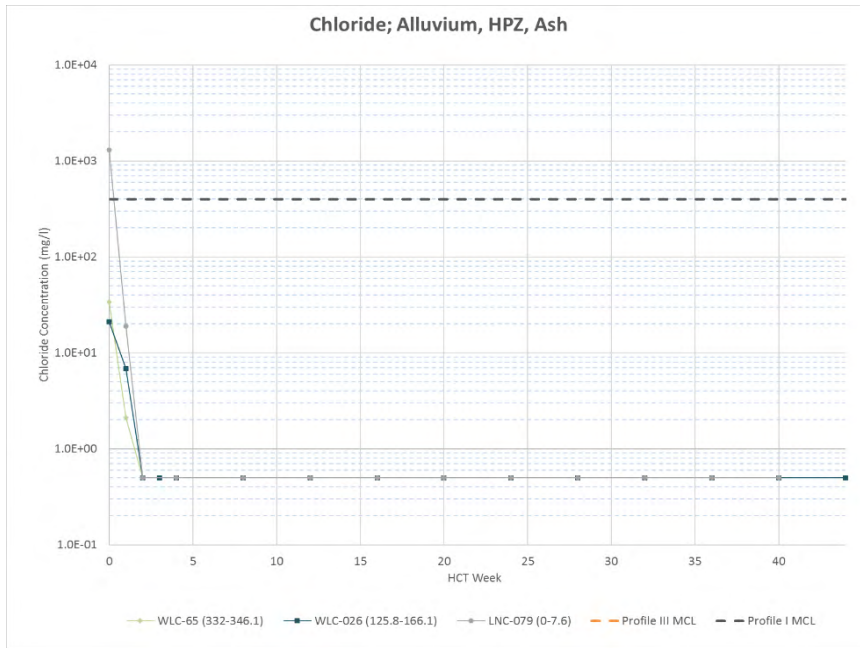
Appendix G. Graphical HCT leachate concentrations through testing



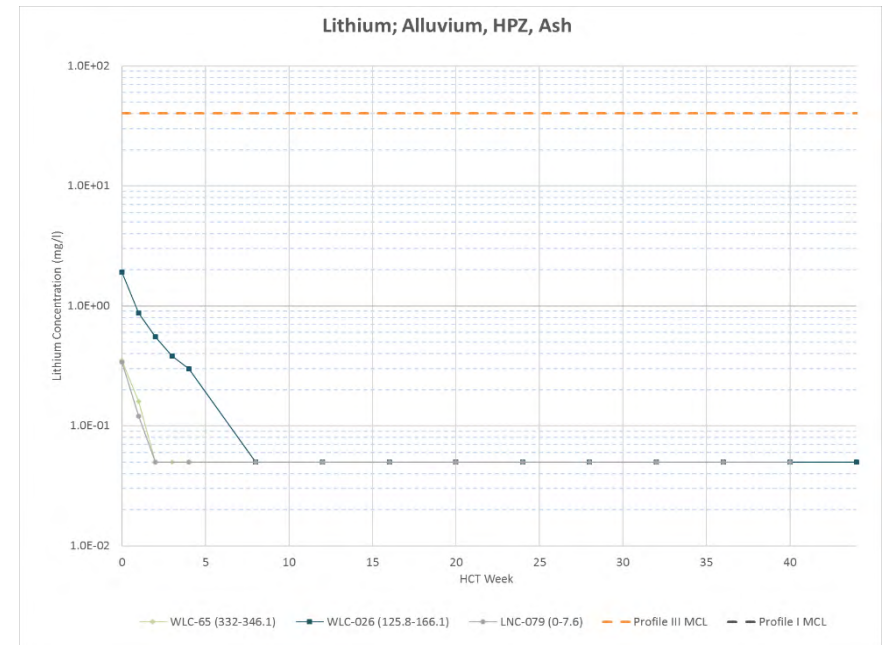
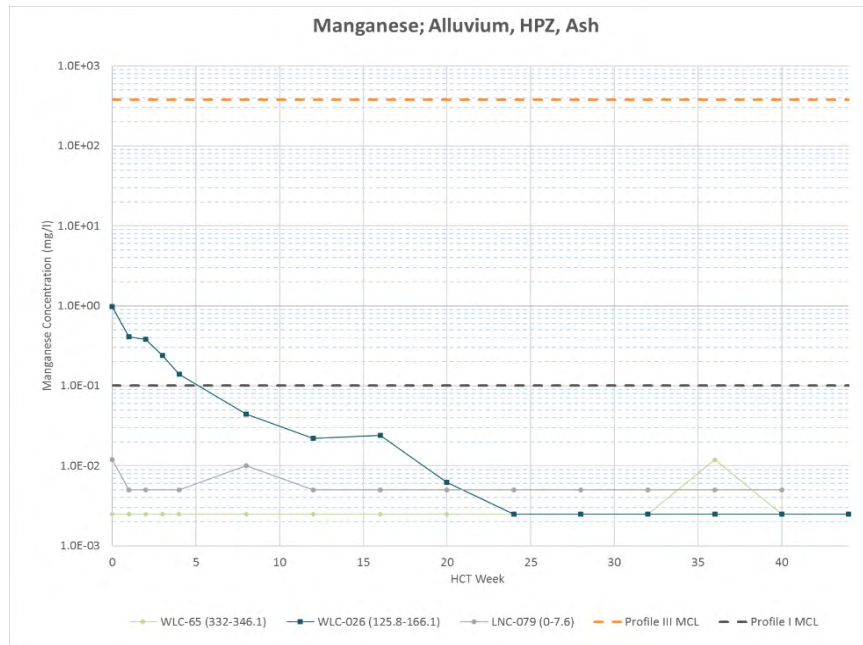
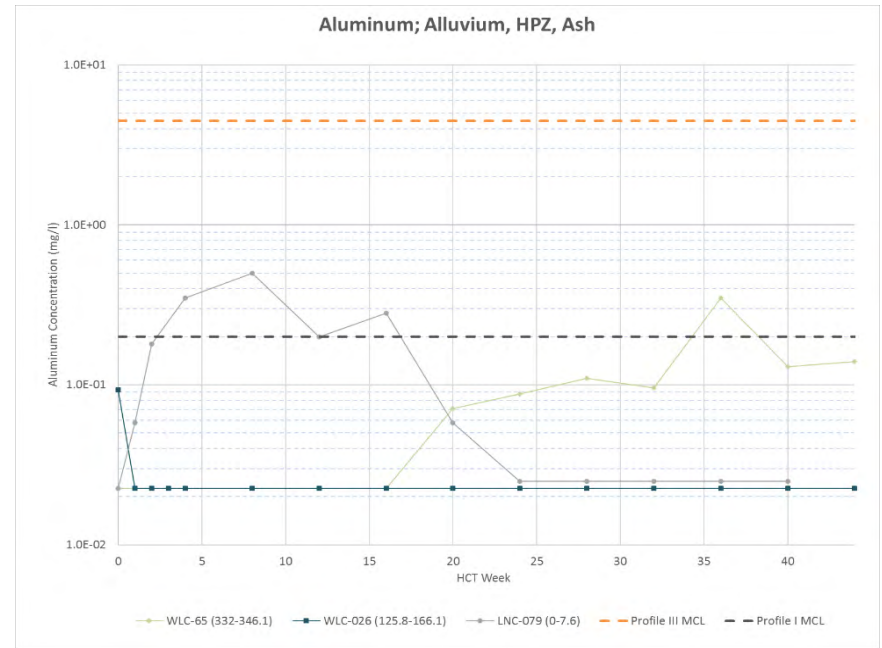
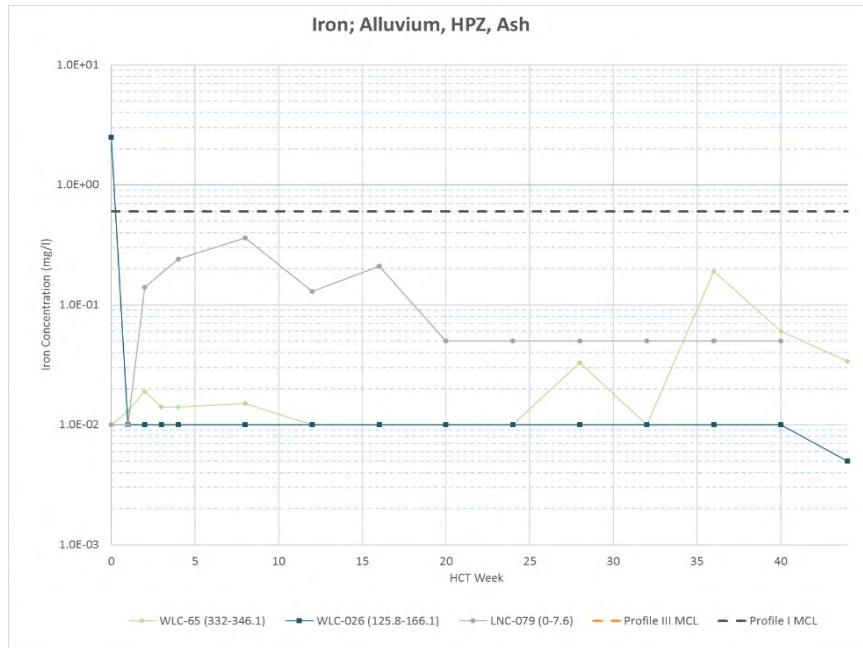
Appendix G. Graphical HCT leachate concentrations through testing



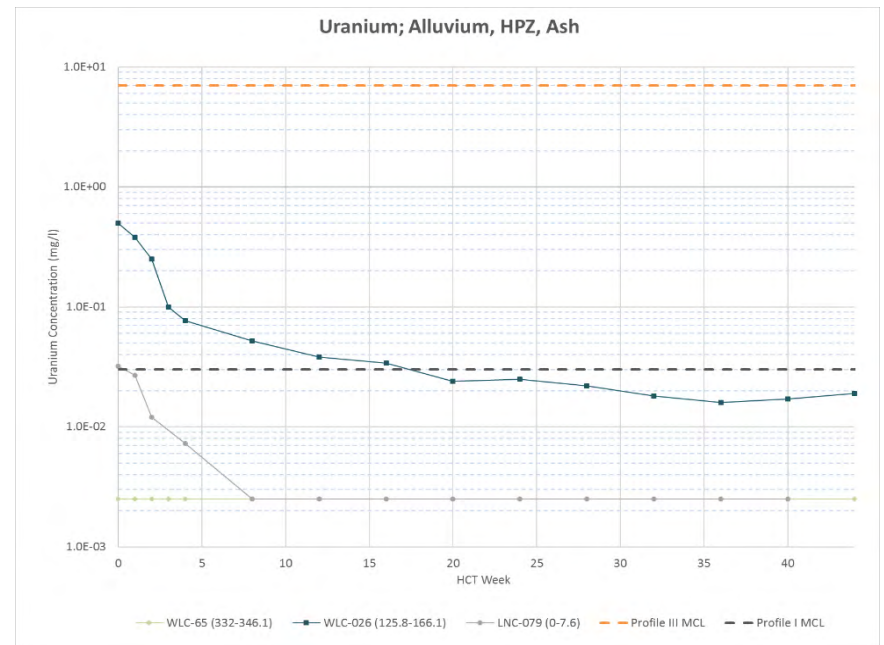
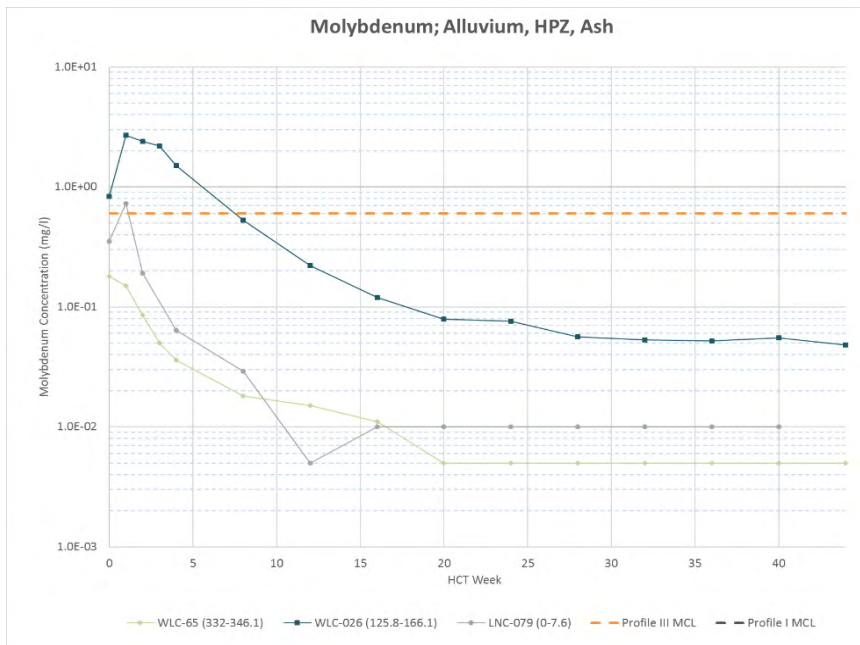
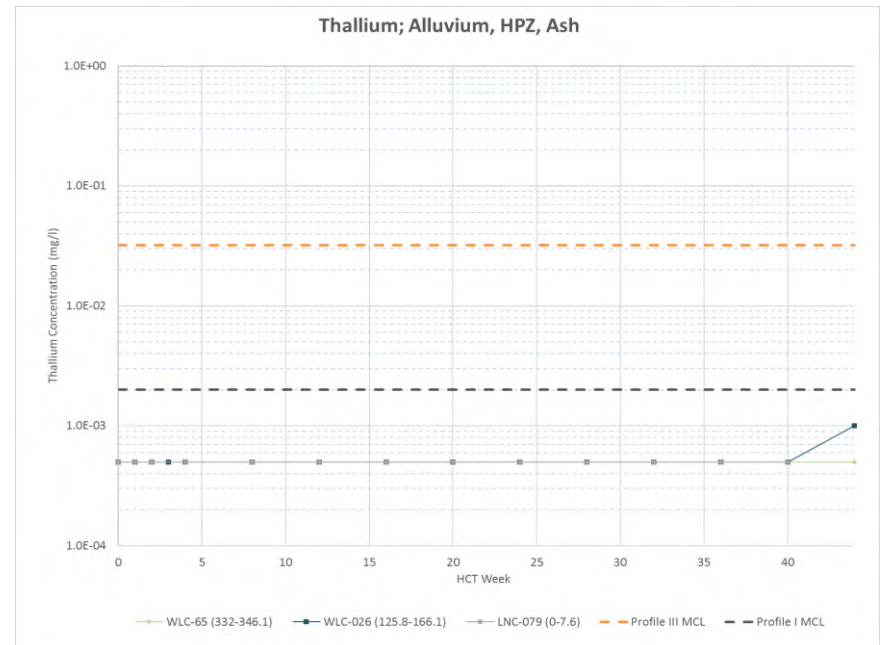
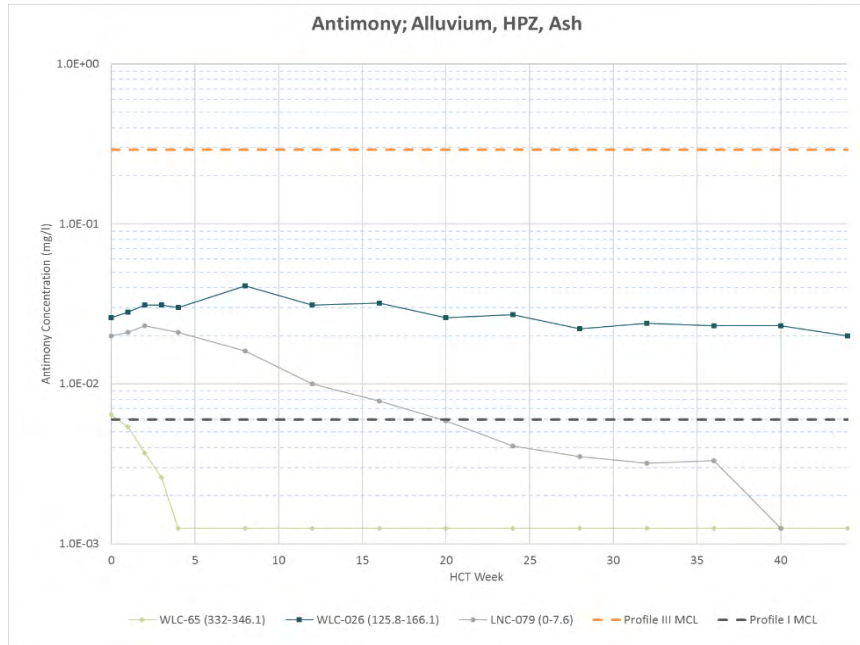
Appendix G. Graphical HCT leachate concentrations through testing



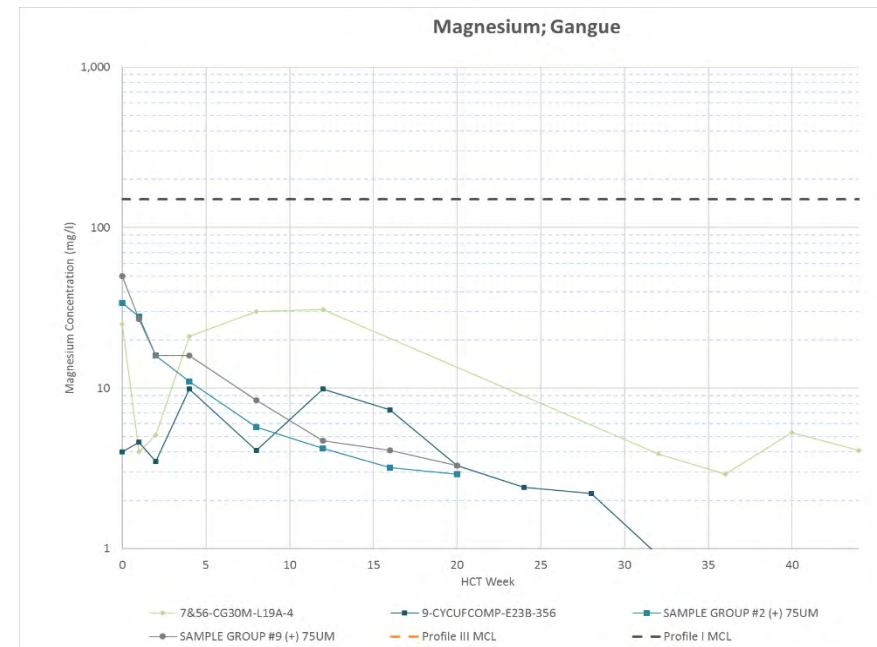
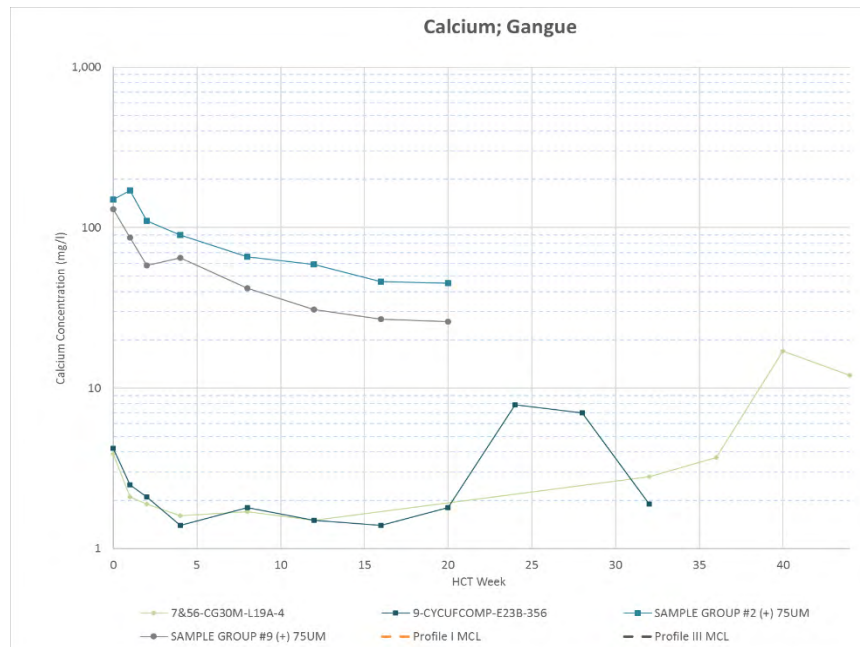
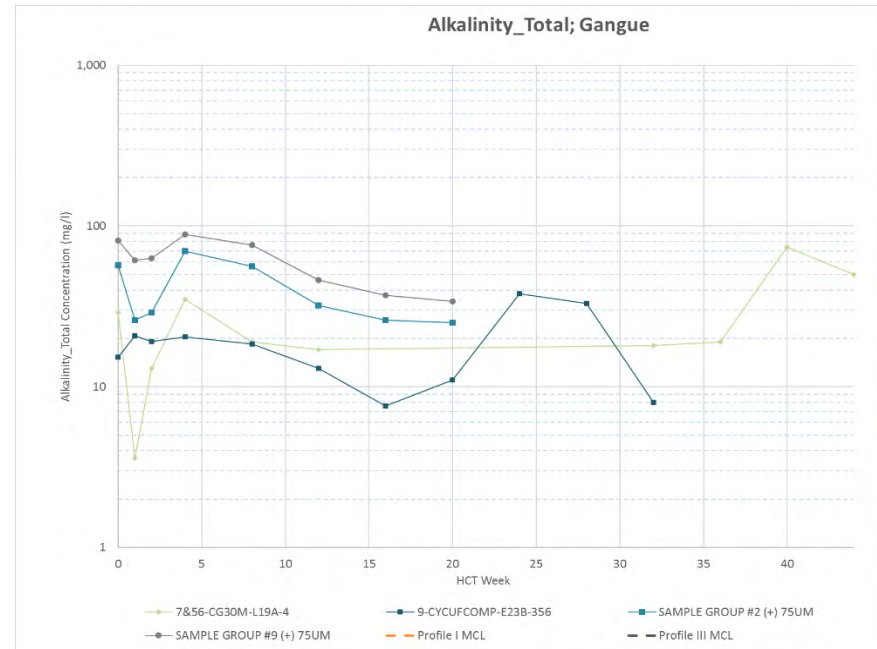
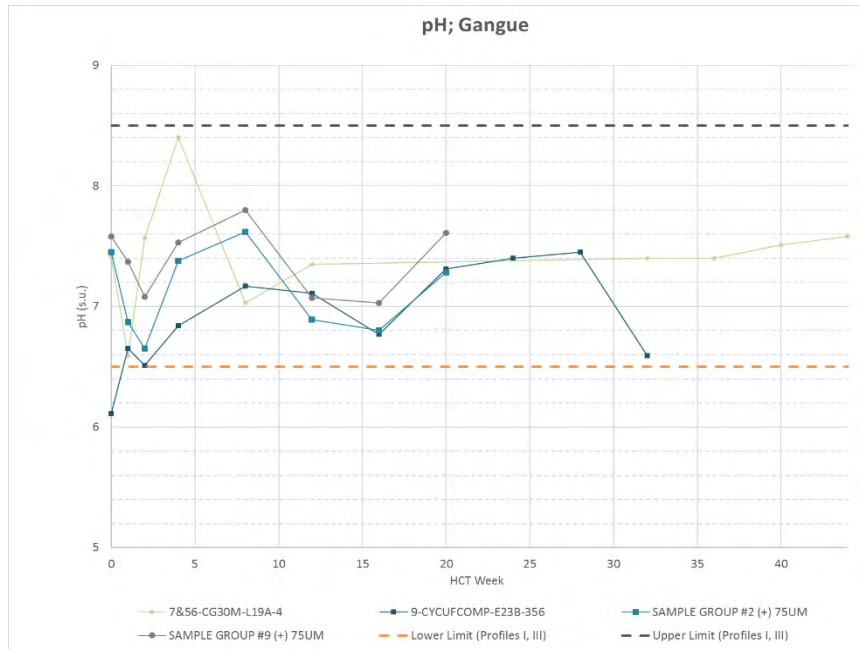
Appendix G. Graphical HCT leachate concentrations through testing



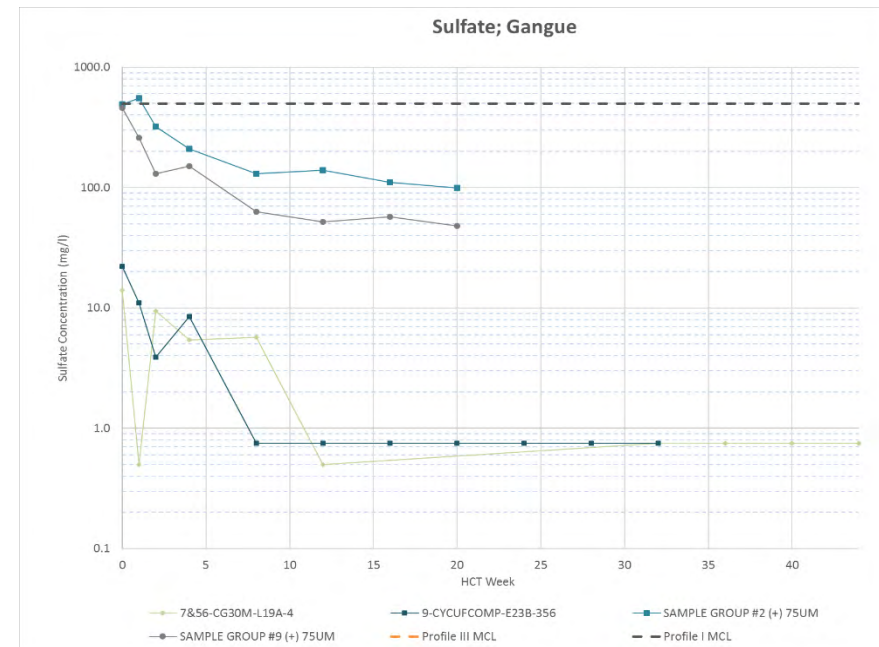
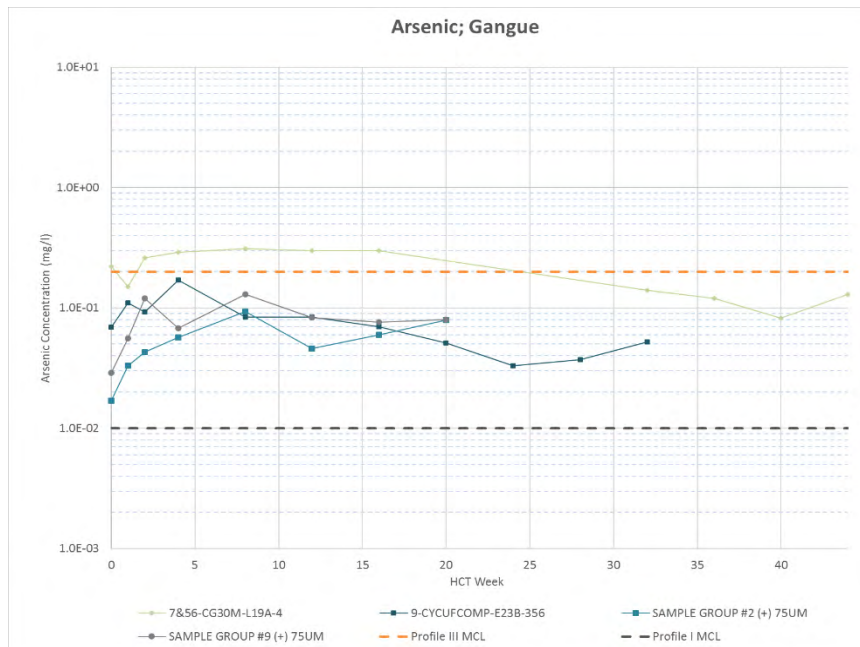
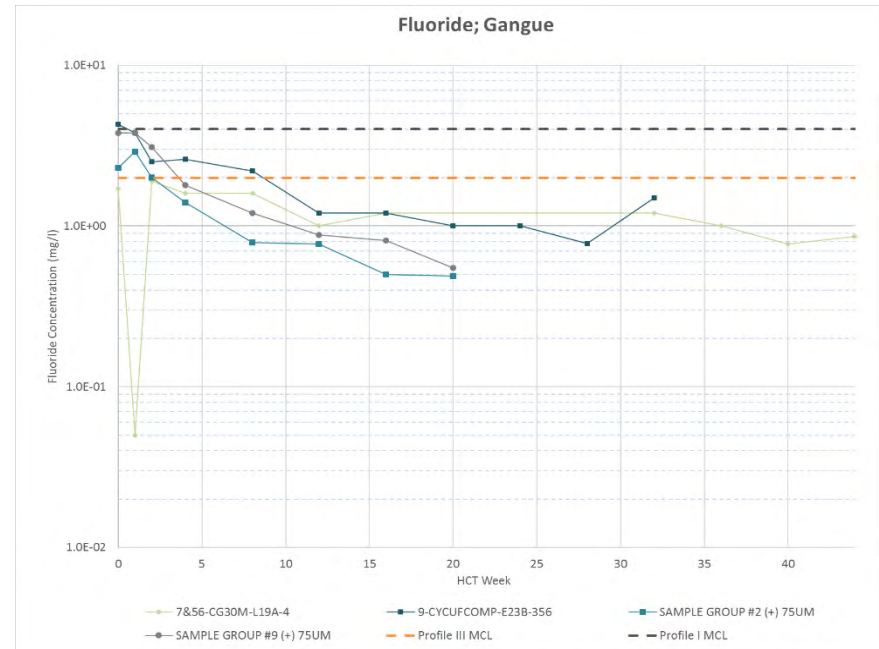
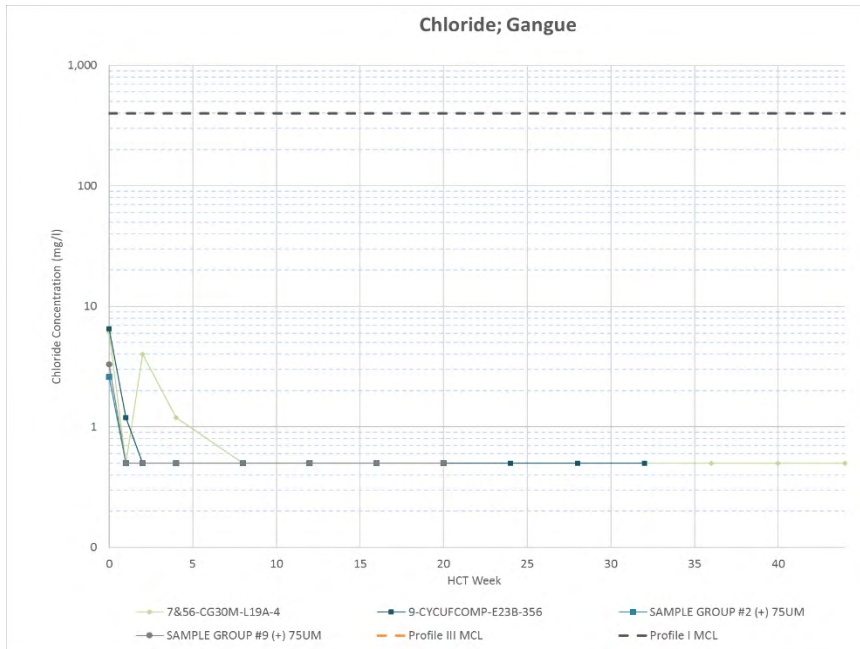
Appendix G. Graphical HCT leachate concentrations through testing



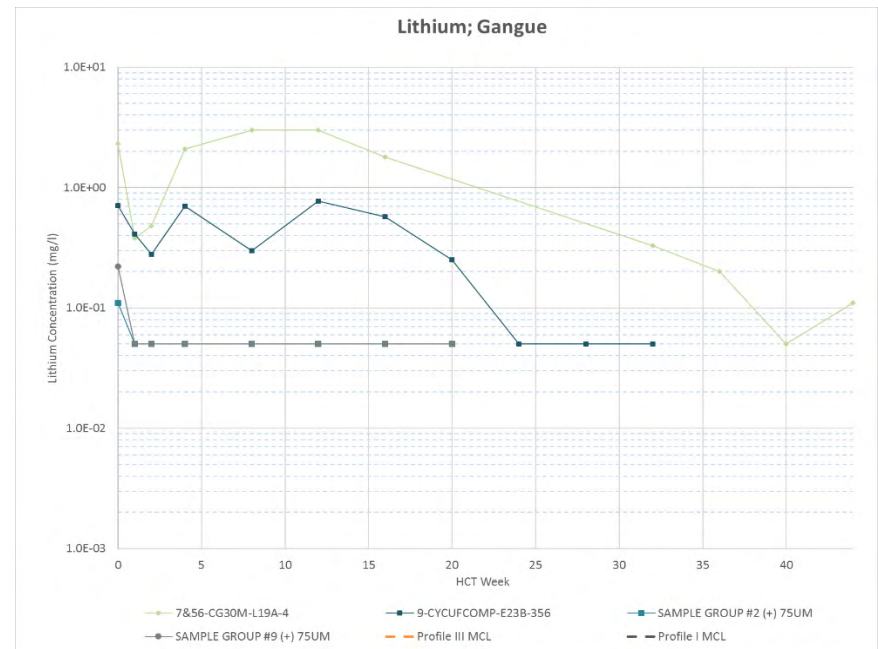
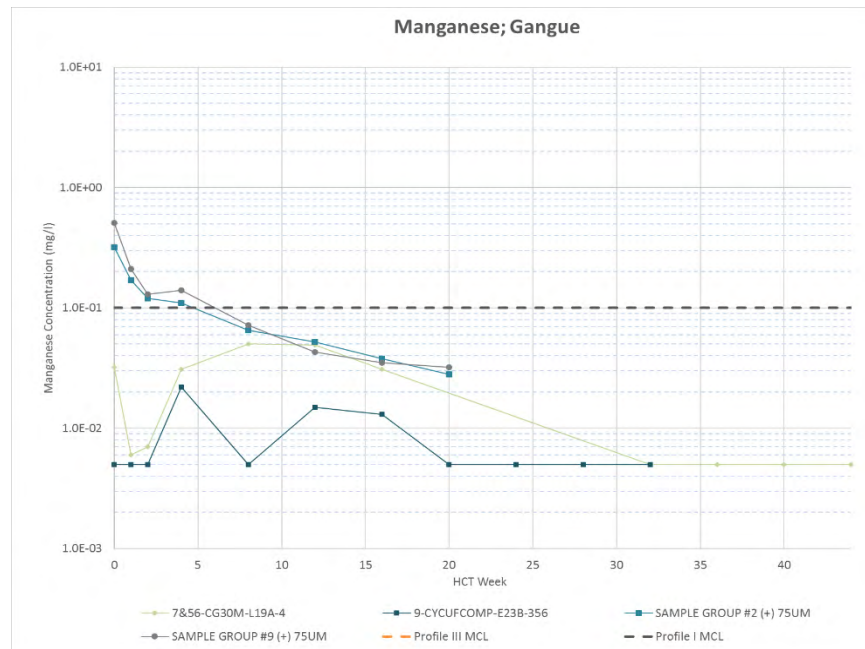
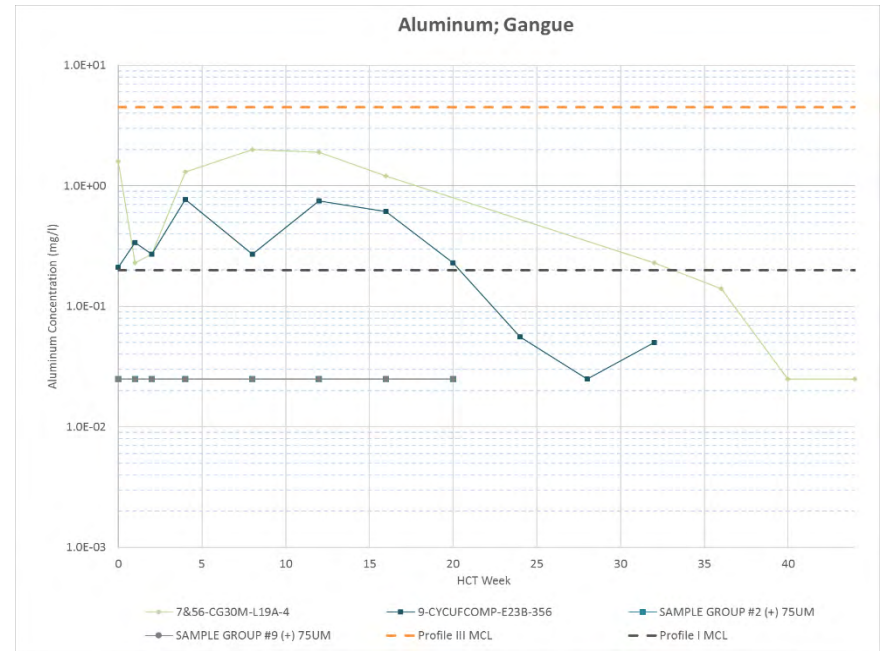
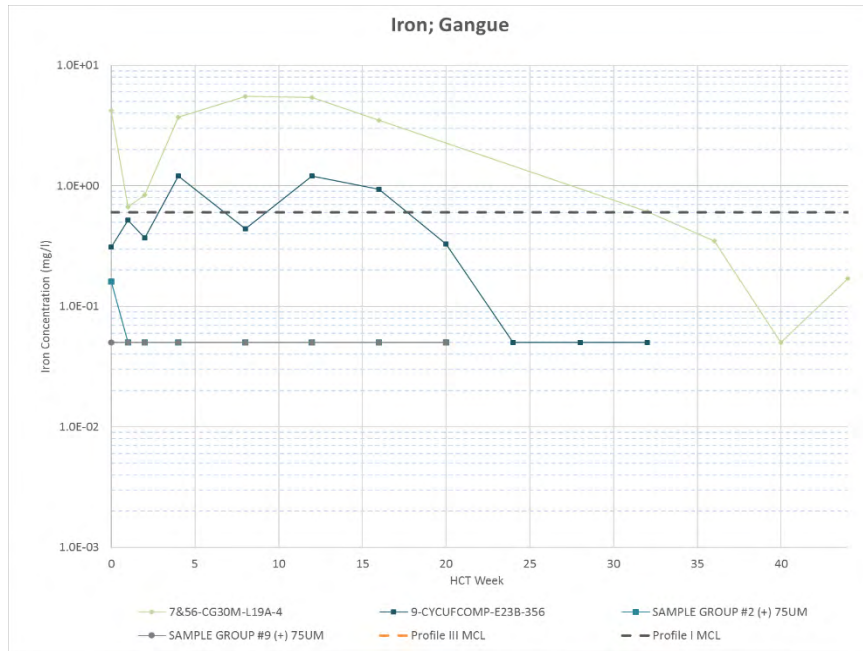
Appendix G. Graphical HCT leachate concentrations through testing



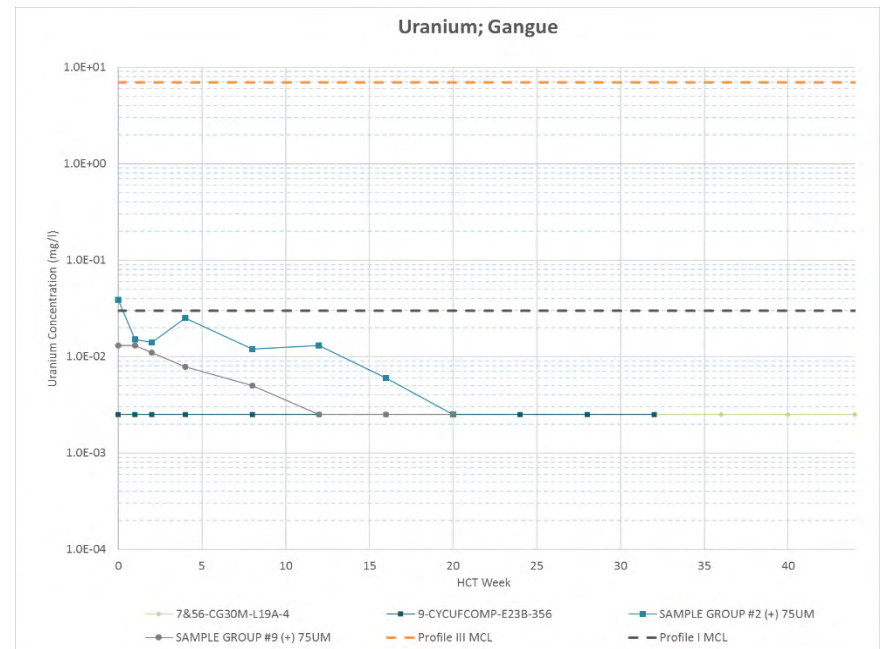
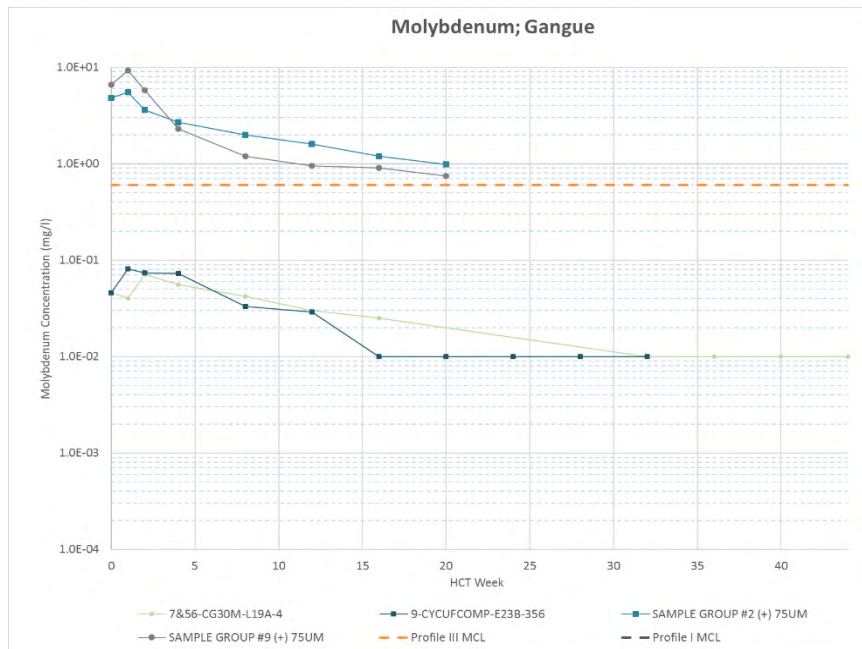
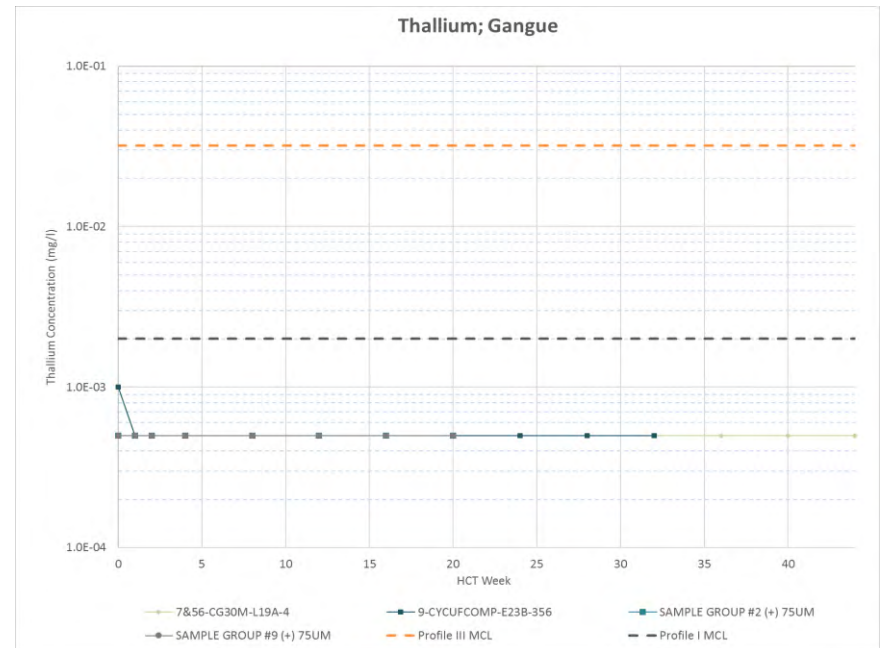
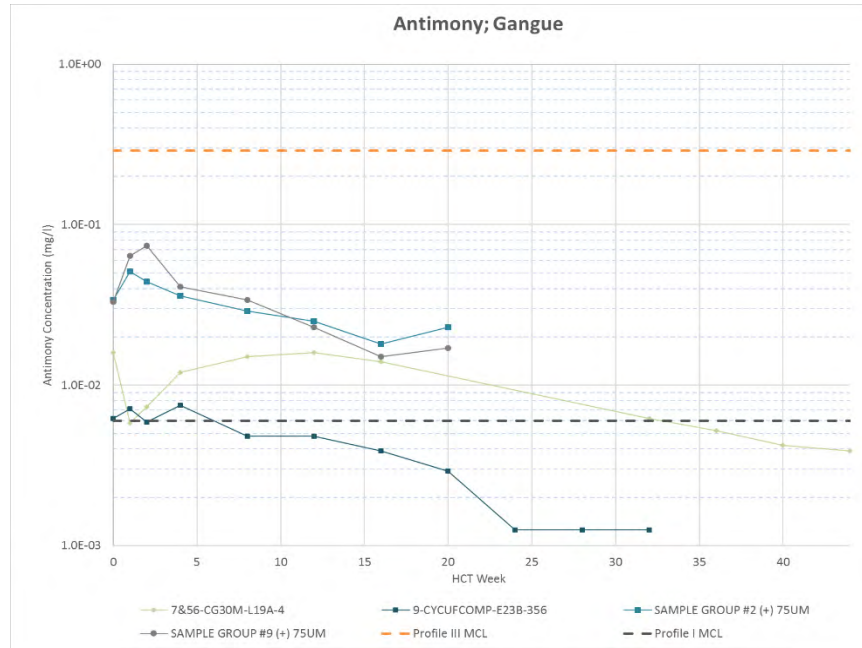
Appendix G. Graphical HCT leachate concentrations through testing



Appendix G. Graphical HCT leachate concentrations through testing



Appendix G. Graphical HCT leachate concentrations through testing



APPENDIX H
Tabulated HCT testing results

Appendix H
Tabulated HCT testing results

Sample_ID	Units	4-LFILTCAKE-E05B-314	4-LFILTCAKE-E05B-314	4-LFILTCAKE-E05B-314	4-LFILTCAKE-E05B-314	4-LFILTCAKE-E05B-314	4-LFILTCAKE-E05B-314	4-LFILTCAKE-E05B-314
Week		0	1	2	4	8	12	16
Lithology		Clay Tailings	Clay Tailings	Clay Tailings	Clay Tailings	Clay Tailings	Clay Tailings	Clay Tailings
Effluent (L)	L	1.02	0.66	0.67	0.49	0.74	0.58	0.56
Redox		484.99	469.24	473.36	457.78	503.33	473.43	367.35
Fe ²⁺	mg/L	1.42	2.46	1.53	19.6	2.6	1.4	1.1
Fe ³⁺	mg/L	3927.78	2417.06	1509.64	932.32	25.73	14.33	9.98
Total Alk	mg/L	-30000	-18000	-7200	-4200	-1200	-1100	-880
CO ₃ ²⁻	mg/L	<1	<1	<1	1	<1	<1	<1
HCO ₃ ⁻	mg/L	<1	<1	<1	1	<1	<1	<1
Aluminum	mg/L	1400	1200	890	530	8	5.2	5.4
Antimony	mg/L	0.24	0.27	0.29	0.34	0.22	0.19	0.13
Arsenic	mg/L	21	6.5	5.4	4.8	0.64	1	0.74
Barium	mg/L	<0.4	<0.2	<0.2	<0.2	0.09	0.12	0.2
Beryllium	mg/L	0.82	0.36	0.28	0.14	<0.002	<0.002	<0.001
Bismuth	mg/L	<2	<1	<1	<1	<0.2	<0.2	<0.1
Boron	mg/L	62	34	28	21	1.2	0.48	0.27
Cadmium	mg/L	0.04	<0.01	<0.01	<0.005	<0.002	<0.002	<0.001
Calcium	mg/L	430	320	330	440	370	340	280
Chloride	mg/L	62	<20	48	<50	<5	10	<10
Chromium	mg/L	0.35	0.29	0.61	0.45	0.022	0.012	0.013
Cobalt	mg/L	0.91	0.51	0.36	0.16	<0.02	<0.02	<0.01
Copper	mg/L	1.7	1.4	1.1	0.69	<0.08	<0.08	<0.04
Fluoride	mg/L	3900	2500	1800	2300	620	570	520
Gallium	mg/L	<2	<1	<1	<1	<0.2	<0.2	<0.1
Iron	mg/L	4100	2000	1600	1200	32	17	13
Lead	mg/L	0.15	0.071	0.065	0.037	0.022	0.015	0.012
Lithium	mg/L	910	640	450	270	5.2	1.4	1.1
Magnesium	mg/L	9000	5100	3800	2800	47	8.5	5.2
Manganese	mg/L	79	44	35	26	0.43	0.07	0.068
Mercury	mg/L	0.015	0.0046	0.0012	0.0011	0.0008	0.00073	<0.00045
Molybdenum	mg/L	6.2	2.2	1.5	0.86	0.076	0.065	0.053
Nickel	mg/L	0.99	0.55	0.42	0.3	<0.06	<0.06	<0.03
Nitrate_as_N	mg/L	<6	<3	<1.5	<7.5	<0.75	<1.5	<1.5
Nitrite_as_N	mg/L	<3	<1.2	<0.6	<3	<0.3	<0.6	<0.6
Total N	mg/L	21	<8.2	7	<12	<5	<2.5	<2.5
TKN	mg/L	20	5.4	7	3.8		0.7	<0.4
pH	s.u.	1.59	1.83	1.92	2.415	2.91	3.01	3.15
Phosphorus	mg/L	74	39	26	14	2	2.6	2.2
Potassium	mg/L	4100	2700	2000	1500	490	500	520
Scandium	mg/L	<2	<1	<1	<1	<0.2	<0.2	<0.1
Selenium	mg/L	0.11	<0.05	<0.1	<0.05	<0.01	<0.01	<0.01
Silver	mg/L	<0.1	0.44	0.45	<0.05	<0.01	<0.01	<0.005
Sodium	mg/L	330	190	140	120	25	25	20
Strontium	mg/L	5.2	3.8	2.9	2.7	0.23	0.22	0.22
Sulfate	mg/L	81000	41000	28000	20000	1500	1200	800
Thallium	mg/L	0.13	0.093	0.07	0.053	0.0077	0.0048	0.0028
Tin	mg/L	<2	<1	<1	<1	<0.2	<0.2	<0.1
Titanium	mg/L	210	130	92	85	22	13	6.7
TDS	mg/L	100000	55000	35000	26000	2700	2300	1700
Uranium	mg/L	0.81	0.42	0.36	0.23	<0.01	<0.01	<0.005
Vanadium	mg/L	18	9.8	7.6	5.3	0.15	0.068	0.046
Zinc	mg/L	11	6.5	4.9	3.4	0.083	0.04	0.033
Anions	mg/L	1560	939	646	348.4	50.8	44.1	38.9
Cations	mg/L	1890	987	679	371.45	63.9	55	44
Error	%	9.79	2.45	2.47	6.935	11.4	11	6.24

Appendix H
Tabulated HCT testing results

Sample_ID	Units	4-LFILTCAKE-E05B-314	4-LFILTCAKE-E05B-314	4-LFILTCAKE-E05B-314	4-LFILTCAKE-E05B-314	4-LFILTCAKE-E05B-314	4-LFILTCAKE-E05B-314	
Week		20	24	28	32	36	40	
Lithology		Clay Tailings	Clay Tailings	Clay Tailings	Clay Tailings	Clay Tailings	Clay Tailings	
Effluent (L)	L	0.59	0.58	0.57	0.56	0.44	0.71	
Redox		333.98	485.6	362.43	370.61	381.96	349	
Fe ²⁺	mg/L	8	0.46	0.23	0.12	<0.1	<0.1	
Fe ³⁺	mg/L	1.93	5.9	4.79	4.61	5.27	4.1	
Total Alk	mg/L	-850	-820	-840	-870	I/S	38	
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	I/S	<1	
HCO ₃ ⁻	mg/L	<1	<1	<1	<1	I/S	38	
Aluminum	mg/L	3.9	4.7	5.2	5.4	6.8	<0.05	
Antimony	mg/L	0.13	0.094	0.075	0.077	0.065	0.021	
Arsenic	mg/L	0.68	0.57	0.45	0.35	0.33	0.095	
Barium	mg/L	0.18	0.24	0.18	0.15	0.15	<0.02	
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Boron	mg/L	0.26	0.26	0.19	0.11	0.11	<0.1	
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Calcium	mg/L	200	93	51	23	15	22	
Chloride	mg/L	<50	<100	<10	<50	<10	<1	
Chromium	mg/L	0.012	0.009	0.0079	0.0084	0.0073	<0.005	
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	
Fluoride	mg/L	350	320	400	430	680	<0.3	
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Iron	mg/L	9	5.8	4.9	5.3	4.5	<0.1	
Lead	mg/L	0.01	0.0081	0.007	0.0059	0.0043	<0.0025	
Lithium	mg/L	0.83	0.43	0.37	0.33	0.28	<0.1	
Magnesium	mg/L	4.4	2.4	2.2	1.8	1.9	9.8	
Manganese	mg/L	0.057	0.039	0.038	0.036	0.036	<0.01	
Mercury	mg/L	<0.00045	<0.00045	0.00046	<0.00045	<0.00045	<0.00045	
Molybdenum	mg/L	0.037	0.024	<0.02	<0.02	<0.02	<0.02	
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Nitrate as N	mg/L	<0.75	<1.5	<1.5	<0.75	<1.5	<0.15	
Nitrite as N	mg/L	<0.3	<0.6	<0.6	<0.3	<0.6	<0.06	
Total N	mg/L	<1.4	<2.5	<2.5	<1.4	<2.5	<0.61	
TKN	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	
pH	s.u.	3.25	3.38	3.52	3.54	I/S	7.73	
Phosphorus	mg/L	1.9	1.3	0.92	0.81	0.71	<0.5	
Potassium	mg/L	420	440	330	460	410	<1	
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Selenium	mg/L	<0.005	<0.01	<0.005	<0.01	<0.005	<0.005	
Silver	mg/L	0.014	<0.005	<0.005	<0.005	<0.005	<0.005	
Sodium	mg/L	19	11	11	11	11	<1.5	
Strontium	mg/L	0.18	0.11	<0.1	<0.1	<0.1	<0.1	
Sulfate	mg/L	730	310	160	120	63	61	
Thallium	mg/L	0.0019	<0.001	<0.001	0.0011	0.0011	0.0019	
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Titanium	mg/L	5.1	3.1	2.5	2	2	<0.1	
TDS	mg/L	1600	1400	910	850	720	130	
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.0081	
Vanadium	mg/L	0.025	0.011	<0.01	<0.01	<0.01	<0.01	
Zinc	mg/L	0.023	<0.02	0.095	0.077	0.044	<0.02	
Anions	mg/L	31.5	25.8	21.1	23.3	I/S	1.9	
Cations	mg/L	33.6	23.3	24.4	25.1	I/S	2.03	
Error	%	3.25	5.05	7.31	3.77	I/S	3.19	

Appendix H
Tabulated HCT testing results

Sample_ID	Units	4-NFILTCAKE-E09B-308	4-NFILTCAKE-E09B-308	4-NFILTCAKE-E09B-308	4-NFILTCAKE-E09B-308	4-NFILTCAKE-E09B-308	4-NFILTCAKE-E09B-308	4-NFILTCAKE-E09B-308
Week		0	1	2	4	8	12	16
Lithology		Neutrailization Solids	Neutrailization Solids	Neutrailization Solids	Neutrailization Solids	Neutrailization Solids	Neutrailization Solids	Neutrailization Solids
Effluent (L)	L	0.99	0.61	0.66	0.46	0.76	0.58	0.53
Redox		260.83	249.7	255.51	257.39	332.73	326.03	348.9
Fe ²⁺	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fe ³⁺	mg/L	0	0	0	0	0	0	0
Total Alk	mg/L	65.49	68.91	70	70.39	59.56	63	46
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	65.49	68.91	70	70.39	59.56	63	46
Aluminum	mg/L	<0.05	<0.05	<0.5	<0.05	<0.1	<0.1	<1
Antimony	mg/L	0.01	<0.05	<0.04	0.0077	0.0063	0.0066	0.0041
Arsenic	mg/L	0.018	<0.2	<0.2	<0.015	0.0076	<0.0075	<0.0075
Barium	mg/L	0.058	<0.2	<0.2	0.03	<0.04	<0.04	<0.1
Beryllium	mg/L	<0.001	<0.001	<0.01	<0.001	<0.002	<0.002	<0.004
Bismuth	mg/L	<0.1	<0.1	<1	<0.1	<0.2	<0.2	<0.5
Boron	mg/L	28	38	35	31	26	24	23
Cadmium	mg/L	<0.001	<0.001	<0.01	<0.001	<0.002	<0.002	<0.004
Calcium	mg/L	340	330	490	500	490	460	570
Chloride	mg/L	<50	<20	<10	<50	<5	<5	<10
Chromium	mg/L	<0.005	<0.005	<0.05	<0.005	<0.01	<0.01	<0.025
Cobalt	mg/L	<0.01	<0.01	<0.1	<0.01	<0.02	<0.02	<0.05
Copper	mg/L	<0.04	<0.04	<0.4	<0.04	<0.08	<0.08	<0.2
Fluoride	mg/L	150	85	69	66	44	39	35
Gallium	mg/L	<0.1	<0.1	<1	<0.1	<0.2	<0.2	<0.5
Iron	mg/L	<0.1	<0.1	<1	<0.5	<0.2	<0.2	<0.5
Lead	mg/L	<0.005	<0.05	<0.02	<0.01	<0.005	<0.005	<0.005
Lithium	mg/L	780	670	380	230	33	18	15
Magnesium	mg/L	5600	4500	2900	2400	800	770	840
Manganese	mg/L	8	4.1	2.6	1.2	0.34	0.23	0.19
Mercury	mg/L	0.00096	0.00076	<0.00025	<0.00045	<0.00045	<0.00045	<0.00045
Molybdenum	mg/L	1.5	2.1	2.1	2.1	1.3	1.3	1.4
Nickel	mg/L	<0.03	<0.03	<0.3	<0.03	<0.06	<0.06	<0.05
Nitrate as N	mg/L	<6	<3	<1.5	<7.5	<0.75	<1.5	<1.5
Nitrite as N	mg/L	<3	<1.2	<0.6	<3	<0.3	<0.6	<0.6
Total N	mg/L	<11	5.1	7.9	<11	<5	<2.5	<2.5
TKN	mg/L	7.2	5	7.9	2.3		0.68	1.2
pH	s.u.	7.85	7.97	8	8.02	8.04	7.97	8.06
Phosphorus	mg/L	<0.5	<0.5	<5	<0.5	<1	<1	<2.5
Potassium	mg/L	3800	3200	1900	1700	390	190	160
Scandium	mg/L	<0.1	<0.1	<1	<0.1	<0.2	<0.2	<0.5
Selenium	mg/L	<0.025	<0.1	<0.2	<0.05	<0.025	<0.025	<0.025
Silver	mg/L	<0.005	<0.005	<0.05	<0.005	<0.01	<0.01	<0.025
Sodium	mg/L	140	78	54	44	18	14	14
Strontium	mg/L	1.1	1	1.1	0.87	0.86	0.77	1.1
Sulfate	mg/L	32000	21000	15000	12000	4500	4300	4100
Thallium	mg/L	0.051	0.045	0.024	0.023	0.013	0.0092	0.0067
Tin	mg/L	<0.1	<0.1	<1	<0.1	<0.2	<0.2	<0.5
Titanium	mg/L	<0.1	<0.1	<1	<0.1	<0.2	<0.2	<0.5
TDS	mg/L	39000	30000	21000	17000	6500	6300	5700
Uranium	mg/L	0.0056	<0.1	<0.02	<0.01	<0.01	0.0068	<0.005
Vanadium	mg/L	<0.01	<0.01	<0.1	<0.01	<0.02	<0.02	<0.05
Zinc	mg/L	0.042	<0.02	<0.2	<0.02	<0.04	<0.04	<0.1
Anions	mg/L	581	472	314	207.5	101	91.8	102
Cations	mg/L	676	443	317	207.15	97.3	92.8	88.1
Error	%	7.49	3.18	<1	1.455	1.91	<1	7.43

Appendix H
Tabulated HCT testing results

Sample_ID	Units	4-NFILTCAKE- E09B-308	4-NFILTCAKE- E09B-308	4-NFILTCAKE- E09B-308	4-NFILTCAKE- E09B-308	4-NFILTCAKE- E09B-308	4-NFILTCAKE- E09B-308	
Week		20	24	28	32	36	40	
Lithology		Neutrailization Solids	Neutrailization Solids	Neutrailization Solids	Neutrailization Solids	Neutrailization Solids	Neutrailization Solids	
Effluent (L)	L	0.58	0.56	0.57	0.75	0.41	0.54	
Redox		304.08	443.56	238.81	324.05	267.72	313.21	
Fe ²⁺	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Fe ³⁺	mg/L	0	0	0	0	0	0	
Total Alk	mg/L	47	56	54	52	I/S	50	
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	I/S	<1	
HCO ₃ ⁻	mg/L	47	56	54	52	I/S	50	
Aluminum	mg/L	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	
Antimony	mg/L	0.0054	0.0051	0.0044	0.0041	0.0041	0.0039	
Arsenic	mg/L	0.014	<0.0075	<0.005	<0.005	<0.005	<0.005	
Barium	mg/L	<0.04	<0.04	<0.02	<0.04	<0.04	<0.04	
Beryllium	mg/L	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002	
Bismuth	mg/L	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	
Boron	mg/L	14	13	8.9	6.3	9.1	7.1	
Cadmium	mg/L	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002	
Calcium	mg/L	480	580	560	700	600	590	
Chloride	mg/L	<5	<20	<10	<5	<10	<10	
Chromium	mg/L	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	
Cobalt	mg/L	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	
Copper	mg/L	<0.08	<0.08	<0.04	<0.08	<0.08	<0.08	
Fluoride	mg/L	29	27	24	20	25	20	
Gallium	mg/L	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	
Iron	mg/L	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.0025	<0.0025	
Lithium	mg/L	8.1	6.9	5.1	4.3	5.5	4.2	
Magnesium	mg/L	570	490	410	260	440	330	
Manganese	mg/L	0.078	0.041	0.028	<0.02	<0.02	<0.02	
Mercury	mg/L	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	
Molybdenum	mg/L	0.95	0.89	0.81	0.67	0.95	0.73	
Nickel	mg/L	<0.05	<0.05	<0.03	<0.05	<0.05	<0.05	
Nitrate_as_N	mg/L	<0.75	<3	<1.5	<0.75	<1.5	<1.5	
Nitrite_as_N	mg/L	<0.3	<1.2	<0.6	<0.3	<0.6	<0.6	
Total N	mg/L	<1.4	<4.6	<2.5	<1.4	<2.5	<2.5	
TKN	mg/L	1.2	2.1	0.41	0.52	0.53	<0.4	
pH	s.u.	7.73	7.71	7.88	7.55	I/S	7.92	
Phosphorus	mg/L	<1	<1	<0.5	<1	<1	<1	
Potassium	mg/L	92	71	58	49	72	57	
Scandium	mg/L	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	
Selenium	mg/L	<0.025	<0.025	<0.01	<0.01	<0.005	<0.005	
Silver	mg/L	0.04	<0.01	<0.005	<0.01	<0.01	<0.01	
Sodium	mg/L	12	11	11	11	18	18	
Strontium	mg/L	0.77	0.76	0.75	0.8	0.95	0.9	
Sulfate	mg/L	3700	3300	2900	2600	2800	2400	
Thallium	mg/L	0.0083	0.0063	0.0063	0.0058	0.0062	0.0071	
Tin	mg/L	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	
Titanium	mg/L	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	
TDS	mg/L	5000	4700	4300	3400	4200	3400	
Uranium	mg/L	0.0067	0.0055	0.0054	<0.01	<0.005	0.0056	
Vanadium	mg/L	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	
Zinc	mg/L	<0.04	<0.04	<0.02	<0.04	<0.04	<0.04	
Anions	mg/L	73.7	71.6	63.6	58.1	I/S	58.8	
Cations	mg/L	79.5	71.2	62.7	56.2	I/S	52	
Error	%	3.76	<1	<1	1.6	I/S	6.15	

Appendix H
Tabulated HCT testing results

Sample_ID	Units	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4
Week		0	1	2	4	8	12	16
Lithology		Ox_Gangue	Ox_Gangue	Ox_Gangue	Ox_Gangue	Ox_Gangue	Ox_Gangue	Ox_Gangue
Effluent (L)	L	1.09	0.72	0.63	0.60	0.54	0.62	0.53
Redox		277.58	319.56	286.89	223.31	277.38	247.77	266.22
Fe ²⁺	mg/L	0.38	0.1	0.11	0.43	0.52	0.53	0.3
Fe ³⁺	mg/L	0.67	0.1626	0.07	0.39	0.56	0.56	0.8
Total Alk	mg/L	29	3.6	13	35	19	17	I/S
CO ₃ ²⁻	mg/L	<1	<1	<1	5.2	<1	<1	I/S
HCO ₃ ⁻	mg/L	29	3.6	13	30	19	17	I/S
Aluminum	mg/L	1.6	0.23	0.27	1.3	2	1.9	1.2
Antimony	mg/L	0.016	0.0058	0.0073	0.012	0.015	0.016	0.014
Arsenic	mg/L	0.22	0.15	0.26	0.29	0.31	0.3	0.3
Barium	mg/L	0.26	0.24	0.19	0.27	0.36	0.13	0.46
Beryllium	mg/L	0.0019	<0.001	<0.001	0.002	0.0025	0.003	0.0016
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.39	0.11	0.12	0.23	0.3	0.27	0.17
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	0.0016	<0.001	<0.001
Calcium	mg/L	3.9	2.1	1.9	1.6	1.7	1.5	1.4
Chloride	mg/L	6.1	<1	4	1.2	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	1.7	<0.1	1.9	1.6	1.6	1	1.2
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	4.2	0.67	0.84	3.7	5.5	5.4	3.5
Lead	mg/L	0.01	<0.0025	<0.0025	0.0049	0.0055	0.0055	<0.0025
Lithium	mg/L	2.3	0.38	0.48	2.1	3	3	1.8
Magnesium	mg/L	25	4	5.1	21	30	31	19
Manganese	mg/L	0.032	0.006	0.007	0.031	0.05	0.049	0.031
Mercury	mg/L	0.00067	<0.00025	<0.00025	0.00067	0.00077	0.00073	0.00052
Molybdenum	mg/L	0.046	0.04	0.071	0.056	0.042	0.03	0.025
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate_as_N	mg/L	0.24	<1	<1	<1	<1	<1	<1
Nitrite_as_N	mg/L	0.22	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L	0.89	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55
TKN	mg/L	0.44	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
pH	s.u.	7.41	6.59	7.57	8.4	7.03	7.35	I/S
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	14	2.6	3.1	12	17	18	11
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	21	12	14	11	12	9.4	9.5
Strontium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sulfate	mg/L	14	<1	9.4	5.4	5.7	<1	2.2
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	0.34	<0.1	<0.1	0.3	0.45	0.45	0.28
TDS	mg/L	220	90	83	220	290	300	210
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.015	<0.01	<0.01	0.016	0.022	0.022	0.015
Zinc	mg/L	0.068	0.028	<0.01	0.044	0.058	0.066	0.039
Anions	mg/L	3.93	1.09	1.28	2.94	4.03	4	I/S
Cations	mg/L	1.15	0.1	0.67	0.92	0.58	0.4	I/S
Error	%	54.8	89.5	31.5	52.1	74.8	81.8	I/S

Appendix H
Tabulated HCT testing results

Sample_ID	Units	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4	7&56-CG30M-L19A-4
Week		20	24	28	32	36	40	44
Lithology		Ox_Gangue	Ox_Gangue	Ox_Gangue	Ox_Gangue	Ox_Gangue	Ox_Gangue	Ox_Gangue
Effluent (L)	L	0.50	0.58	0.51	0.64	0.70	0.65	0.61
Redox		234.46	342.5	311.96	379.69	348.21	350.35	330.09
Fe ²⁺	mg/L	0.26	<0.1	0.2	<0.1	<0.1	<0.1	<0.1
Fe ³⁺	mg/L	0.2	0.34	1.16	0.15	0.1	0	0
Total Alk	mg/L	28.39	41.8	19.51	18	19	74	50
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	28.39	41.8	19.51	18	19	74	50
Aluminum	mg/L				0.23	0.14	<0.05	<0.05
Antimony	mg/L				0.0062	0.0052	0.0042	0.0039
Arsenic	mg/L				0.14	0.12	0.082	0.13
Barium	mg/L				0.2	0.22	0.022	<0.02
Beryllium	mg/L				<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L				<0.1	<0.1	<0.1	<0.1
Boron	mg/L				<0.1	<0.1	0.15	<0.1
Cadmium	mg/L				<0.001	<0.001	<0.001	<0.001
Calcium	mg/L				2.8	3.7	17	12
Chloride	mg/L				<1	<1	<1	<1
Chromium	mg/L				<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L				<0.01	<0.01	<0.01	<0.01
Copper	mg/L				<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L				1.2	1	0.77	0.86
Gallium	mg/L				<0.1	<0.1	<0.1	<0.1
Iron	mg/L				0.61	0.35	<0.1	0.17
Lead	mg/L				<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L				0.33	0.2	<0.1	0.11
Magnesium	mg/L				3.9	2.9	5.3	4.1
Manganese	mg/L				<0.01	<0.01	<0.01	<0.01
Mercury	mg/L				<0.00045	<0.00045	<0.00045	<0.00045
Molybdenum	mg/L				<0.02	<0.02	<0.02	<0.02
Nickel	mg/L				<0.03	<0.03	<0.03	<0.03
Nitrate_as_N	mg/L				<0.15	<0.15	<0.15	<0.15
Nitrite_as_N	mg/L				<0.06	<0.06	<0.06	<0.06
Total N	mg/L				<0.61	<0.61	<0.61	<0.61
TKN	mg/L				<0.4	<0.4	<0.4	<0.4
pH	s.u.				7.4	7.4	7.51	7.58
Phosphorus	mg/L				<0.5	<0.5	<0.5	<0.5
Potassium	mg/L				1.9	1.5	2.5	2.3
Scandium	mg/L				<0.1	<0.1	<0.1	<0.1
Selenium	mg/L				<0.005	<0.005	<0.005	<0.005
Silver	mg/L				<0.005	<0.005	<0.005	<0.005
Sodium	mg/L				5.2	3.9	3.2	1.7
Strontium	mg/L				<0.1	<0.1	0.17	0.12
Sulfate	mg/L				<1.5	<1.5	<1.5	<1.5
Thallium	mg/L				<0.001	<0.001	<0.001	<0.001
Tin	mg/L				<0.1	<0.1	<0.1	<0.1
Titanium	mg/L				<0.1	<0.1	<0.1	<0.1
TDS	mg/L				58	48	160	150
Uranium	mg/L				<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L				<0.01	<0.01	<0.01	<0.01
Zinc	mg/L				0.027	0.028	<0.02	<0.02
Anions	mg/L				0.79	0.67	1.49	1.08
Cations	mg/L				0.42	0.43	1.52	1.04
Error	%				30.5	21.3	1.07	1.58

Appendix H
Tabulated HCT testing results

Sample_ID	Units	9-CYCUFCOMP-E23B-356	9-CYCUFCOMP-E23B-356	9-CYCUFCOMP-E23B-356	9-CYCUFCOMP-E23B-356	9-CYCUFCOMP-E23B-356	9-CYCUFCOMP-E23B-356	9-CYCUFCOMP-E23B-356
Week		0	1	2	4	8	12	16
Lithology		Gangue	Gangue	Gangue	Gangue	Gangue	Gangue	Gangue
Effluent (L)	L	1.07	0.68	0.72	0.52	0.76	0.58	0.56
Redox		292.95	263.08	278.8	260.53	346.18	351.98	328.74
Fe ²⁺	mg/L	<0.1	<0.1	<0.1	0.17	<0.1	0.16	0.15
Fe ³⁺	mg/L	0.31	0.33	0.2	0.29	0.17	0.28	0.15
Total Alk	mg/L	15.32	20.68	19.18	20.36	18.4	13	7.6
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	15.32	20.68	19.18	20.36	18.4	13	7.6
Aluminum	mg/L	0.21	0.34	0.27	0.77	0.27	0.75	0.61
Antimony	mg/L	0.0062	0.0071	0.0059	0.0075	0.0048	0.0048	0.0039
Arsenic	mg/L	0.069	0.11	0.092	0.17	0.084	0.084	0.07
Barium	mg/L	0.22	0.48	0.21	0.26	0.15	0.21	0.069
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.24	0.33	0.16	0.16	0.29	0.13	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	4.2	2.5	2.1	1.4	1.8	1.5	1.4
Chloride	mg/L	6.5	1.2	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	4.3	3.8	2.5	2.6	2.2	1.2	1.2
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	0.31	0.52	0.37	1.2	0.44	1.2	0.94
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	0.71	0.41	0.28	0.7	0.3	0.77	0.57
Magnesium	mg/L	4	4.6	3.5	9.9	4.1	9.9	7.3
Manganese	mg/L	<0.01	<0.01	<0.01	0.022	<0.01	0.015	0.013
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00045	<0.00045	0.00047	<0.00045
Molybdenum	mg/L	0.046	0.081	0.074	0.073	0.033	0.029	<0.02
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate_as_N	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Nitrite_as_N	mg/L	0.11	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Total N	mg/L	1.1	<0.61	<0.61	<0.61	<4.2	<0.61	<0.61
TKN	mg/L	0.94	<0.4	<0.4	<0.4		<0.4	<0.4
pH	s.u.	6.11	6.65	6.51	6.84	7.17	7.11	6.77
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	4	3	2.4	5	2.5	5	4.4
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	16	12	9.2	9.2	5.8	5.2	3.4
Strontium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sulfate	mg/L	22	11	3.9	8.5	<1.5	<1.5	<1.5
Thallium	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	0.11	<0.1
TDS	mg/L	140	100	88	140	84	110	89
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.022	0.043	0.041	0.054	0.036	0.039	0.034
Zinc	mg/L	0.02	0.032	0.029	0.035	0.028	0.058	0.026
Anions	mg/L	1.38	1.17	0.91	0.855	0.8	1.39	1.05
Cations	mg/L	1	0.72	0.49	0.445	0.4	0.32	0.22
Error	%	15.7	23.6	29.5	31.6	33.7	62.4	66

Appendix H
Tabulated HCT testing results

Sample_ID	Units	9-CYCUFCOMP- E23B-356	9-CYCUFCOMP- E23B-356	9-CYCUFCOMP- E23B-356	9-CYCUFCOMP- E23B-356			
Week		20	24	28	32			
Lithology		Gangue	Gangue	Gangue	Gangue			
Effluent (L)	L	0.61	0.66	0.56	0.68			
Redox		291.18	447.97	223.45	324.71			
Fe ²⁺	mg/L	<0.1	<0.1	<0.1	<0.1			
Fe ³⁺	mg/L	0.13	0	0	0			
Total Alk	mg/L	11	38	33	8			
CO ₃ ²⁻	mg/L	<1	<1	<1	<1			
HCO ₃ ⁻	mg/L	11	38	33	8			
Aluminum	mg/L	0.23	0.056	<0.05	0.05			
Antimony	mg/L	0.0029	<0.0025	<0.0025	<0.0025			
Arsenic	mg/L	0.051	0.033	0.037	0.052			
Barium	mg/L	0.2	0.026	0.024	<0.02			
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001			
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1			
Boron	mg/L	<0.1	0.11	<0.1	<0.1			
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001			
Calcium	mg/L	1.8	7.9	7	1.9			
Chloride	mg/L	<1	<1	<1	<1			
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005			
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01			
Copper	mg/L	<0.04	<0.04	<0.04	<0.04			
Fluoride	mg/L	1	1	0.78	1.5			
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1			
Iron	mg/L	0.33	<0.1	<0.1	<0.1			
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025			
Lithium	mg/L	0.25	<0.1	<0.1	<0.1			
Magnesium	mg/L	3.3	2.4	2.2	0.91			
Manganese	mg/L	<0.01	<0.01	<0.01	<0.01			
Mercury	mg/L	<0.00045	<0.00045	<0.00045	<0.00045			
Molybdenum	mg/L	<0.02	<0.02	<0.02	<0.02			
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03			
Nitrate_as_N	mg/L	<0.15	<0.15	<0.15	<0.15			
Nitrite_as_N	mg/L	<0.06	<0.06	<0.06	<0.06			
Total N	mg/L	<0.61	<0.61	<0.61	<0.61			
TKN	mg/L	<0.4	<0.4	<0.4	<0.4			
pH	s.u.	7.31	7.4	7.45	6.59			
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5			
Potassium	mg/L	3.9	2.6	2.6	1.7			
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1			
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005			
Silver	mg/L	<0.005	<0.005	<0.005	<0.005			
Sodium	mg/L	3.5	2.2	1.5	<1.5			
Strontium	mg/L	<0.1	<0.1	<0.1	<0.1			
Sulfate	mg/L	<1.5	<1.5	<1.5	<1.5			
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001			
Tin	mg/L	<0.1	<0.1	<0.1	<0.1			
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1			
TDS	mg/L	57	140	120	77			
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005			
Vanadium	mg/L	0.023	0.017	0.021	0.025			
Zinc	mg/L	0.038	<0.02	<0.02	<0.02			
Anions	mg/L	0.66	0.76	0.66	0.22			
Cations	mg/L	0.27	0.81	0.7	0.24			
Error	%	41.4	3.31	2.83	4.4			

Appendix H
Tabulated HCT testing results

Sample_ID	Units	LNC-079 (0-7.6)	LNC-079 (0-7.6)	LNC-079 (0-7.6)	LNC-079 (0-7.6)	LNC-079 (0-7.6)	LNC-079 (0-7.6)	LNC-079 (0-7.6)
Week		0	1	2	4	8	12	16
Lithology		Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium
Effluent (L)	L	0.86	0.80	0.68	0.69	0.71	0.71	0.70
Redox		319.39	322.02	268.77	293.45	306.84	307.86	302.22
Fe ²⁺	mg/L	0.1	0.15	0.1	0.1	0.1	0.1	<0.1
Fe ³⁺	mg/L	0	0.3	0.17	0.21	0.19	0.16	0.14
Total Alk	mg/L	220	360	310	270	200	160	125.01
CO ₃ ²⁻	mg/L	4.2	17	23	25	15	16	<1
HCO ₃ ⁻	mg/L	220	340	290	240	180	140	125.01
Aluminum	mg/L	<0.045	0.058	0.18	0.35	0.5	0.2	0.28
Antimony	mg/L	0.02	0.021	0.023	0.021	0.016	0.01	0.0078
Arsenic	mg/L	0.41	0.25	0.37	0.18	0.072	0.042	0.031
Barium	mg/L	0.19	0.1	0.062	0.051	0.039	<0.01	<0.02
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	4.9	4.7	2.7	1.3	0.49	0.27	0.19
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	260	20	7.9	6.2	5.2	3.5	4.02
Chloride	mg/L	1300	19	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	4.8	7.7	12	7.7	4.1	1.9	1.2
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	0.14	0.24	0.36	0.13	0.21
Lead	mg/L	<0.0025	0.012	0.0057	<0.0025	<0.0025	0.0052	<0.0025
Lithium	mg/L	0.34	0.12	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	100	5.9	2	1.5	1.1	0.7	0.74
Manganese	mg/L	0.012	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Molybdenum	mg/L	0.35	0.73	0.19	0.064	0.029	<0.01	<0.02
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	0.39
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.06
Total N	mg/L	6.5	2.4	1.5	<0.55	<0.55	<0.55	<0.61
TKN	mg/L	6.5	2.2	1.2	0.59	0.4	<0.4	<0.4
pH	s.u.	8.3	8.46	8.41	8.69	8.63	8.67	8.41
Phosphorus	mg/L	0.69	0.57	0.9	1.1	1.1	0.85	0.59
Potassium	mg/L	27	8.9	4.7	4	3.2	2.7	2.6
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.13	0.0063	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	0.0093
Sodium	mg/L	1200	310	170	140	94	69	56
Strontium	mg/L	2.6	0.19	<0.1	<0.1	<0.1	<0.1	<0.1
Sulfate	mg/L	940	350	82	38	14	4.2	1
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	3400	1100	460	440	270	230	180
Uranium	mg/L	0.032	0.027	0.012	0.0073	<0.005	<0.005	<0.005
Vanadium	mg/L	0.13	0.23	0.48	0.71	0.65	0.27	0.16
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02
Anions	mg/L	74.1	15.2	8.1	6.68	4.6	3.33	2.8
Cations	mg/L	61	15.4	8.51	6.58	4.41	3.31	2.69
Error	%	9.72	1	2.43	1	2.06	1	1.87

Appendix H
Tabulated HCT testing results

Sample_ID	Units	LNC-079 (0-7.6)	LNC-079 (0-7.6)	LNC-079 (0-7.6)	LNC-079 (0-7.6)	LNC-079 (0-7.6)	LNC-079 (0-7.6)	
Week		20	24	28	32	40	44	
Lithology		Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	
Effluent (L)	L	0.72	0.71	0.71	0.70	0.67	0.71	
Redox		338.8	328.63	350.53	306.96	325.45	371.74	
Fe ²⁺	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Fe ³⁺	mg/L	0	0	0	0	0	0	
Total Alk	mg/L	98.22	94.64	68	80	68	79	
CO ₃ ²⁻	mg/L	<1	<1	<1	19	<1	<1	
HCO ₃ ⁻	mg/L	98.22	94.64	68	61	68	79	
Aluminum	mg/L	0.058	<0.05	<0.05	<0.05	<0.05	<0.05	
Antimony	mg/L	0.0059	0.0041	0.0035	0.0032	0.0033	<0.0025	
Arsenic	mg/L	0.022	0.013	0.011	0.013	0.012	0.0078	
Barium	mg/L	<0.02	0.026	0.023	0.031	0.049	0.058	
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Boron	mg/L	0.14	0.11	0.1	<0.1	<0.1	<0.1	
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Calcium	mg/L	3.75	6.61	7.6	11	16	20	
Chloride	mg/L	<1	<1	<1	<1	<1	<1	
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	
Fluoride	mg/L	0.71	0.43	0.47	0.44	0.4	<0.3	
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Iron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Magnesium	mg/L	0.68	1.32	1.4	2.1	3.1	5.1	
Manganese	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Mercury	mg/L	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	
Molybdenum	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Nitrate_as_N	mg/L	0.3	0.24	0.3	0.34	0.59	0.33	
Nitrite_as_N	mg/L	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	
Total N	mg/L	<0.61	<0.61	<0.61	<0.61	0.67	<0.61	
TKN	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	
pH	s.u.	8.55	8.12	7.69	8.47	7.15	7.44	
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Potassium	mg/L	2.6	3.5	3.8	3.9	4.9	6.2	
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Silver	mg/L	0.0061	<0.005	<0.005	<0.005	<0.005	<0.005	
Sodium	mg/L	40	32	17	7.9	4.8	3	
Strontium	mg/L	<0.1	<0.1	<0.1	0.11	0.17	0.22	
Sulfate	mg/L	<1	<1	<1.5	<1.5	<1.5	<1.5	
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
TDS	mg/L	140	130	95	100	110	100	
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Vanadium	mg/L	0.09	0.041	0.035	0.028	0.026	0.017	
Zinc	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Anions	mg/L	2.02	1.89	1.33	1.17	1.39	1.71	
Cations	mg/L	2.1	2.04	1.41	1.65	1.42	1.6	
Error	%	1.94	3.79	2.71	17.2	1.24	3.15	

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)
Week		0	1	2	3	4	8	12
Lithology		Basalt	Basalt	Basalt	Basalt	Basalt	Basalt	Basalt
Effluent (L)	L	0.58	0.69	0.73	0.68	0.69	0.64	0.72
Redox		-10	108	261	209	286	233	325
Fe ²⁺	mg/L	0.25	0.15	0.06	0.09	0.04	0.03	0.02
Fe ³⁺	mg/L	0.54	0.28	0.34	0.09	0.13	0.05	0
Total Alk	mg/L	220	97	77	49	48	53	48
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	270	120	94	60	58	65	58
Aluminum	mg/L	0.093	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.026	0.028	0.031	0.031	0.03	0.041	0.031
Arsenic	mg/L	0.029	0.086	0.074	0.13	0.14	0.18	0.17
Barium	mg/L	0.13	0.038	0.034	0.031	0.023	0.039	0.037
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.23	0.18	0.13	<0.1	0.12	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	340	250	240	210	140	58	38
Chloride	mg/L	21	6.8	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	0.058	0.013	0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	<0.1	1.6	1.3	1.8	2	2.1	1.4
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	2.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	1.9	0.87	0.55	0.38	0.3	<0.1	<0.1
Magnesium	mg/L	170	110	99	85	56	21	14
Manganese	mg/L	0.98	0.41	0.38	0.24	0.14	0.044	0.022
Mercury	mg/L	0.00029	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Molybdenum	mg/L	0.83	2.7	2.4	2.2	1.5	0.53	0.22
Nickel	mg/L	0.072	0.077	0.058	0.036	0.032	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.48	1.7
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.2	7.69	7.67	7.77	7.68	7.85	7.82
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	13	9.3	8.3	7.5	7.2	3.5	2.5
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.19	0.078	0.022	0.012	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	130	93	75	59	49	16	8.3
Strontium	mg/L	3	2	1.9	1.6	1.1	0.5	0.34
Sulfate	mg/L	1600	1900	1100	850	570	200	110
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	2700	1900	1700	1400	980	390	220
Uranium	mg/L	0.5	0.38	0.25	0.1	0.077	0.052	0.038
Vanadium	mg/L	0.03	<0.01	0.03	0.028	0.068	0.03	0.018
Zinc	mg/L	0.08	0.014	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	37.1	25.8	23.6	20.2	13.9	5.41	3.47
Cations	mg/L	38.3	41.8	24.5	18.8	12.9	5.34	3.31
Error	%	1.6	24	1.9	3.8	3.7	1	2.4

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)
Week		16	20	24	28	32	36	40
Lithology		Basalt	Basalt	Basalt	Basalt	Basalt	Basalt	Basalt
Effluent (L)	L	0.72	0.68	0.72	0.69	0.69	0.70	0.68
Redox		260	288	214	240	195	173	199
Fe ²⁺	mg/L	0	0	0	0	0	0	0
Fe ³⁺	mg/L	0.02	0	0	0	0.02	0.04	0
Total Alk	mg/L	52	42	48	66	44	44	47
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	63	51	58	80	53	53	58
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.032	0.026	0.027	0.022	0.024	0.023	0.023
Arsenic	mg/L	0.18	0.18	0.19	0.2	0.2	0.2	0.22
Barium	mg/L	0.045	0.041	0.049	0.049	0.039	0.044	0.048
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	42	39	40	37	30	31	30
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	1.2	0.81	0.68	0.46	0.43	0.39	0.37
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead	mg/L	<0.0025	0.0034	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	14	14	13	12	9.1	9.3	9.3
Manganese	mg/L	0.024	0.0062	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	0.00014	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Molybdenum	mg/L	0.12	0.079	0.076	0.056	0.053	0.052	0.055
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.9	7.75	7.75	7.4	7.62	7.62	7.74
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	2.4	2	1.8	1.3	1.3	1.2	1.3
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	0.013	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	5.5	4.8	3.8	2.7	2.6	1.9	2
Strontium	mg/L	0.37	0.32	0.35	0.29	0.26	0.26	0.26
Sulfate	mg/L	130	110	98	82	71	68	66
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	300	240	200	240	180	170	180
Uranium	mg/L	0.034	0.024	0.025	0.022	0.018	0.016	0.017
Vanadium	mg/L	0.033	0.02	0.032	0.021	0.021	0.022	0.014
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	3.55	3.36	3.28	2.98	2.39	2.43	2.38
Cations	mg/L	3.8	3.17	3.03	3.04	2.37	2.3	2.34
Error	%	3.4	2.9	4	1	1	2.5	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-026 (125.8-166.1)	WLC-026 (125.8-166.1)					
Week		44	47					
Lithology		Basalt	Basalt					
Effluent (L)	L	0.75	0.71					
Redox		194	248					
Fe ²⁺	mg/L	0	0					
Fe ³⁺	mg/L	0	0.04					
Total Alk	mg/L	41	47					
CO ₃ ²⁻	mg/L	<1	<1					
HCO ₃ ⁻	mg/L	50	58					
Aluminum	mg/L	<0.045	<0.045					
Antimony	mg/L	0.02	0.02					
Arsenic	mg/L	0.19	0.19					
Barium	mg/L	0.041	0.04					
Beryllium	mg/L	<0.001	<0.001					
Bismuth	mg/L	<0.1	<0.1					
Boron	mg/L	<0.1	<0.1					
Cadmium	mg/L	<0.001	<0.001					
Calcium	mg/L	26	25					
Chloride	mg/L	<1	<1					
Chromium	mg/L	<0.005	<0.005					
Cobalt	mg/L	<0.01	<0.01					
Copper	mg/L	<0.05	<0.05					
Fluoride	mg/L	0.26	0.22					
Gallium	mg/L	<0.1	<0.1					
Iron	mg/L	<0.01	0.01					
Lead	mg/L	<0.0025	<0.0025					
Lithium	mg/L	<0.1	<0.1					
Magnesium	mg/L	7.8	7.4					
Manganese	mg/L	<0.005	<0.005					
Mercury	mg/L	<0.0001	<0.0001					
Molybdenum	mg/L	0.048	0.044					
Nickel	mg/L	<0.01	<0.01					
Nitrate as N	mg/L	<1	<1					
Nitrite as N	mg/L	<0.025	<0.025					
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.4	7.76					
Phosphorus	mg/L	0.5	0.5					
Potassium	mg/L	0.91	0.93					
Scandium	mg/L	0.1	0.1					
Selenium	mg/L	0.005	0.005					
Silver	mg/L	0.005	0.005					
Sodium	mg/L	1.7	1.5					
Strontium	mg/L	0.24	0.22					
Sulfate	mg/L	50	48					
Thallium	mg/L	0.001	0.001					
Tin	mg/L	<0.1	<0.1					
Titanium	mg/L	<0.1	<0.1					
TDS	mg/L	130	120					
Uranium	mg/L	0.019	0.018					
Vanadium	mg/L	0.018	0.016					
Zinc	mg/L	<0.01	<0.01					
Anions	mg/L	2.04	1.95					
Cations	mg/L	1.87	1.96					
Error	%	4.2	1					

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)
Week		0	1	2	4	8	12	16
Lithology		Ash	Ash	Ash	Ash	Ash	Ash	Ash
Effluent (L)	L	0.98	0.60	0.71	0.70	0.66	0.61	0.72
Redox		313.3	374.56	329.99	338.12	338.19	328.18	385.46
Fe ²⁺	mg/L	0.1	0.1	0.1	0.1	0.1	<0.1	<0.1
Fe ³⁺	mg/L	0	0	0	0	<	0	0
Total Alk	mg/L	200	30	57	69	44	50.11	53.05
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	200	30	57	69	44	50.11	53.05
Aluminum	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Antimony	mg/L	0.0068	0.013	0.012	0.017	0.018	0.014	0.012
Arsenic	mg/L	<0.005	0.0064	0.0075	0.0064	0.008	0.0076	0.0087
Barium	mg/L	0.075	0.045	0.031	0.041	0.05	0.067	0.057
Beryllium	mg/L	0.0019	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	1.1	0.43	0.29	0.2	<0.1	<0.1	0.15
Cadmium	mg/L	0.0052	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	620	590	350	220	62	46	34
Chloride	mg/L	22	<10	<10	<5	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	0.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	8.4	7.8	3.4	3.5	1.5	0.53	0.51
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	mg/L	<0.0025	<0.0025	<0.0025	0.0059	<0.0025	<0.0025	<0.0025
Lithium	mg/L	1.9	0.24	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	210	76	32	10	3	2.2	1.4
Manganese	mg/L	34	3.5	2.9	0.97	0.2	0.11	0.084
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00045	<0.00045
Molybdenum	mg/L	0.26	0.9	0.48	0.57	0.27	0.15	0.085
Nickel	mg/L	0.18	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate_as_N	mg/L	<1.5	<1.5	<1.5	<0.75	<0.15	<0.15	<0.15
Nitrite_as_N	mg/L	<0.6	<0.6	<0.6	<0.3	<0.06	<0.06	<0.06
Total N	mg/L	<2.5	<2.5	<2.5	<1.4	<0.61	<0.61	<4.2
TKN	mg/L	1.3	0.51	<0.4	<0.4	<0.4	<0.4	<4.01
pH	s.u.	7.58	7.5	7.68	8.02	7.27	7.67	7.75
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	14	4.7	2.9	1.7	1	1.1	<1
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.0084	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	0.016	<0.005	<0.005	<0.005
Sodium	mg/L	95	20	7	3.4	1.9	<1.5	<1.5
Strontium	mg/L	6.9	3.8	2.2	1.4	0.45	0.33	0.24
Sulfate	mg/L	2100	1400	870	450	110	69	39
Thallium	mg/L	0.0026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	3400	2350	1300	780	240	160	130
Uranium	mg/L	0.011	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	2.2	0.074	0.045	<0.02	<0.02	<0.02	<0.02
Anions	mg/L	54	36.8	20.6	12	3.46	2.51	1.81
Cations	mg/L	48.9	30.1	19.4	10.9	3.25	2.5	1.94
Error	%	5	9.96	2.87	4.81	3	<1	3.29

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)	WLC-050 (337.1-357.2)
Week		20	24	28	32	36	40	44
Lithology		Ash	Ash	Ash	Ash	Ash	Ash	Ash
Effluent (L)	L	0.73	0.72	0.70	0.72	0.73	0.72	0.71
Redox		383.89	358	300.06	428.49	201.35	331.81	288.51
Fe ²⁺	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fe ³⁺	mg/L	0	0	0	0	0	0	0
Total Alk	mg/L	54	47	49	110	79	54	54
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	54	47	49	110	79	54	54
Aluminum	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Antimony	mg/L	0.011	0.0085	0.0087	0.0066	0.0072	0.0075	0.0069
Arsenic	mg/L	0.0074	0.0068	0.01	0.012	0.022	0.022	0.02
Barium	mg/L	0.056	0.049	0.059	0.099	0.074	0.053	0.058
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	0.12	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	30	27	30	46	34	25	25
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	1.1	0.98	1	1.6	1.2	0.77	0.83
Manganese	mg/L	0.06	0.049	0.046	0.067	0.032	0.022	0.019
Mercury	mg/L	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045
Molybdenum	mg/L	0.064	0.049	0.045	0.021	0.022	<0.02	<0.02
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate_as_N	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Nitrite_as_N	mg/L	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Total N	mg/L	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61
TKN	mg/L	<0.4	<4	<0.4	<0.4	<0.4	<0.4	<0.4
pH	s.u.	7.63	7.54	7.25	7.83	7.7	7.06	6.97
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	<1	<1	<1	<1	<1	<1	<1
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	<1.5	<1.5	1.8	<1.5	<1.5	<1.5	<1.5
Strontium	mg/L	0.21	0.19	0.19	0.31	0.23	0.17	0.17
Sulfate	mg/L	30	25	36	17	17	16	18
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	100	93	120	200	150	120	86
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Anions	mg/L	1.59	1.43	1.66	2.43	1.8	1.31	1.32
Cations	mg/L	1.7	1.46	1.73	2.55	1.93	1.41	1.45
Error	%	3.47	1.05	2.06	2.47	3.66	3.7	4.97

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)
Week		0	1	2	3	4	8	12
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.55	0.78	0.76	0.72	0.76	0.73	0.72
Redox		-107	160	159	189	186	273	318
Fe ²⁺	mg/L	8.45	0.28	0.04	0.06	0.07	0.06	0.1
Fe ³⁺	mg/L	32.15	161.72	12.26	2.24	0.88	0.02	0.05
Total Alk	mg/L	140	220	170	130	110	7.5	9.8
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	170	270	200	160	130	9.1	12
Aluminum	mg/L	0.89	0.091	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.12	0.19	0.21	0.15	0.16	0.0065	0.0086
Arsenic	mg/L	0.045	0.073	0.064	0.037	0.041	0.0098	0.0082
Barium	mg/L	0.13	0.033	0.058	0.061	0.054	0.084	0.011
Beryllium	mg/L	0.0087	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	3.1	1.6	0.54	0.19	0.14	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	490	520	180	130	95	30	44
Chloride	mg/L	49	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	0.0087	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	0.68	0.016	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	21	16	12	9.6	8.5	0.64	0.78
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	87	<0.02	<0.02	0.011	0.02	0.026	0.019
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	12	0.51	0.2	0.12	<0.1	<0.1	<0.1
Magnesium	mg/L	700	110	13	10	6.9	1.6	2.4
Manganese	mg/L	27	1.5	0.17	0.14	0.088	0.015	0.015
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Molybdenum	mg/L	10	48	33	15	10	0.69	1.1
Nickel	mg/L	0.97	0.094	0.05	0.026	<0.03	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	6.82	7.93	8.11	8.07	7.87	7.12	7.02
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	53	22	11	8.7	6.7	0.69	1.4
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.031	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	260	21	8.1	4.7	2.9	1.5	0.52
Strontium	mg/L	8.9	6.2	1.9	1.4	1	0.26	0.36
Sulfate	mg/L	4500	1400	290	200	130	70	100
Thallium	mg/L	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	7100	2700	800	560	380	140	160
Uranium	mg/L	0.059	0.068	0.018	0.012	0.01	<0.005	<0.005
Vanadium	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	5.9	0.065	<0.01	0.015	<0.01	<0.01	<0.01
Anions	mg/L	101	36.5	10.7	7.74	5.61	1.71	2.45
Cations	mg/L	99	34.4	9.95	7.29	5.28	1.64	2.32
Error	%	1	3	3.6	3	3	2.2	2.8

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)
Week		16	20	24	28	32	36	40
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.75	0.76	0.71	0.74	0.72	0.75	0.73
Redox		294	286	279	249	212	203	206
Fe ²⁺	mg/L	0.02	0	0	0	0	0	0
Fe ³⁺	mg/L	0.26	0.22	0.22	0.1	0.13	0.13	0.1
Total Alk	mg/L	17	14	18	38	11	13	17
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	21	18	22	46	14	16	21
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.015	0.011	0.014	0.014	0.0083	0.0091	0.0099
Arsenic	mg/L	0.013	0.0089	0.013	0.016	0.01	0.0096	0.012
Barium	mg/L	0.015	<0.01	0.011	0.014	<0.01	0.011	0.012
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	0.22	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	43	53	62	36	20	22	38
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	1.2	0.96	1.2	1	0.73	0.78	0.84
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	0.034	<0.02	<0.02	0.018	0.03	0.018	0.012
Lead	mg/L	<0.0025	0.0033	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	2.8	3	3.4	2.1	1.2	1.2	2
Manganese	mg/L	0.033	0.026	0.034	0.055	0.016	0.023	0.025
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Molybdenum	mg/L	1.6	1.3	1.8	1.3	0.83	0.94	0.95
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.38	7.31	7.41	6.91	6.83	6.88	7.37
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	1.8	1.5	1.9	1.2	0.81	0.74	1.1
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	<0.5	0.8	0.79	<0.5	<0.5	<0.5	<0.5
Strontium	mg/L	0.34	0.38	0.46	0.27	0.16	0.16	0.27
Sulfate	mg/L	100	120	120	60	44	41	77
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	200	220	220	250	85	90	150
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	2.43	2.97	3.46	2	1.12	1.22	2.09
Cations	mg/L	2.49	2.84	2.92	2.06	1.18	1.16	1.99
Error	%	1.3	2.1	8.4	1.3	2.8	2.5	2.4

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)
Week		44	48	52	56	60	64	68
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.72	0.74	0.75	0.73	0.74	0.74	0.74
Redox		213	219	212	212	205	206	214
Fe ²⁺	mg/L	0	0	0.01	0	0	0	0
Fe ³⁺	mg/L	0.11	0.16	0.05	0.08	0.12	0.15	0.06
Total Alk	mg/L	15	23	32	22	28	26	16
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	1
HCO ₃ ⁻	mg/L	18	28	39	27	35	31	19
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.0092	0.013	0.017	0.012	0.016	0.015	0.0079
Arsenic	mg/L	0.013	0.016	0.021	0.014	0.02	0.017	0.012
Barium	mg/L	<0.01	0.014	0.013	0.012	0.013	0.012	<0.01
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	30	23	25	20	22	16	14
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	0.81	0.97	1.1	0.75	1	0.78	0.48
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	0.02	0.031	0.024	0.022	0.016	0.023	0.03
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	1.5	1.3	1.3	1	0.93	0.78	0.71
Manganese	mg/L	0.018	0.019	0.018	0.014	0.015	0.017	0.016
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Molybdenum	mg/L	0.91	1.1	1.4	0.91	1	0.83	0.51
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate_as_N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite_as_N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	6.85	7.41	7.43	7.49	7.09	7.47	7.08
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	0.87	0.97	1	0.75	<0.5	0.89	0.58
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	<0.5	<0.5	<0.5	<0.5	1	0.57	<0.5
Strontium	mg/L	0.22	0.16	0.18	0.14	0.15	0.11	0.1
Sulfate	mg/L	58	36	33	26	27	20	19
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	120	100	82	80	94	63	81
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	1.64	1.28	1.38	1.1	1.22	0.91	0.77
Cations	mg/L	1.55	1.26	1.38	1.02	1.19	0.97	0.73
Error	%	3.1	1	1	3.7	1.3	2.9	2.8

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-117 (76.5-85.5)	WLC-117 (76.5-85.5)				
Week		72	74				
Lithology		Claystone/Ash	Claystone/Ash				
Effluent (L)	L	0.75	0.74				
Redox		195	203				
Fe ²⁺	mg/L	0.01	0.01				
Fe ³⁺	mg/L	0.06	0.07				
Total Alk	mg/L	19	16				
CO ₃ ²⁻	mg/L	<1	<1				
HCO ₃ ⁻	mg/L	23	20				
Aluminum	mg/L	<0.045	<0.045				
Antimony	mg/L	0.011	0.013				
Arsenic	mg/L	0.016	0.019				
Barium	mg/L	0.014	<0.01				
Beryllium	mg/L	<0.001	<0.001				
Bismuth	mg/L	<0.1	<0.1				
Boron	mg/L	<0.1	<0.1				
Cadmium	mg/L	<0.001	<0.001				
Calcium	mg/L	16	15				
Chloride	mg/L	<1	<1				
Chromium	mg/L	<0.005	<0.005				
Cobalt	mg/L	<0.01	<0.01				
Copper	mg/L	<0.04	<0.04				
Fluoride	mg/L	0.55	0.57				
Gallium	mg/L	<0.1	<0.1				
Iron	mg/L	0.024	<0.02				
Lead	mg/L	<0.0025	<0.0025				
Lithium	mg/L	<0.1	<0.1				
Magnesium	mg/L	0.74	0.59				
Manganese	mg/L	0.018	0.014				
Mercury	mg/L	<0.00025	<0.00025				
Molybdenum	mg/L	0.68	0.65				
Nickel	mg/L	<0.03	<0.03				
Nitrate as N	mg/L	<1	<1				
Nitrite as N	mg/L	<0.05	<0.05				
Total N	mg/L						
TKN	mg/L						
pH	s.u.	7.24	7.2				
Phosphorus	mg/L	<0.5	<0.5				
Potassium	mg/L	0.95	<0.5				
Scandium	mg/L	<0.1	<0.1				
Selenium	mg/L	<0.005	<0.005				
Silver	mg/L	<0.005	<0.005				
Sodium	mg/L	<0.5	<0.5				
Strontium	mg/L	0.11	0.11				
Sulfate	mg/L	21	19				
Thallium	mg/L	<0.001	<0.001				
Tin	mg/L	<0.1	<0.1				
Titanium	mg/L	<0.1	<0.1				
TDS	mg/L	62	63				
Uranium	mg/L	<0.005	<0.005				
Vanadium	mg/L	<0.01	<0.01				
Zinc	mg/L	<0.01	<0.01				
Anions	mg/L	0.89	0.8				
Cations	mg/L	0.84	0.75				
Error	%	2.5	2.8				

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)
Week		0	1	2	3	4	8	12
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.44	0.79	0.67	0.68	0.82	0.69	0.73
Redox		-112	156	174	176	206	233	296
Fe ²⁺	mg/L	0.08	0.03	0.04	0.06	0.07	0.05	0.02
Fe ³⁺	mg/L	2.71	1.92	1.11	0.74	0.26	0.02	0.09
Total Alk	mg/L	170	150	140	140	120	90	76
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	200	190	170	170	140	110	93
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.047	0.07	0.076	0.071	0.066	0.053	0.045
Arsenic	mg/L	0.012	0.04	0.049	0.089	0.11	0.081	0.069
Barium	mg/L	0.096	0.028	0.063	0.054	0.059	0.06	0.087
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.37	0.44	0.3	0.19	0.14	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	390	96	40	26	20	16	15
Chloride	mg/L	52	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	7	9.3	9.9	9.6	9.4	5.5	4.2
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	0.33	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	2.4	0.83	0.5	0.36	0.29	0.11	<0.1
Magnesium	mg/L	300	71	31	21	16	12	12
Manganese	mg/L	0.091	0.0075	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Molybdenum	mg/L	23	17	9.3	5.9	3.4	0.89	0.33
Nickel	mg/L	0.037	0.01	0.013	<0.03	0.017	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.81	8.14	8.26	8.24	8.15	8.2	7.99
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	19	8.7	6.3	5.1	4.7	3.8	3.4
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.032	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	150	63	42	32	28	12	6.3
Strontium	mg/L	6.2	1.4	0.62	0.41	0.31	0.26	0.24
Sulfate	mg/L	2300	420	140	60	30	26	21
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	3800	800	400	270	190	160	120
Uranium	mg/L	0.11	0.052	0.033	0.024	0.02	0.013	<0.005
Vanadium	mg/L	0.036	0.015	0.028	0.026	0.04	0.023	0.02
Zinc	mg/L	0.019	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	51.2	13.6	6.54	4.55	3.65	2.4	2.1
Cations	mg/L	53	12.3	6.22	4.54	3.41	2.63	2.18
Error	%	1.7	4.8	2.5	1	3.4	4.5	2

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)
Week		16	20	24	28	32	36	40
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.73	0.76	0.73	0.64	0.62	0.72	0.74
Redox		274	243	246	238	197	173	172
Fe ²⁺	mg/L	0.01	0	0	0	0	0	0
Fe ³⁺	mg/L	0.01	0.01	0.01	0	0.01	0.01	0
Total Alk	mg/L	76	69	70	84	59	62	63
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	92	84	85	100	72	75	76
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.037	0.033	0.027	0.016	0.018	0.017	0.015
Arsenic	mg/L	0.056	0.055	0.044	0.038	0.042	0.043	0.039
Barium	mg/L	0.1	0.11	0.12	0.14	0.1	0.11	0.13
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	17	18	20	18	13	14	14
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	3.7	3.1	2.8	2.1	2.4	2.5	2.2
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead	mg/L	<0.0025	0.0027	<0.0025	0.003	<0.0025	<0.0025	<0.0025
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	13	14	14	13	9	9.6	9.7
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00025	0.00011	<0.00025	<0.00025
Molybdenum	mg/L	0.2	0.14	0.14	0.076	0.065	0.057	0.06
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	8.09	8.03	8.01	7.66	7.72	7.89	8.05
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	3.3	3.4	3.2	2.5	2.2	1.9	2
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	3	2.5	1.8	<0.5	0.84	0.7	0.67
Strontium	mg/L	0.27	0.27	0.28	0.26	0.2	0.2	0.21
Sulfate	mg/L	29	30	26	18	15	15	14
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	140	110	100	150	89	100	100
Uranium	mg/L	<0.005	0.008	0.0077	0.0088	0.0058	0.0051	0.0057
Vanadium	mg/L	0.034	0.024	0.035	0.025	0.024	0.024	0.016
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	2.13	2.25	2.31	2.03	1.48	1.57	1.58
Cations	mg/L	2.31	2.16	2.08	2.12	1.62	1.67	1.65
Error	%	3.9	1.8	5.2	2.2	4.4	3.3	2.3

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-199 (132.2-162.2)	WLC-199 (132.2-162.2)					
Week		44	47					
Lithology		Claystone/Ash	Claystone/Ash					
Effluent (L)	L	0.76	0.69					
Redox		190	231					
Fe ²⁺	mg/L	0	0					
Fe ³⁺	mg/L	0	0.01					
Total Alk	mg/L	51	61					
CO ₃ ²⁻	mg/L	<1	<1					
HCO ₃ ⁻	mg/L	62	74					
Aluminum	mg/L	<0.045	<0.045					
Antimony	mg/L	0.013	0.013					
Arsenic	mg/L	0.038	0.035					
Barium	mg/L	0.14	0.14					
Beryllium	mg/L	<0.001	<0.001					
Bismuth	mg/L	<0.1	<0.1					
Boron	mg/L	<0.1	<0.1					
Cadmium	mg/L	<0.001	<0.001					
Calcium	mg/L	15	13					
Chloride	mg/L	<1	<1					
Chromium	mg/L	<0.005	<0.005					
Cobalt	mg/L	<0.01	<0.01					
Copper	mg/L	<0.04	<0.04					
Fluoride	mg/L	2.1	1.7					
Gallium	mg/L	<0.1	<0.1					
Iron	mg/L	<0.02	<0.02					
Lead	mg/L	<0.0025	<0.0025					
Lithium	mg/L	<0.1	<0.1					
Magnesium	mg/L	10	9.1					
Manganese	mg/L	<0.005	<0.005					
Mercury	mg/L	<0.00025	<0.00025					
Molybdenum	mg/L	0.058	0.045					
Nickel	mg/L	<0.03	<0.03					
Nitrate_as_N	mg/L	<1	<1					
Nitrite_as_N	mg/L	<0.05	<0.05					
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.76	7.93					
Phosphorus	mg/L	<0.5	<0.5					
Potassium	mg/L	1.7	1.6					
Scandium	mg/L	<0.1	<0.1					
Selenium	mg/L	<0.005	<0.005					
Silver	mg/L	<0.005	<0.005					
Sodium	mg/L	0.78	0.59					
Strontium	mg/L	0.22	0.19					
Sulfate	mg/L	14	12					
Thallium	mg/L	<0.001	<0.001					
Tin	mg/L	<0.1	<0.1					
Titanium	mg/L	<0.1	<0.1					
TDS	mg/L	88	86					
Uranium	mg/L	0.006	0.0057					
Vanadium	mg/L	0.024	0.019					
Zinc	mg/L	<0.01	<0.01					
Anions	mg/L	1.65	1.46					
Cations	mg/L	1.42	1.55					
Error	%	7.5	2.9					

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-199 (202-221.8)	WLC-199 (202-221.8)	WLC-199 (202-221.8)	WLC-199 (202-221.8)	WLC-199 (202-221.8)	WLC-199 (202-221.8)	WLC-199 (202-221.8)
Week		0	1	2	3	4	8	12
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.91	0.62	0.66	0.70	0.60	0.68	0.62
Redox		-88	227	245	244	254	269	319
Fe ²⁺	mg/L	4.85	0.11	0.04	0.04	0.04	0.08	0.01
Fe ³⁺	mg/L	2.35	0.08	0.42	0.59	0.73	0.55	0.43
Total Alk	mg/L	110	4	2.6	5.2	5	3.9	3
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	130	4.9	3.2	6.4	6.1	4.8	3.7
Aluminum	mg/L	0.18	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.052	0.0031	0.0073	0.011	0.011	0.0088	0.0057
Arsenic	mg/L	0.016	0.0057	<0.005	0.0069	0.0091	0.0055	<0.005
Barium	mg/L	0.14	<0.01	<0.01	0.013	0.01	<0.01	<0.01
Beryllium	mg/L	0.0016	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.42	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	290	17	31	49	47	32	29
Chloride	mg/L	21	1.1	2.1	<1	2.8	1.2	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	0.032	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	12	0.69	0.99	1.3	1.7	1.1	0.99
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	3.9	<0.02	<0.02	<0.02	0.023	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	3.2	0.11	0.25	0.29	0.41	0.21	0.13
Magnesium	mg/L	220	9.9	22	32	43	25	17
Manganese	mg/L	2.3	0.046	0.1	0.15	0.14	0.069	0.05
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Molybdenum	mg/L	3.8	0.87	2.5	4	5.7	4	2.9
Nickel	mg/L	0.075	<0.03	<0.03	<0.03	0.014	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.41	6.46	6.42	6.76	6.69	6.76	6.46
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	20	3	2.1	2.8	2.9	2.2	1.5
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	65	4.4	9	11	15	8.4	5.8
Strontium	mg/L	3.5	0.19	0.38	0.59	0.63	0.42	0.34
Sulfate	mg/L	1500	77	170	230	270	170	130
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	2500	150	270	400	460	160	230
Uranium	mg/L	0.056	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.037	<0.01	<0.01	0.012	0.07	0.021	0.011
Zinc	mg/L	0.036	0.017	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	36.2	1.93	3.81	5.63	6.62	4.08	3.14
Cations	mg/L	34.6	1.75	3.7	4.96	5.89	3.71	2.82
Error	%	2.3	5	1.4	6.3	5.8	4.7	5.4

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-199 (202-221.8)	WLC-199 (202-221.8)	WLC-199 (202-221.8)	WLC-199 (202-221.8)	WLC-199 (202-221.8)	WLC-199 (202-221.8)	WLC-199 (202-221.8)
Week		16	20	24	28	32	36	40
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.67	0.71	0.67	0.67	0.66	0.67	0.68
Redox		310	291	297	274	236	230	225
Fe ²⁺	mg/L	0.01	0	0	0	0	0	0
Fe ³⁺	mg/L	0.48	0.36	0.41	0.33	0.3	0.29	0.25
Total Alk	mg/L	3.7	3.5	3	5	3.5	2	2.6
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	4.5	4.3	3.7	6.2	4.3	2.4	3.1
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.0075	0.0063	0.0055	0.0056	0.0044	0.004	0.0052
Arsenic	mg/L	0.0052	0.0057	<0.005	0.01	0.0055	0.0053	0.0066
Barium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	0.26	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	35	34	35	31	25	26	34
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	1	0.79	0.84	0.75	0.67	0.64	0.81
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	0.011	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	19	15	16	12	10	10	11
Manganese	mg/L	0.055	0.049	0.05	0.057	0.025	0.034	0.022
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Molybdenum	mg/L	3.2	2.2	2.8	1.9	1.8	1.7	1.7
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	6.72	6.73	6.62	6.12	6.66	6.31	6.57
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	1.9	1.2	1.5	<0.5	1.2	1.2	1.4
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	5.3	3.9	4.1	2.7	2.4	1.9	2.1
Strontium	mg/L	0.4	0.36	0.37	0.34	0.27	0.26	0.34
Sulfate	mg/L	170	140	130	110	100	100	120
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	270	210	200	400	170	170	210
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.024	0.014	0.025	0.012	0.013	<0.01	<0.01
Zinc	mg/L	<0.01	0.019	<0.01	0.038	<0.01	<0.01	<0.01
Anions	mg/L	3.59	3.13	3.28	2.66	2.21	2.23	2.73
Cations	mg/L	3.67	3.03	2.81	2.43	2.19	2.16	2.59
Error	%	1	1.7	7.7	4.4	1	1.8	2.6

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-199 (202-221.8)	WLC-199 (202-221.8)					
Week		44	47					
Lithology		Claystone/Ash	Claystone/Ash					
Effluent (L)	L	0.67	0.69					
Redox		238	270					
Fe ²⁺	mg/L	0	0					
Fe ³⁺	mg/L	0.2	0.23					
Total Alk	mg/L	1.8	2.6					
CO ₃ ²⁻	mg/L	<1	<1					
HCO ₃ ⁻	mg/L	2.2	3.2					
Aluminum	mg/L	<0.045	<0.045					
Antimony	mg/L	0.0049	0.0052					
Arsenic	mg/L	0.0073	0.0054					
Barium	mg/L	<0.01	<0.01					
Beryllium	mg/L	<0.001	<0.001					
Bismuth	mg/L	<0.1	<0.1					
Boron	mg/L	<0.1	<0.1					
Cadmium	mg/L	<0.001	<0.001					
Calcium	mg/L	33	29					
Chloride	mg/L	<1	<1					
Chromium	mg/L	<0.005	<0.005					
Cobalt	mg/L	<0.01	<0.01					
Copper	mg/L	<0.04	<0.04					
Fluoride	mg/L	0.69	0.56					
Gallium	mg/L	<0.1	<0.1					
Iron	mg/L	<0.02	<0.02					
Lead	mg/L	<0.0025	<0.0025					
Lithium	mg/L	<0.1	<0.1					
Magnesium	mg/L	10	9.2					
Manganese	mg/L	0.018	0.021					
Mercury	mg/L	<0.00025	<0.00025					
Molybdenum	mg/L	1.5	1.4					
Nickel	mg/L	<0.03	<0.03					
Nitrate_as_N	mg/L	<1	<1					
Nitrite_as_N	mg/L	<0.05	<0.05					
Total N	mg/L							
TKN	mg/L							
pH	s.u.	6.28	6.53					
Phosphorus	mg/L	<0.5	<0.5					
Potassium	mg/L	1.4	1.1					
Scandium	mg/L	<0.1	<0.1					
Selenium	mg/L	<0.005	<0.005					
Silver	mg/L	<0.005	<0.005					
Sodium	mg/L	2.1	1.6					
Strontium	mg/L	0.31	0.27					
Sulfate	mg/L	110	100					
Thallium	mg/L	<0.001	<0.001					
Tin	mg/L	<0.1	<0.1					
Titanium	mg/L	<0.1	<0.1					
TDS	mg/L	190	160					
Uranium	mg/L	<0.005	<0.005					
Vanadium	mg/L	<0.01	<0.01					
Zinc	mg/L	<0.01	<0.01					
Anions	mg/L	2.6	2.3					
Cations	mg/L	2.36	2.16					
Error	%	4.7	3.1					

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-204 (75-82)	WLC-204 (75-82)	WLC-204 (75-82)	WLC-204 (75-82)	WLC-204 (75-82)	WLC-204 (75-82)	WLC-204 (75-82)
Week		0	1	2	3	4	8	12
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.36	0.68	0.63	0.74	0.69	0.66	0.67
Redox		-79	205	204	213	217	236	271
Fe ²⁺	mg/L	0.02	0.01	0.01	0.01	0.02	0.02	0.02
Fe ³⁺	mg/L	0.08	0.09	0.07	0.08	0.02	0.07	0.05
Total Alk	mg/L	200	170	140	140	120	82	75
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	240	210	170	170	150	100	91
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.032	0.024	0.021	0.02	0.019	0.017	0.015
Arsenic	mg/L	0.032	0.052	0.067	0.072	0.074	0.061	0.041
Barium	mg/L	0.017	0.087	0.07	0.076	0.069	0.06	0.073
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.19	0.25	0.2	0.18	0.16	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	68	33	24	23	19	12	13
Chloride	mg/L	54	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	6.8	5.7	6	5.7	5.7	3.9	3.2
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	0.017	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	1.1	0.76	0.6	0.56	0.53	0.28	0.2
Magnesium	mg/L	30	13	10	10	8.3	5.2	5.7
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Molybdenum	mg/L	0.17	0.076	0.047	0.025	0.018	<0.01	<0.01
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	0.011	<0.03	<0.03
Nitrate_as_N	mg/L	2.2	<1	<1	<1	<1	<1	<1
Nitrite_as_N	mg/L	0.56	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	8.08	8.2	8.19	8.23	8.29	8.24	8.04
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	16	11	9.2	9.6	9.1	6.7	7.1
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.026	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	37	27	23	22	21	12	8.8
Strontium	mg/L	0.66	0.32	0.25	0.24	0.21	0.13	0.14
Sulfate	mg/L	81	17	12	5.8	6.1	2	1.4
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	500	270	200	210	180	150	120
Uranium	mg/L	0.018	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.022	0.037	0.044	0.055	0.068	0.071	0.073
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	7.88	4.17	3.26	3.17	2.78	1.72	1.68
Cations	mg/L	7.66	4.1	3.35	3.21	2.89	1.89	1.69
Error	%	1.4	1	1.4	1	1.9	4.6	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-204 (75-82)	WLC-204 (75-82)	WLC-204 (75-82)	WLC-204 (75-82)	WLC-204 (75-82)	WLC-204 (75-82)	WLC-204 (75-82)
Week		16	20	24	28	32	36	40
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.69	0.71	0.72	0.66	0.57	0.62	0.72
Redox		252	248	253	232	189	182	177
Fe ²⁺	mg/L	0.01	0.01	0	0	0	0	0
Fe ³⁺	mg/L	0	0	0.01	0	0.02	0.01	0
Total Alk	mg/L	76	71	63	92	66	64	62
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	92	87	77	110	81	77	76
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.013	0.013	0.013	0.01	0.0094	0.0082	0.009
Arsenic	mg/L	0.028	0.024	0.02	0.014	0.013	0.011	0.011
Barium	mg/L	0.076	0.078	0.11	0.11	0.085	0.091	0.088
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	13	14	19	18	14	14	14
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	2.3	2	1.8	1.5	1.6	1.5	1.6
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	0.017	<0.02	<0.02	<0.02	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	0.0029	<0.0025	<0.0025
Lithium	mg/L	0.11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	5.6	5.9	7.4	7.1	5.3	5.4	5.3
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Molybdenum	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	8.26	8.15	7.96	8.05	7.81	7.83	8.01
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	6.7	7	8.8	7.1	6.4	5.7	6.2
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	4.6	3	2.5	1.3	0.79	0.62	0.54
Strontium	mg/L	0.14	0.14	<0.1	0.19	0.14	0.14	0.14
Sulfate	mg/L	1.1	<1	<1	<1	<1	<1	<1
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	84	130	91	130	110	110	110
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.069	0.057	0.069	0.05	0.048	0.05	0.045
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	1.48	1.49	1.89	1.72	1.33	1.32	1.32
Cations	mg/L	1.65	1.53	1.36	1.88	1.41	1.34	1.33
Error	%	5.5	1.2	16	4.5	2.9	1	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-204 (75-82)	WLC-204 (75-82)					
Week		44	47					
Lithology		Claystone/Ash	Claystone/Ash					
Effluent (L)	L	0.78	0.66					
Redox		192	229					
Fe ²⁺	mg/L	0	0					
Fe ³⁺	mg/L	0	0.01					
Total Alk	mg/L	60	63					
CO ₃ ²⁻	mg/L	<1	<1					
HCO ₃ ⁻	mg/L	73	76					
Aluminum	mg/L	<0.045	<0.045					
Antimony	mg/L	0.0072	0.0078					
Arsenic	mg/L	0.0099	0.0077					
Barium	mg/L	0.085	0.082					
Beryllium	mg/L	<0.001	<0.001					
Bismuth	mg/L	<0.1	<0.1					
Boron	mg/L	<0.1	<0.1					
Cadmium	mg/L	<0.001	<0.001					
Calcium	mg/L	13	13					
Chloride	mg/L	<1	<1					
Chromium	mg/L	<0.005	<0.005					
Cobalt	mg/L	<0.01	<0.01					
Copper	mg/L	<0.04	<0.04					
Fluoride	mg/L	1.5	1.2					
Gallium	mg/L	<0.1	<0.1					
Iron	mg/L	<0.02	0.01					
Lead	mg/L	<0.0025	<0.0025					
Lithium	mg/L	<0.1	<0.1					
Magnesium	mg/L	5.3	5.1					
Manganese	mg/L	<0.005	<0.005					
Mercury	mg/L	<0.00025	<0.00025					
Molybdenum	mg/L	<0.01	<0.01					
Nickel	mg/L	<0.03	<0.03					
Nitrate as N	mg/L	<1	<1					
Nitrite as N	mg/L	<0.05	<0.05					
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.83	7.91					
Phosphorus	mg/L	<0.5	<0.5					
Potassium	mg/L	5.8	5.4					
Scandium	mg/L	<0.1	<0.1					
Selenium	mg/L	<0.005	<0.005					
Silver	mg/L	<0.005	<0.005					
Sodium	mg/L	0.72	<0.5					
Strontium	mg/L	0.14	0.13					
Sulfate	mg/L	<1	<1					
Thallium	mg/L	<0.001	<0.001					
Tin	mg/L	<0.1	<0.1					
Titanium	mg/L	<0.1	<0.1					
TDS	mg/L	95	84					
Uranium	mg/L	<0.005	<0.005					
Vanadium	mg/L	0.041	0.039					
Zinc	mg/L	<0.01	<0.01					
Anions	mg/L	1.26	1.21					
Cations	mg/L	1.28	1.31					
Error	%	1	4					

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)
Week		0	1	2	3	4	8	12
Lithology		HPZ	HPZ	HPZ	HPZ	HPZ	HPZ	HPZ
Effluent (L)	L	0.58	0.72	0.74	0.72	0.71	0.77	0.82
Redox		50	136	205	187	239	218	291
Fe ²⁺	mg/L	0.02	0.03	0.02	0.02	0.02	0.02	0.02
Fe ³⁺	mg/L	0.09	0.03	0.02	0.07	0.06	0.04	0.06
Total Alk	mg/L	82	57	53	49	48	35	25
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	100	69	64	60	59	43	31
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.0064	0.0054	0.0037	0.0026	<0.0025	<0.0025	<0.0025
Arsenic	mg/L	0.08	0.15	0.16	0.14	0.12	0.1	0.12
Barium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.48	0.23	0.11	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	32	8.5	7.2	7.2	7.7	7.1	5.6
Chloride	mg/L	34	2.1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	4.5	1.8	1	0.56	0.47	0.25	0.22
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	0.013	0.019	0.014	0.014	0.015	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	0.35	0.16	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	10	2.4	2.1	2.1	2.3	2	1.6
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	0.0022	0.0014	<0.00025	<0.00025	0.00094	0.00068	0.00094
Molybdenum	mg/L	0.18	0.15	0.085	0.05	0.036	0.018	0.015
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	0.014	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.87	7.83	7.82	7.89	7.83	7.77	7.42
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	7.6	4.5	3.8	3.6	3.1	2.8	2.1
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	36	19	14	9.4	6.5	2.4	1.3
Strontium	mg/L	0.18	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sulfate	mg/L	54	10	3.9	2.3	1.8	<1	<1
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	290	110	90	82	73	56	37
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	4.18	1.56	1.24	1.03	0.94	0.7	0.52
Cations	mg/L	3.96	1.49	1.18	1.06	1.03	0.72	0.52
Error	%	2.7	2.3	2.3	1.3	4.7	1.6	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)
Week		16	20	24	28	32	36	40
Lithology		HPZ	HPZ	HPZ	HPZ	HPZ	HPZ	HPZ
Effluent (L)	L	0.74	0.78	0.72	0.76	0.66	0.75	0.79
Redox		256	275	238	234	188	183	197
Fe ²⁺	mg/L	0.01	0.03	0.01	0.01	0.01	0.05	0.02
Fe ³⁺	mg/L	0.02	0.01	0.02	0.02	0.03	0.05	0.18
Total Alk	mg/L	22	16	17	38	15	8.2	7.4
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	27	20	20	46	18	10	9
Aluminum	mg/L	<0.045	0.071	0.088	0.11	0.096	0.35	0.13
Antimony	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Arsenic	mg/L	0.092	0.1	0.046	0.041	0.049	0.043	0.0095
Barium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.011	<0.01
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	5	4.3	6.1	9.2	3.8	2.3	2
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	0.17	0.11	0.11	<0.1	<0.1	<0.1	<0.1
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	0.033	<0.02	0.19	0.06
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0025	<0.0025
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	1.3	1.2	1.6	2.4	0.98	0.64	0.54
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.012	<0.005
Mercury	mg/L	0.00085	0.00069	<0.00025	0.00016	0.00021	0.00024	<0.00025
Molybdenum	mg/L	0.011	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.58	7.37	7.33	6.94	7.02	6.75	6.93
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	1.5	1.8	1.8	2	1.3	0.99	1.1
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	0.55	1.1	0.62	0.66	<0.5	<0.5	<0.5
Strontium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sulfate	mg/L	<1	<1	<1	<1	<1	<1	<1
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	49	45	34	81	27	30	28
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.01	<0.01	<0.01	0.011	<0.01	<0.01	<0.01
Anions	mg/L	0.42	0.42	0.52	0.75	0.31	0.24	0.19
Cations	mg/L	0.45	0.33	0.33	0.75	0.3	0.16	0.15
Error	%	3.8	11	22	1	3.1	19	13

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)	WLC-65 (332-346.1)
Week		44	48	52	56	60	64	68
Lithology		HPZ	HPZ	HPZ	HPZ	HPZ	HPZ	HPZ
Effluent (L)	L	0.75	0.74	0.75	0.73	0.78	0.70	0.72
Redox		197	222	212	215	209	205	211
Fe ²⁺	mg/L	0	0.01	0.02	0	0.01	0.01	0.02
Fe ³⁺	mg/L	0.02	0.06	0	0.05	0	0.08	0.04
Total Alk	mg/L	9	6	6.2	7.8	7.2	5.6	5.9
CO ₃ ²⁻	mg/L	1	1	1	1	1	1	1
HCO ₃ ⁻	mg/L	11	7.3	7.6	9.5	8.8	6.5	7.2
Aluminum	mg/L	0.14	0.1	0.12	0.096	0.28	0.16	0.22
Antimony	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Arsenic	mg/L	0.019	0.022	0.018	0.012	0.018	0.013	0.012
Barium	mg/L	0.014	<0.01	<0.01	<0.01	0.1	<0.01	<0.01
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	2.6	1.6	1.8	2.2	1.5	1.6	1.8
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	0.034	0.043	0.044	0.028	0.12	0.063	0.074
Lead	mg/L	<0.0025	0.0038	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	0.68	<0.5	<0.5	0.58	<0.5	<0.5	0.53
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	0.0057	<0.005	<0.005
Mercury	mg/L	<0.0001	<0.0001	0.00013	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Total N	mg/L							
TKN	mg/L							
pH	s.u.	6.66	6.85	6.85	6.94	6.6	6.84	6.75
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	0.96	0.65	0.63	0.64	0.54	0.8	0.79
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	<0.5	<0.5	<0.5	<0.5	2.8	0.63	<0.5
Strontium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sulfate	mg/L	<1	<1	<1	<1	2.4	<1	<1
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	34	28	10	29	35	16	27
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	0.23	0.11	0.12	0.19	0.25	0.15	0.18
Cations	mg/L	0.18	0.12	0.12	0.16	0.19	0.11	0.12
Error	%	12	4.2	1.2	8.9	12	17	21

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-65 (332-346.1)	WLC-65 (332-346.1)					
Week		72	74					
Lithology		HPZ	HPZ					
Effluent (L)	L	0.75	0.76					
Redox		189	209					
Fe ²⁺	mg/L	0.02	0.03					
Fe ³⁺	mg/L	0.06	0.04					
Total Alk	mg/L	4.4	4.5					
CO ₃ ²⁻	mg/L	1	1					
HCO ₃ ⁻	mg/L	5.3	5.5					
Aluminum	mg/L	0.19	<0.045					
Antimony	mg/L	<0.0025	<0.0025					
Arsenic	mg/L	0.014	0.015					
Barium	mg/L	<0.01	<0.01					
Beryllium	mg/L	<0.001	<0.001					
Bismuth	mg/L	<0.1	<0.1					
Boron	mg/L	<0.1	<0.1					
Cadmium	mg/L	<0.001	<0.001					
Calcium	mg/L	1.3	1.6					
Chloride	mg/L	<1	<1					
Chromium	mg/L	<0.005	<0.005					
Cobalt	mg/L	<0.01	<0.01					
Copper	mg/L	<0.04	<0.04					
Fluoride	mg/L	<0.1	0.13					
Gallium	mg/L	<0.1	<0.1					
Iron	mg/L	0.058	<0.02					
Lead	mg/L	<0.0025	<0.0025					
Lithium	mg/L	<0.1	<0.1					
Magnesium	mg/L	<0.5	<0.5					
Manganese	mg/L	<0.005	<0.005					
Mercury	mg/L	<0.0001	<0.0001					
Molybdenum	mg/L	<0.01	<0.01					
Nickel	mg/L	<0.01	<0.01					
Nitrate as N	mg/L	<1	<1					
Nitrite as N	mg/L	0.025	0.025					
Total N	mg/L							
TKN	mg/L							
pH	s.u.	6.64	6.6					
Phosphorus	mg/L	<0.5	<0.5					
Potassium	mg/L	0.87	<0.5					
Scandium	mg/L	<0.1	<0.1					
Selenium	mg/L	<0.005	<0.005					
Silver	mg/L	<0.005	<0.005					
Sodium	mg/L	<0.5	<0.5					
Strontium	mg/L	<0.1	<0.1					
Sulfate	mg/L	<1	<1					
Thallium	mg/L	<0.001	<0.001					
Tin	mg/L	<0.1	<0.1					
Titanium	mg/L	<0.1	<0.1					
TDS	mg/L	23	19					
Uranium	mg/L	<0.005	<0.005					
Vanadium	mg/L	<0.01	<0.01					
Zinc	mg/L	<0.01	<0.01					
Anions	mg/L	0.11	0.1					
Cations	mg/L	0.1	0.1					
Error	%	12	N/A					

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)
Week		0	1	2	3	4	8	12
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.51	0.68	0.65	0.67	0.70	0.65	0.68
Redox		-49	192	252	237	238	236	288
Fe ²⁺	mg/L	5.7	0.07	0.01	0.07	0.05	0.06	0.01
Fe ³⁺	mg/L	8.7	2.05	1.57	0.77	0.69	0.28	0.33
Total Alk	mg/L	95	44	33	36	39	35	36
CO ₃ ²⁻	mg/L	1	1	1	1	1	1	1
HCO ₃ ⁻	mg/L	120	53	41	44	47	42	43
Aluminum	mg/L	0.34	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.0071	0.015	0.015	0.013	0.012	0.012	0.011
Arsenic	mg/L	0.016	0.031	0.027	0.028	0.026	0.033	0.035
Barium	mg/L	0.074	0.036	0.051	0.023	0.02	0.029	0.019
Beryllium	mg/L	0.0036	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.59	0.34	0.2	0.12	0.17	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	320	280	230	230	210	92	60
Chloride	mg/L	29	14	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	0.085	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	5.7	7.1	6.5	5.8	5.9	4.1	3.5
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	22	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	2.8	1.9	0.84	0.43	0.32	<0.1	<0.1
Magnesium	mg/L	210	180	150	120	98	25	16
Manganese	mg/L	1.6	0.37	0.27	0.23	0.16	0.041	<0.005
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	mg/L	3	9.7	7.5	5.8	5.1	3.8	2.8
Nickel	mg/L	0.056	0.019	0.015	0.012	0.01	0.01	0.01
Nitrate_as_N	mg/L	1	1	1	1	1	1	1
Nitrite_as_N	mg/L	0.25	0.12	0.12	0.12	0.12	0.12	0.25
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.03	7.51	7.42	7.59	7.58	7.7	7.58
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	30	25	20	18	19	7.2	5.3
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.0066	0.0077	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	100	89	47	22	13	1.8	0.9
Strontium	mg/L	4.7	3.8	3.2	2.7	2.4	0.84	0.56
Sulfate	mg/L	1700	1400	1200	1000	790	260	170
Thallium	mg/L	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	2800	2500	1900	1700	1400	500	330
Uranium	mg/L	0.021	0.013	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.031	0.027	0.032	0.027	0.073	0.028	0.014
Zinc	mg/L	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	39.6	33.3	26.4	22.8	19.6	6.91	4.49
Cations	mg/L	38.5	30.8	26	21.8	17.5	6.32	4.43
Error	%	1.5	3.9	1	2.1	5.6	4.5	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)
Week		16	20	24	28	32	36	40
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.75	0.70	0.73	0.71	0.71	0.70	0.68
Redox		290	280	243	247	178	174	196
Fe ²⁺	mg/L	0	0	0	0	0	0	0
Fe ³⁺	mg/L	0.17	0.11	0.08	0.04	0.09	0.06	0.05
Total Alk	mg/L	45	49	45	68	47	40	33
CO ₃ ²⁻	mg/L	1	1	1	1	1	1	1
HCO ₃ ⁻	mg/L	55	60	55	83	58	49	40
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.011	0.013	0.01	0.0093	0.0089	0.0076	0.0051
Arsenic	mg/L	0.037	0.05	0.051	0.053	0.056	0.052	0.044
Barium	mg/L	0.019	0.018	0.019	0.018	0.015	0.016	0.013
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	51	49	48	46	35	36	33
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	3.2	2.9	2.3	2	1.7	1.5	1.1
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead	mg/L	<0.0025	0.0031	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	12	11	11	11	7.9	7.9	7.2
Manganese	mg/L	0.016	<0.005	0.0076	0.0083	0.0068	0.018	<0.005
Mercury	mg/L	0.00014	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	mg/L	2	1.3	1.2	0.91	0.75	0.72	0.63
Nickel	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Nitrate as N	mg/L	1	1	1	1	1	1	1
Nitrite as N	mg/L	0.05	0.03	0.06	0.05	0.025	0.04	0.025
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.84	7.78	7.64	7.39	7.62	7.56	7.54
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	4.6	4.2	4.2	3.3	2.8	2.3	2.3
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	0.5	0.88	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/L	0.45	0.44	0.42	0.37	0.3	0.29	0.27
Sulfate	mg/L	130	110	93	91	71	76	72
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	270	240	190	260	180	190	160
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.02	<0.01	0.019	0.014	0.015	0.012	<0.01
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	3.67	3.5	3.41	3.29	2.47	2.51	2.3
Cations	mg/L	3.78	3.43	2.96	3.36	2.52	2.46	2.21
Error	%	1.4	1	7.1	1.1	1	1	1.9

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-85 (168.6-176.9)	WLC-85 (168.6-176.9)				
Week		44	47				
Lithology		Claystone/Ash	Claystone/Ash				
Effluent (L)	L	0.73	0.70				
Redox		201	249				
Fe ²⁺	mg/L	0	0				
Fe ³⁺	mg/L	0	0.05				
Total Alk	mg/L	38	42				
CO ₃ ²⁻	mg/L	1	1				
HCO ₃ ⁻	mg/L	46	51				
Aluminum	mg/L	<0.045	<0.045				
Antimony	mg/L	0.005	0.0056				
Arsenic	mg/L	0.041	0.044				
Barium	mg/L	0.013	0.012				
Beryllium	mg/L	<0.001	<0.001				
Bismuth	mg/L	<0.1	<0.1				
Boron	mg/L	<0.1	<0.1				
Cadmium	mg/L	<0.001	<0.001				
Calcium	mg/L	31	32				
Chloride	mg/L	<1	<1				
Chromium	mg/L	<0.005	<0.005				
Cobalt	mg/L	<0.01	<0.01				
Copper	mg/L	<0.04	<0.04				
Fluoride	mg/L	1.1	1				
Gallium	mg/L	<0.1	<0.1				
Iron	mg/L	<0.02	<0.02				
Lead	mg/L	<0.0025	<0.0025				
Lithium	mg/L	<0.1	<0.1				
Magnesium	mg/L	6.6	6.7				
Manganese	mg/L	0.0064	0.0063				
Mercury	mg/L	<0.0001	<0.0001				
Molybdenum	mg/L	0.5	0.47				
Nickel	mg/L	0.01	0.01				
Nitrate_as_N	mg/L	1	1				
Nitrite_as_N	mg/L	0.025	0.025				
Total N	mg/L						
TKN	mg/L						
pH	s.u.	7.29	7.67				
Phosphorus	mg/L	<0.5	<0.5				
Potassium	mg/L	1.8	1.8				
Scandium	mg/L	<0.1	<0.1				
Selenium	mg/L	<0.005	<0.005				
Silver	mg/L	<0.005	<0.005				
Sodium	mg/L	<0.5	<0.5				
Strontium	mg/L	0.26	0.25				
Sulfate	mg/L	61	67				
Thallium	mg/L	<0.001	<0.001				
Tin	mg/L	<0.1	<0.1				
Titanium	mg/L	<0.1	<0.1				
TDS	mg/L	140	150				
Uranium	mg/L	<0.005	<0.005				
Vanadium	mg/L	0.011	<0.01				
Zinc	mg/L	<0.01	<0.01				
Anions	mg/L	2.14	2.19				
Cations	mg/L	2.08	2.28				
Error	%	1.3	2				

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)
Week		0	1	2	3	4	8	12
Lithology		Ash	Ash	Ash	Ash	Ash	Ash	Ash
Effluent (L)	L	0.44	0.77	0.73	0.72	0.77	0.63	0.71
Redox		16	131	170	183	221	209	260
Fe ²⁺	mg/L	0.2	0.03	0.03	0.02	0.02	0.02	0.01
Fe ³⁺	mg/L	0.93	0.22	0	0.06	0.06	0.06	0.01
Total Alk	mg/L	190	160	150	140	130	60	94
CO ₃ ²⁻	mg/L	1	1	1	1.2	1	1	1
HCO ₃ ⁻	mg/L	230	200	180	170	160	73	110
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.19	0.2	0.17	0.16	0.14	0.067	0.082
Arsenic	mg/L	0.042	0.095	0.11	0.13	0.12	0.11	0.087
Barium	mg/L	0.02	0.024	0.059	0.036	0.038	0.029	0.044
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.5	0.88	0.53	0.26	0.19	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	250	46	34	29	26	18	27
Chloride	mg/L	120	2.3	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	3.6	5.4	4.9	4	3.1	1.1	0.9
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	0.022	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	1.6	0.55	0.38	0.31	0.29	<0.1	<0.1
Magnesium	mg/L	120	20	15	13	12	8	12
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	0.00049	0.00021	0.0002
Molybdenum	mg/L	11	1.9	0.37	0.17	0.097	0.044	0.047
Nickel	mg/L	0.021	0.01	0.01	0.01	0.01	0.01	0.01
Nitrate as N	mg/L	1.6	1	1	1	1	1	1
Nitrite as N	mg/L	0.25	0.05	0.05	0.05	0.025	0.025	0.025
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.76	8.23	8.24	8.31	8.22	7.99	8.03
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	17	6.8	5.5	4.9	5.1	2.5	1.9
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.13	0.0071	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	160	74	60	50	48	15	9.4
Strontium	mg/L	2.7	0.53	0.41	0.34	0.32	0.22	0.33
Sulfate	mg/L	1000	170	120	86	73	51	47
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	2100	490	360	330	270	180	180
Uranium	mg/L	0.087	0.036	0.029	0.025	0.022	<0.005	<0.005
Vanadium	mg/L	0.039	0.06	0.067	0.066	0.083	0.066	0.053
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.017	<0.01
Anions	mg/L	29.7	7.33	5.68	4.82	4.5	2.27	2.79
Cations	mg/L	28.3	7.17	5.71	4.83	4.31	2.32	2.83
Error	%	2.5	1.2	1	1	2.2	1	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)
Week		16	20	24	28	32	36	40
Lithology		Ash	Ash	Ash	Ash	Ash	Ash	Ash
Effluent (L)	L	0.68	0.77	0.67	0.61	0.70	0.70	0.74
Redox		264	248	208	235	162	162	173
Fe ²⁺	mg/L	0.01	0	0	0	0	0	0
Fe ³⁺	mg/L	0.01	0	0.01	0	0.01	0.01	0
Total Alk	mg/L	86	84	74	81	75	69	67
CO ₃ ²⁻	mg/L	1	1	1	1	1	1	1
HCO ₃ ⁻	mg/L	100	100	90	98	91	84	82
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.07	0.067	0.059	0.044	0.043	0.036	0.034
Arsenic	mg/L	0.075	0.074	0.069	0.059	0.056	0.047	0.045
Barium	mg/L	0.061	0.04	0.042	0.036	0.034	0.036	0.034
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	31	26	27	23	21	22	19
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	0.74	0.62	0.51	0.35	0.32	0.3	0.27
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	0.12	<0.02	<0.02
Lead	mg/L	<0.0025	0.0026	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	13	11	11	9.3	8.4	8.2	7.4
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	0.00034	0.00021	<0.0001	0.00012	0.00012	<0.0001	0.00012
Molybdenum	mg/L	0.033	0.02	0.023	0.017	0.013	0.013	0.012
Nickel	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Nitrate as N	mg/L	1	1	1	1	1	1	1
Nitrite as N	mg/L	0.05	0.03	0.03	0.025	0.025	0.025	0.025
Total N	mg/L							
TKN	mg/L							
pH	s.u.	8.16	8.1	7.94	7.62	7.88	7.85	7.91
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	1.3	0.89	0.64	<0.5	<0.5	<0.5	0.76
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	4.8	4.2	3.6	2.8	2.6	2	2.4
Strontium	mg/L	0.35	0.3	0.31	0.25	0.24	0.23	0.23
Sulfate	mg/L	62	31	30	26	20	23	17
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	180	150	150	170	120	130	120
Uranium	mg/L	<0.005	0.0065	0.0051	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.065	0.046	0.065	0.047	0.044	0.043	0.034
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	2.86	2.41	2.43	2.03	1.86	1.86	1.68
Cations	mg/L	2.97	2.32	2.13	2.17	1.92	1.87	1.71
Error	%	1.9	1.9	6.6	3.1	1.7	1	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-87 (143.6-163.9)	WLC-87 (143.6-163.9)				
Week		44	47				
Lithology		Ash	Ash				
Effluent (L)	L	0.73	0.75				
Redox		183	234				
Fe ²⁺	mg/L	0	0				
Fe ³⁺	mg/L	0	0.04				
Total Alk	mg/L	65	65				
CO ₃ ²⁻	mg/L	1	1				
HCO ₃ ⁻	mg/L	79	79				
Aluminum	mg/L	<0.045	<0.045				
Antimony	mg/L	0.03	0.029				
Arsenic	mg/L	0.043	0.039				
Barium	mg/L	0.033	0.032				
Beryllium	mg/L	<0.001	<0.001				
Bismuth	mg/L	<0.1	<0.1				
Boron	mg/L	<0.1	<0.1				
Cadmium	mg/L	<0.001	<0.001				
Calcium	mg/L	20	18				
Chloride	mg/L	<1	<1				
Chromium	mg/L	<0.005	<0.005				
Cobalt	mg/L	<0.01	<0.01				
Copper	mg/L	<0.04	<0.04				
Fluoride	mg/L	0.26	0.18				
Gallium	mg/L	<0.1	<0.1				
Iron	mg/L	<0.02	<0.02				
Lead	mg/L	<0.0025	<0.0025				
Lithium	mg/L	<0.1	<0.1				
Magnesium	mg/L	7.4	6.6				
Manganese	mg/L	<0.005	<0.005				
Mercury	mg/L	<0.0001	<0.0001				
Molybdenum	mg/L	<0.01	<0.01				
Nickel	mg/L	<0.01	<0.01				
Nitrate as N	mg/L	<1	<1				
Nitrite as N	mg/L	0.025	0.025				
Total N	mg/L						
TKN	mg/L						
pH	s.u.	7.75	7.87				
Phosphorus	mg/L	<0.5	<0.5				
Potassium	mg/L	0.57	<0.5				
Scandium	mg/L	<0.1	<0.1				
Selenium	mg/L	<0.005	<0.005				
Silver	mg/L	<0.005	<0.005				
Sodium	mg/L	2.6	2.4				
Strontium	mg/L	0.22	0.19				
Sulfate	mg/L	17	16				
Thallium	mg/L	<0.001	<0.001				
Tin	mg/L	<0.1	<0.1				
Titanium	mg/L	<0.1	<0.1				
TDS	mg/L	120	100				
Uranium	mg/L	<0.005	<0.005				
Vanadium	mg/L	0.037	0.033				
Zinc	mg/L	<0.01	<0.01				
Anions	mg/L	1.73	1.55				
Cations	mg/L	1.66	1.64				
Error	%	2.1	2.9				

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)
Week		0	1	2	3	4	8	12
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.30	0.83	0.65	0.70	0.78	0.77	0.72
Redox		93	158	235	227	246	175	287
Fe ²⁺	mg/L	0.07	0.1	0.07	0.05	0.04	0.09	0.02
Fe ³⁺	mg/L	2.5	4.65	9.33	6.85	1.51	0.41	0.03
Total Alk	mg/L	200	170	100	140	150	130	91
CO ₃ ²⁻	mg/L	1	1	1	1	1	1	1
HCO ₃ ⁻	mg/L	240	210	130	170	190	160	110
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.36	0.33	0.3	0.28	0.31	0.26	0.22
Arsenic	mg/L	0.045	0.037	0.044	0.045	0.043	0.03	0.026
Barium	mg/L	0.14	0.038	0.056	0.054	0.041	0.03	0.034
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.17	0.51	0.43	0.38	0.29	0.1	0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	590	230	100	76	58	36	47
Chloride	mg/L	160	5.1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	2.9	4.4	5.6	5.6	6	4.4	3.1
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	0.013	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	3.4	1.5	0.82	0.69	0.68	0.28	0.2
Magnesium	mg/L	290	100	46	36	27	16	22
Manganese	mg/L	0.036	0.02	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	mg/L	36	30	26	21	16	6.3	0.93
Nickel	mg/L	0.071	0.037	0.037	0.029	0.01	0.05	0.01
Nitrate_as_N	mg/L	2.9	1	1	1	1	1	1
Nitrite_as_N	mg/L	0.25	0.12	0.05	0.12	0.05	0.05	0.25
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.81	8.05	8	8.14	8.18	8.09	7.96
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	18	9.1	6	5.2	5.6	3	2.6
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.7	0.055	0.0059	0.006	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	250	120	79	66	54	22	12
Strontium	mg/L	5.1	1.9	0.88	0.7	0.51	0.32	0.43
Sulfate	mg/L	2600	960	420	300	170	66	130
Thallium	mg/L	0.0022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	4900	1800	860	690	490	260	320
Uranium	mg/L	0.16	0.062	0.024	0.03	0.036	0.017	0.013
Vanadium	mg/L	0.051	0.052	0.06	0.06	0.066	0.045	0.036
Zinc	mg/L	0.012	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	64.6	25.2	12.4	9.76	7.61	4.15	4.74
Cations	mg/L	62.9	23.8	11.2	9.33	6.97	4.23	4.67
Error	%	1.3	2.8	5.1	2.3	4.4	1	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)
Week		16	20	24	28	32	36	40
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.73	0.79	0.74	0.69	0.77	0.69	0.66
Redox		284	261	288	240	179	174	183
Fe ²⁺	mg/L	0.01	0	0	0	0	0	0
Fe ³⁺	mg/L	0.02	0.01	0.01	0	0.02	0.01	0
Total Alk	mg/L	100	120	98	100	96	82	75
CO ₃ ²⁻	mg/L	1	1	1	1	1	1	1
HCO ₃ ⁻	mg/L	120	140	120	120	120	100	91
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.2	0.21	0.19	0.16	0.17	0.16	0.14
Arsenic	mg/L	0.024	0.022	0.022	0.026	0.024	0.027	0.028
Barium	mg/L	0.032	0.024	0.027	0.02	0.02	0.017	0.016
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	43	37	44	35	36	33	31
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	2.4	2	1.7	1.4	1.3	1.2	1
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead	mg/L	<0.0025	0.0061	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	0.14	0.11	0.11	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	18	16	18	15	14	13	12
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	mg/L	0.36	0.28	0.21	0.16	0.11	0.11	0.096
Nickel	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Nitrate as N	mg/L	1	1	1	1	1	1	1
Nitrite as N	mg/L	0.05	0.03	0.06	0.025	0.025	0.025	0.025
Total N	mg/L							
TKN	mg/L							
pH	s.u.	8.15	8.09	8.02	7.79	7.97	7.92	7.9
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	2	1.4	1.1	0.87	0.95	0.8	0.91
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	6.7	5.2	4.2	3.1	2.9	2.3	2.6
Strontium	mg/L	0.38	0.31	0.35	0.28	0.3	0.26	0.26
Sulfate	mg/L	110	49	68	59	57	55	54
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	290	210	210	210	200	200	170
Uranium	mg/L	0.011	0.012	0.0095	<0.005	0.0087	0.0056	0.0052
Vanadium	mg/L	0.052	0.03	0.048	0.032	0.034	0.036	0.022
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	3.97	3.42	3.89	3.14	3.1	2.84	2.67
Cations	mg/L	4.38	3.42	3.47	3.27	3.22	2.85	2.67
Error	%	5	1	5.6	2	1.9	1	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-88 (80.3-89.4)	WLC-88 (80.3-89.4)					
Week		44	47					
Lithology		Claystone/Ash	Claystone/Ash					
Effluent (L)	L	0.71	0.73					
Redox		189	235					
Fe ²⁺	mg/L	0	0					
Fe ³⁺	mg/L	0	0.01					
Total Alk	mg/L	73	82					
CO ₃ ²⁻	mg/L	1	1					
HCO ₃ ⁻	mg/L	89	100					
Aluminum	mg/L	<0.045	<0.045					
Antimony	mg/L	0.13	0.13					
Arsenic	mg/L	0.029	0.025					
Barium	mg/L	0.016	0.016					
Beryllium	mg/L	<0.001	<0.001					
Bismuth	mg/L	<0.1	<0.1					
Boron	mg/L	<0.1	<0.1					
Cadmium	mg/L	<0.001	<0.001					
Calcium	mg/L	29	27					
Chloride	mg/L	<1	<1					
Chromium	mg/L	<0.005	<0.005					
Cobalt	mg/L	<0.01	<0.01					
Copper	mg/L	<0.04	<0.04					
Fluoride	mg/L	0.97	0.8					
Gallium	mg/L	<0.1	<0.1					
Iron	mg/L	<0.02	<0.02					
Lead	mg/L	<0.0025	<0.0025					
Lithium	mg/L	<0.1	<0.1					
Magnesium	mg/L	11	10					
Manganese	mg/L	<0.005	<0.005					
Mercury	mg/L	<0.0001	<0.0001					
Molybdenum	mg/L	0.082	0.067					
Nickel	mg/L	0.01	0.01					
Nitrate_as_N	mg/L	1	1					
Nitrite_as_N	mg/L	0.025	0.025					
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.79	7.92					
Phosphorus	mg/L	<0.5	<0.5					
Potassium	mg/L	0.71	0.75					
Scandium	mg/L	<0.1	<0.1					
Selenium	mg/L	<0.005	<0.005					
Silver	mg/L	<0.005	<0.005					
Sodium	mg/L	2.6	2.4					
Strontium	mg/L	0.24	0.21					
Sulfate	mg/L	44	36					
Thallium	mg/L	<0.001	<0.001					
Tin	mg/L	<0.1	<0.1					
Titanium	mg/L	<0.1	<0.1					
TDS	mg/L	160	130					
Uranium	mg/L	0.0055	0.0061					
Vanadium	mg/L	0.031	0.025					
Zinc	mg/L	<0.01	<0.01					
Anions	mg/L	2.48	2.29					
Cations	mg/L	2.43	2.43					
Error	%	1.2	2.9					

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)
Week		0	1	2	3	4	8	12
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.36	0.78	0.68	0.73	0.76	0.63	0.68
Redox		106	151	214	209	242	193	288
Fe ²⁺	mg/L	0.07	0.02	0.05	0.02	0.06	0.03	0.02
Fe ³⁺	mg/L	1.93	1.93	0.91	0.58	0.05	0.02	0.13
Total Alk	mg/L	260	150	120	130	110	55	62
CO ₃ ²⁻	mg/L	1	1	1	1.1	1	1	1
HCO ₃ ⁻	mg/L	310	180	140	150	140	67	76
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.26	0.25	0.2	0.21	0.18	0.065	0.066
Arsenic	mg/L	0.054	0.14	0.18	0.22	0.19	0.084	0.069
Barium	mg/L	0.028	0.027	0.048	0.044	0.046	0.036	0.06
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.27	0.65	0.59	0.42	0.27	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	310	32	21	14	12	8.9	12
Chloride	mg/L	200	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	4.6	6.2	6.3	5.7	4.7	1.3	1.2
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	0.016	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	1.7	0.48	0.34	0.28	0.27	0.11	0.1
Magnesium	mg/L	180	18	12	8.7	7.8	5.1	7.4
Manganese	mg/L	0.12	0.014	0.0071	0.0064	0.0064	<0.005	<0.005
Mercury	mg/L	0.00014	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	mg/L	68	16	6.7	4.1	2.2	0.35	0.2
Nickel	mg/L	0.069	0.014	0.01	0.01	0.01	0.01	0.01
Nitrate_as_N	mg/L	4.5	1	1	1	1	1	1
Nitrite_as_N	mg/L	0.26	0.05	0.025	0.025	0.025	0.025	0.025
Total N	mg/L							
TKN	mg/L							
pH	s.u.	8.06	8.2	8.15	8.31	8.1	7.95	7.81
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	18	5.9	4.6	4	4.1	2.4	2.6
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.098	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	220	73	59	50	48	21	18
Strontium	mg/L	5.8	0.6	0.42	0.29	0.26	0.18	0.25
Sulfate	mg/L	1400	130	94	37	37	34	37
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	2900	420	290	220	180	120	120
Uranium	mg/L	0.19	0.056	0.031	0.028	0.022	<0.005	<0.005
Vanadium	mg/L	0.037	0.055	0.064	0.072	0.076	0.045	0.04
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	40.3	6.4	4.72	3.69	3.43	1.84	2.06
Cations	mg/L	40.4	5.98	4.58	3.57	3.31	1.87	2.08
Error	%	1	3.4	1.5	1.7	1.8	1	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)
Week		16	20	24	28	32	36	40
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.67	0.73	0.79	0.62	0.64	0.73	0.73
Redox		284	252	249	243	188	178	181
Fe ²⁺	mg/L	0.01	0	0	0	0	0	0
Fe ³⁺	mg/L	0	0	0.01	0	0.01	0.01	0
Total Alk	mg/L	60	74	71	83	54	64	61
CO ₃ ²⁻	mg/L	1	1	1	1	1	1	1
HCO ₃ ⁻	mg/L	73	90	87	100	66	78	74
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.062	0.084	0.076	0.049	0.035	0.044	0.041
Arsenic	mg/L	0.067	0.074	0.063	0.044	0.037	0.044	0.044
Barium	mg/L	0.056	0.08	0.11	0.12	0.078	0.099	0.094
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	12	16	19	21	14	17	16
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	1	1.2	1	0.67	0.56	0.55	0.53
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	0.011	<0.02	<0.02
Lead	mg/L	<0.0025	0.004	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	7.2	9.4	11	11	7.5	8.9	8.5
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.0083	<0.005
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	mg/L	0.11	0.079	0.062	0.04	0.026	0.027	0.024
Nickel	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Nitrate_as_N	mg/L	1	1	1	1	1	1	1
Nitrite_as_N	mg/L	0.025	0.03	0.03	0.025	0.025	0.025	0.025
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.91	7.97	8.08	7.65	7.67	7.8	7.85
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	2.6	2.5	2.4	1.7	1.3	1.1	1.2
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	9.6	8.1	5.6	3.6	2.4	2	2.1
Strontium	mg/L	0.26	0.32	0.37	0.39	0.28	0.32	0.32
Sulfate	mg/L	29	24	21	31	21	18	18
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	130	130	110	140	99	100	96
Uranium	mg/L	<0.005	0.0067	0.0058	0.007	<0.005	<0.005	<0.005
Vanadium	mg/L	0.049	0.038	0.053	0.036	0.034	0.037	0.029
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	1.68	1.99	2.16	2.15	1.45	1.7	1.62
Cations	mg/L	1.85	2.04	1.92	2.32	1.55	1.68	1.62
Error	%	5	1.2	6	3.7	3.1	1	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-90 (113.5-125.8)	WLC-90 (113.5-125.8)					
Week		44	47					
Lithology		Claystone/Ash	Claystone/Ash					
Effluent (L)	L	0.74	0.74					
Redox		188	235					
Fe ²⁺	mg/L	0	0					
Fe ³⁺	mg/L	0	0.01					
Total Alk	mg/L	52	60					
CO ₃ ²⁻	mg/L	1	1					
HCO ₃ ⁻	mg/L	63	73					
Aluminum	mg/L	<0.045	<0.045					
Antimony	mg/L	0.036	0.034					
Arsenic	mg/L	0.042	0.037					
Barium	mg/L	0.097	0.09					
Beryllium	mg/L	<0.001	<0.001					
Bismuth	mg/L	<0.1	<0.1					
Boron	mg/L	<0.1	<0.1					
Cadmium	mg/L	<0.001	<0.001					
Calcium	mg/L	16	14					
Chloride	mg/L	<1	<1					
Chromium	mg/L	<0.005	<0.005					
Cobalt	mg/L	<0.01	<0.01					
Copper	mg/L	<0.04	<0.04					
Fluoride	mg/L	0.47	0.37					
Gallium	mg/L	<0.1	<0.1					
Iron	mg/L	<0.02	<0.02					
Lead	mg/L	<0.0025	<0.0025					
Lithium	mg/L	<0.1	<0.1					
Magnesium	mg/L	8.6	7.6					
Manganese	mg/L	<0.005	<0.005					
Mercury	mg/L	<0.0001	<0.0001					
Molybdenum	mg/L	0.019	0.016					
Nickel	mg/L	0.01	0.01					
Nitrate as N	mg/L	1	1					
Nitrite as N	mg/L	0.025	0.025					
Total N	mg/L							
TKN	mg/L							
pH	s.u.	7.68	7.87					
Phosphorus	mg/L	<0.5	<0.5					
Potassium	mg/L	0.91	0.93					
Scandium	mg/L	<0.1	<0.1					
Selenium	mg/L	<0.005	<0.005					
Silver	mg/L	<0.005	<0.005					
Sodium	mg/L	2	1.8					
Strontium	mg/L	0.33	0.28					
Sulfate	mg/L	16	14					
Thallium	mg/L	<0.001	<0.001					
Tin	mg/L	<0.1	<0.1					
Titanium	mg/L	<0.1	<0.1					
TDS	mg/L	96	96					
Uranium	mg/L	<0.005	<0.005					
Vanadium	mg/L	0.036	0.029					
Zinc	mg/L	<0.01	<0.01					
Anions	mg/L	1.62	1.43					
Cations	mg/L	1.39	1.51					
Error	%	7.5	2.8					

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-92 (26.9-46)	WLC-92 (26.9-46)	WLC-92 (26.9-46)	WLC-92 (26.9-46)	WLC-92 (26.9-46)	WLC-92 (26.9-46)	WLC-92 (26.9-46)
Week		0	1	2	3	4	8	12
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.33	0.83	0.62	0.83	0.68	0.73	0.73
Redox		129	175	226	217	243	220	291
Fe ²⁺	mg/L	0.06	0.01	0.01	0.01	0.02	0.01	0.01
Fe ³⁺	mg/L	0.15	0.09	0.05	0.05	0.06	0.07	0.01
Total Alk	mg/L	160	150	110	120	100	96	88
CO ₃ ²⁻	mg/L	1	1	1	1	1	1	1
HCO ₃ ⁻	mg/L	200	180	130	150	130	120	110
Aluminum	mg/L	0.059	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.011	0.0083	0.0081	0.0062	0.0056	0.0048	0.0037
Arsenic	mg/L	0.017	0.023	0.025	0.025	0.021	0.015	0.0067
Barium	mg/L	0.098	0.095	0.083	0.087	0.084	0.084	0.11
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.38	0.66	0.34	0.16	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	130	28	17	16	13	12	12
Chloride	mg/L	300	2.6	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	9	7.4	6.5	5	3.9	1.8	1.3
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	1.2	0.63	0.46	0.43	0.4	0.3	0.21
Magnesium	mg/L	39	8	4.7	4.6	3.7	3.5	3.5
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	0.00039	0.00041	0.00038
Molybdenum	mg/L	0.22	0.083	0.053	0.028	0.018	0.012	<0.01
Nickel	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	<0.01
Nitrate as N	mg/L	1	1	1	1	1	1	<1
Nitrite as N	mg/L	0.25	0.05	0.025	0.025	0.025	0.025	0.025
Total N	mg/L							
TKN	mg/L							
pH	s.u.	8.09	8.24	8.15	8.26	8.1	8.23	8.22
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	16	8.8	7.1	6.8	5.9	5.6	5.6
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.017	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	70	43	35	33	30	25	21
Strontium	mg/L	0.93	0.2	0.13	0.12	<0.1	<0.1	<0.1
Sulfate	mg/L	94	31	20	14	10	7.1	7.2
Thallium	mg/L	<0.001	<0.001	<0.001	0.15	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	1000	300	220	240	190	160	160
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.031	0.041	0.062	0.059	0.078	0.065	0.064
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	13.2	4.15	2.94	2.79	2.41	2.12	1.94
Cations	mg/L	14.2	4.06	2.89	3.01	2.54	2.21	2.02
Error	%	3.7	1.1	1	3.9	2.7	2.1	2

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-92 (26.9-46)	WLC-92 (26.9-46)	WLC-92 (26.9-46)	WLC-92 (26.9-46)	WLC-92 (26.9-46)	WLC-92 (26.9-46)	WLC-92 (26.9-46)
Week		16	20	24	28	32	36	40
Lithology		Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash	Claystone/Ash
Effluent (L)	L	0.68	0.76	0.72	0.70	0.71	0.70	0.70
Redox		286	259	236	237	175	160	172
Fe ²⁺	mg/L	0.02	0.01	0.01	0	0	0	0
Fe ³⁺	mg/L	0	0	0.01	0	0.02	0.01	0
Total Alk	mg/L	77	78	69	71	62	59	59
CO ₃ ²⁻	mg/L	1	1	1	1	1	1	1
HCO ₃ ⁻	mg/L	94	95	84	87	76	72	72
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.0031	0.0027	0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Arsenic	mg/L	0.0056	0.0051	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	mg/L	0.12	0.12	0.18	0.17	0.17	0.18	0.18
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	12	13	16	14	14	14	15
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	1.2	1.1	0.93	0.86	0.88	0.89	0.86
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	0.0028	<0.0025	<0.0025	<0.0025
Lithium	mg/L	0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	3.4	3.6	4.2	3.9	3.6	3.8	3.8
Manganese	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	mg/L	0.00044	0.00035	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	<1	<1	<1	<1	<1	<1	<1
Nitrite as N	mg/L	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Total N	mg/L							
TKN	mg/L							
pH	s.u.	8.23	7.62	8.09	7.9	8.06	8.12	8.11
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	5.6	5.6	6.2	5.2	5	4.3	4.3
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	14	12	9.2	6	4.9	3.4	3.1
Strontium	mg/L	<0.1	<0.1	0.11	<0.1	0.1	0.1	0.1
Sulfate	mg/L	5.2	3.9	3.5	3.5	3.2	3.2	2.9
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	130	150	140	140	130	140	130
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.056	0.04	0.049	0.033	0.029	0.026	0.019
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	1.63	1.61	1.7	1.41	1.34	1.27	1.31
Cations	mg/L	1.71	1.7	1.5	1.54	1.36	1.29	1.29
Error	%	2.4	2.6	6.4	4.4	1	1	1

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-92 (26.9-46)	WLC-92 (26.9-46)					
Week		44	47					
Lithology		Claystone/Ash	Claystone/Ash					
Effluent (L)	L	0.69	0.73					
Redox		183	232					
Fe ²⁺	mg/L	0	0					
Fe ³⁺	mg/L	0	0.01					
Total Alk	mg/L	58	56					
CO ₃ ²⁻	mg/L	1	1					
HCO ₃ ⁻	mg/L	71	69					
Aluminum	mg/L	<0.045	<0.045					
Antimony	mg/L	<0.0025	<0.0025					
Arsenic	mg/L	<0.005	<0.005					
Barium	mg/L	0.2	0.18					
Beryllium	mg/L	<0.001	<0.001					
Bismuth	mg/L	<0.1	<0.1					
Boron	mg/L	<0.1	<0.1					
Cadmium	mg/L	<0.001	<0.001					
Calcium	mg/L	16	13					
Chloride	mg/L	<1	<1					
Chromium	mg/L	<0.005	<0.005					
Cobalt	mg/L	<0.01	<0.01					
Copper	mg/L	<0.04	<0.04					
Fluoride	mg/L	0.85	0.74					
Gallium	mg/L	<0.1	<0.1					
Iron	mg/L	<0.02	<0.02					
Lead	mg/L	<0.0025	<0.0025					
Lithium	mg/L	<0.1	<0.1					
Magnesium	mg/L	4.1	3.5					
Manganese	mg/L	<0.005	<0.005					
Mercury	mg/L	<0.0001	<0.0001					
Molybdenum	mg/L	<0.01	<0.01					
Nickel	mg/L	<0.01	<0.01					
Nitrate as N	mg/L	<1	<1					
Nitrite as N	mg/L	0.025	0.025					
Total N	mg/L							
TKN	mg/L							
pH	s.u.	8.04	7.97					
Phosphorus	mg/L	<0.5	<0.5					
Potassium	mg/L	3.9	3.6					
Scandium	mg/L	<0.1	<0.1					
Selenium	mg/L	<0.005	<0.005					
Silver	mg/L	<0.005	<0.005					
Sodium	mg/L	2.9	2.4					
Strontium	mg/L	0.12	<0.1					
Sulfate	mg/L	2.1	2.2					
Thallium	mg/L	<0.001	<0.001					
Tin	mg/L	<0.1	<0.1					
Titanium	mg/L	<0.1	<0.1					
TDS	mg/L	120	110					
Uranium	mg/L	<0.005	<0.005					
Vanadium	mg/L	0.02	0.016					
Zinc	mg/L	<0.01	<0.01					
Anions	mg/L	1.36	1.13					
Cations	mg/L	1.25	1.22					
Error	%	4.2	3.5					

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)
Week		0	1	2	3	4	8	12
Lithology		Ash	Ash	Ash	Ash	Ash	Ash	Ash
Effluent (L)	L	0.50	0.72	0.65	0.59	0.54	0.60	0.57
Redox		-114	204	215	223	275	272	315
Fe ²⁺	mg/L	0.33	0.16	0.1	0.02	0.1	0.08	0.02
Fe ³⁺	mg/L	0.56	6.19	9.35	3.23	0.1	0.02	0.13
Total Alk	mg/L	370	250	170	110	5.6	4.8	3.6
CO ₃ ²⁻	mg/L	1	1	1	1	1	1	1
HCO ₃ ⁻	mg/L	450	310	200	130	6.8	5.8	4.3
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	0.052	<0.045	<0.045
Antimony	mg/L	0.12	0.14	0.17	0.15	0.0043	0.0046	0.004
Arsenic	mg/L	0.012	0.032	0.028	0.025	0.01	0.0052	<0.005
Barium	mg/L	0.069	0.037	0.1	0.11	0.14	<0.01	0.014
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	2.5	1.7	0.6	0.23	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	440	490	150	87	6.1	28	27
Chloride	mg/L	39	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	0.0075	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	0.16	0.018	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	14	15	11	10	0.39	0.52	0.55
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	1.4	<0.02	<0.02	<0.02	0.066	0.011	0.032
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	9	0.62	0.24	0.17	<0.1	<0.1	<0.1
Magnesium	mg/L	740	220	24	15	1.5	3.9	5
Manganese	mg/L	5.2	0.81	0.026	0.03	0.0067	0.0084	<0.005
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	mg/L	18	39	29	18	0.38	0.92	1.2
Nickel	mg/L	0.23	0.054	0.038	0.024	0.01	0.01	0.01
Nitrate_as_N	mg/L	1	1	1	1	1	1	1
Nitrite_as_N	mg/L	0.25	0.12	0.05	0.025	0.04	0.06	0.029
Total N	mg/L							
TKN	mg/L							
pH	s.u.	8.03	8.09	8.17	8.11	6.76	6.84	6.53
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	28	13	6.5	4.6	0.84	1	1.2
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	0.026	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	340	33	12	8.6	2	0.91	1.1
Strontium	mg/L	9.4	7	2	1.4	<0.1	0.31	0.29
Sulfate	mg/L	4200	1800	270	90	16	75	76
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	6900	2900	720	340	46	140	140
Uranium	mg/L	0.082	0.047	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	0.071	<0.01	0.012	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anions	mg/L	98.6	44.4	10.1	6.07	0.55	1.78	1.84
Cations	mg/L	96.7	43.3	9.48	4.53	0.47	1.68	1.68
Error	%	1	1.1	3.4	15	8	2.9	4.5

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)
Week		16	20	24	28	32	36	40
Lithology		Ash	Ash	Ash	Ash	Ash	Ash	Ash
Effluent (L)	L	0.67	0.72	0.67	0.67	0.66	0.67	0.67
Redox		318	297	283	259	225	214	213
Fe ²⁺	mg/L	0.01	0	0	0	0	0	0
Fe ³⁺	mg/L	0.23	0.28	0.15	0.11	0.16	0.13	0.14
Total Alk	mg/L	7.1	9.6	8.4	19	7.4	7.5	7.4
CO ₃ ²⁻	mg/L	1	1	1	1	1	1	1
HCO ₃ ⁻	mg/L	8.6	12	10	24	9.1	9.2	9
Aluminum	mg/L	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Antimony	mg/L	0.0093	0.012	0.0096	0.011	0.0087	0.0075	0.0079
Arsenic	mg/L	<0.005	0.0051	0.0064	0.013	<0.005	0.0054	0.0062
Barium	mg/L	0.01	0.017	0.011	0.011	<0.01	<0.01	0.013
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	<0.1	<0.1	<0.1	0.25	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	67	74	58	49	35	34	32
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	1.1	1.3	1.1	1.1	1.1	0.95	0.94
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.02	<0.02	<0.02	<0.02	0.016	<0.02	<0.02
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	7.6	7	5.4	4.5	3	2.7	2.5
Manganese	mg/L	0.011	<0.005	<0.005	0.0058	<0.005	0.0075	<0.005
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	mg/L	1.7	1.7	1.7	1.4	1.2	1.1	1.1
Nickel	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Nitrate as N	mg/L	1	1	1	1	1	1	1
Nitrite as N	mg/L	0.13	0.054	0.06	0.025	0.025	0.025	0.025
Total N	mg/L							
TKN	mg/L							
pH	s.u.	6.98	7.15	7.06	6.66	6.7	6.73	7
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	1.6	1.6	1.4	1.2	1	0.89	0.94
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	1.3	1.7	1.3	1.1	0.87	0.63	0.63
Strontium	mg/L	0.64	0.67	0.53	0.44	0.34	0.3	0.29
Sulfate	mg/L	190	230	130	110	87	79	72
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	300	310	210	320	160	140	130
Uranium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
Anions	mg/L	4.07	4.38	3.43	2.89	2.06	1.97	1.85
Cations	mg/L	4.15	5.05	2.93	2.74	2.02	1.85	1.7
Error	%	1.1	7.1	7.9	2.7	<1	3.2	4.4

Appendix H
Tabulated HCT testing results

Sample_ID	Units	WLC-96 (206.4-230.2)	WLC-96 (206.4-230.2)				
Week		44	47				
Lithology		Ash	Ash				
Effluent (L)	L	0.68	0.69				
Redox		222	261				
Fe ²⁺	mg/L	0	0				
Fe ³⁺	mg/L	0.12	0.15				
Total Alk	mg/L	7.5	8.1				
CO ₃ ²⁻	mg/L	1	<1				
HCO ₃ ⁻	mg/L	9.1	9.9				
Aluminum	mg/L	<0.045	<0.045				
Antimony	mg/L	0.008	0.008				
Arsenic	mg/L	0.0069	<0.005				
Barium	mg/L	0.015	0.013				
Beryllium	mg/L	<0.001	<0.001				
Bismuth	mg/L	<0.1	<0.1				
Boron	mg/L	<0.1	<0.1				
Cadmium	mg/L	<0.001	<0.001				
Calcium	mg/L	31	26				
Chloride	mg/L	<1	<1				
Chromium	mg/L	<0.005	<0.005				
Cobalt	mg/L	<0.01	<0.01				
Copper	mg/L	<0.04	<0.04				
Fluoride	mg/L	0.97	0.74				
Gallium	mg/L	<0.1	<0.1				
Iron	mg/L	<0.02	<0.02				
Lead	mg/L	<0.0025	<0.0025				
Lithium	mg/L	<0.1	<0.1				
Magnesium	mg/L	2.4	2				
Manganese	mg/L	<0.005	<0.005				
Mercury	mg/L	<0.0001	<0.0001				
Molybdenum	mg/L	1	0.88				
Nickel	mg/L	0.01	0.01				
Nitrate_as_N	mg/L	1	1				
Nitrite_as_N	mg/L	0.025	0.025				
Total N	mg/L						
TKN	mg/L						
pH	s.u.	6.64	6.88				
Phosphorus	mg/L	<0.5	<0.5				
Potassium	mg/L	0.8	0.77				
Scandium	mg/L	<0.1	<0.1				
Selenium	mg/L	<0.005	<0.005				
Silver	mg/L	<0.005	<0.005				
Sodium	mg/L	0.7	0.6				
Strontium	mg/L	0.3	0.25				
Sulfate	mg/L	71	63				
Thallium	mg/L	<0.001	<0.001				
Tin	mg/L	<0.1	<0.1				
Titanium	mg/L	<0.1	<0.1				
TDS	mg/L	120	92				
Uranium	mg/L	<0.005	<0.005				
Vanadium	mg/L	<0.01	<0.01				
Zinc	mg/L	<0.01	<0.01				
Anions	mg/L	1.8	1.51				
Cations	mg/L	1.68	1.51				
Error	%	3.4	<1				

Appendix H
Tabulated HCT testing results

Sample_ID	Units	SAMPLE GROUP #2 (+) 75UM	SAMPLE GROUP #2 (+) 75UM	SAMPLE GROUP #2 (+) 75UM	SAMPLE GROUP #2 (+) 75UM	SAMPLE GROUP #2 (+) 75UM	SAMPLE GROUP #2 (+) 75UM	SAMPLE GROUP #2 (+) 75UM
Week		0	1	2	4	8	12	16
Lithology		Unoxidized Gangue	Unoxidized Gangue	Unoxidized Gangue	Unoxidized Gangue	Unoxidized Gangue	Unoxidized Gangue	Unoxidized Gangue
Effluent (L)	L	1.10	0.67	0.65	0.63	0.63	0.61	0.51
Redox		116.65	151.97	120.84	133.95	100.93	363.33	319.54
Fe ²⁺	mg/L	0.15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fe ³⁺	mg/L	0.109	0	0	0	0	0	0
Total Alk	mg/L	57	26	29	70	56	32	26
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	57	26	29	70	56	32	26
Aluminum	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Antimony	mg/L	0.034	0.051	0.044	0.036	0.029	0.025	0.018
Arsenic	mg/L	0.017	0.033	0.043	0.057	0.093	0.046	0.06
Barium	mg/L	0.036	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.38	0.26	0.34	0.24	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	150	170	110	90	66	59	46
Chloride	mg/L	2.6	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	2.3	2.9	2	1.4	0.79	0.77	0.5
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	0.16	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	0.11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	34	28	16	11	5.7	4.2	3.2
Manganese	mg/L	0.32	0.17	0.12	0.11	0.065	0.052	0.038
Mercury	mg/L	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045
Molybdenum	mg/L	4.8	5.5	3.6	2.7	2	1.6	1.2
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate_as_N	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Nitrite_as_N	mg/L	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Total N	mg/L	0.66	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61
TKN	mg/L	0.58	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
pH	s.u.	7.45	6.87	6.65	7.38	7.62	6.89	6.8
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	7.5	4.3	3	2.4	1.4	1	1
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	0.014	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	12	6.3	3.4	1.8	<1.5	<1.5	<1.5
Strontium	mg/L	1.2	1.1	0.81	0.65	0.46	0.4	0.34
Sulfate	mg/L	490	550	320	210	130	140	110
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	760	820	510	480	300	220	200
Uranium	mg/L	0.039	0.015	0.014	0.025	0.012	0.013	0.006
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Anions	mg/L	11	11.2	7.03	5.54	3.8	3.32	2.59
Cations	mg/L	11.5	12.1	7.35	5.84	3.87	3.59	2.84
Error	%	2.3	4.06	2.17	2.68	<1	4.02	4.62

Appendix H
Tabulated HCT testing results

Sample_ID	Units	SAMPLE GROUP #2 (+) 75UM						
Week		20						
Lithology		Unoxidized Gangue						
Effluent (L)	L	0.59						
Redox		227.85						
Fe ²⁺	mg/L	<0.1						
Fe ³⁺	mg/L	0						
Total Alk	mg/L	25						
CO ₃ ²⁻	mg/L	<1						
HCO ₃ ⁻	mg/L	25						
Aluminum	mg/L	<0.05						
Antimony	mg/L	0.023						
Arsenic	mg/L	0.079						
Barium	mg/L	<0.02						
Beryllium	mg/L	<0.001						
Bismuth	mg/L	<0.1						
Boron	mg/L	<0.1						
Cadmium	mg/L	<0.001						
Calcium	mg/L	45						
Chloride	mg/L	<1						
Chromium	mg/L	<0.005						
Cobalt	mg/L	<0.01						
Copper	mg/L	<0.04						
Fluoride	mg/L	0.49						
Gallium	mg/L	<0.1						
Iron	mg/L	<0.1						
Lead	mg/L	<0.0025						
Lithium	mg/L	<0.1						
Magnesium	mg/L	2.9						
Manganese	mg/L	0.028						
Mercury	mg/L	<0.00045						
Molybdenum	mg/L	0.98						
Nickel	mg/L	<0.03						
Nitrate_as_N	mg/L	<0.15						
Nitrite_as_N	mg/L	<0.06						
Total N	mg/L	<0.61						
TKN	mg/L	<0.4						
pH	s.u.	7.28						
Phosphorus	mg/L	<0.5						
Potassium	mg/L	1.2						
Scandium	mg/L	<0.1						
Selenium	mg/L	<0.02						
Silver	mg/L	<0.005						
Sodium	mg/L	<1.5						
Strontium	mg/L	0.32						
Sulfate	mg/L	99						
Thallium	mg/L	<0.001						
Tin	mg/L	<0.1						
Titanium	mg/L	<0.1						
TDS	mg/L	160						
Uranium	mg/L	<0.005						
Vanadium	mg/L	<0.01						
Zinc	mg/L	<0.02						
Anions	mg/L	2.52						
Cations	mg/L	2.59						
Error	%	1.39						

Appendix H
Tabulated HCT testing results

Sample_ID	Units	SAMPLE GROUP #9 (+) 75UM	SAMPLE GROUP #9 (+) 75UM	SAMPLE GROUP #9 (+) 75UM	SAMPLE GROUP #9 (+) 75UM	SAMPLE GROUP #9 (+) 75UM	SAMPLE GROUP #9 (+) 75UM	SAMPLE GROUP #9 (+) 75UM
Week		0	1	2	4	8	12	16
Lithology		Unoxidized Gangue	Unoxidized Gangue	Unoxidized Gangue	Unoxidized Gangue	Unoxidized Gangue	Unoxidized Gangue	Unoxidized Gangue
Effluent (L)	L	1.07	0.71	0.73	0.68	0.71	0.65	0.56
Redox		161.56	169.39	181.08	170.94	135.64	334.11	302.56
Fe ²⁺	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fe ³⁺	mg/L	0	0	0	0	0	0	0
Total Alk	mg/L	81	61	63	89	76	46	37
CO ₃ ²⁻	mg/L	<1	<1	<1	<1	<1	<1	<1
HCO ₃ ⁻	mg/L	81	61	63	89	76	46	37
Aluminum	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Antimony	mg/L	0.033	0.064	0.074	0.041	0.034	0.023	0.015
Arsenic	mg/L	0.029	0.056	0.12	0.068	0.13	0.083	0.076
Barium	mg/L	0.054	0.026	<0.02	<0.02	<0.02	<0.02	<0.02
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.61	0.33	0.31	0.23	<0.1	<0.1	<0.1
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	130	87	58	65	42	31	27
Chloride	mg/L	3.3	<1	<1	<1	<1	<1	<1
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoride	mg/L	3.8	3.8	3.1	1.8	1.2	0.88	0.81
Gallium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Lithium	mg/L	0.22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	mg/L	50	27	16	16	8.4	4.7	4.1
Manganese	mg/L	0.51	0.21	0.13	0.14	0.072	0.043	0.035
Mercury	mg/L	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045	<0.00045
Molybdenum	mg/L	6.6	9.3	5.8	2.3	1.2	0.95	0.91
Nickel	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nitrate_as_N	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Nitrite_as_N	mg/L	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Total N	mg/L	0.68	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61
TKN	mg/L	0.68	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
pH	s.u.	7.58	7.37	7.08	7.53	7.8	7.07	7.03
Phosphorus	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium	mg/L	5.5	2.7	2	1.8	1	<1	<1
Scandium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L	<0.005	0.0064	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/L	18	5.8	3.5	1.8	<1.5	<1.5	<1.5
Strontium	mg/L	1.9	0.87	0.62	0.61	0.37	0.24	0.24
Sulfate	mg/L	460	260	130	150	63	52	57
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TDS	mg/L	730	510	280	360	220	140	160
Uranium	mg/L	0.013	0.013	0.011	0.0078	<0.01	<0.005	<0.005
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Anions	mg/L	11.5	6.89	4.42	4.69	2.82	1.94	1.69
Cations	mg/L	11.5	6.83	4.13	5	2.89	2.05	1.97
Error	%	<1	<1	3.39	3.17	1.38	2.84	7.74

Appendix H
Tabulated HCT testing results

Sample_ID	Units	SAMPLE GROUP #9 (+) 75UM
Week		20
Lithology		Unoxidized Gangue
Effluent (L)	L	0.64
Redox		250.51
Fe ²⁺	mg/L	<0.1
Fe ³⁺	mg/L	0
Total Alk	mg/L	34
CO ₃ ²⁻	mg/L	<1
HCO ₃ ⁻	mg/L	34
Aluminum	mg/L	<0.05
Antimony	mg/L	0.017
Arsenic	mg/L	0.08
Barium	mg/L	<0.02
Beryllium	mg/L	<0.001
Bismuth	mg/L	<0.1
Boron	mg/L	<0.1
Cadmium	mg/L	<0.001
Calcium	mg/L	26
Chloride	mg/L	<1
Chromium	mg/L	<0.005
Cobalt	mg/L	<0.01
Copper	mg/L	<0.04
Fluoride	mg/L	0.55
Gallium	mg/L	<0.1
Iron	mg/L	<0.1
Lead	mg/L	<0.0025
Lithium	mg/L	<0.1
Magnesium	mg/L	3.3
Manganese	mg/L	0.032
Mercury	mg/L	<0.00045
Molybdenum	mg/L	0.75
Nickel	mg/L	<0.03
Nitrate_as_N	mg/L	<0.15
Nitrite_as_N	mg/L	<0.06
Total N	mg/L	<0.61
TKN	mg/L	<0.4
pH	s.u.	7.61
Phosphorus	mg/L	<0.5
Potassium	mg/L	<1
Scandium	mg/L	<0.1
Selenium	mg/L	<0.02
Silver	mg/L	<0.005
Sodium	mg/L	<1.5
Strontium	mg/L	0.21
Sulfate	mg/L	48
Thallium	mg/L	<0.001
Tin	mg/L	<0.1
Titanium	mg/L	<0.1
TDS	mg/L	110
Uranium	mg/L	<0.005
Vanadium	mg/L	<0.01
Zinc	mg/L	<0.02
Anions	mg/L	1.57
Cations	mg/L	1.71
Error	%	4.2

APPENDIX I
Composite geochemical unit chemical release functions

Geochemical Unit		Ash (Non-PAG)	Ash (Non-PAG)	Ash (Non-PAG)	Ash (Non-PAG)	Ash (Non-PAG)	Ash (Non-PAG)	Ash (Non-PAG)
Week	Units	0	1	2	4	8	12	16
pH	s.u.	8.03	8.26	8.27	7.89	7.82	7.74	7.85
Alkalinity Total		249.15	243.29	199.21	58.14	38.62	37.83	42.42
Aluminum	mg/l	0.005	0.011	0.015	0.043	0.022	0.016	0.018
Antimony	mg/l	0.077	0.084	0.087	0.023	0.017	0.015	0.017
Arsenic	mg/l	0.059	0.091	0.104	0.060	0.035	0.012	0.011
Barium	mg/l	0.06	0.04	0.07	0.06	0.01	0.01	0.01
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	1.8	1.9	1.0	0.1	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	305.8	76.7	34.3	9.9	13.8	13.7	20.3
Chloride	mg/l	182.6	1.6	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	6.23	8.54	8.65	2.10	1.33	0.98	0.99
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.011	0.001	0.005	0.025	0.044	0.016	0.006
Lead	mg/l	0.000	0.001	0.001	0.000	0.000	0.001	0.000
Lithium	mg/l	1.70	0.34	0.10	0.03	0.01	0.01	0.01
Magnesium	mg/l	207.1	29.6	9.0	3.0	3.2	3.5	4.2
Manganese	mg/l	0.03	0.01	0.00	0.00	0.00	0.00	0.00
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	4.11	3.78	1.27	0.13	0.11	0.08	0.08
Nickel	mg/l	0.02	0.01	0.01	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	23.4	9.2	5.5	2.6	2.0	1.8	1.8
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.076	0.003	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	402.6	91.1	49.7	23.8	10.9	8.9	7.0
Strontium	mg/l	4.0	0.9	0.2	0.0	0.1	0.1	0.1
Sulfate	mg/l	1580	475	139	35	38	25	23
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	3666	1161	492	176	189	180	213
Uranium	mg/l	0.061	0.036	0.006	0.004	0.001	0.001	0.001
Vanadium	mg/l	0.071	0.024	0.073	0.039	0.035	0.024	0.022
Zinc	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		Ash (Non-PAG)	Ash (Non-PAG)	Ash (Non-PAG)	Ash (Non-PAG)	Ash (Non-PAG)	Ash (Non-PAG)	Ash (Non-PAG)
Week	Units	20	24	28	32	36	40	44
pH	s.u.	7.93	7.71	7.32	7.68	7.24	7.45	7.28
Alkalinity Total		42.95	38.89	47.12	35.41	32.77	33.96	33.77
Aluminum	mg/l	0.011	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.017	0.013	0.012	0.011	0.010	0.004	0.004
Arsenic	mg/l	0.020	0.018	0.020	0.007	0.014	0.013	0.013
Barium	mg/l	0.01	0.02	0.02	0.01	0.01	0.03	0.03
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	19.3	21.8	20.5	20.1	22.9	23.0	23.1
Chloride	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	0.83	0.62	0.57	0.54	0.48	0.14	0.14
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.001	0.001	0.012	0.001	0.001	0.001
Lead	mg/l	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	3.7	4.3	3.9	3.8	4.1	4.6	4.5
Manganese	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	0.07	0.07	0.06	0.05	0.05	0.05	0.05
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	1.5	1.5	0.8	0.7	0.8	1.6	1.4
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	6.6	5.3	3.7	2.6	1.8	1.7	1.8
Strontium	mg/l	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Sulfate	mg/l	15	12	11	10	10	8	8
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	187	160	173	124	126	116	113
Uranium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.016	0.014	0.012	0.011	0.010	0.008	0.009
Zinc	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		Ash (PAG)	Ash (PAG)	Ash (PAG)	Ash (PAG)	Ash (PAG)	Ash (PAG)	Ash (PAG)
Week	Units	0	1	2	4	8	12	16
pH	s.u.	7.58	7.50	7.68	8.02	7.27	7.67	7.75
Alkalinity Total		200.00	30.00	57.00	69.00	44.00	50.11	53.05
Aluminum	mg/l	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.007	0.013	0.012	0.017	0.018	0.014	0.012
Arsenic	mg/l	0.001	0.006	0.008	0.006	0.008	0.008	0.009
Barium	mg/l	0.08	0.05	0.03	0.04	0.05	0.07	0.06
Beryllium	mg/l	0.0019	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	1.1	0.4	0.3	0.2	0.0	0.0	0.2
Cadmium	mg/l	0.005	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	620.0	590.0	350.0	220.0	62.0	46.0	34.0
Chloride	mg/l	22.0	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.27	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	8.40	7.80	3.40	3.50	1.50	0.53	0.51
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lead	mg/l	0.000	0.000	0.000	0.006	0.000	0.000	0.000
Lithium	mg/l	1.90	0.24	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	210.0	76.0	32.0	10.0	3.0	2.2	1.4
Manganese	mg/l	34.00	3.50	2.90	0.97	0.20	0.11	0.08
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	0.26	0.90	0.48	0.57	0.27	0.15	0.09
Nickel	mg/l	0.18	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	14.0	4.7	2.9	1.7	1.0	1.1	0.1
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.008	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.016	0.001	0.001	0.001
Sodium	mg/l	95.0	20.0	7.0	3.4	1.9	0.5	0.5
Strontium	mg/l	6.9	3.8	2.2	1.4	0.5	0.3	0.2
Sulfate	mg/l	2100	1400	870	450	110	69	39
Thallium	mg/l	0.0026	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	3400	2350	1300	780	240	160	130
Uranium	mg/l	0.011	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Zinc	mg/l	2.20	0.07	0.05	0.00	0.00	0.00	0.00

Geochemical Unit		Ash (PAG)	Ash (PAG)	Ash (PAG)	Ash (PAG)	Ash (PAG)	Ash (PAG)	Ash (PAG)
Week	Units	20	24	28	32	36	40	44
pH	s.u.	7.63	7.54	7.25	7.83	7.70	7.06	6.97
Alkalinity Total		54.00	47.00	49.00	110.00	79.00	54.00	54.00
Aluminum	mg/l	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.011	0.009	0.009	0.007	0.007	0.008	0.007
Arsenic	mg/l	0.007	0.007	0.010	0.012	0.022	0.022	0.020
Barium	mg/l	0.06	0.05	0.06	0.10	0.07	0.05	0.06
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	30.0	27.0	30.0	46.0	34.0	25.0	25.0
Chloride	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lead	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	1.1	1.0	1.0	1.6	1.2	0.8	0.8
Manganese	mg/l	0.06	0.05	0.05	0.07	0.03	0.02	0.02
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	0.06	0.05	0.05	0.02	0.02	0.01	0.01
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	0.5	0.5	1.8	0.5	0.5	0.5	0.5
Strontium	mg/l	0.2	0.2	0.2	0.3	0.2	0.2	0.2
Sulfate	mg/l	30	25	36	17	17	16	18
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	100	93	120	200	150	120	86
Uranium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Zinc	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		Basalt	Basalt	Basalt	Basalt	Basalt	Basalt	Basalt
Week	Units	0	1	2	4	8	12	16
pH	s.u.	7.20	7.69	7.67	7.68	7.85	7.82	7.90
Alkalinity Total		220.00	97.00	77.00	48.00	53.00	48.00	52.00
Aluminum	mg/l	0.093	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.026	0.028	0.031	0.030	0.041	0.031	0.032
Arsenic	mg/l	0.029	0.086	0.074	0.140	0.180	0.170	0.180
Barium	mg/l	0.13	0.04	0.03	0.02	0.04	0.04	0.05
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.2	0.2	0.1	0.1	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	340.0	250.0	240.0	140.0	58.0	38.0	42.0
Chloride	mg/l	21.0	6.8	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.06	0.01	0.01	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	0.01	1.60	1.30	2.00	2.10	1.40	1.20
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	2.500	0.001	0.001	0.001	0.001	0.001	0.001
Lead	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	1.90	0.87	0.55	0.30	0.01	0.01	0.01
Magnesium	mg/l	170.0	110.0	99.0	56.0	21.0	14.0	14.0
Manganese	mg/l	0.98	0.41	0.38	0.14	0.04	0.02	0.02
Mercury	mg/l	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
Molybdenum	mg/l	0.83	2.70	2.40	1.50	0.53	0.22	0.12
Nickel	mg/l	0.07	0.08	0.06	0.03	0.00	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	13.0	9.3	8.3	7.2	3.5	2.5	2.4
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.190	0.078	0.022	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	130.0	93.0	75.0	49.0	16.0	8.3	5.5
Strontium	mg/l	3.0	2.0	1.9	1.1	0.5	0.3	0.4
Sulfate	mg/l	1600	1900	1100	570	200	110	130
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	2700	1900	1700	980	390	220	300
Uranium	mg/l	0.500	0.380	0.250	0.077	0.052	0.038	0.034
Vanadium	mg/l	0.030	0.001	0.030	0.068	0.030	0.018	0.033
Zinc	mg/l	0.08	0.01	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		Basalt	Basalt	Basalt	Basalt	Basalt	Basalt	Basalt
Week	Units	20	24	28	32	36	40	44
pH	s.u.	7.75	7.75	7.40	7.62	7.62	7.74	7.40
Alkalinity Total		42.00	48.00	66.00	44.00	44.00	47.00	41.00
Aluminum	mg/l	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.026	0.027	0.022	0.024	0.023	0.023	0.020
Arsenic	mg/l	0.180	0.190	0.200	0.200	0.200	0.220	0.190
Barium	mg/l	0.04	0.05	0.05	0.04	0.04	0.05	0.04
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	39.0	40.0	37.0	30.0	31.0	30.0	26.0
Chloride	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	0.81	0.68	0.46	0.43	0.39	0.37	0.26
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lead	mg/l	0.003	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	14.0	13.0	12.0	9.1	9.3	9.3	7.8
Manganese	mg/l	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	0.08	0.08	0.06	0.05	0.05	0.06	0.05
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.5
Potassium	mg/l	2.0	1.8	1.3	1.3	1.2	1.3	0.9
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.10
Selenium	mg/l	0.013	0.001	0.001	0.001	0.001	0.001	0.005
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.005
Sodium	mg/l	4.8	3.8	2.7	2.6	1.9	2.0	1.7
Strontium	mg/l	0.3	0.4	0.3	0.3	0.3	0.3	0.2
Sulfate	mg/l	110	98	82	71	68	66	50
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0010
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	240	200	240	180	170	180	130
Uranium	mg/l	0.024	0.025	0.022	0.018	0.016	0.017	0.019
Vanadium	mg/l	0.020	0.032	0.021	0.021	0.022	0.014	0.018
Zinc	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		Claystone (Non-PAG)	Claystone (Non-PAG)	Claystone (Non-PAG)	Claystone (Non-PAG)	Claystone (Non-PAG)	Claystone (Non-PAG)	Claystone (Non-PAG)
Week	Units	0	1	2	4	8	12	16
pH	s.u.	7.81	8.06	8.03	8.07	8.07	7.93	8.08
Alkalinity Total		173.07	127.48	97.40	98.74	74.95	68.34	70.24
Aluminum	mg/l	0.014	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.047	0.051	0.048	0.041	0.031	0.027	0.024
Arsenic	mg/l	0.025	0.044	0.051	0.058	0.043	0.033	0.028
Barium	mg/l	0.06	0.05	0.06	0.05	0.05	0.05	0.06
Beryllium	mg/l	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.3	0.4	0.3	0.1	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	242.2	75.3	44.6	30.0	20.2	20.7	20.3
Chloride	mg/l	96.0	0.8	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	5.65	6.51	6.68	5.71	3.11	2.47	2.07
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.014	0.001	0.001	0.004	0.001	0.001	0.001
Lead	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	1.93	0.90	0.56	0.39	0.12	0.07	0.04
Magnesium	mg/l	125.2	36.6	22.2	14.7	8.7	9.2	8.5
Manganese	mg/l	0.02	0.01	0.00	0.00	0.00	0.00	0.00
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	4.30	2.82	1.77	0.76	0.31	0.16	0.11
Nickel	mg/l	0.02	0.01	0.01	0.01	0.01	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	19.0	10.2	7.8	6.9	4.4	4.1	3.8
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.043	0.002	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	113.5	62.0	44.2	29.0	12.0	7.8	4.3
Strontium	mg/l	2.8	0.9	0.5	0.2	0.2	0.2	0.2
Sulfate	mg/l	690	184	108	46	24	24	20
Thallium	mg/l	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	2056	705	450	305	198	175	158
Uranium	mg/l	0.029	0.009	0.004	0.004	0.002	0.001	0.001
Vanadium	mg/l	0.034	0.035	0.046	0.065	0.043	0.035	0.043
Zinc	mg/l	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		Claystone (Non-PAG)	Claystone (Non-PAG)	Claystone (Non-PAG)	Claystone (Non-PAG)	Claystone (Non-PAG)	Claystone (Non-PAG)	Claystone (Non-PAG)
Week	Units	20	24	28	32	36	40	44
pH	s.u.	7.94	7.97	7.74	7.81	7.85	7.91	7.73
Alkalinity Total		74.15	67.58	82.25	62.36	60.52	57.14	54.29
Aluminum	mg/l	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.025	0.022	0.012	0.011	0.011	0.010	0.009
Arsenic	mg/l	0.029	0.018	0.016	0.015	0.016	0.015	0.015
Barium	mg/l	0.06	0.07	0.07	0.06	0.06	0.06	0.06
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	21.4	25.0	23.1	18.9	19.5	19.1	18.9
Chloride	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	1.90	1.62	1.31	1.27	1.22	1.10	1.05
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.002	0.001	0.001	0.001	0.001	0.001	0.001
Lead	mg/l	0.002	0.000	0.001	0.000	0.000	0.000	0.000
Lithium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	8.9	9.9	9.3	7.2	7.5	7.2	7.2
Manganese	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	0.09	0.08	0.06	0.05	0.05	0.05	0.04
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	3.5	3.5	2.8	2.5	2.1	2.3	1.9
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	3.9	2.8	1.7	1.5	1.2	1.2	1.3
Strontium	mg/l	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Sulfate	mg/l	14	13	13	11	11	11	9
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	155	133	166	129	134	125	114
Uranium	mg/l	0.002	0.002	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.020	0.042	0.030	0.029	0.028	0.014	0.025
Zinc	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		Claystone (PAG)	Claystone (PAG)	Claystone (PAG)	Claystone (PAG)	Claystone (PAG)	Claystone (PAG)	Claystone (PAG)
Week	Units	0	1	2	4	8	12	16
pH	s.u.	7.58	7.50	7.68	8.02	7.27	7.67	7.75
Alkalinity Total		200.00	30.00	57.00	69.00	44.00	50.11	53.05
Aluminum	mg/l	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.007	0.013	0.012	0.017	0.018	0.014	0.012
Arsenic	mg/l	0.001	0.006	0.008	0.006	0.008	0.008	0.009
Barium	mg/l	0.08	0.05	0.03	0.04	0.05	0.07	0.06
Beryllium	mg/l	0.0019	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	1.1	0.4	0.3	0.2	0.0	0.0	0.2
Cadmium	mg/l	0.005	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	620.0	590.0	350.0	220.0	62.0	46.0	34.0
Chloride	mg/l	22.0	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.27	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	8.40	7.80	3.40	3.50	1.50	0.53	0.51
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lead	mg/l	0.000	0.000	0.000	0.006	0.000	0.000	0.000
Lithium	mg/l	1.90	0.24	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	210.0	76.0	32.0	10.0	3.0	2.2	1.4
Manganese	mg/l	34.00	3.50	2.90	0.97	0.20	0.11	0.08
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	0.26	0.90	0.48	0.57	0.27	0.15	0.09
Nickel	mg/l	0.18	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	14.0	4.7	2.9	1.7	1.0	1.1	0.1
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.008	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.016	0.001	0.001	0.001
Sodium	mg/l	95.0	20.0	7.0	3.4	1.9	0.5	0.5
Strontium	mg/l	6.9	3.8	2.2	1.4	0.5	0.3	0.2
Sulfate	mg/l	2100	1400	870	450	110	69	39
Thallium	mg/l	0.0026	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	3400	2350	1300	780	240	160	130
Uranium	mg/l	0.011	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Zinc	mg/l	2.20	0.07	0.05	0.00	0.00	0.00	0.00

Geochemical Unit		Claystone (PAG)	Claystone (PAG)	Claystone (PAG)	Claystone (PAG)	Claystone (PAG)	Claystone (PAG)	Claystone (PAG)
Week	Units	20	24	28	32	36	40	44
pH	s.u.	7.63	7.54	7.25	7.83	7.70	7.06	6.97
Alkalinity Total		54.00	47.00	49.00	110.00	79.00	54.00	54.00
Aluminum	mg/l	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.011	0.009	0.009	0.007	0.007	0.008	0.007
Arsenic	mg/l	0.007	0.007	0.010	0.012	0.022	0.022	0.020
Barium	mg/l	0.06	0.05	0.06	0.10	0.07	0.05	0.06
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	30.0	27.0	30.0	46.0	34.0	25.0	25.0
Chloride	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lead	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	1.1	1.0	1.0	1.6	1.2	0.8	0.8
Manganese	mg/l	0.06	0.05	0.05	0.07	0.03	0.02	0.02
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	0.06	0.05	0.05	0.02	0.02	0.01	0.01
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	0.5	0.5	1.8	0.5	0.5	0.5	0.5
Strontium	mg/l	0.2	0.2	0.2	0.3	0.2	0.2	0.2
Sulfate	mg/l	30	25	36	17	17	16	18
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	100	93	120	200	150	120	86
Uranium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Zinc	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		HPZ	HPZ	HPZ	HPZ	HPZ	HPZ	HPZ
Week	Units	0	1	2	4	8	12	16
pH	s.u.	7.87	7.83	7.82	7.83	7.77	7.42	7.58
Alkalinity Total		82.00	57.00	53.00	48.00	35.00	25.00	22.00
Aluminum	mg/l	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.006	0.005	0.004	0.000	0.000	0.000	0.000
Arsenic	mg/l	0.080	0.150	0.160	0.120	0.100	0.120	0.092
Barium	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.5	0.2	0.1	0.0	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	32.0	8.5	7.2	7.7	7.1	5.6	5.0
Chloride	mg/l	34.0	2.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	4.50	1.80	1.00	0.47	0.25	0.22	0.17
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.013	0.019	0.014	0.015	0.001	0.001
Lead	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	0.35	0.16	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	10.0	2.4	2.1	2.3	2.0	1.6	1.3
Manganese	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mercury	mg/l	0.0022	0.0014	0.0000	0.0009	0.0007	0.0009	0.0009
Molybdenum	mg/l	0.18	0.15	0.09	0.04	0.02	0.02	0.01
Nickel	mg/l	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	7.6	4.5	3.8	3.1	2.8	2.1	1.5
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	36.0	19.0	14.0	6.5	2.4	1.3	0.6
Strontium	mg/l	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Sulfate	mg/l	54	10	4	2	1	1	1
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	290	110	90	73	56	37	49
Uranium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Zinc	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		HPZ	HPZ	HPZ	HPZ	HPZ	HPZ	HPZ
Week	Units	20	24	28	32	36	40	44
pH	s.u.	7.37	7.33	6.94	7.02	6.75	6.93	6.66
Alkalinity Total		16.00	17.00	38.00	15.00	8.20	7.40	9.00
Aluminum	mg/l	0.071	0.088	0.110	0.096	0.350	0.130	0.140
Antimony	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Arsenic	mg/l	0.100	0.046	0.041	0.049	0.043	0.010	0.019
Barium	mg/l	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	4.3	6.1	9.2	3.8	2.3	2.0	2.6
Chloride	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	0.11	0.11	0.01	0.01	0.01	0.01	0.01
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.001	0.033	0.001	0.190	0.060	0.034
Lead	mg/l	0.000	0.000	0.000	0.000	0.003	0.000	0.000
Lithium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	1.2	1.6	2.4	1.0	0.6	0.5	0.7
Manganese	mg/l	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Mercury	mg/l	0.0007	0.0000	0.0002	0.0002	0.0002	0.0000	0.0000
Molybdenum	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	1.8	1.8	2.0	1.3	1.0	1.1	1.0
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	1.1	0.6	0.7	0.5	0.5	0.5	0.5
Strontium	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sulfate	mg/l	1	1	1	1	1	1	1
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	45	34	81	27	30	28	34
Uranium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Zinc	mg/l	0.00	0.00	0.01	0.00	0.00	0.00	0.00

Geochemical Unit		Qal	Qal	Qal	Qal	Qal	Qal	Qal
Week	Units	0	1	2	4	8	12	16
pH	s.u.	8.30	8.46	8.41	8.69	8.63	8.67	8.41
Alkalinity Total		220.00	360.00	310.00	270.00	200.00	160.00	125.01
Aluminum	mg/l	0.005	0.058	0.180	0.350	0.500	0.200	0.280
Antimony	mg/l	0.020	0.021	0.023	0.021	0.016	0.010	0.008
Arsenic	mg/l	0.410	0.250	0.370	0.180	0.072	0.042	0.031
Barium	mg/l	0.19	0.10	0.06	0.05	0.04	0.00	0.00
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	4.9	4.7	2.7	1.3	0.5	0.3	0.2
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	260.0	20.0	7.9	6.2	5.2	3.5	4.0
Chloride	mg/l	1300.0	19.0	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	4.80	7.70	12.00	7.70	4.10	1.90	1.20
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.001	0.140	0.240	0.360	0.130	0.210
Lead	mg/l	0.000	0.012	0.006	0.000	0.000	0.005	0.000
Lithium	mg/l	0.34	0.12	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	100.0	5.9	2.0	1.5	1.1	0.7	0.7
Manganese	mg/l	0.01	0.00	0.00	0.00	0.01	0.00	0.00
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	0.35	0.73	0.19	0.06	0.03	0.01	0.01
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l	6.50	2.40	1.50	0.10	0.10	0.10	0.10
Phosphorus	mg/l	0.7	0.6	0.9	1.1	1.1	0.9	0.6
Potassium	mg/l	27.0	8.9	4.7	4.0	3.2	2.7	2.6
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.130	0.006	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.011	0.009
Sodium	mg/l	1200.0	310.0	170.0	140.0	94.0	69.0	56.0
Strontium	mg/l	2.6	0.2	0.0	0.0	0.0	0.0	0.0
Sulfate	mg/l	940	350	82	38	14	4	1
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	3400	1100	460	440	270	230	180
Uranium	mg/l	0.032	0.027	0.012	0.007	0.001	0.001	0.001
Vanadium	mg/l	0.130	0.230	0.480	0.710	0.650	0.270	0.160
Zinc	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		Qal	Qal	Qal	Qal	Qal	Qal	Qal
Week	Units	20	24	28	32	36	40	44
pH	s.u.	8.55	8.12	7.69	8.47	7.15	7.44	7.44
Alkalinity Total		98.22	94.64	68.00	80.00	68.00	79.00	79.00
Aluminum	mg/l	0.058	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.006	0.004	0.004	0.003	0.003	0.000	0.000
Arsenic	mg/l	0.022	0.013	0.011	0.013	0.012	0.008	0.008
Barium	mg/l	0.00	0.03	0.02	0.03	0.05	0.06	0.06
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	3.8	6.6	7.6	11.0	16.0	20.0	20.0
Chloride	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	0.71	0.43	0.47	0.44	0.40	0.01	0.01
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Lead	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	0.7	1.3	1.4	2.1	3.1	5.1	5.1
Manganese	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l	0.10	0.10	0.10	0.10	0.67	0.10	0.10
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	2.6	3.5	3.8	3.9	4.9	6.2	6.2
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.006	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	40.0	32.0	17.0	7.9	4.8	3.0	3.0
Strontium	mg/l	0.0	0.0	0.0	0.1	0.2	0.2	0.2
Sulfate	mg/l	1	1	1	1	1	1	1
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	140	130	95	100	110	100	100
Uranium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.090	0.041	0.035	0.028	0.026	0.017	0.017
Zinc	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		Tuff	Tuff	Tuff	Tuff	Tuff	Tuff	Tuff
Week	Units	0	1	2	4	8	12	16
pH	s.u.	7.87	7.83	7.82	7.83	7.77	7.42	7.58
Alkalinity Total		82.00	57.00	53.00	48.00	35.00	25.00	22.00
Aluminum	mg/l	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.006	0.005	0.004	0.000	0.000	0.000	0.000
Arsenic	mg/l	0.080	0.150	0.160	0.120	0.100	0.120	0.092
Barium	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.5	0.2	0.1	0.0	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	32.0	8.5	7.2	7.7	7.1	5.6	5.0
Chloride	mg/l	34.0	2.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	4.50	1.80	1.00	0.47	0.25	0.22	0.17
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.013	0.019	0.014	0.015	0.001	0.001
Lead	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	0.35	0.16	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	10.0	2.4	2.1	2.3	2.0	1.6	1.3
Manganese	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mercury	mg/l	0.0022	0.0014	0.0000	0.0009	0.0007	0.0009	0.0009
Molybdenum	mg/l	0.18	0.15	0.09	0.04	0.02	0.02	0.01
Nickel	mg/l	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	7.6	4.5	3.8	3.1	2.8	2.1	1.5
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	36.0	19.0	14.0	6.5	2.4	1.3	0.6
Strontium	mg/l	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Sulfate	mg/l	54	10	4	2	1	1	1
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	290	110	90	73	56	37	49
Uranium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Zinc	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		Tuff	Tuff	Tuff	Tuff	Tuff	Tuff	Tuff
Week	Units	20	24	28	32	36	40	44
pH	s.u.	7.37	7.33	6.94	7.02	6.75	6.93	6.66
Alkalinity Total		16.00	17.00	38.00	15.00	8.20	7.40	9.00
Aluminum	mg/l	0.071	0.088	0.110	0.096	0.350	0.130	0.140
Antimony	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Arsenic	mg/l	0.100	0.046	0.041	0.049	0.043	0.010	0.019
Barium	mg/l	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	4.3	6.1	9.2	3.8	2.3	2.0	2.6
Chloride	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	0.11	0.11	0.01	0.01	0.01	0.01	0.01
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.001	0.033	0.001	0.190	0.060	0.034
Lead	mg/l	0.000	0.000	0.000	0.000	0.003	0.000	0.000
Lithium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	1.2	1.6	2.4	1.0	0.6	0.5	0.7
Manganese	mg/l	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Mercury	mg/l	0.0007	0.0000	0.0002	0.0002	0.0002	0.0000	0.0000
Molybdenum	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	1.8	1.8	2.0	1.3	1.0	1.1	1.0
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	1.1	0.6	0.7	0.5	0.5	0.5	0.5
Strontium	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sulfate	mg/l	1	1	1	1	1	1	1
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	45	34	81	27	30	28	34
Uranium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Zinc	mg/l	0.00	0.00	0.01	0.00	0.00	0.00	0.00

Geochemical Unit		Gangue	Gangue	Gangue	Gangue	Gangue	Gangue	Gangue
Week	Units	0	1	2	4	8	12	16
pH	s.u.	7.14	6.87	6.95	7.54	7.41	7.11	6.87
Alkalinity Total		37.84	18.54	25.98	45.90	34.93	23.88	19.41
Aluminum	mg/l	0.051	0.035	0.035	0.067	0.058	0.073	0.062
Antimony	mg/l	0.018	0.019	0.019	0.019	0.016	0.014	0.011
Arsenic	mg/l	0.052	0.074	0.105	0.118	0.133	0.099	0.099
Barium	mg/l	0.10	0.04	0.01	0.02	0.02	0.01	0.01
Beryllium	mg/l	0.0002	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.4	0.2	0.2	0.2	0.1	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	23.8	16.7	12.6	10.7	9.6	8.0	7.0
Chloride	mg/l	4.3	0.2	0.3	0.2	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	2.83	0.80	2.33	1.80	1.35	0.95	0.87
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.120	0.024	0.024	0.046	0.039	0.050	0.043
Lead	mg/l	0.001	0.000	0.000	0.001	0.001	0.001	0.000
Lithium	mg/l	0.45	0.06	0.06	0.11	0.10	0.12	0.10
Magnesium	mg/l	20.3	10.9	8.2	13.8	8.8	8.8	6.5
Manganese	mg/l	0.04	0.02	0.02	0.06	0.02	0.04	0.03
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
Molybdenum	mg/l	0.51	0.64	0.58	0.40	0.24	0.19	0.13
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l	0.81	0.10	0.10	0.10	0.10	0.10	0.10
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	6.9	3.1	2.6	4.0	2.8	1.7	1.5
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.002	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	16.4	8.5	6.3	4.3	2.0	1.9	1.7
Strontium	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sulfate	mg/l	91	30	35	35	12	7	9
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.02	0.01	0.01	0.02	0.03	0.05	0.02
TDS	mg/l	362	248	180	270	200	179	156
Uranium	mg/l	0.003	0.003	0.002	0.003	0.001	0.001	0.001
Vanadium	mg/l	0.004	0.003	0.003	0.005	0.005	0.005	0.005
Zinc	mg/l	0.01	0.01	0.00	0.01	0.01	0.01	0.01

Geochemical Unit		Gangue	Gangue	Gangue	Gangue	Gangue	Gangue	Gangue
Week	Units	20	24	28	32	36	40	44
pH	s.u.	6.87	6.87	6.87	6.87	6.87	6.87	6.87
Alkalinity Total		19.41	19.41	19.41	19.41	19.41	19.41	19.41
Aluminum	mg/l	0.062	0.062	0.062	0.062	0.062	0.062	0.062
Antimony	mg/l	0.011	0.011	0.011	0.011	0.011	0.011	0.011
Arsenic	mg/l	0.099	0.099	0.099	0.099	0.099	0.099	0.099
Barium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Beryllium	mg/l	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Chloride	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.043	0.043	0.043	0.043	0.043	0.043	0.043
Lead	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Magnesium	mg/l	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Manganese	mg/l	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Strontium	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sulfate	mg/l	9	9	9	9	9	9	9
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.02	0.02	0.02	0.02	0.02	0.02	0.02
TDS	mg/l	156	156	156	156	156	156	156
Uranium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Zinc	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Geochemical Unit		Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock
Week	Units	0	1	2	4	8	12	16
pH	s.u.	7.83	8.08	8.07	7.92	7.91	7.77	7.95
Alkalinity Total		192.55	142.67	110.21	71.39	51.70	49.23	54.09
Aluminum	mg/l	0.011	0.005	0.005	0.006	0.005	0.005	0.005
Antimony	mg/l	0.063	0.068	0.065	0.036	0.027	0.025	0.025
Arsenic	mg/l	0.024	0.047	0.052	0.051	0.037	0.022	0.019
Barium	mg/l	0.05	0.04	0.06	0.05	0.03	0.04	0.05
Beryllium	mg/l	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.4	0.6	0.4	0.1	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	262.0	89.5	50.2	24.1	20.7	22.1	24.8
Chloride	mg/l	88.2	0.7	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	5.98	7.06	6.84	3.78	2.18	1.80	1.68
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.018	0.001	0.001	0.005	0.002	0.002	0.001
Lead	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	2.28	0.81	0.48	0.24	0.06	0.04	0.03
Magnesium	mg/l	155.5	42.4	21.4	10.8	7.8	8.8	8.9
Manganese	mg/l	0.03	0.01	0.00	0.00	0.00	0.00	0.00
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	5.78	3.72	2.06	0.54	0.28	0.18	0.13
Nickel	mg/l	0.03	0.01	0.01	0.01	0.01	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	19.7	10.0	7.3	5.1	3.4	3.2	3.0
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.046	0.002	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	135.9	58.6	39.0	22.1	8.9	6.3	3.7
Strontium	mg/l	3.3	1.0	0.6	0.2	0.2	0.2	0.2
Sulfate	mg/l	906	242	123	42	31	30	31
Thallium	mg/l	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	2399	804	464	237	187	171	174
Uranium	mg/l	0.038	0.013	0.004	0.003	0.001	0.001	0.001
Vanadium	mg/l	0.038	0.024	0.041	0.040	0.028	0.024	0.028
Zinc	mg/l	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Geochemical Unit		Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock	Waste Rock
Week	Units	20	24	28	32	36	40	44
pH	s.u.	7.86	7.85	7.59	7.68	7.71	7.80	7.60
Alkalinity Total		58.33	52.67	68.35	48.89	47.39	45.14	43.35
Aluminum	mg/l	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	mg/l	0.026	0.023	0.014	0.013	0.012	0.011	0.010
Arsenic	mg/l	0.026	0.019	0.018	0.012	0.016	0.015	0.015
Barium	mg/l	0.05	0.05	0.05	0.03	0.03	0.05	0.05
Beryllium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth	mg/l	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Boron	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cadmium	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Calcium	mg/l	25.6	28.0	25.4	20.6	21.2	20.3	20.2
Chloride	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	mg/l	1.58	1.34	1.09	1.05	0.99	0.90	0.87
Gallium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Iron	mg/l	0.001	0.001	0.001	0.003	0.001	0.001	0.001
Lead	mg/l	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Lithium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Magnesium	mg/l	8.9	9.3	8.5	6.6	6.7	6.4	6.3
Manganese	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mercury	mg/l	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Molybdenum	mg/l	0.10	0.10	0.08	0.06	0.06	0.06	0.05
Nickel	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Nitrogen	mg/l							
Phosphorus	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Potassium	mg/l	2.7	2.5	1.6	1.5	1.3	1.8	1.5
Scandium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Selenium	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Silver	mg/l	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Sodium	mg/l	3.5	2.6	1.7	1.5	1.2	1.2	1.3
Strontium	mg/l	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Sulfate	mg/l	22	20	19	16	15	14	13
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Tin	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Titanium	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/l	169	143	181	131	134	125	115
Uranium	mg/l	0.002	0.002	0.001	0.001	0.001	0.001	0.001
Vanadium	mg/l	0.015	0.028	0.021	0.020	0.020	0.011	0.018
Zinc	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX J
Sub-pit water balance summaries

Appendix J. Sub-pit Water Balance Summaries
Backfilled Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	WRF Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
0.0	0.00	4593.0	0.00E+00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0%
91.3	0.25	4605.3	2.15E+07	41.3	0.0	7.6	15.0	48.9	15.0	33.9	2.19E+07	2%
182.6	0.50	4617.3	5.95E+07	45.2	0.0	3.2	12.6	48.4	12.6	35.8	6.03E+07	1%
273.9	0.75	4625.8	9.40E+07	43.7	0.0	5.1	11.7	48.8	11.7	37.1	9.39E+07	0%
365.3	1.00	4633.3	1.32E+08	41.4	0.0	10.6	10.8	51.9	10.8	41.2	1.31E+08	1%
456.6	1.25	4640.2	1.67E+08	38.9	0.0	7.6	10.0	46.4	10.0	36.5	1.65E+08	1%
547.9	1.50	4646.0	2.00E+08	36.5	0.0	3.2	9.4	39.7	9.4	30.4	1.99E+08	1%
639.2	1.75	4650.7	2.29E+08	34.6	0.0	5.1	8.8	39.7	8.8	30.9	2.29E+08	0%
730.5	2.0	4655.8	2.60E+08	32.5	0.0	10.6	8.2	43.1	8.2	34.9	2.61E+08	0%
1095.8	3.0	4669.4	3.69E+08	27.6	0.0	10.6	7.0	38.2	7.0	31.2	3.69E+08	0%
1461.0	4.0	4679.3	4.65E+08	24.3	0.0	10.6	6.5	34.9	6.5	28.4	4.65E+08	0%
1826.3	5.0	4687.1	5.52E+08	21.7	0.0	10.6	6.3	32.3	6.3	26.0	5.55E+08	1%
2191.5	6.0	4693.4	6.30E+08	19.8	0.0	10.6	6.1	30.4	12.8	17.6	6.37E+08	1%
2556.8	7.0	4697.7	7.04E+08	18.6	0.0	10.6	5.9	29.2	12.8	16.4	7.10E+08	1%
2922.0	8.0	4701.8	7.74E+08	17.4	0.0	10.6	5.7	28.0	12.8	15.2	7.78E+08	0%
3287.3	9.0	4705.6	8.40E+08	16.1	0.0	10.6	5.5	26.6	12.8	13.8	8.42E+08	0%
3652.5	10.0	4708.9	9.01E+08	14.9	0.0	10.6	5.3	25.5	12.8	12.7	9.02E+08	0%
4017.8	11.0	4711.5	9.59E+08	13.9	0.0	10.6	5.1	24.5	12.8	11.7	9.58E+08	0%
4383.0	12.0	4714.0	1.01E+09	13.0	0.0	10.6	5.0	23.7	12.8	10.9	1.01E+09	0%
4748.3	13.0	4716.3	1.07E+09	12.2	0.0	10.6	4.9	22.8	12.8	10.0	1.06E+09	0%
5113.5	14.0	4718.5	1.11E+09	11.5	0.0	10.6	4.9	22.1	12.8	9.3	1.11E+09	0%
5478.8	15.0	4720.6	1.16E+09	10.9	0.0	10.6	5.0	21.5	12.8	8.7	1.16E+09	0%
5844.0	16.0	4722.6	1.20E+09	10.3	0.0	10.6	5.0	20.9	12.8	8.1	1.20E+09	0%
6209.3	17.0	4724.4	1.25E+09	9.8	0.0	10.6	5.2	20.4	12.8	7.6	1.24E+09	1%
6574.5	18.0	4725.8	1.28E+09	9.4	0.0	10.6	5.4	20.0	12.8	7.2	1.28E+09	1%
6939.8	19.0	4727.2	1.32E+09	9.0	0.0	10.6	5.5	19.6	12.8	6.8	1.32E+09	0%
7305.0	20.0	4728.6	1.36E+09	8.7	0.0	10.6	5.7	19.3	12.8	6.5	1.35E+09	0%
8035.5	22.0	4731.0	1.42E+09	8.1	0.0	10.6	6.0	18.7	12.8	5.9	1.42E+09	0%
8766.0	24.0	4733.2	1.48E+09	7.6	0.0	10.6	6.3	18.2	12.8	5.4	1.48E+09	0%
9496.5	26.0	4735.1	1.53E+09	7.2	0.0	10.6	6.6	17.8	12.8	5.0	1.53E+09	0%
10227.0	28.0	4736.8	1.57E+09	6.9	0.0	10.6	7.0	17.5	12.8	4.7	1.58E+09	0%
10957.5	30.0	4738.4	1.61E+09	6.7	0.0	10.6	7.3	17.3	12.8	4.5	1.62E+09	0%

Appendix J. Sub-pit Water Balance Summaries
Backfilled Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	WRF Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
11688.0	32.0	4739.8	1.65E+09	6.5	0.0	10.6	7.7	17.1	12.8	4.3	1.66E+09	0%
12418.5	34.0	4741.0	1.68E+09	6.3	0.0	10.6	7.9	16.9	12.8	4.1	1.69E+09	1%
13149.0	36.0	4741.9	1.71E+09	6.2	0.0	10.5	8.2	16.7	12.8	3.9	1.72E+09	1%
13879.5	38.0	4742.7	1.74E+09	6.1	0.0	10.6	8.3	16.7	12.8	3.9	1.75E+09	0%
14610.0	40.0	4743.5	1.77E+09	6.0	0.0	10.5	8.5	16.5	12.8	3.7	1.78E+09	0%
15340.5	42.0	4744.2	1.79E+09	5.9	0.0	10.6	8.6	16.5	12.8	3.7	1.80E+09	0%
16071.0	44.0	4744.8	1.81E+09	5.8	0.0	10.5	8.8	16.4	12.8	3.6	1.82E+09	0%
16801.5	46.0	4745.4	1.83E+09	5.8	0.0	10.6	8.9	16.3	12.8	3.5	1.84E+09	0%
17532.0	48.0	4746.0	1.85E+09	5.7	0.0	10.5	9.0	16.2	12.8	3.4	1.86E+09	0%
18262.5	50.0	4746.5	1.87E+09	5.6	0.0	10.6	9.1	16.2	12.8	3.4	1.87E+09	0%
20088.8	55.0	4747.6	1.91E+09	5.5	0.0	10.5	9.4	16.1	12.8	3.3	1.91E+09	0%
21915.0	60.0	4748.6	1.94E+09	5.4	0.0	10.5	9.6	16.0	12.8	3.2	1.94E+09	0%
23741.3	65.0	4749.3	1.96E+09	5.4	0.0	10.5	9.8	15.9	12.8	3.1	1.97E+09	0%
25567.5	70.0	4750.0	1.99E+09	5.3	0.0	10.6	9.9	15.9	12.8	3.1	1.99E+09	0%
27393.8	75.0	4750.5	2.00E+09	5.3	0.0	10.5	10.0	15.8	12.8	3.0	2.01E+09	0%
29220.0	80.0	4751.0	2.02E+09	5.3	0.0	10.5	10.1	15.8	12.8	3.0	2.02E+09	0%
31046.3	85.0	4751.4	2.03E+09	5.2	0.0	10.5	10.2	15.7	12.8	2.9	2.03E+09	0%
32872.5	90.0	4751.7	2.04E+09	5.2	0.0	10.6	10.3	15.8	12.8	3.0	2.04E+09	0%
34698.8	95.0	4752.0	2.05E+09	5.2	0.0	10.5	10.4	15.8	12.8	3.0	2.05E+09	0%
36525.0	100.0	4752.2	2.06E+09	5.2	0.0	10.5	10.4	15.7	12.8	2.9	2.06E+09	0%
38351.3	105.0	4752.4	2.07E+09	5.2	0.0	10.5	10.5	15.7	12.8	2.9	2.07E+09	0%
40177.5	110.0	4752.6	2.07E+09	5.2	0.0	10.6	10.5	15.8	12.8	3.0	2.07E+09	0%
42003.8	115.0	4752.7	2.08E+09	5.2	0.0	10.5	10.6	15.7	12.8	2.9	2.08E+09	0%
43830.0	120.0	4752.8	2.08E+09	5.2	0.0	10.5	10.6	15.7	12.8	2.9	2.08E+09	0%
45656.3	125.0	4752.9	2.08E+09	5.2	0.0	10.5	10.6	15.7	12.8	2.9	2.08E+09	0%
47482.5	130.0	4753.0	2.09E+09	5.2	0.0	10.6	10.6	15.7	12.8	2.9	2.09E+09	0%
49308.8	135.0	4753.1	2.09E+09	5.2	0.0	10.4	10.7	15.6	12.8	2.8	2.09E+09	0%
51135.0	140.0	4753.1	2.09E+09	5.2	0.0	10.4	10.7	15.6	12.8	2.8	2.09E+09	0%
52961.3	145.0	4753.2	2.09E+09	5.2	0.0	10.4	10.7	15.6	12.8	2.8	2.09E+09	0%
54787.5	150.0	4753.2	2.09E+09	5.2	0.0	10.5	10.7	15.6	12.8	2.8	2.09E+09	0%
58440.0	160.0	4753.2	2.09E+09	5.2	0.0	10.4	10.7	15.6	12.8	2.8	2.09E+09	0%
62092.5	170.0	4753.2	2.09E+09	5.2	0.0	10.5	10.7	15.6	12.8	2.8	2.09E+09	0%

Appendix J. Sub-pit Water Balance Summaries
Backfilled Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	WRF Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
65745.0	180.0	4753.2	2.09E+09	5.2	0.0	10.4	10.7	15.6	12.8	2.8	2.09E+09	0%
69397.5	190.0	4753.2	2.09E+09	5.2	0.0	10.5	10.7	15.6	12.8	2.8	2.09E+09	0%
73050.0	200.0	4753.2	2.09E+09	5.2	0.0	10.4	10.7	15.6	12.8	2.8	2.09E+09	0%
76702.5	210.0	4753.2	2.09E+09	5.2	0.0	10.5	10.7	15.6	12.8	2.8	2.09E+09	0%
80355.0	220.0	4753.2	2.09E+09	5.2	0.0	10.4	10.7	15.6	12.8	2.8	2.09E+09	0%
84007.5	230.0	4753.2	2.09E+09	5.2	0.0	10.5	10.7	15.6	12.8	2.8	2.09E+09	0%
87660.0	240.0	4753.2	2.09E+09	5.2	0.0	10.3	10.7	15.5	12.8	2.7	2.09E+09	0%
91312.5	250.0	4753.2	2.09E+09	5.2	0.0	10.4	10.7	15.6	12.8	2.8	2.09E+09	0%
94965.0	260.0	4753.2	2.09E+09	5.2	0.0	10.3	10.7	15.5	12.8	2.7	2.09E+09	0%
98617.5	270.0	4753.2	2.09E+09	5.2	0.0	10.4	10.7	15.5	12.8	2.7	2.09E+09	0%
102270.0	280.0	4753.2	2.09E+09	5.2	0.0	10.3	10.7	15.5	12.8	2.7	2.09E+09	0%
105922.5	290.0	4753.2	2.09E+09	5.2	0.0	10.4	10.7	15.6	12.8	2.8	2.09E+09	0%
109571.0	300.0	4753.2	2.09E+09	5.2	0.0	10.6	10.7	15.8	12.8	3.0	2.09E+09	0%

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Backfilled Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
0.0	0.00	4774.0	0.00E+00	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0%
91.3	0.25	4775.8	1.13E+05	8.6	9.3	17.4	17.8	17.4	0.4	2.01E+05	77%
182.6	0.50	4776.8	1.74E+05	8.2	9.3	17.0	17.5	17.0	0.5	2.61E+05	50%
273.9	0.75	4778.0	2.49E+05	7.9	9.3	16.5	17.2	16.5	0.6	3.35E+05	34%
365.3	1.00	4779.4	3.36E+05	7.5	9.3	16.1	16.8	16.1	0.6	4.12E+05	23%
456.6	1.25	4780.6	4.10E+05	7.3	9.3	16.0	16.5	16.0	0.5	4.77E+05	16%
547.9	1.50	4781.5	4.72E+05	7.1	9.3	15.9	16.3	15.9	0.4	5.31E+05	12%
639.2	1.75	4782.4	5.23E+05	6.9	9.3	15.8	16.2	15.8	0.4	5.75E+05	10%
730.5	2.0	4783.1	5.68E+05	6.8	9.3	15.8	16.1	15.8	0.3	6.16E+05	8%
1095.8	3.0	4785.3	7.07E+05	6.6	9.3	15.7	15.9	15.7	0.2	7.39E+05	5%
1461.0	4.0	4786.9	8.05E+05	6.5	9.3	15.6	15.8	15.6	0.2	8.28E+05	3%
1826.3	5.0	4788.5	9.05E+05	6.4	9.3	15.5	15.7	15.5	0.2	9.20E+05	2%
2191.5	6.0	4790.0	1.01E+06	6.3	9.3	15.3	15.5	15.3	0.2	1.01E+06	1%
2556.8	7.0	4790.6	1.11E+06	6.2	9.3	15.3	15.5	15.3	0.2	1.12E+06	0%
2922.0	8.0	4791.2	1.22E+06	6.2	9.3	15.3	15.5	15.3	0.2	1.22E+06	0%
3287.3	9.0	4791.8	1.32E+06	6.2	9.3	15.2	15.4	15.2	0.2	1.32E+06	0%
3652.5	10.0	4792.4	1.43E+06	6.1	9.3	15.2	15.4	15.2	0.2	1.43E+06	0%
4017.8	11.0	4793.0	1.54E+06	6.1	9.3	15.2	15.4	15.2	0.2	1.53E+06	0%
4383.0	12.0	4793.6	1.64E+06	6.1	9.3	15.1	15.3	15.1	0.2	1.63E+06	1%
4748.3	13.0	4794.2	1.75E+06	6.0	9.3	15.1	15.3	15.1	0.2	1.74E+06	1%
5113.5	14.0	4794.8	1.87E+06	6.0	9.3	15.0	15.3	15.0	0.2	1.86E+06	1%
5478.8	15.0	4795.5	1.99E+06	6.0	9.3	15.0	15.2	15.0	0.2	1.97E+06	1%
5844.0	16.0	4796.2	2.11E+06	5.9	9.3	15.0	15.2	15.0	0.2	2.10E+06	1%
6209.3	17.0	4796.9	2.24E+06	5.9	9.3	14.9	15.2	14.9	0.3	2.22E+06	1%
6574.5	18.0	4797.7	2.38E+06	5.9	9.3	14.9	15.2	14.9	0.3	2.36E+06	1%
6939.8	19.0	4798.5	2.53E+06	5.8	9.3	14.8	15.1	14.8	0.3	2.51E+06	1%
7305.0	20.0	4799.4	2.69E+06	5.8	9.3	14.8	15.1	14.8	0.3	2.66E+06	1%
8035.5	22.0	4801.2	3.02E+06	5.8	9.3	14.7	15.0	14.7	0.3	2.98E+06	1%
8766.0	24.0	4803.0	3.34E+06	5.7	9.3	14.7	15.0	14.7	0.3	3.30E+06	1%
9496.5	26.0	4804.7	3.66E+06	5.7	9.3	14.7	15.0	14.7	0.3	3.60E+06	1%

Appendix J. Sub-pit Water Balance Summaries
Backfilled Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
10227.0	28.0	4806.1	3.95E+06	5.6	9.3	14.7	14.9	14.7	0.3	3.85E+06	3%
10957.5	30.0	4806.8	4.23E+06	5.6	9.3	14.7	14.9	14.7	0.3	4.07E+06	4%
11688.0	32.0	4807.4	4.50E+06	5.6	9.3	14.7	14.9	14.7	0.3	4.34E+06	3%
12418.5	34.0	4808.0	4.76E+06	5.6	9.3	14.6	14.9	14.6	0.2	4.61E+06	3%
13149.0	36.0	4808.5	5.00E+06	5.6	9.3	14.7	14.9	14.7	0.2	4.87E+06	3%
13879.5	38.0	4809.0	5.24E+06	5.6	9.3	14.7	14.9	14.7	0.2	5.11E+06	2%
14610.0	40.0	4809.6	5.46E+06	5.6	9.3	14.7	14.9	14.7	0.2	5.34E+06	2%
15340.5	42.0	4810.0	5.67E+06	5.6	9.3	14.7	14.9	14.7	0.2	5.56E+06	2%
16071.0	44.0	4810.5	5.87E+06	5.6	9.3	14.7	14.9	14.7	0.2	5.77E+06	2%
16801.5	46.0	4810.9	6.06E+06	5.6	9.3	14.7	14.8	14.7	0.2	5.96E+06	2%
17532.0	48.0	4811.3	6.24E+06	5.6	9.3	14.7	14.8	14.7	0.2	6.15E+06	1%
18262.5	50.0	4811.7	6.42E+06	5.6	9.3	14.7	14.8	14.7	0.2	6.33E+06	1%
20088.8	55.0	4812.6	6.82E+06	5.5	9.3	14.7	14.8	14.7	0.1	6.75E+06	1%
21915.0	60.0	4813.4	7.18E+06	5.5	9.3	14.7	14.8	14.7	0.1	7.12E+06	1%
23741.3	65.0	4814.1	7.48E+06	5.5	9.3	14.7	14.8	14.7	0.1	7.44E+06	1%
25567.5	70.0	4814.7	7.75E+06	5.5	9.3	14.7	14.8	14.7	0.1	7.71E+06	0%
27393.8	75.0	4815.2	7.97E+06	5.5	9.3	14.7	14.8	14.7	0.1	7.94E+06	0%
29220.0	80.0	4815.7	8.17E+06	5.5	9.3	14.7	14.8	14.7	0.1	8.15E+06	0%
31046.3	85.0	4816.0	8.34E+06	5.5	9.3	14.7	14.8	14.7	0.1	8.33E+06	0%
32872.5	90.0	4816.4	8.50E+06	5.5	9.3	14.7	14.8	14.7	0.1	8.49E+06	0%
34698.8	95.0	4816.7	8.64E+06	5.5	9.3	14.7	14.8	14.7	0.0	8.63E+06	0%
36525.0	100.0	4817.0	8.77E+06	5.5	9.3	14.7	14.7	14.7	0.0	8.77E+06	0%
38351.3	105.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
40177.5	110.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
42003.8	115.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
43830.0	120.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
45656.3	125.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
47482.5	130.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
49308.8	135.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
51135.0	140.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%

Appendix J. Sub-pit Water Balance Summaries
Backfilled Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
52961.3	145.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
54787.5	150.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
58440.0	160.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
62092.5	170.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
65745.0	180.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
69397.5	190.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
73050.0	200.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
76702.5	210.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
80355.0	220.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
84007.5	230.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
87660.0	240.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
91312.5	250.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
94965.0	260.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
98617.5	270.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
102270.0	280.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
105922.5	290.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%
109571.0	300.0	4817.2	8.84E+06	5.4	9.3	14.7	14.7	14.7	0.0	8.84E+06	0%

Appendix J. Sub-pit Water Balance Summaries
Backfilled Pit Scenario

Time	Time2	Pit Stage Elevation (ft)	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
0.0	0.00	4757.5	0.00E+00	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0%
91.3	0.25	4759.5	3.76E+06	2.6	3.9	2.3	6.5	2.3	4.2	3.16E+06	16%
182.6	0.50	4761.5	7.53E+06	2.8	1.6	2.0	4.4	2.0	2.4	7.15E+06	5%
273.9	0.75	4764.5	1.36E+07	7.8	2.6	1.7	10.4	1.7	8.7	1.31E+07	3%
365.3	1.00	4771.5	2.59E+07	11.7	5.5	2.2	17.2	2.2	15.0	2.71E+07	5%
456.6	1.25	4775.5	3.86E+07	11.8	3.9	2.4	15.7	2.4	13.3	4.01E+07	4%
547.9	1.50	4777.5	5.09E+07	11.6	1.7	2.5	13.2	2.5	10.8	5.15E+07	1%
639.2	1.75	4779.5	6.13E+07	11.4	2.6	2.5	14.0	2.5	11.5	6.28E+07	2%
730.5	2.00	4781.5	7.35E+07	11.1	5.5	2.6	16.6	2.6	14.1	7.42E+07	1%
1095.8	3.0	4788.5	1.16E+08	10.0	5.5	3.1	15.5	3.1	12.5	1.14E+08	2%
1461.0	4.0	4793.5	1.53E+08	9.7	5.5	3.7	15.2	3.7	11.4	1.53E+08	0%
1826.3	5.0	4796.5	1.86E+08	9.4	5.5	4.3	14.9	4.3	10.6	1.81E+08	3%
2191.5	6.0	4800.5	2.17E+08	9.0	5.5	4.7	14.5	4.7	9.8	2.19E+08	1%
2556.8	7.0	4802.5	2.44E+08	8.7	5.5	4.9	14.2	4.9	9.2	2.38E+08	3%
2922.0	8.0	4805.5	2.70E+08	8.2	5.5	5.2	13.7	5.2	8.6	2.66E+08	1%
3287.3	9.0	4807.5	2.92E+08	7.9	5.5	5.4	13.4	5.4	8.1	2.87E+08	2%
3652.5	10.0	4809.5	3.14E+08	7.7	5.5	5.5	13.2	5.5	7.7	3.12E+08	0%
4017.8	11.0	4810.5	3.34E+08	7.6	5.5	5.7	13.1	5.7	7.4	3.25E+08	3%
4383.0	12.0	4812.5	3.53E+08	7.4	5.5	5.9	12.9	5.9	7.1	3.51E+08	1%
4748.3	13.0	4813.5	3.70E+08	7.3	5.5	6.0	12.8	6.0	6.8	3.64E+08	2%
5113.5	14.0	4815.5	3.87E+08	7.2	5.5	6.2	12.8	6.2	6.6	3.89E+08	1%
5478.8	15.0	4816.5	4.03E+08	7.2	5.5	6.3	12.7	6.3	6.4	4.02E+08	0%
5844.0	16.0	4817.5	4.18E+08	7.1	5.5	6.5	12.6	6.5	6.1	4.15E+08	1%
6209.3	17.0	4818.5	4.32E+08	7.1	5.5	6.7	12.6	6.7	5.9	4.28E+08	1%
6574.5	18.0	4819.5	4.45E+08	7.1	5.5	6.8	12.6	6.8	5.8	4.40E+08	1%
6939.8	19.0	4820.5	4.58E+08	7.1	5.5	7.0	12.6	7.0	5.6	4.53E+08	1%
7305.0	20.0	4821.5	4.70E+08	7.0	5.5	7.1	12.5	7.1	5.5	4.66E+08	1%
8035.5	22.0	4823.5	4.92E+08	7.0	5.5	7.3	12.5	7.3	5.2	4.92E+08	0%
8766.0	24.0	4825.5	5.13E+08	6.9	5.5	7.4	12.4	7.4	5.1	5.24E+08	2%
9496.5	26.0	4826.5	5.33E+08	6.8	5.5	7.4	12.3	7.4	4.9	5.40E+08	1%
10227.0	28.0	4827.5	5.51E+08	6.7	5.5	7.5	12.2	7.5	4.7	5.56E+08	1%

Appendix J. Sub-pit Water Balance Summaries
Backfilled Pit Scenario

Time	Time2	Pit Stage Elevation (ft)	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
10957.5	30.0	4828.5	5.68E+08	6.6	5.5	7.6	12.1	7.6	4.5	5.72E+08	1%
11688.0	32.0	4829.5	5.84E+08	6.5	5.5	7.7	12.0	7.7	4.4	5.88E+08	1%
12418.5	34.0	4830.5	5.98E+08	6.4	5.5	7.7	11.9	7.7	4.2	6.04E+08	1%
13149.0	36.0	4830.5	6.12E+08	6.4	5.5	7.8	11.8	7.8	4.0	6.04E+08	1%
13879.5	38.0	4831.5	6.24E+08	6.3	5.5	7.9	11.8	7.9	3.9	6.21E+08	1%
14610.0	40.0	4832.5	6.35E+08	6.2	5.5	7.9	11.7	7.9	3.8	6.37E+08	0%
15340.5	42.0	4833.5	6.45E+08	6.1	5.5	7.9	11.6	7.9	3.7	6.53E+08	1%
16071.0	44.0	4833.5	6.54E+08	6.0	5.5	8.0	11.5	8.0	3.5	6.53E+08	0%
16801.5	46.0	4833.5	6.60E+08	5.2	5.5	8.0	10.6	8.0	2.7	6.53E+08	1%
17532.0	48.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.5	6.53E+08	1%
18262.5	50.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.6	6.53E+08	1%
20088.8	55.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.5	6.53E+08	1%
21915.0	60.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.5	6.53E+08	1%
23741.3	65.0	4833.5	6.60E+08	5.1	5.4	8.0	10.5	8.0	2.5	6.53E+08	1%
25567.5	70.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.6	6.53E+08	1%
27393.8	75.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.5	6.53E+08	1%
29220.0	80.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.5	6.53E+08	1%
31046.3	85.0	4833.5	6.60E+08	5.1	5.4	8.0	10.5	8.0	2.5	6.53E+08	1%
32872.5	90.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.6	6.53E+08	1%
34698.8	95.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.5	6.53E+08	1%
36525.0	100.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.5	6.53E+08	1%
38351.3	105.0	4833.5	6.60E+08	5.1	5.4	8.0	10.5	8.0	2.5	6.53E+08	1%
40177.5	110.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.6	6.53E+08	1%
42003.8	115.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.5	6.53E+08	1%
43830.0	120.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.5	6.53E+08	1%
45656.3	125.0	4833.5	6.60E+08	5.1	5.4	8.0	10.5	8.0	2.5	6.53E+08	1%
47482.5	130.0	4833.5	6.60E+08	5.1	5.5	8.0	10.5	8.0	2.6	6.53E+08	1%
49308.8	135.0	4833.5	6.60E+08	5.0	5.4	8.0	10.5	8.0	2.5	6.53E+08	1%
51135.0	140.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.5	6.53E+08	1%
52961.3	145.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.4	6.53E+08	1%
54787.5	150.0	4833.5	6.60E+08	5.0	5.4	8.0	10.5	8.0	2.5	6.53E+08	1%

Appendix J. Sub-pit Water Balance Summaries
Backfilled Pit Scenario

Time	Time2	Pit Stage Elevation (ft)	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
58440.0	160.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.5	6.53E+08	1%
62092.5	170.0	4833.5	6.60E+08	5.1	5.4	8.0	10.5	8.0	2.5	6.53E+08	1%
65745.0	180.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.5	6.53E+08	1%
69397.5	190.0	4833.5	6.60E+08	5.0	5.4	8.0	10.5	8.0	2.5	6.53E+08	1%
73050.0	200.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.5	6.53E+08	1%
76702.5	210.0	4833.5	6.60E+08	5.0	5.4	8.0	10.5	8.0	2.5	6.53E+08	1%
80355.0	220.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.5	6.53E+08	1%
84007.5	230.0	4833.5	6.60E+08	5.0	5.4	8.0	10.5	8.0	2.5	6.53E+08	1%
87660.0	240.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.4	6.53E+08	1%
91312.5	250.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.4	6.53E+08	1%
94965.0	260.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.4	6.53E+08	1%
98617.5	270.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.4	6.53E+08	1%
102270.0	280.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.4	6.53E+08	1%
105922.5	290.0	4833.5	6.60E+08	5.0	5.4	8.0	10.4	8.0	2.4	6.53E+08	1%
109571.0	300.0	4833.5	6.60E+08	5.1	5.5	8.0	10.6	8.0	2.6	6.53E+08	1%

Appendix J. Sub-pit Water Balance Summaries

Open Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Pit Wall Runoff	Precip	East WRF	GW North	GW West	ET	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
0.0	0.00	4593.0	0.00E+00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0%
91.3	0.25	4597.9	5.68E+07	31.3	25.7	2.1	0.3	2.6	4.8	4.1	0.0	66.8	4.1	62.6	5.82E+07	2%
182.6	0.50	4602.8	1.13E+08	40.6	10.6	1.8	0.3	1.7	5.6	19.7	0.0	60.7	19.7	40.9	1.16E+08	2%
273.9	0.75	4606.1	1.52E+08	41.0	17.0	3.8	0.3	1.6	7.2	18.9	0.0	70.9	18.9	52.0	1.55E+08	2%
365.3	1.00	4611.0	2.23E+08	38.8	35.1	10.7	0.3	1.5	10.4	5.7	0.0	96.8	5.7	91.1	2.34E+08	5%
456.6	1.25	4613.5	2.92E+08	40.1	25.1	8.1	0.3	1.5	9.5	16.0	0.0	84.6	16.0	68.6	3.01E+08	3%
547.9	1.50	4615.4	3.42E+08	41.7	10.5	3.5	0.3	1.4	7.9	38.7	0.0	65.4	38.7	26.7	3.50E+08	2%
639.2	1.75	4616.4	3.69E+08	42.2	16.7	5.7	0.3	1.4	7.2	29.1	0.0	73.6	29.1	44.4	3.76E+08	2%
730.5	2.00	4618.9	4.39E+08	43.1	35.0	12.5	0.3	1.4	5.9	6.6	0.0	98.0	6.6	91.4	4.44E+08	1%
1095.8	3.0	4626.1	6.36E+08	39.6	34.8	14.0	0.3	1.3	6.1	7.5	0.0	96.2	7.5	88.8	6.37E+08	0%
1461.0	4.0	4631.4	8.15E+08	37.1	34.7	14.9	0.3	1.2	6.2	7.9	0.0	94.5	7.9	86.5	8.12E+08	0%
1826.3	5.0	4636.4	9.80E+08	34.3	34.6	15.7	0.3	1.2	6.6	8.4	0.0	92.7	8.4	84.3	9.74E+08	1%
2191.5	6.0	4640.8	1.13E+09	31.8	34.6	16.4	0.3	1.2	7.0	8.8	0.0	91.3	8.8	82.6	1.12E+09	1%
2556.8	7.0	4644.5	1.27E+09	29.6	34.5	17.5	0.3	1.3	7.3	9.3	0.0	90.5	9.3	81.2	1.26E+09	1%
2922.0	8.0	4647.6	1.40E+09	27.8	34.3	18.6	0.3	1.5	7.6	9.9	0.0	90.1	9.9	80.2	1.39E+09	0%
3287.3	9.0	4650.5	1.52E+09	26.2	34.2	19.5	0.3	1.6	7.9	10.4	0.0	89.6	10.4	79.2	1.51E+09	0%
3652.5	10.0	4653.1	1.62E+09	24.7	34.2	20.5	0.3	1.7	8.0	10.9	0.0	89.4	10.9	78.5	1.62E+09	0%
4017.8	11.0	4655.4	1.72E+09	23.4	34.1	21.3	0.3	1.8	8.2	11.4	0.0	89.2	11.4	77.8	1.72E+09	0%
4383.0	12.0	4657.6	1.81E+09	22.2	34.0	22.1	0.3	2.0	8.3	11.8	0.0	88.9	11.8	77.2	1.82E+09	1%
4748.3	13.0	4659.5	1.89E+09	21.0	33.8	22.8	0.3	2.3	8.4	12.2	0.0	88.6	12.2	76.4	1.90E+09	1%
5113.5	14.0	4660.8	1.96E+09	20.2	33.9	23.4	0.3	2.5	8.4	12.4	0.0	88.6	12.4	76.2	1.98E+09	1%
5478.8	15.0	4662.0	2.03E+09	19.4	33.8	23.9	0.3	2.6	8.5	12.7	0.0	88.5	12.7	75.8	2.05E+09	1%
5844.0	16.0	4663.1	2.10E+09	18.7	33.8	24.4	0.3	2.7	8.6	13.0	0.0	88.5	13.0	75.5	2.11E+09	0%
6209.3	17.0	4664.2	2.16E+09	18.1	33.6	24.7	0.3	2.8	8.6	13.2	0.0	88.3	13.2	75.0	2.17E+09	0%
6574.5	18.0	4665.2	2.22E+09	17.5	33.7	25.2	0.3	2.9	8.7	13.4	0.0	88.3	13.4	74.9	2.22E+09	0%
6939.8	19.0	4666.1	2.27E+09	16.9	33.6	25.6	0.3	3.1	8.7	13.6	0.0	88.2	13.6	74.6	2.28E+09	0%
7305.0	20.0	4667.0	2.32E+09	16.3	33.6	26.0	0.3	3.3	8.7	13.8	0.0	88.2	13.8	74.3	2.32E+09	0%
8035.5	22.0	4668.6	2.41E+09	15.2	33.5	26.6	0.3	3.5	8.8	14.2	0.0	88.0	14.2	73.9	2.41E+09	0%
8766.0	24.0	4669.9	2.49E+09	14.2	33.5	27.2	0.3	3.7	9.0	14.5	0.0	87.9	14.5	73.4	2.49E+09	0%
9496.5	26.0	4671.1	2.55E+09	13.4	33.4	27.6	0.3	3.8	9.1	14.7	0.0	87.8	14.7	73.1	2.55E+09	0%

Appendix J. Sub-pit Water Balance Summaries

Open Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Pit Wall Runoff	Precip	East WRF	GW North	GW West	ET	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
10227.0	28.0	4672.1	2.61E+09	12.6	33.4	28.1	0.3	3.9	9.3	14.9	0.0	87.7	14.9	72.7	2.61E+09	0%
10957.5	30.0	4672.9	2.66E+09	11.9	33.4	28.4	0.3	4.1	9.4	15.1	0.0	87.5	15.1	72.4	2.65E+09	0%
11688.0	32.0	4673.6	2.70E+09	11.3	33.3	28.7	0.3	4.1	9.6	15.3	0.0	87.4	15.3	72.1	2.70E+09	0%
12418.5	34.0	4674.3	2.74E+09	10.7	33.2	28.9	0.3	4.2	9.8	15.5	0.0	87.0	15.5	71.6	2.73E+09	0%
13149.0	36.0	4674.8	2.77E+09	10.2	33.0	29.0	0.3	4.2	10.0	15.6	0.0	86.7	15.6	71.1	2.76E+09	0%
13879.5	38.0	4675.2	2.79E+09	9.7	33.1	29.3	0.3	4.2	10.2	15.7	0.0	86.9	15.7	71.2	2.78E+09	0%
14610.0	40.0	4675.5	2.82E+09	9.5	32.9	29.4	0.3	4.2	10.2	15.8	0.0	86.7	15.8	70.8	2.81E+09	0%
15340.5	42.0	4675.8	2.83E+09	9.3	33.1	29.7	0.3	4.2	10.3	15.9	0.0	87.0	15.9	71.0	2.83E+09	0%
16071.0	44.0	4676.0	2.85E+09	9.2	32.9	29.8	0.3	4.3	10.3	16.0	0.0	86.7	16.0	70.7	2.84E+09	0%
16801.5	46.0	4676.1	2.86E+09	9.0	33.0	30.0	0.3	4.3	10.3	16.1	0.0	87.0	16.1	70.9	2.86E+09	0%
17532.0	48.0	4676.3	2.87E+09	8.9	32.9	30.0	0.3	4.3	10.3	16.2	0.0	86.8	16.2	70.6	2.87E+09	0%
18262.5	50.0	4676.4	2.88E+09	8.8	33.0	30.2	0.3	4.3	10.3	16.2	0.0	87.0	16.2	70.9	2.87E+09	0%
20088.8	55.0	4676.6	2.89E+09	8.7	32.9	30.3	0.3	4.3	10.4	16.3	0.0	86.9	16.3	70.6	2.89E+09	0%
21915.0	60.0	4676.7	2.90E+09	8.5	32.9	30.3	0.3	4.3	10.3	16.3	0.0	86.7	16.3	70.4	2.90E+09	0%
23741.3	65.0	4676.7	2.91E+09	8.5	32.8	30.3	0.3	4.3	10.3	16.4	0.0	86.5	16.4	70.2	2.90E+09	0%
25567.5	70.0	4676.8	2.91E+09	8.4	33.0	30.5	0.3	4.4	10.3	16.3	0.0	86.9	16.3	70.6	2.90E+09	0%
27393.8	75.0	4676.8	2.91E+09	8.4	32.9	30.5	0.3	4.4	10.3	16.4	0.0	86.8	16.4	70.4	2.90E+09	0%
29220.0	80.0	4676.8	2.91E+09	8.4	32.8	30.4	0.3	4.4	10.3	16.4	0.0	86.6	16.4	70.3	2.90E+09	0%
31046.3	85.0	4676.8	2.91E+09	8.4	32.8	30.3	0.3	4.4	10.3	16.4	0.0	86.5	16.4	70.1	2.90E+09	0%
32872.5	90.0	4676.8	2.91E+09	8.4	33.0	30.5	0.3	4.4	10.3	16.4	0.0	86.9	16.4	70.6	2.90E+09	0%
34698.8	95.0	4676.8	2.91E+09	8.4	32.9	30.5	0.3	4.4	10.3	16.4	0.0	86.8	16.4	70.4	2.90E+09	0%
36525.0	100.0	4676.8	2.91E+09	8.3	32.8	30.4	0.3	4.4	10.3	16.4	0.0	86.6	16.4	70.3	2.90E+09	0%
38351.3	105.0	4676.8	2.91E+09	8.3	32.8	30.3	0.3	4.4	10.3	16.4	0.0	86.5	16.4	70.1	2.91E+09	0%
40177.5	110.0	4676.8	2.91E+09	8.4	33.0	30.5	0.3	4.4	10.3	16.4	0.0	86.9	16.4	70.6	2.90E+09	0%
42003.8	115.0	4676.8	2.91E+09	8.3	32.9	30.5	0.3	4.4	10.3	16.4	0.0	86.8	16.4	70.4	2.90E+09	0%
43830.0	120.0	4676.8	2.91E+09	8.3	32.8	30.4	0.3	4.4	10.3	16.4	0.0	86.6	16.4	70.3	2.90E+09	0%
45656.3	125.0	4676.8	2.91E+09	8.3	32.8	30.3	0.3	4.4	10.3	16.4	0.0	86.5	16.4	70.1	2.91E+09	0%
47482.5	130.0	4676.8	2.91E+09	8.4	33.0	30.5	0.3	4.4	10.3	16.4	0.0	86.9	16.4	70.6	2.90E+09	0%
49308.8	135.0	4676.8	2.91E+09	8.3	32.6	30.2	0.3	4.4	10.3	16.4	0.0	86.2	16.4	69.8	2.91E+09	0%
51135.0	140.0	4676.8	2.91E+09	8.3	32.6	30.1	0.3	4.4	10.3	16.4	0.0	86.1	16.4	69.7	2.91E+09	0%

Appendix J. Sub-pit Water Balance Summaries
Open Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Pit Wall Runoff	Precip	East WRF	GW North	GW West	ET	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
52961.3	145.0	4676.8	2.91E+09	8.3	32.5	30.1	0.3	4.4	10.3	16.4	0.0	85.9	16.4	69.5	2.91E+09	0%
54787.5	150.0	4676.8	2.91E+09	8.3	32.7	30.3	0.3	4.4	10.3	16.4	0.0	86.4	16.4	69.9	2.91E+09	0%
58440.0	160.0	4676.8	2.91E+09	8.3	32.6	30.1	0.3	4.4	10.3	16.4	0.0	86.1	16.4	69.7	2.91E+09	0%
62092.5	170.0	4676.8	2.91E+09	8.3	32.7	30.3	0.3	4.4	10.3	16.4	0.0	86.4	16.4	70.0	2.91E+09	0%
65745.0	180.0	4676.8	2.91E+09	8.3	32.6	30.1	0.3	4.4	10.3	16.4	0.0	86.1	16.4	69.6	2.91E+09	0%
69397.5	190.0	4676.8	2.91E+09	8.3	32.7	30.3	0.3	4.4	10.3	16.4	0.0	86.3	16.4	69.9	2.91E+09	0%
73050.0	200.0	4676.8	2.91E+09	8.3	32.6	30.1	0.3	4.4	10.3	16.4	0.0	86.1	16.4	69.6	2.91E+09	0%
76702.5	210.0	4676.8	2.91E+09	8.3	32.7	30.3	0.3	4.4	10.3	16.4	0.0	86.4	16.4	70.0	2.91E+09	0%
80355.0	220.0	4676.8	2.91E+09	8.3	32.6	30.1	0.3	4.4	10.3	16.4	0.0	86.1	16.4	69.7	2.91E+09	0%
84007.5	230.0	4676.8	2.91E+09	8.3	32.7	30.3	0.3	4.4	10.3	16.4	0.0	86.3	16.4	70.0	2.91E+09	0%
87660.0	240.0	4676.8	2.91E+09	8.3	32.3	29.9	0.3	4.4	10.3	16.5	0.0	85.5	16.5	69.0	2.91E+09	0%
91312.5	250.0	4676.8	2.91E+09	8.3	32.4	30.0	0.3	4.4	10.3	16.4	0.0	85.8	16.4	69.3	2.91E+09	0%
94965.0	260.0	4676.8	2.91E+09	8.3	32.3	29.9	0.3	4.4	10.3	16.5	0.0	85.5	16.5	69.0	2.91E+09	0%
98617.5	270.0	4676.8	2.91E+09	8.3	32.4	30.0	0.3	4.4	10.3	16.4	0.0	85.8	16.4	69.3	2.91E+09	0%
102270.0	280.0	4676.8	2.91E+09	8.3	32.3	29.9	0.3	4.4	10.3	16.5	0.0	85.5	16.5	69.0	2.91E+09	0%
105922.5	290.0	4676.8	2.91E+09	8.3	32.4	30.0	0.3	4.4	10.3	16.4	0.0	85.8	16.4	69.3	2.91E+09	0%
109571.0	300.0	4676.8	2.91E+09	8.3	33.1	30.7	0.3	4.4	10.3	16.4	0.0	87.2	16.4	69.3	2.90E+09	0%

Appendix J. Sub-pit Water Balance Summaries
Open Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Precipitation	Pit Wall Runoff	GW Outflow	ET	Total Inputs	Total Output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
0.0	0.00	4774.0	0.00E+00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.54E+05	0%
91.3	0.25	4786.3	5.14E+06	6.8	1.2	42.0	5.2	2.5	50.0	7.7	42.3	5.16E+06	0%
182.6	0.50	4792.1	9.17E+06	7.7	0.9	17.4	7.4	9.8	26.0	17.2	8.8	9.09E+06	1%
273.9	0.75	4793.0	1.03E+07	7.9	1.5	28.1	7.6	7.5	37.5	15.1	22.4	1.02E+07	1%
365.3	1.00	4797.3	1.54E+07	8.6	3.7	58.4	9.0	2.0	70.7	11.0	59.7	1.52E+07	1%
456.6	1.25	4801.1	2.01E+07	9.6	3.3	41.8	10.4	6.7	54.8	17.1	37.7	1.97E+07	2%
547.9	1.50	4803.9	2.33E+07	5.1	1.6	17.5	5.7	17.9	24.2	23.5	0.7	2.29E+07	2%
639.2	1.75	4803.9	2.34E+07	5.1	2.5	27.8	5.7	13.1	35.4	18.8	16.6	2.30E+07	2%
730.5	2.00	4806.8	2.83E+07	4.9	5.9	58.3	5.8	3.2	69.1	9.0	60.1	2.71E+07	4%
1095.8	3.0	4810.5	3.92E+07	4.8	8.1	58.1	6.1	4.4	71.0	10.6	60.4	3.84E+07	2%
1461.0	4.0	4813.6	4.85E+07	4.8	9.9	57.9	6.0	5.4	72.6	11.5	61.1	4.80E+07	1%
1826.3	5.0	4816.3	5.65E+07	4.8	11.5	57.6	6.3	6.3	73.8	12.6	61.3	5.64E+07	0%
2191.5	6.0	4818.5	6.31E+07	4.8	12.8	57.6	6.6	7.0	75.2	13.7	61.5	6.32E+07	0%
2556.8	7.0	4820.4	6.86E+07	4.7	13.9	57.5	6.9	7.6	76.2	14.6	61.6	6.89E+07	0%
2922.0	8.0	4822.0	7.32E+07	4.7	14.9	57.4	7.2	8.1	77.0	15.3	61.7	7.37E+07	1%
3287.3	9.0	4823.1	7.71E+07	4.7	15.6	57.2	7.5	8.6	77.5	16.0	61.5	7.83E+07	2%
3652.5	10.0	4823.6	8.04E+07	4.7	16.1	57.3	7.6	8.8	78.1	16.4	61.7	8.15E+07	1%
4017.8	11.0	4824.1	8.33E+07	4.7	16.5	57.2	7.7	9.0	78.4	16.8	61.7	8.43E+07	1%
4383.0	12.0	4824.5	8.60E+07	4.7	16.8	57.2	7.8	9.2	78.7	17.0	61.7	8.69E+07	1%
4748.3	13.0	4824.8	8.83E+07	4.7	17.1	57.0	7.9	9.4	78.8	17.3	61.5	8.92E+07	1%
5113.5	14.0	4825.1	9.03E+07	4.7	17.4	57.1	8.0	9.5	79.2	17.5	61.7	9.12E+07	1%
5478.8	15.0	4825.4	9.21E+07	4.7	17.6	57.1	8.1	9.7	79.4	17.7	61.7	9.30E+07	1%
5844.0	16.0	4825.6	9.38E+07	4.7	17.8	57.1	8.1	9.8	79.6	17.9	61.7	9.45E+07	1%
6209.3	17.0	4825.9	9.52E+07	4.7	18.0	56.9	8.2	9.9	79.6	18.0	61.6	9.60E+07	1%
6574.5	18.0	4826.0	9.64E+07	4.7	18.2	57.1	8.2	10.0	79.9	18.2	61.8	9.72E+07	1%
6939.8	19.0	4826.2	9.76E+07	4.7	18.3	57.0	8.3	10.0	80.1	18.3	61.8	9.83E+07	1%
7305.0	20.0	4826.3	9.86E+07	4.7	18.5	57.0	8.3	10.1	80.2	18.4	61.7	9.92E+07	1%
8035.5	22.0	4826.6	1.00E+08	4.7	18.7	57.0	8.4	10.2	80.3	18.6	61.7	1.01E+08	1%
8766.0	24.0	4826.8	1.01E+08	4.7	18.8	57.0	8.4	10.3	80.5	18.7	61.7	1.02E+08	1%
9496.5	26.0	4826.9	1.02E+08	4.6	19.0	57.0	8.5	10.4	80.6	18.8	61.7	1.03E+08	1%

Appendix J. Sub-pit Water Balance Summaries
Open Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Precipitation	Pit Wall Runoff	GW Outflow	ET	Total Inputs	Total Output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
10227.0	28.0	4827.0	1.03E+08	4.6	19.0	57.0	8.5	10.4	80.6	18.9	61.7	1.03E+08	1%
10957.5	30.0	4827.0	1.03E+08	4.6	19.1	57.0	8.5	10.4	80.7	18.9	61.7	1.04E+08	1%
11688.0	32.0	4827.1	1.03E+08	4.6	19.1	57.0	8.5	10.5	80.7	19.0	61.7	1.04E+08	1%
12418.5	34.0	4827.1	1.03E+08	4.6	19.0	56.7	8.5	10.5	80.4	19.0	61.4	1.04E+08	1%
13149.0	36.0	4827.1	1.04E+08	4.6	18.9	56.5	8.5	10.5	80.0	19.0	61.0	1.04E+08	1%
13879.5	38.0	4827.1	1.04E+08	4.6	19.0	56.7	8.5	10.5	80.4	19.0	61.4	1.04E+08	1%
14610.0	40.0	4827.1	1.04E+08	4.6	18.9	56.5	8.5	10.5	80.0	19.0	61.0	1.04E+08	1%
15340.5	42.0	4827.1	1.04E+08	4.6	19.0	56.7	8.5	10.5	80.4	19.0	61.4	1.04E+08	1%
16071.0	44.0	4827.1	1.04E+08	4.6	18.9	56.5	8.5	10.5	80.0	19.0	61.0	1.04E+08	1%
16801.5	46.0	4827.1	1.04E+08	4.6	19.0	56.7	8.5	10.5	80.4	19.0	61.4	1.04E+08	1%
17532.0	48.0	4827.1	1.04E+08	4.6	18.9	56.5	8.5	10.5	80.0	19.0	61.0	1.04E+08	1%
18262.5	50.0	4827.1	1.04E+08	4.6	19.0	56.7	8.5	10.5	80.4	19.0	61.4	1.04E+08	1%
20088.8	55.0	4827.1	1.04E+08	4.6	19.0	56.6	8.5	10.5	80.2	19.0	61.2	1.04E+08	1%
21915.0	60.0	4827.1	1.04E+08	4.6	18.9	56.5	8.5	10.5	80.0	19.0	61.0	1.04E+08	1%
23741.3	65.0	4827.1	1.04E+08	4.6	18.9	56.3	8.5	10.5	79.9	19.0	60.9	1.04E+08	1%
25567.5	70.0	4827.1	1.04E+08	4.6	19.0	56.7	8.5	10.5	80.4	19.0	61.4	1.04E+08	1%
27393.8	75.0	4827.1	1.04E+08	4.6	19.0	56.6	8.5	10.5	80.2	19.0	61.2	1.04E+08	1%
29220.0	80.0	4827.1	1.04E+08	4.6	18.9	56.5	8.5	10.5	80.0	19.0	61.0	1.04E+08	1%
31046.3	85.0	4827.1	1.04E+08	4.6	18.9	56.3	8.5	10.5	79.9	19.0	60.9	1.04E+08	1%
32872.5	90.0	4827.1	1.04E+08	4.6	19.0	56.7	8.5	10.5	80.4	19.0	61.4	1.04E+08	1%
34698.8	95.0	4827.1	1.04E+08	4.6	19.0	56.6	8.5	10.5	80.2	19.0	61.2	1.04E+08	1%
36525.0	100.0	4827.1	1.04E+08	4.6	18.9	56.5	8.5	10.5	80.0	19.0	61.0	1.04E+08	1%
38351.3	105.0	4827.1	1.04E+08	4.6	18.9	56.3	8.5	10.5	79.9	19.0	60.9	1.04E+08	1%
40177.5	110.0	4827.1	1.04E+08	4.6	19.0	56.7	8.5	10.5	80.4	19.0	61.4	1.04E+08	1%
42003.8	115.0	4827.1	1.04E+08	4.6	19.0	56.6	8.5	10.5	80.2	19.0	61.2	1.04E+08	1%
43830.0	120.0	4827.1	1.04E+08	4.6	18.9	56.5	8.5	10.5	80.0	19.0	61.0	1.04E+08	1%
45656.3	125.0	4827.1	1.04E+08	4.6	18.9	56.3	8.5	10.5	79.9	19.0	60.9	1.04E+08	1%
47482.5	130.0	4827.1	1.04E+08	4.6	19.0	56.7	8.5	10.5	80.4	19.0	61.4	1.04E+08	1%
49308.8	135.0	4827.1	1.04E+08	4.6	18.8	56.1	8.5	10.5	79.6	19.0	60.5	1.04E+08	1%
51135.0	140.0	4827.1	1.04E+08	4.6	18.8	56.0	8.5	10.5	79.4	19.0	60.3	1.04E+08	1%

Appendix J. Sub-pit Water Balance Summaries
Open Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Precipitation	Pit Wall Runoff	GW Outflow	ET	Total Inputs	Total Output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
52961.3	145.0	4827.1	1.04E+08	4.6	18.8	55.8	8.5	10.5	79.2	19.1	60.2	1.04E+08	1%
54787.5	150.0	4827.1	1.04E+08	4.6	18.9	56.2	8.5	10.5	79.7	19.0	60.7	1.04E+08	1%
58440.0	160.0	4827.1	1.04E+08	4.6	18.8	56.0	8.5	10.5	79.4	19.1	60.3	1.04E+08	1%
62092.5	170.0	4827.1	1.04E+08	4.6	18.9	56.2	8.5	10.5	79.7	19.0	60.7	1.04E+08	1%
65745.0	180.0	4827.1	1.04E+08	4.6	18.8	56.0	8.5	10.5	79.4	19.1	60.3	1.04E+08	1%
69397.5	190.0	4827.1	1.04E+08	4.6	18.9	56.2	8.5	10.5	79.7	19.0	60.7	1.04E+08	1%
73050.0	200.0	4827.1	1.04E+08	4.6	18.8	56.0	8.5	10.5	79.4	19.0	60.3	1.04E+08	1%
76702.5	210.0	4827.1	1.04E+08	4.6	18.9	56.2	8.5	10.5	79.7	19.0	60.7	1.04E+08	1%
80355.0	220.0	4827.1	1.04E+08	4.6	18.8	56.0	8.5	10.5	79.4	19.0	60.3	1.04E+08	1%
84007.5	230.0	4827.1	1.04E+08	4.6	18.9	56.2	8.5	10.5	79.7	19.0	60.7	1.04E+08	1%
87660.0	240.0	4827.1	1.04E+08	4.6	18.6	55.5	8.5	10.6	78.7	19.1	59.6	1.04E+08	1%
91312.5	250.0	4827.1	1.04E+08	4.6	18.7	55.7	8.5	10.5	79.1	19.1	60.0	1.04E+08	1%
94965.0	260.0	4827.1	1.04E+08	4.6	18.6	55.5	8.5	10.6	78.7	19.1	59.6	1.04E+08	1%
98617.5	270.0	4827.1	1.04E+08	4.6	18.7	55.7	8.5	10.5	79.1	19.1	60.0	1.04E+08	1%
102270.0	280.0	4827.1	1.04E+08	4.6	18.6	55.5	8.5	10.6	78.7	19.1	59.6	1.04E+08	1%
105922.5	290.0	4827.1	1.04E+08	4.6	18.7	55.7	8.5	10.5	79.0	19.1	60.0	1.04E+08	1%
109571.0	300.0	4827.1	1.03E+08	4.6	18.7	55.7	8.5	10.5	79.0	19.1	60.0	1.04E+08	1%

Open Pit Scenario

Time	Time	Pit Stage	Pit Volume	GW Inflow	Precipitation	Pit Wall	ET	GW	Total	Total	Net WB	Interpolated	Cumulative
(Days)	(Years)	Elevation	(gallons)	(gpm)	(gpm)	Runoff	(gpm)	Outflow	inputs	output	(gpm)	Pit Volume	Volume Error
		(feet)				(gpm)		(gpm)	(gpm)	(gpm)		(gallons)	%
0.0	0.00	4757.0	0.00E+00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0%
91.3	0.25	4758.8	2.32E+07	7.4	22.3	1.4	2.8	3.6	31.0	6.4	24.7	1.88E+07	19%
182.6	0.50	4760.2	4.01E+07	6.7	9.2	0.9	9.8	2.8	16.8	12.5	4.3	3.66E+07	9%
273.9	0.75	4760.5	4.44E+07	6.8	14.9	1.4	7.4	2.6	23.1	10.0	13.1	4.09E+07	8%
365.3	1.00	4762.6	7.10E+07	10.5	30.9	4.0	2.2	1.8	45.4	4.0	41.4	6.89E+07	3%
456.6	1.25	4764.8	9.88E+07	12.2	22.1	3.9	8.0	1.5	38.2	9.5	28.7	9.81E+07	1%
547.9	1.50	4766.1	1.15E+08	12.2	9.2	2.0	22.0	1.5	23.4	23.5	-0.1	1.16E+08	0%
639.2	1.75	4766.2	1.16E+08	12.2	14.6	3.1	16.1	1.5	29.9	17.6	12.3	1.16E+08	0%
730.5	2.00	4768.4	1.45E+08	11.9	30.6	7.5	4.1	1.4	50.0	5.5	44.5	1.47E+08	1%
1095.8	3.00	4772.5	1.97E+08	9.8	30.4	10.0	5.5	1.2	50.2	6.7	43.5	2.01E+08	2%
1461.0	4.00	4774.4	2.31E+08	8.9	30.2	11.4	6.3	1.4	50.6	7.7	42.9	2.45E+08	6%
1826.3	5.00	4775.2	2.60E+08	8.8	30.1	12.0	6.6	1.6	50.9	8.2	42.7	2.74E+08	5%
2191.5	6.00	4775.8	2.84E+08	8.6	30.1	12.5	6.9	1.7	51.3	8.5	42.7	2.97E+08	5%
2556.8	7.00	4776.3	3.05E+08	8.6	30.1	13.0	7.1	1.9	51.6	9.0	42.6	3.18E+08	4%
2922.0	8.00	4776.8	3.23E+08	8.6	30.0	13.3	7.3	2.1	51.9	9.4	42.5	3.35E+08	4%
3287.3	9.00	4777.2	3.37E+08	8.6	29.9	13.6	7.5	2.4	52.1	9.9	42.2	3.49E+08	4%
3652.5	10.00	4777.5	3.49E+08	8.6	30.0	13.9	7.6	2.7	52.4	10.3	42.2	3.60E+08	3%
4017.8	11.00	4777.7	3.59E+08	8.6	30.0	14.1	7.7	2.8	52.6	10.5	42.1	3.70E+08	3%
4383.0	12.00	4777.9	3.67E+08	8.6	29.9	14.2	7.8	2.9	52.8	10.7	42.1	3.78E+08	3%
4748.3	13.00	4778.1	3.73E+08	8.6	29.9	14.3	7.9	3.1	52.8	10.9	41.8	3.84E+08	3%
5113.5	14.00	4778.2	3.78E+08	8.6	29.9	14.5	7.9	3.2	53.0	11.2	41.8	3.89E+08	3%
5478.8	15.00	4778.3	3.83E+08	8.6	29.9	14.6	8.0	3.4	53.0	11.4	41.7	3.93E+08	3%
5844.0	16.00	4778.4	3.86E+08	8.6	29.9	14.6	8.0	3.5	53.1	11.5	41.6	3.97E+08	3%
6209.3	17.00	4778.5	3.89E+08	8.6	29.8	14.7	8.1	3.6	53.1	11.7	41.4	4.00E+08	3%
6574.5	18.00	4778.5	3.91E+08	8.6	29.9	14.7	8.1	3.7	53.2	11.7	41.5	4.02E+08	3%
6939.8	19.00	4778.6	3.93E+08	8.6	29.9	14.8	8.1	3.7	53.3	11.8	41.4	4.03E+08	3%
7305.0	20.00	4778.6	3.95E+08	8.6	29.9	14.8	8.1	3.7	53.3	11.9	41.4	4.05E+08	3%
8035.5	22.00	4778.7	3.97E+08	8.6	29.9	14.9	8.1	3.8	53.3	11.9	41.4	4.07E+08	3%
8766.0	24.00	4778.7	3.99E+08	8.6	29.9	14.9	8.2	3.8	53.4	12.0	41.4	4.09E+08	3%
9496.5	26.00	4778.8	4.00E+08	8.6	29.9	14.9	8.2	3.8	53.4	12.0	41.4	4.10E+08	3%
10227.0	28.00	4778.8	4.01E+08	8.6	29.9	14.9	8.2	3.9	53.4	12.0	41.4	4.11E+08	3%
10957.5	30.00	4778.8	4.01E+08	8.6	29.9	14.9	8.2	3.9	53.4	12.0	41.4	4.11E+08	3%

Open Pit Scenario

Time	Time	Pit Stage	Pit Volume	GW Inflow	Precipitation	Pit Wall	ET	GW	Total	Total	Net WB	Interpolated	Cumulative
(Days)	(Years)	Elevation	(gallons)	(gpm)	(gpm)	Runoff	(gpm)	Outflow	inputs	output	(gpm)	Pit Volume	Volume Error
		(feet)				(gpm)		(gpm)	(gpm)	(gpm)		(gallons)	%
11688.0	32.00	4778.8	4.02E+08	8.6	29.9	15.0	8.2	3.9	53.4	12.1	41.4	4.12E+08	3%
12418.5	34.00	4778.8	4.02E+08	8.6	29.7	14.9	8.2	3.9	53.2	12.1	41.2	4.12E+08	3%
13149.0	36.00	4778.8	4.02E+08	8.6	29.6	14.8	8.2	3.9	53.0	12.1	40.9	4.12E+08	3%
13879.5	38.00	4778.8	4.02E+08	8.6	29.7	14.9	8.2	3.9	53.2	12.1	41.2	4.13E+08	3%
14610.0	40.00	4778.8	4.02E+08	8.6	29.6	14.8	8.2	3.9	53.0	12.1	40.9	4.13E+08	3%
15340.5	42.00	4778.8	4.02E+08	8.6	29.7	14.9	8.2	3.9	53.2	12.1	41.2	4.13E+08	3%
16071.0	44.00	4778.8	4.03E+08	8.6	29.6	14.8	8.2	3.9	53.0	12.1	40.9	4.13E+08	3%
16801.5	46.00	4778.8	4.02E+08	8.6	29.7	14.9	8.2	3.9	53.2	12.1	41.2	4.13E+08	3%
17532.0	48.00	4778.8	4.03E+08	8.6	29.6	14.8	8.2	3.9	53.0	12.1	40.9	4.13E+08	3%
18262.5	50.00	4778.8	4.02E+08	8.6	29.7	14.9	8.2	3.9	53.2	12.1	41.2	4.13E+08	3%
20088.8	55.00	4778.8	4.03E+08	8.6	29.7	14.9	8.2	3.9	53.1	12.1	41.1	4.13E+08	3%
21915.0	60.00	4778.8	4.03E+08	8.6	29.6	14.8	8.2	3.9	53.0	12.1	40.9	4.13E+08	3%
23741.3	65.00	4778.8	4.03E+08	8.6	29.5	14.8	8.2	3.9	52.9	12.1	40.8	4.13E+08	3%
25567.5	70.00	4778.8	4.02E+08	8.6	29.7	14.9	8.2	3.9	53.2	12.1	41.2	4.13E+08	3%
27393.8	75.00	4778.8	4.03E+08	8.6	29.7	14.9	8.2	3.9	53.1	12.1	41.1	4.13E+08	3%
29220.0	80.00	4778.8	4.03E+08	8.6	29.6	14.8	8.2	3.9	53.0	12.1	40.9	4.13E+08	3%
31046.3	85.00	4778.8	4.03E+08	8.6	29.5	14.8	8.2	3.9	53.0	12.1	40.8	4.13E+08	3%
32872.5	90.00	4778.8	4.02E+08	8.6	29.7	14.9	8.2	3.9	53.2	12.1	41.2	4.13E+08	3%
34698.8	95.00	4778.8	4.03E+08	8.6	29.7	14.9	8.2	3.9	53.1	12.1	41.1	4.13E+08	3%
36525.0	100.00	4778.8	4.03E+08	8.6	29.6	14.8	8.2	3.9	53.0	12.1	40.9	4.13E+08	3%
38351.3	105.00	4778.8	4.03E+08	8.6	29.5	14.8	8.2	3.9	53.0	12.1	40.8	4.13E+08	3%
40177.5	110.00	4778.8	4.02E+08	8.6	29.7	14.9	8.2	3.9	53.2	12.1	41.2	4.13E+08	3%
42003.8	115.00	4778.8	4.03E+08	8.6	29.7	14.9	8.2	3.9	53.1	12.1	41.0	4.13E+08	3%
43830.0	120.00	4778.8	4.03E+08	8.6	29.6	14.8	8.2	3.9	53.0	12.1	41.0	4.13E+08	3%
45656.3	125.00	4778.8	4.03E+08	8.6	29.5	14.8	8.2	3.9	52.9	12.1	40.8	4.13E+08	3%
47482.5	130.00	4778.8	4.02E+08	8.6	29.7	14.9	8.2	3.9	53.2	12.1	41.2	4.13E+08	3%
49308.8	135.00	4778.8	4.03E+08	8.6	29.4	14.7	8.2	3.9	52.8	12.1	40.6	4.13E+08	3%
51135.0	140.00	4778.8	4.03E+08	8.6	29.3	14.7	8.2	3.9	52.7	12.1	40.5	4.13E+08	3%
52961.3	145.00	4778.9	4.03E+08	8.6	29.3	14.7	8.3	3.9	52.6	12.1	40.4	4.13E+08	3%
54787.5	150.00	4778.9	4.03E+08	8.6	29.5	14.8	8.2	3.9	52.9	12.1	40.7	4.13E+08	3%
58440.0	160.00	4778.8	4.03E+08	8.6	29.3	14.7	8.3	3.9	52.7	12.1	40.5	4.13E+08	3%
62092.5	170.00	4778.9	4.03E+08	8.6	29.5	14.8	8.2	3.9	52.9	12.1	40.7	4.13E+08	3%

Open Pit Scenario

Time	Time	Pit Stage	Pit Volume	GW Inflow	Precipitation	Pit Wall	ET	GW	Total	Total	Net WB	Interpolated	Cumulative
(Days)	(Years)	Elevation	(gallons)	(gpm)	(gpm)	Runoff	(gpm)	Outflow	inputs	output	(gpm)	Pit Volume	Volume Error
		(feet)				(gpm)		(gpm)	(gpm)	(gpm)		(gallons)	%
65745.0	180.00	4778.8	4.03E+08	8.6	29.3	14.7	8.2	3.9	52.7	12.1	40.5	4.13E+08	3%
69397.5	190.00	4778.9	4.03E+08	8.6	29.5	14.8	8.2	3.9	52.9	12.1	40.7	4.13E+08	3%
73050.0	200.00	4778.8	4.03E+08	8.6	29.3	14.7	8.2	3.9	52.7	12.1	40.5	4.13E+08	3%
76702.5	210.00	4778.9	4.03E+08	8.6	29.5	14.8	8.2	3.9	52.9	12.1	40.7	4.13E+08	3%
80355.0	220.00	4778.8	4.03E+08	8.6	29.3	14.7	8.2	3.9	52.7	12.1	40.5	4.13E+08	3%
84007.5	230.00	4778.9	4.03E+08	8.6	29.5	14.8	8.2	3.9	52.9	12.1	40.7	4.13E+08	3%
87660.0	240.00	4778.9	4.03E+08	8.6	29.1	14.6	8.3	3.9	52.3	12.2	40.1	4.13E+08	3%
91312.5	250.00	4778.9	4.03E+08	8.6	29.2	14.7	8.3	3.9	52.5	12.1	40.3	4.13E+08	3%
94965.0	260.00	4778.9	4.03E+08	8.6	29.1	14.6	8.3	3.9	52.3	12.2	40.1	4.13E+08	3%
98617.5	270.00	4778.9	4.03E+08	8.6	29.2	14.7	8.3	3.9	52.5	12.1	40.3	4.13E+08	3%
102270.0	280.00	4778.9	4.03E+08	8.6	29.1	14.6	8.3	3.9	52.3	12.2	40.1	4.13E+08	3%
105922.5	290.00	4778.9	4.03E+08	8.6	29.2	14.7	8.3	3.9	52.5	12.1	40.3	4.13E+08	3%
109514.1	299.00	4778.9	4.03E+08	8.6	29.2	14.7	8.3	3.9	52.5	12.1	40.3	4.13E+08	3%

Partial Backfilled South Sub-Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	Infil-tration	Precip	Pit Wall Runoff	GW Inflow	East WRF	ET	Trans-piration	Total Input	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
0.0	0.0	4593.0	0.00E+00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0%
91.3	0.3	4612.9	5.53E+06	8.6	0.0	21.5	15.3	0.3	0.0	0.0	45.7	0.0	45.7	5.70E+06	3%
182.6	0.5	4623.6	1.14E+07	7.8	0.0	9.0	18.3	0.3	0.0	0.0	35.4	0.0	35.4	1.14E+07	0%
273.9	0.8	4631.2	1.62E+07	8.2	0.0	14.5	20.1	0.3	0.0	0.0	43.0	0.0	43.0	1.61E+07	1%
365.3	1.0	4640.9	2.28E+07	9.1	0.0	30.1	19.8	0.3	0.0	0.0	59.2	0.0	59.2	2.26E+07	1%
456.6	1.3	4648.6	2.89E+07	8.6	0.0	21.6	18.0	0.3	0.0	0.0	48.5	0.0	48.5	2.88E+07	0%
547.9	1.5	4655.7	3.47E+07	7.8	0.0	9.1	16.2	0.3	0.0	0.0	33.4	0.0	33.4	3.48E+07	0%
639.2	1.8	4660.3	3.89E+07	8.1	0.0	14.4	13.8	0.3	0.0	0.0	36.6	0.0	36.6	3.92E+07	1%
730.5	2.0	4665.2	4.44E+07	9.1	0.0	30.1	11.5	0.3	0.0	0.0	51.0	0.0	51.0	4.45E+07	0%
1095.8	3.0	4679.0	6.17E+07	9.1	0.0	30.1	5.3	0.3	0.0	0.0	44.8	0.0	44.8	6.17E+07	0%
1461.0	4.0	4689.5	7.74E+07	9.1	0.0	30.1	3.2	0.3	0.0	0.0	42.8	0.0	42.8	7.80E+07	1%
1826.3	5.0	4696.8	9.21E+07	9.1	0.0	30.1	1.8	0.3	0.0	0.0	41.3	0.0	41.3	9.29E+07	1%
2191.5	6.0	4703.6	1.08E+08	9.1	0.0	30.1	6.6	0.3	0.0	1.1	46.1	1.1	45.0	1.08E+08	0%
2556.8	7.0	4707.4	1.16E+08	9.1	0.0	30.1	11.4	0.3	0.0	27.2	51.0	27.2	23.8	1.16E+08	0%
2922.0	8.0	4708.1	1.20E+08	7.4	55.9	30.1	14.1	0.3	29.8	33.0	107.9	62.8	45.1	1.20E+08	0%
3287.3	9.0	4708.1	1.20E+08	7.4	56.3	30.1	14.1	0.3	30.1	33.0	108.2	63.1	45.1	1.20E+08	0%
3652.5	10.0	4708.1	1.20E+08	7.5	54.9	30.1	14.1	0.3	29.3	33.0	106.9	62.2	44.7	1.20E+08	0%
4017.8	11.0	4708.1	1.20E+08	7.4	55.4	30.1	14.1	0.3	29.5	33.0	107.4	62.5	44.9	1.20E+08	0%
4383.0	12.0	4708.1	1.20E+08	7.4	55.9	30.1	14.1	0.3	29.8	33.0	107.9	62.8	45.1	1.20E+08	0%
4748.3	13.0	4708.1	1.20E+08	7.4	58.3	30.1	14.1	0.3	31.1	33.0	110.1	64.1	46.0	1.20E+08	0%
5113.5	14.0	4708.1	1.20E+08	7.4	56.9	30.1	14.1	0.3	30.3	33.0	108.9	63.3	45.5	1.20E+08	0%
5478.8	15.0	4708.1	1.20E+08	7.4	55.4	30.1	14.1	0.3	29.5	33.0	107.4	62.5	44.9	1.20E+08	0%
5844.0	16.0	4708.1	1.20E+08	7.4	55.9	30.1	14.1	0.3	29.8	33.0	107.9	62.8	45.1	1.20E+08	0%
6209.3	17.0	4708.1	1.20E+08	7.4	56.3	30.1	14.1	0.3	30.1	33.0	108.2	63.1	45.1	1.20E+08	0%
6574.5	18.0	4708.1	1.20E+08	7.5	54.9	30.1	14.1	0.3	29.3	33.0	106.9	62.2	44.7	1.20E+08	0%
6939.8	19.0	4708.1	1.20E+08	7.4	55.4	30.1	14.1	0.3	29.5	33.0	107.4	62.5	44.9	1.20E+08	0%
7305.0	20.0	4708.1	1.20E+08	7.4	55.9	30.1	14.1	0.3	29.8	33.0	107.9	62.8	45.1	1.20E+08	0%
8035.5	22.0	4708.1	1.20E+08	7.4	56.9	30.1	14.1	0.3	30.3	33.0	108.9	63.3	45.5	1.20E+08	0%
8766.0	24.0	4708.1	1.20E+08	7.4	55.9	30.1	14.1	0.3	29.8	33.0	107.9	62.8	45.1	1.20E+08	0%
9496.5	26.0	4708.1	1.20E+08	7.5	54.9	30.1	14.1	0.3	29.3	33.0	106.9	62.2	44.7	1.20E+08	0%
10227.0	28.0	4708.1	1.20E+08	7.4	55.9	30.1	14.1	0.3	29.8	33.0	107.9	62.8	45.1	1.20E+08	0%

Partial Backfilled South Sub-Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	Infil-tration	Precip	Pit Wall Runoff	GW Inflow	East WRF	ET	Trans-piration	Total Input	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
10957.5	30.0	4708.1	1.20E+08	7.4	56.9	30.1	14.1	0.3	30.3	33.0	108.9	63.3	45.5	1.20E+08	0%
11688.0	32.0	4708.1	1.20E+08	7.4	55.9	30.1	14.1	0.3	29.8	33.0	107.9	62.8	45.1	1.20E+08	0%
12418.5	34.0	4708.1	1.20E+08	7.3	60.5	30.0	14.1	0.3	32.4	33.0	112.2	65.4	46.8	1.20E+08	0%
13149.0	36.0	4708.1	1.20E+08	7.3	60.3	29.9	14.1	0.3	32.5	33.0	111.9	65.5	46.4	1.20E+08	0%
13879.5	38.0	4708.1	1.20E+08	7.3	60.5	30.0	14.2	0.3	32.4	33.0	112.3	65.4	46.8	1.20E+08	0%
14610.0	40.0	4708.1	1.20E+08	7.3	59.4	29.9	14.1	0.3	32.0	33.0	111.0	65.0	46.0	1.20E+08	0%
15340.5	42.0	4708.1	1.20E+08	7.3	58.7	30.0	14.1	0.3	31.4	33.0	110.4	64.4	46.0	1.20E+08	0%
16071.0	44.0	4708.1	1.20E+08	7.3	60.3	29.9	14.1	0.3	32.5	33.0	111.8	65.5	46.4	1.20E+08	0%
16801.5	46.0	4708.1	1.20E+08	7.3	60.5	30.0	14.1	0.3	32.4	33.0	112.2	65.4	46.8	1.20E+08	0%
17532.0	48.0	4708.1	1.20E+08	7.3	60.3	29.9	14.1	0.3	32.5	33.0	111.9	65.5	46.4	1.20E+08	0%
18262.5	50.0	4708.1	1.20E+08	7.3	60.5	30.0	14.1	0.3	32.4	33.0	112.2	65.4	46.8	1.20E+08	0%
20088.8	55.0	4708.1	1.20E+08	7.3	59.0	29.9	14.1	0.3	31.7	33.0	110.7	64.7	46.0	1.20E+08	0%
21915.0	60.0	4708.1	1.20E+08	7.3	59.4	29.9	14.1	0.3	32.0	33.0	111.0	65.0	46.0	1.20E+08	0%
23741.3	65.0	4708.1	1.20E+08	7.3	60.1	29.8	14.2	0.3	32.5	33.0	111.7	65.5	46.2	1.20E+08	0%
25567.5	70.0	4708.1	1.20E+08	7.3	60.5	30.0	14.2	0.3	32.4	33.0	112.3	65.4	46.8	1.20E+08	0%
27393.8	75.0	4708.1	1.20E+08	7.4	57.0	29.9	14.1	0.3	30.6	33.0	108.7	63.6	45.1	1.20E+08	0%
29220.0	80.0	4708.1	1.20E+08	7.3	60.3	29.9	14.1	0.3	32.5	33.0	111.9	65.5	46.4	1.20E+08	0%
31046.3	85.0	4708.1	1.20E+08	7.3	60.1	29.8	14.2	0.3	32.5	33.0	111.7	65.5	46.2	1.20E+08	0%
32872.5	90.0	4708.1	1.20E+08	7.3	60.5	30.0	14.1	0.3	32.4	33.0	112.2	65.4	46.8	1.20E+08	0%
34698.8	95.0	4708.1	1.20E+08	7.4	57.0	29.9	14.1	0.3	30.6	33.0	108.7	63.6	45.1	1.20E+08	0%
36525.0	100.0	4708.1	1.20E+08	7.3	59.4	29.9	14.1	0.3	32.0	33.0	111.0	65.0	46.0	1.20E+08	0%
38351.3	105.0	4708.1	1.20E+08	7.3	60.1	29.8	14.1	0.3	32.5	33.0	111.7	65.5	46.2	1.20E+08	0%
40177.5	110.0	4708.1	1.20E+08	7.4	56.7	30.0	14.1	0.3	30.4	33.0	108.5	63.4	45.1	1.20E+08	0%
42003.8	115.0	4708.1	1.20E+08	7.3	59.0	29.9	14.1	0.3	31.7	33.0	110.7	64.7	46.0	1.20E+08	0%
43830.0	120.0	4708.1	1.20E+08	7.3	59.4	29.9	14.1	0.3	32.0	33.0	111.0	65.0	46.0	1.20E+08	0%
45656.3	125.0	4708.1	1.20E+08	7.3	60.1	29.8	14.2	0.3	32.5	33.0	111.7	65.5	46.2	1.20E+08	0%
47482.5	130.0	4708.1	1.20E+08	7.3	60.5	30.0	14.2	0.3	32.4	33.0	112.3	65.4	46.8	1.20E+08	0%
49308.8	135.0	4708.1	1.20E+08	7.3	59.9	29.7	14.1	0.3	32.5	33.0	111.2	65.5	45.7	1.20E+08	0%
51135.0	140.0	4708.1	1.20E+08	7.3	59.7	29.6	14.1	0.3	32.5	33.0	111.0	65.5	45.5	1.20E+08	0%
52961.3	145.0	4708.1	1.20E+08	7.3	59.2	29.5	14.1	0.3	32.4	33.0	110.5	65.4	45.1	1.20E+08	0%
54787.5	150.0	4708.1	1.20E+08	7.3	60.0	29.7	14.2	0.3	32.5	33.0	111.5	65.5	46.0	1.20E+08	0%

Partial Backfilled South Sub-Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	Infil- tration	Precip	Pit Wall Runoff	GW Inflow	East WRF	ET	Trans- piration	Total Input	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	%
58440.0	160.0	4708.1	1.20E+08	7.3	59.7	29.6	14.1	0.3	32.5	33.0	111.0	65.5	45.5	1.20E+08	0%
62092.5	170.0	4708.1	1.20E+08	7.3	60.0	29.7	14.2	0.3	32.5	33.0	111.5	65.5	46.0	1.20E+08	0%
65745.0	180.0	4708.1	1.20E+08	7.3	59.7	29.6	14.1	0.3	32.5	33.0	111.0	65.5	45.5	1.20E+08	0%
69397.5	190.0	4708.1	1.20E+08	7.3	60.0	29.7	14.1	0.3	32.5	33.0	111.4	65.5	45.9	1.20E+08	0%
73050.0	200.0	4708.1	1.20E+08	7.3	59.7	29.6	14.1	0.3	32.5	33.0	111.0	65.5	45.5	1.20E+08	0%
76702.5	210.0	4708.1	1.20E+08	7.3	60.0	29.7	14.1	0.3	32.5	33.0	111.4	65.5	45.9	1.20E+08	0%
80355.0	220.0	4708.1	1.20E+08	7.3	59.7	29.6	14.1	0.3	32.5	33.0	111.1	65.5	45.5	1.20E+08	0%
84007.5	230.0	4708.1	1.20E+08	7.3	60.0	29.7	14.2	0.3	32.5	33.0	111.5	65.5	46.0	1.20E+08	0%
87660.0	240.0	4708.1	1.20E+08	7.3	59.2	29.3	14.2	0.3	32.6	33.0	110.3	65.6	44.7	1.20E+08	0%
91312.5	250.0	4708.1	1.20E+08	7.3	59.5	29.5	14.2	0.3	32.6	33.0	110.7	65.6	45.1	1.20E+08	0%
94965.0	260.0	4708.1	1.20E+08	7.3	59.2	29.3	14.1	0.3	32.6	33.0	110.3	65.6	44.7	1.20E+08	0%
98617.5	270.0	4708.1	1.20E+08	7.3	59.5	29.5	14.2	0.3	32.6	33.0	110.7	65.6	45.1	1.20E+08	0%
102270.0	280.0	4708.1	1.20E+08	7.3	59.2	29.3	14.1	0.3	32.6	33.0	110.3	65.6	44.6	1.20E+08	0%
105922.5	290.0	4708.1	1.20E+08	7.3	59.5	29.5	14.2	0.3	32.6	33.0	110.7	65.6	45.1	1.20E+08	0%
109571.0	300.0	4708.1	1.19E+08	7.3	60.8	30.1	14.1	0.3	32.4	33.0	112.6	65.4	47.2	1.19E+08	0%
109571.0	300.0	4708.1	1.19E+08	7.3	60.8	30.1	14.1	0.3	32.4	33.0	112.6	65.4	47.2	1.19E+08	0%
109571.0	300.0	4708.1	1.19E+08	7.3	60.8	30.1	14.1	0.3	32.4	33.0	112.6	65.4	47.2	1.19E+08	0%

Appendix J. Sub-pit Water Balance Summaries
Partial Backfilled South Sub-Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated pit volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
0.0	0.0	4774.0	0.00E+00	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0%
91.3	0.3	4774.8	5.26E+04	6.7	9.2	15.6	15.9	15.6	0.3	7.44E+04	42%
182.6	0.5	4775.2	7.26E+04	6.4	9.2	15.5	15.6	15.5	0.1	9.39E+04	29%
273.9	0.8	4775.4	8.76E+04	6.4	9.2	15.5	15.6	15.5	0.1	1.09E+05	24%
365.3	1.0	4775.6	9.99E+04	6.3	9.2	15.4	15.5	15.4	0.1	1.21E+05	21%
456.6	1.3	4775.8	1.10E+05	6.3	9.2	15.4	15.5	15.4	0.1	1.31E+05	19%
547.9	1.5	4775.9	1.18E+05	6.3	9.2	15.4	15.5	15.4	0.1	1.39E+05	17%
639.2	1.8	4776.0	1.27E+05	6.3	9.2	15.4	15.5	15.4	0.1	1.47E+05	16%
730.5	2.0	4776.2	1.36E+05	6.3	9.2	15.4	15.5	15.4	0.1	1.56E+05	15%
1095.8	3.0	4777.1	1.94E+05	6.2	9.2	15.3	15.4	15.3	0.1	2.13E+05	10%
1461.0	4.0	4779.0	3.15E+05	6.2	9.2	15.0	15.4	15.0	0.4	3.31E+05	5%
1826.3	5.0	4781.8	4.88E+05	5.4	9.2	14.5	14.6	14.5	0.0	5.00E+05	2%
2191.5	6.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
2556.8	7.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
2922.0	8.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
3287.3	9.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
3652.5	10.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
4017.8	11.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
4383.0	12.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
4748.3	13.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
5113.5	14.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
5478.8	15.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
5844.0	16.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
6209.3	17.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
6574.5	18.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
6939.8	19.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
7305.0	20.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
8035.5	22.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
8766.0	24.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
9496.5	26.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%

Appendix J. Sub-pit Water Balance Summaries
Partial Backfilled South Sub-Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated pit volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
10227.0	28.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
10957.5	30.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
11688.0	32.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
12418.5	34.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
13149.0	36.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
13879.5	38.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
14610.0	40.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
15340.5	42.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
16071.0	44.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
16801.5	46.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
17532.0	48.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
18262.5	50.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
20088.8	55.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
21915.0	60.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
23741.3	65.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
25567.5	70.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
27393.8	75.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
29220.0	80.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
31046.3	85.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
32872.5	90.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
34698.8	95.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
36525.0	100.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
38351.3	105.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
40177.5	110.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
42003.8	115.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
43830.0	120.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
45656.3	125.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
47482.5	130.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
49308.8	135.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
51135.0	140.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%

Appendix J. Sub-pit Water Balance Summaries
Partial Backfilled South Sub-Pit Scenario

Time	Time2	Pit Stage Elevation	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated pit volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
52961.3	145.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
54787.5	150.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
58440.0	160.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
62092.5	170.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
65745.0	180.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
69397.5	190.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
73050.0	200.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
76702.5	210.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
80355.0	220.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
84007.5	230.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
87660.0	240.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
91312.5	250.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
94965.0	260.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
98617.5	270.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
102270.0	280.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
105922.5	290.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%
109571.0	300.0	4781.8	4.90E+05	5.3	9.2	14.5	14.5	14.5	0.0	5.02E+05	2%

Appendix J. Sub-pit Water Balance Summaries
Partial Backfilled South Sub-Pit Scenario

Time	Time2	Pit Stage Elevation (ft)	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
0.0	0.0	4757.0	0.00E+00	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0%
91.3	0.3	4760.9	9.87E+05	5.0	3.9	3.4	9.0	3.4	5.6	9.24E+05	6%
182.6	0.5	4763.3	1.59E+06	4.9	1.6	3.5	6.5	3.5	3.1	1.56E+06	2%
273.9	0.8	4764.9	2.02E+06	5.2	2.6	3.3	7.8	3.3	4.5	2.01E+06	1%
365.3	1.0	4768.2	2.83E+06	5.7	5.5	3.0	11.2	3.0	8.2	2.86E+06	1%
456.6	1.3	4771.5	3.69E+06	6.1	3.9	2.9	10.0	2.9	7.1	3.76E+06	2%
547.9	1.5	4774.3	4.56E+06	6.2	1.7	2.9	7.8	2.9	4.9	4.84E+06	6%
639.2	1.8	4775.1	5.18E+06	6.2	2.6	3.2	8.8	3.2	5.6	5.45E+06	5%
730.5	2.0	4776.2	6.03E+06	6.2	5.5	3.6	11.7	3.6	8.1	6.28E+06	4%
1095.8	3.0	4779.5	8.59E+06	6.2	5.5	4.8	11.7	4.8	6.9	8.78E+06	2%
1461.0	4.0	4782.3	1.08E+07	6.3	5.5	5.4	11.8	5.4	6.4	1.09E+07	1%
1826.3	5.0	4784.8	1.27E+07	6.5	5.5	6.0	11.9	6.0	6.0	1.28E+07	1%
2191.5	6.0	4787.1	1.45E+07	6.5	5.5	6.4	12.1	6.4	5.6	1.45E+07	0%
2556.8	7.0	4789.1	1.60E+07	6.6	5.5	6.8	12.1	6.8	5.3	1.61E+07	0%
2922.0	8.0	4790.6	1.75E+07	6.7	5.5	7.1	12.2	7.1	5.1	1.75E+07	0%
3287.3	9.0	4791.6	1.88E+07	6.6	5.5	7.3	12.1	7.3	4.8	1.87E+07	0%
3652.5	10.0	4792.5	2.00E+07	6.6	5.5	7.5	12.1	7.5	4.6	1.99E+07	0%
4017.8	11.0	4793.4	2.11E+07	6.6	5.5	7.7	12.1	7.7	4.4	2.10E+07	0%
4383.0	12.0	4794.2	2.21E+07	6.6	5.5	7.8	12.1	7.8	4.3	2.19E+07	1%
4748.3	13.0	4794.9	2.30E+07	6.6	5.5	8.0	12.1	8.0	4.1	2.28E+07	1%
5113.5	14.0	4795.5	2.38E+07	6.6	5.5	8.1	12.1	8.1	4.0	2.36E+07	1%
5478.8	15.0	4796.1	2.46E+07	6.5	5.5	8.2	12.1	8.2	3.9	2.44E+07	1%
5844.0	16.0	4796.7	2.53E+07	6.5	5.5	8.2	12.1	8.2	3.9	2.51E+07	1%
6209.3	17.0	4797.3	2.61E+07	6.5	5.5	8.2	12.0	8.2	3.9	2.59E+07	1%
6574.5	18.0	4797.9	2.68E+07	6.6	5.5	8.2	12.1	8.2	3.9	2.66E+07	1%
6939.8	19.0	4798.4	2.76E+07	6.5	5.5	8.2	12.0	8.2	3.8	2.73E+07	1%
7305.0	20.0	4798.8	2.80E+07	6.4	5.5	8.8	11.9	8.8	3.1	2.78E+07	1%
8035.5	22.0	4799.0	2.82E+07	6.2	5.5	9.1	11.7	9.1	2.6	2.80E+07	1%
8766.0	24.0	4799.0	2.83E+07	6.2	5.5	9.1	11.7	9.1	2.6	2.80E+07	1%
9496.5	26.0	4799.0	2.83E+07	6.2	5.5	9.1	11.7	9.1	2.5	2.80E+07	1%
10227.0	28.0	4799.0	2.83E+07	6.2	5.5	9.1	11.7	9.1	2.5	2.80E+07	1%

Appendix J. Sub-pit Water Balance Summaries
Partial Backfilled South Sub-Pit Scenario

Time	Time2	Pit Stage Elevation (ft)	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
10957.5	30.0	4799.0	2.83E+07	6.2	5.5	9.1	11.7	9.1	2.5	2.80E+07	1%
11688.0	32.0	4799.0	2.83E+07	6.2	5.5	9.1	11.7	9.1	2.5	2.80E+07	1%
12418.5	34.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
13149.0	36.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
13879.5	38.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
14610.0	40.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
15340.5	42.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
16071.0	44.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
16801.5	46.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
17532.0	48.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
18262.5	50.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
20088.8	55.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
21915.0	60.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
23741.3	65.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.5	2.80E+07	1%
25567.5	70.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
27393.8	75.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
29220.0	80.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
31046.3	85.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.5	2.80E+07	1%
32872.5	90.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
34698.8	95.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
36525.0	100.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
38351.3	105.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.5	2.80E+07	1%
40177.5	110.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
42003.8	115.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
43830.0	120.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
45656.3	125.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.5	2.80E+07	1%
47482.5	130.0	4799.0	2.83E+07	6.2	5.5	9.1	11.6	9.1	2.5	2.80E+07	1%
49308.8	135.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.4	2.80E+07	1%
51135.0	140.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.4	2.80E+07	1%
52961.3	145.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.4	2.80E+07	1%
54787.5	150.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.5	2.80E+07	1%

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Partial Backfilled South Sub-Pit Scenario

Time	Time2	Pit Stage Elevation (ft)	Pit Volume	GW Inflow	Infiltration	GW Outflow	Total inputs	Total output	Net WB	Interpolated Pit Volume	Cumulative Volume Error
(Days)	(Years)	(feet)	(gallons)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gallons)	(%)
58440.0	160.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.4	2.80E+07	1%
62092.5	170.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.5	2.80E+07	1%
65745.0	180.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.4	2.80E+07	1%
69397.5	190.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.5	2.80E+07	1%
73050.0	200.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.4	2.80E+07	1%
76702.5	210.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.5	2.80E+07	1%
80355.0	220.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.4	2.80E+07	1%
84007.5	230.0	4799.0	2.83E+07	6.2	5.4	9.1	11.6	9.1	2.5	2.80E+07	1%
87660.0	240.0	4799.0	2.83E+07	6.2	5.4	9.1	11.5	9.1	2.4	2.80E+07	1%
91312.5	250.0	4799.0	2.83E+07	6.2	5.4	9.1	11.5	9.1	2.4	2.80E+07	1%
94965.0	260.0	4799.0	2.83E+07	6.2	5.4	9.1	11.5	9.1	2.4	2.80E+07	1%
98617.5	270.0	4799.0	2.83E+07	6.2	5.4	9.1	11.5	9.1	2.4	2.80E+07	1%
102270.0	280.0	4799.0	2.83E+07	6.2	5.4	9.1	11.5	9.1	2.4	2.80E+07	1%
105922.5	290.0	4799.0	2.83E+07	6.2	5.4	9.1	11.5	9.1	2.4	2.80E+07	1%
109571.0	300.0	4799.0	2.83E+07	6.2	5.5	9.1	11.7	9.1	2.5	2.80E+07	1%

APPENDIX K
PHREEQC input files

Appendix K - PHREEQC Input Files
Proposed Action Backfilled North Pit

USER_PUNCH

-headings	Ag	Al	Alk	As	B	Ba	Be	Bi	Ca	Cd	Cl	Cr	Co
	Cu	Fe	Ga	Hg	K	Li	Mg	Mn	Mo	N	Na	Ni	P
	Pb	S(6)	Sb	Se(6)	Sn	Sr	Tl	Ti	U	V	Zn		
-start													

10 PUNCH TOT("Ag")*107.868*1000

20 PUNCH TOT("Al")*26.981*1000

30 PUNCH ALK*61.017*1000

40 PUNCH TOT("As")*74.921*1000

50 PUNCH TOT("B")*10.81*1000

60 PUNCH TOT("Ba")*137.32*1000

70 PUNCH TOT("Be")*9.012*1000

80 PUNCH TOT("Bi")*208.9803*1000

90 PUNCH TOT("Ca")*40.080*1000

100 PUNCH TOT("Cd")*112.410*1000

110 PUNCH TOT("Cl")*35.45*1000

120 PUNCH TOT("Cr")*51.996*1000

130 PUNCH TOT("Co")*58.9332*1000

140 PUNCH TOT("Cu")*63.546*1000

150 PUNCH TOT("Fe")*55.845*1000

160 PUNCH TOT("F")*18.9984*1000

170 PUNCH TOT("Ga")*69.723*1000

180 PUNCH TOT("Hg")*200.59*1000

190 PUNCH TOT("K")*39.098*1000

200 PUNCH TOT("Li")*6.941*1000

210 PUNCH TOT("Mg")*24.305*1000

220 PUNCH TOT("Mn")*54.938*1000

230 PUNCH TOT("Mo")*95.94*1000

240 PUNCH TOT("N")*14.007*1000

250 PUNCH TOT("Na")*22.99*1000

260 PUNCH TOT("Ni")*58.710*1000

270 PUNCH TOT("P")*94.971*1000

280 PUNCH TOT("Pb")*207.200*1000

290 PUNCH TOT("S(6)")*96*1000

300 PUNCH TOT("Sb")*121.750*1000

310 PUNCH TOT("Sc")*44.9559*1000

320 PUNCH TOT("Se(6)")*78.96*1000

330 PUNCH TOT("Sn")*118.710*1000

340 PUNCH TOT("Sr")*87.62*1000

350 PUNCH TOT("Tl")*196.966*1000

360 PUNCH TOT("Ti")*47.867*1000

370 PUNCH TOT("U")*10.81*1000

380 PUNCH TOT("V")*50.9415*1000

390 PUNCH TOT("Zn")*65.39*1000

-end

Selected_Output

-file N_Pit_GoldSimPhreeqcGoldSimOutput.dat

-pH TRUE

-water TRUE

-percent error true

-user_punch TRUE

-saturation_indices	Barite	Calcite	CO2(g)	Malachite	Ferrihydrite
Fluorite	Gibbsite	Gypsum	Siderite	Pyrolusite	
Rhodochrosite	TlOH	TlMetal	Galena		
			fix_pe		

KNOBS

-iterations 500

-convergence_tolerance 1.00E-06

-tolerance 1.00E-15

-step_size 1000

-pe_step_size 10

PHASES

Fix_pe

e- = e-

log_k 0

SOLUTION 999

Dummy Equilibrium

temp 13.3

pH 7

pe 1

redox pe

units mg/l

density 1

-water 1 # kg

End

Solution_Spread

-temp 15

-pe 0

-units mg/l

Number	pH	Ag	Al	Alkalinity	As	B	Ba	Be	Bi	Ca	Cd	Cl		
Cr	Co	Cu	Fe	F	Ga	Hg	K	Li	Mg	Mn	Mo	N		
Ni	P	Pb	S(6)	Sb	Sc	Se(6)	Sn	Sr	Tl	Ti	U	V		
			as CaCO3									charge		
as SO4														
1	7.067817181	0.002211328	0.086659841	397.4946289	0.19067739	1.109300256	0.148534462	0.000681901	2.717642069	340.5679016	0.000442286	106.9529572	0.003024336	0.005615806
	0.021610746	0.128169462	13.39967251	0.033987537	0.001117691	32.111866	3.08651185	189.3461151	0.193985626	7.333891392	1.678922892	214.5192871	0.042247739	0.169872314
	0.001772618	1084.975464	0.099198058	0.027107622	0.04733783	0.037153777	3.975920439	0.00053802	0.034495063	0.044319205	0.058754463	0.024936175		
	7.089252958	0.002042328	0.089863926	369.2250671	0.13048245	0.968424916	0.144679919	0.000664855	2.20294714	322.7133179	0.000408488	110.5844955	0.002939589	0.005240935
	0.019868661	0.129681736	11.82800961	0.029546436	0.000611327	29.40817261	2.949798107	186.2937317	0.130734339	6.94786644	1.612370849	203.7909851	0.041846901	0.147660047
2	0.001742917	1053.32251	0.090235382	0.021953542	0.048343331	0.032806624	3.871504068	0.00050722	0.029571701	0.04381191	0.0537536	0.024524262		
	7.102913173	0.001966972	0.088950828	354.5964355	0.115509637	0.913953483	0.140218541	0.00064887	2.039248228	311.0704651	0.000393417	109.0247421	0.002870427	0.005044903
	0.019111276	0.127550453	11.1751852	0.027961329	0.000502069	28.08348656	2.844180584	181.0453644	0.116159111	6.672549248	1.557895899	196.5573883	0.040775239	0.139734015
	0.001705467	1021.116394	0.085669927	0.020316029	0.047443897	0.031166259	3.753889322	0.000490532	0.02780916	0.04259932	0.051057499	0.024035463		
	7.135847276	0.001822722	0.08529716	324.9594421	0.094815083	0.81566304	0.129366353	0.000611408	1.768369436	284.5128784	0.000364567	102.8613815	0.002717774	0.004622175
4	0.017673971	0.120652035	9.983181	0.025182148	0.000369454	25.36505127	2.597790956							

29.52756882 0.029833572 0.863501012 0.314265609 48.22002029 0.011594396 0.041707806
0.000889086 152.2805634 0.010700029 0.002173862 0.007391203 0.008765017 0.651652157
0.000189602 0.003253982 0.006471164 0.008429495 0.012031879

end

1

Mix

1 1

save solution 101

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO₂(g) 0.0039

O₂(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO₂(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 101

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 101

End

#2nd

Mix

2 1

save solution 102

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 02(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 102

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 102

End

#3nd

Mix

3 1

save solution 103

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-2	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only

Sb02 1000 0 precipitate_only

use solution 103

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 103

end

#4

Mix

4 1

save solution 104

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-1	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 104

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 104

end

#5

Mix

5 1

save solution 105

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 0 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 105

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 105

end

#6

Mix

6 1

save solution 106

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	1	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 106

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 106

end

#7

Mix

7	1
---	---

save solution 107

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 2 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 107

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 107

end

#8

Mix

8 1

save solution 108

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

C02(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

C02(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 3 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 108

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 108

end

#9

Mix

9 1

save solution 109

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 109

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 109

end

#10

Mix

10 1

save solution 110

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 110

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 110

end

#11

Mix

11 1

save solution 111

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

```
Pyrolusite  0      0      precipitate_only
Rhodochrosite      0      0      precipitate_only
Magnesite    0      0      precipitate_only
Epsomite     0      0      precipitate_only
SbO2  1000  0      precipitate_only
```

```
use solution 111
```

```
SURFACE      100
```

```
-equilibrate with solution 999
```

```
Hfo_wOH      Ferrihydrite      equilibrium_phase 0.2      53300
```

```
Hfo_sOH      Ferrihydrite      equilibrium_phase 0.005
```

```
save solution 111
```

```
end
```

```
#12
```

```
Mix
```

```
12      1
```

```
save solution 112
```

```
End
```

```
GAS_PHASE    1
```

```
-fixed_pressure
```

```
-pressure    1
```

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 112

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 112

end

#13

Mix

13 1

save solution 113

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 113

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase	0.2	53300
---------	--------------	-------------------	-----	-------

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 113

end

#14

Mix

14 1

save solution 114

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 114

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 114

end

#15

Mix

15 1

save solution 115

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 115

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 115

end

Appendix K - PHREEQC Input Files
Proposed Action Backfilled West Pit

USER_PUNCH

-headings	Ag	Al	Alk	As	B	Ba	Be	Bi	Ca	Cd	Cl	Cr	Co
	Cu	Fe	Ga	Hg	K	Li	Mg	Mn	Mo	N	Na	Ni	P
	Pb	S(6)	Sb	Se(6)	Sn	Sr	Tl	Ti	U	V	Zn		
-start													

10 PUNCH TOT("Ag")*107.868*1000

20 PUNCH TOT("Al")*26.981*1000

30 PUNCH ALK*61.017*1000

40 PUNCH TOT("As")*74.921*1000

50 PUNCH TOT("B")*10.81*1000

60 PUNCH TOT("Ba")*137.32*1000

70 PUNCH TOT("Be")*9.012*1000

80 PUNCH TOT("Bi")*208.9803*1000

90 PUNCH TOT("Ca")*40.080*1000

100 PUNCH TOT("Cd")*112.410*1000

110 PUNCH TOT("Cl")*35.45*1000

120 PUNCH TOT("Cr")*51.996*1000

130 PUNCH TOT("Co")*58.9332*1000

140 PUNCH TOT("Cu")*63.546*1000

150 PUNCH TOT("Fe")*55.845*1000

160 PUNCH TOT("F")*18.9984*1000

170 PUNCH TOT("Ga")*69.723*1000

180 PUNCH TOT("Hg")*200.59*1000

190 PUNCH TOT("K")*39.098*1000

200 PUNCH TOT("Li")*6.941*1000

210 PUNCH TOT("Mg")*24.305*1000

220 PUNCH TOT("Mn")*54.938*1000

230 PUNCH TOT("Mo")*95.94*1000

240 PUNCH TOT("N")*14.007*1000

250 PUNCH TOT("Na")*22.99*1000

260 PUNCH TOT("Ni")*58.710*1000

270 PUNCH TOT("P")*94.971*1000

280 PUNCH TOT("Pb")*207.200*1000

290 PUNCH TOT("S(6)")*96*1000

300 PUNCH TOT("Sb")*121.750*1000

310 PUNCH TOT("Sc")*44.9559*1000

320 PUNCH TOT("Se(6)")*78.96*1000

330 PUNCH TOT("Sn")*118.710*1000

340 PUNCH TOT("Sr")*87.62*1000

350 PUNCH TOT("Tl")*196.966*1000

360 PUNCH TOT("Ti")*47.867*1000

370 PUNCH TOT("U")*10.81*1000

380 PUNCH TOT("V")*50.9415*1000

390 PUNCH TOT("Zn")*65.39*1000

-end

Selected_Output

-file West_Pit_BF_PhreeqcGoldSimOutput.dat

-pH TRUE

-water TRUE

-percent error true

-user_punch TRUE

-saturation_indices	Barite	Calcite	CO2(g)	Malachite	Ferrihydrite
Fluorite	Gibbsite	Gypsum	Siderite	Pyrolusite	
Rhodochrosite	TlOH	TlMetal	Galena		
			fix_pe		

KNOBS

-iterations 500

-convergence_tolerance 1.00E-06

-tolerance 1.00E-15

-step_size 1000

-pe_step_size 10

PHASES

Fix_pe

e- = e-

log_k 0

SOLUTION 999

Dummy Equilibrium

temp 13.3

pH 7

pe 1

redox pe

units mg/l

density 1

-water 1 # kg

End

Solution_Spread

-temp 15

-pe 0

-units mg/l

Number	Cr	pH Co Ni	Ag Cu Pb	Al Fe S(6)	Alkalinity F Sb as CaCO3	As Hg Se(6)	B K Sn	Ba Li Sr	Be Mg Tl	Bi Mn Ti	Ca Mo U	Cd N V charge	Cl Na Zn																												
as S04																																									
1	7.505717603	0.000744339	0.000744339	0.031139862	158.2653961	0.03288522	0.335947901	0.063457109	0.000195158	0.676785827	125.8088531	0.000148868	49.25846863	0.000900584	0.002061234	0.007137395	0.048831224	4.237076283	0.011219298	5.46962E-05	10.54943562	1.113354087	74.42945862	0.033702001	2.589747429	0.790680408	78.7328186	0.013986134	0.056096494	0.000539328	407.219574	0.032351367	0.006722894	0.019274417	0.012560845	1.526827574	0.000188528	0.009787061	0.017079907	0.019331405	0.009508567
2	7.520818298	0.00070402	0.029926859	150.3628693	0.030357581	0.31774658	0.060966957	0.000186465	0.64258343	121.9971695	0.000140804	48.00442886	0.000849507	0.001983827	0.006751705	0.047399342	4.001808643	0.010622676	4.46688E-05	10.15843964	1.077952743	72.41178131	0.032500543	2.491286993	0.758663952	75.61670685	0.013509358	0.053113382	0.000513184	397.0010071	0.030729573	0.006383442	0.018958639	0.011945979	1.482101798	0.000179925	0.00940594	0.016603621	0.018356778	0.009112769	
3	7.526531056	0.000689809	0.029508777	147.4639893	0.029363647	0.310239702	0.060057424	0.000183341	0.628780305	120.4377823	0.000137962	47.54221344	0.000830795	0.001952256	0.006615107	0.046879523	3.910825014	0.010404495	4.05913E-05	10.00300884	1.06396246	71.58443451	0.032066375	2.447679996	0.746582627	74.44865417	0.013314144	0.052022472	0.000504047	392.5631104	0.030006722	0.00624622	0.018822826	0.011719646	1.463659883	0.000176842	0.009250099	0.01638783	0.017996447	0.00897922	
4	7.524889053	0.000684771	0.029383553	147.160675	0.029450467	0.312454253	0.060264297	0.000183028	0.637044072	121.7891541	0.000136954	47.79803848	0.000822761	0.001965013	0.006571634	0.047026072	3.930644989	0.010386572	4.01607E-05	10.12043571	1.076983929																				


```

73.09234619 0.03133801 2.489716291 0.732246041 74.04938507 0.013442196 0.049999997
0.000478565 403.0852966 0.030106403 0.006317017 0.01951465 0.011369459 1.488696337
0.000170525 0.009444937 0.016768672 0.018052302 0.008533568
end

# 1

Mix

1      1

save solution 101

End

GAS_PHASE    1

    -fixed_pressure

    -pressure    1

    -volume      1

    -temperature    15

    CO2(g)      0.0039

    O2(g) 0.21

EQUILIBRIUM_PHASES    100

    Barite      0.5    0    precipitate_only

    Calcite     0.5    0    precipitate_only

    CO2(g)      -2.48874515 10    #

    Malachite   0      0    precipitate_only

```

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 101

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 101

End

#2nd

Mix

2 1

save solution 102

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 02(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 102

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 102

End

#3nd

Mix

3 1

save solution 103

End

GAS_PHASE 1

-fixed_pressure

```

-pressure    1

-volume      1

-temperature    15

CO2(g)       0.0039

O2(g) 0.21

```

```

EQUILIBRIUM_PHASES    100

```

```

Barite      0.5    0    precipitate_only

Calcite     0.5    0    precipitate_only

CO2(g)      -2.48874515 10    #

Malachite   0      0    precipitate_only

Ferrihydrite    0    0    precipitate_only

Fluorite    0      0    precipitate_only

Gibbsite    0      0    precipitate_only

Gypsum      0      0    precipitate_only

Siderite    0      0    precipitate_only

fix_pe      -2      O2(g) #

Pyrolusite  0      0    precipitate_only

Rhodochrosite    0    0    precipitate_only

Magnesite   0      0    precipitate_only

Epsomite    0      0    precipitate_only

```

Sb02 1000 0 precipitate_only

use solution 103

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 103

end

#4

Mix

4 1

save solution 104

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	0	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 104

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 104

end

#5

Mix

5 1

save solution 105

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 1 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 105

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 105

end

#6

Mix

6 1

save solution 106

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	2	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 106

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 106

end

#7

Mix

7 1

save solution 107

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 107

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 107

end

#8

Mix

8 1

save solution 108

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

C02(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

C02(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 108

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 108

end

#9

Mix

9 1

save solution 109

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 109

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 109

end

#10

Mix

10 1

save solution 110

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 110

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 110

end

#11

Mix

11 1

save solution 111

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

```
Pyrolusite  0      0      precipitate_only
Rhodochrosite      0      0      precipitate_only
Magnesite    0      0      precipitate_only
Epsomite     0      0      precipitate_only
SbO2  1000  0      precipitate_only
```

```
use solution 111
```

```
SURFACE      100
```

```
-equilibrate with solution 999
```

```
Hfo_wOH      Ferrihydrite      equilibrium_phase 0.2      53300
```

```
Hfo_sOH      Ferrihydrite      equilibrium_phase 0.005
```

```
save solution 111
```

```
end
```

```
#12
```

```
Mix
```

```
12      1
```

```
save solution 112
```

```
End
```

```
GAS_PHASE    1
```

```
-fixed_pressure
```

```
-pressure    1
```

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 112

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 112

end

#13

Mix

13 1

save solution 113

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 113

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase	0.2	53300
---------	--------------	-------------------	-----	-------

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 113

end

#14

Mix

14 1

save solution 114

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 114

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 114

end

#15

Mix

15 1

save solution 115

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
Sb02	1000	0	precipitate_only

use solution 115

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 115

end

Appendix K - PHREEQC Input Files
Proposed Action Backfilled South Pit

USER_PUNCH

-headings	Ag	Al	Alk	As	B	Ba	Be	Bi	Ca	Cd	Cl	Cr	Co
	Cu	Fe	Ga	Hg	K	Li	Mg	Mn	Mo	N	Na	Ni	P
	Pb	S(6)	Sb	Se(6)	Sn	Sr	Tl	Ti	U	V	Zn		
-start													

10 PUNCH TOT("Ag")*107.868*1000

20 PUNCH TOT("Al")*26.981*1000

30 PUNCH ALK*61.017*1000

40 PUNCH TOT("As")*74.921*1000

50 PUNCH TOT("B")*10.81*1000

60 PUNCH TOT("Ba")*137.32*1000

70 PUNCH TOT("Be")*9.012*1000

80 PUNCH TOT("Bi")*208.9803*1000

90 PUNCH TOT("Ca")*40.080*1000

100 PUNCH TOT("Cd")*112.410*1000

110 PUNCH TOT("Cl")*35.45*1000

120 PUNCH TOT("Cr")*51.996*1000

130 PUNCH TOT("Co")*58.9332*1000

140 PUNCH TOT("Cu")*63.546*1000

150 PUNCH TOT("Fe")*55.845*1000

160 PUNCH TOT("F")*18.9984*1000

170 PUNCH TOT("Ga")*69.723*1000

180 PUNCH TOT("Hg")*200.59*1000

190 PUNCH TOT("K")*39.098*1000

200 PUNCH TOT("Li")*6.941*1000

210 PUNCH TOT("Mg")*24.305*1000

220 PUNCH TOT("Mn")*54.938*1000

230 PUNCH TOT("Mo")*95.94*1000

240 PUNCH TOT("N")*14.007*1000

250 PUNCH TOT("Na")*22.99*1000

260 PUNCH TOT("Ni")*58.710*1000

270 PUNCH TOT("P")*94.971*1000

280 PUNCH TOT("Pb")*207.200*1000

290 PUNCH TOT("S(6)")*96*1000

300 PUNCH TOT("Sb")*121.750*1000

310 PUNCH TOT("Sc")*44.9559*1000

320 PUNCH TOT("Se(6)")*78.96*1000

330 PUNCH TOT("Sn")*118.710*1000

340 PUNCH TOT("Sr")*87.62*1000

350 PUNCH TOT("Tl")*196.966*1000

360 PUNCH TOT("Ti")*47.867*1000

370 PUNCH TOT("U")*10.81*1000

380 PUNCH TOT("V")*50.9415*1000

390 PUNCH TOT("Zn")*65.39*1000

-end

Selected_Output

-file South_Pit_GoldSim_PhreeqcGoldSimOutput.dat

-pH TRUE

-water TRUE

-percent error true

-user_punch TRUE

-saturation_indices	Barite	Calcite	CO2(g)	Malachite	Ferrihydrite
Fluorite	Gibbsite	Gypsum	Siderite	fix_pe	Pyrolusite
Rhodochrosite	Magnesite	Epsomite	Sb02		

KNOBS

-iterations 500

-convergence_tolerance 1.00E-07

-tolerance 1.00E-15

-step_size 10

-pe_step_size 5

PHASES

Fix_pe

e- = e-

log_k 0

SOLUTION 999

Dummy Equilibrium

temp 13.3

pH 7

pe 1

redox pe

units mg/l

density 1

-water 1 # kg

End

Solution_Spread

-temp 15

-pe 0

-units mg/l

Number	Cr	pH Co Ni	Ag Cu Pb	Al Fe S(6)	Alkalinity F Sb as CaCO3	As Hg Se(6)	B K Sn	Ba Li Sr	Be Mg Tl	Bi Mn Ti	Ca Mo U	Cd N V charge	Cl Na Zn
as S04													
1	7.247394687	0.000247895	0.001641636	0.048688918	381.1424255	0.067896724	1.014668465	0.10075184					
	0.018208403	0.070827954	10.51494884	0.030144669	7.92115E-05	23.63384628	2.533865452						
	165.6586151	0.071041241	5.731523037	1.245764971	206.8323059	0.036036175	0.119358189						
	0.001084753	897.1532593	0.07253094	0.014912343	0.041441817	0.026737802	3.514627457						
	0.000413298	0.021424714	0.037153728	0.051654927	0.013095998								
2	7.231704188	0.001653428	0.04983848	386.5794983	0.070400186	1.03559351	0.106057324						
	0.000260841	1.573406577	289.1163635	0.000374022	139.9356537	0.001653438	0.003638303						
	0.01826773	0.074223511	10.85027409	0.030468388	7.95681E-05	24.73530006	2.648345232						
	172.7026825	0.072359055	6.033833027	1.305120349	211.6408234	0.037150323	0.122002237						
	0.001096036	938.7357178	0.076460585	0.015734067	0.04337927	0.027404996	3.653331518						
	0.000419739	0.022557113	0.038942032	0.053582247	0.013366026								
3	7.225661327	0.001665259	0.050247833	390.5892944	0.072136573	1.0509938	0.108754694						
	0.00026721	1.622020364	294.5570679	0.000375764	140.3379059	0.00166542	0.003718037						
	0.018361082	0.075316876	11.09328461	0.030742427	7.9763E-05	25.31186485	2.704744816						
	175.7476044	0.072857872	6.194874287	1.334504247	214.3372498	0.037705142	0.123809166						
	0.001103304	956.2010498	0.078867987	0.016220205	0.044044312	0.027811399	3.715827465						
	0.000423433	0.023140388	0.03972473	0.054937109	0.013459265								
4	7.221303119	0.001661708	0.05036658	391.5110779	0.073504485	1.058990836	0.111248359						
	0.000273116	1.667346239	299.2233887	0.000373743	139.7395935	0.001662337	0.003793243						
	0.018273151	0.076297648	11.27358246	0.030750057	7.91855E-05	25.82238007	2.754109144						

46.72421265 0.024907222 1.419044852 0.329719186 70.61789703 0.011487898 0.040344615
0.000405879 242.8864899 0.017260892 0.00341367 0.011310778 0.008839624 1.028469443
0.000150159 0.004952533 0.009841601 0.015144163 0.004534582

end

1

Mix

1 1

save solution 101

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 101

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 101

End

#2nd

Mix

2 1

save solution 102

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 02(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 102

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 102

End

#3nd

Mix

3 1

save solution 103

End

GAS_PHASE 1

-fixed_pressure

```

-pressure      1

-volume        1

-temperature    15

CO2(g)         0.0039

O2(g) 0.21

```

```

EQUILIBRIUM_PHASES      100

```

```

Barite      0.5  0  precipitate_only

Calcite     0.5  0  precipitate_only

CO2(g)      -2.48874515  10  #

Malachite   0    0  precipitate_only

Ferrihydrite  0    0  precipitate_only

Fluorite    0    0  precipitate_only

Gibbsite    0    0  precipitate_only

Gypsum      0    0  precipitate_only

Siderite    0    0  precipitate_only

fix_pe      2    O2(g) #

Pyrolusite  0    0  precipitate_only

Rhodochrosite  0    0  precipitate_only

Magnesite   0    0  precipitate_only

Epsomite    0    0  precipitate_only

```

Sb02 1000 0 precipitate_only

use solution 103

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 103

end

#4

Mix

4 1

save solution 104

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	0	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 104

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 104

end

#5

Mix

5 1

save solution 105

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 2 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 105

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 105

end

#6

Mix

6 1

save solution 106

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 106

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 106

end

#7

Mix

7 1

save solution 107

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 107

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 107

end

#8

Mix

8 1

save solution 108

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

C02(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

C02(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 108

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 108

end

#9

Mix

9 1

save solution 109

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 109

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 109

end

#10

Mix

10 1

save solution 110

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 110

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 110

end

#11

Mix

11 1

save solution 111

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

```
Pyrolusite  0      0      precipitate_only
Rhodochrosite      0      0      precipitate_only
Magnesite    0      0      precipitate_only
Epsomite     0      0      precipitate_only
SbO2  1000  0      precipitate_only
```

```
use solution 111
```

```
SURFACE      100
```

```
-equilibrate with solution 999
```

```
Hfo_wOH      Ferrihydrite      equilibrium_phase 0.2      53300
```

```
Hfo_sOH      Ferrihydrite      equilibrium_phase 0.005
```

```
save solution 111
```

```
end
```

```
#12
```

```
Mix
```

```
12      1
```

```
save solution 112
```

```
End
```

```
GAS_PHASE    1
```

```
-fixed_pressure
```

```
-pressure    1
```

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 112

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 112

end

#13

Mix

13 1

save solution 113

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 113

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase	0.2	53300
---------	--------------	-------------------	-----	-------

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 113

end

#14

Mix

14 1

save solution 114

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 114

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 114

end

#15

Mix

15 1

save solution 115

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
Sb02	1000	0	precipitate_only

use solution 115

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	

save solution 115

end

Appendix K - PHREEQC Input Files

Open	Pit	Alternative	North	Pit
------	-----	-------------	-------	-----

USER_PUNCH

-headings	Ag	Al	Alk	As	B	Ba	Be	Bi	Ca	Cd	Cl	Cr	Co
	Cu	Fe	Ga	Hg	K	Li	Mg	Mn	Mo	N	Na	Ni	P
	Pb	S(6)	Sb	Se(6)	Sn	Sr	Tl	Ti	U	V	Zn		
-start													

10 PUNCH TOT("Ag")*107.868*1000

20 PUNCH TOT("Al")*26.981*1000

30 PUNCH ALK*61.017*1000

40 PUNCH TOT("As")*74.921*1000

50 PUNCH TOT("B")*10.81*1000

60 PUNCH TOT("Ba")*137.32*1000

70 PUNCH TOT("Be")*9.012*1000

80 PUNCH TOT("Bi")*208.9803*1000

90 PUNCH TOT("Ca")*40.080*1000

100 PUNCH TOT("Cd")*112.410*1000

110 PUNCH TOT("Cl")*35.45*1000

120 PUNCH TOT("Cr")*51.996*1000

130 PUNCH TOT("Co")*58.9332*1000

140 PUNCH TOT("Cu")*63.546*1000

150 PUNCH TOT("Fe")*55.845*1000

160 PUNCH TOT("F")*18.9984*1000

170 PUNCH TOT("Ga")*69.723*1000

180 PUNCH TOT("Hg")*200.59*1000

190 PUNCH TOT("K")*39.098*1000

200 PUNCH TOT("Li")*6.941*1000

210 PUNCH TOT("Mg")*24.305*1000

220 PUNCH TOT("Mn")*54.938*1000

230 PUNCH TOT("Mo")*95.94*1000

240 PUNCH TOT("N")*14.007*1000

250 PUNCH TOT("Na")*22.99*1000

260 PUNCH TOT("Ni")*58.710*1000

270 PUNCH TOT("P")*94.971*1000

280 PUNCH TOT("Pb")*207.200*1000

290 PUNCH TOT("S(6)")*96*1000

300 PUNCH TOT("Sb")*121.750*1000

310 PUNCH TOT("Sc")*44.9559*1000

320 PUNCH TOT("Se(6)")*78.96*1000

330 PUNCH TOT("Sn")*118.710*1000

340 PUNCH TOT("Sr")*87.62*1000

350 PUNCH TOT("Tl")*196.966*1000

360 PUNCH TOT("Ti")*47.867*1000

370 PUNCH TOT("U")*10.81*1000

380 PUNCH TOT("V")*50.9415*1000

390 PUNCH TOT("Zn")*65.39*1000

-end

Selected_Output

-file N_Pit_PhreeqcGoldSimOutput.dat

-pH TRUE

-water TRUE

-percent error true

-user_punch TRUE

-saturation_indices	Barite	Calcite	CO2(g)	Malachite	Ferrihydrite
Fluorite	Gibbsite	Gypsum	Siderite	fix_pe	Pyrolusite
Rhodochrosite	Magnesite	Epsomite	Sb02		

KNOBS

-iterations 500

-convergence_tolerance 1.00E-07

-tolerance 1.00E-15

-step_size 10

-pe_step_size 5

PHASES

Fix_pe

e- = e-

log_k 0

SOLUTION 999 Dummy Equilibrium

temp 13.3

pH 7

pe 1

redox pe

units mg/l

density 1

-water 1 # kg

End

Solution_Spread

-temp 15

-pe 0

-units mg/l

Number	pH	Ag	Al	Alkalinity	As	B	Ba	Be	Bi	Ca	Cd	Cl		
	Cr	Co	Cu	Fe	F	Ga	Hg	K	Li	Mg	Mn	Mo	N	Na
	Ni	P	Pb	S(6)	Sb	Sc	Se(6)	Sn	Sr	Tl	Ti	U	V	Zn
				as CaCO3										
	as SO4 charge													
1	6.766952904	0.001063911	0.034393251	191.5541992	0.109882392	0.706935167	0.055282403							
	0.000326867	1.143388033	158.7642212	0.000236833	124.0066757	0.001533322	0.003589884							
	0.010348955	0.033745673	5.985703945	0.015366452	0.00081684	14.57306004	1.199021578							
	77.40701294	0.252069265	2.684251308	0.780638814	155.577179	0.018343607	0.111133419							
	0.000802858	468.3763428	0.035664879	0.011394156	0.026546199	0.017140606	1.780306339							
2	0.000282652	0.011394156	0.018019799	0.029676275	0.021730868									
	6.527589241	0.001180054	0.039569627	205.8626404	0.111319125	0.729068756	0.059086688							
	0.000363419	1.174850106	158.7935791	0.000258997	121.7482071	0.001745224	0.003614244							
	0.011451196	0.037947074	6.424715996	0.016483316	0.000801986	14.90779686	1.228193402							
	77.69866943	0.241055503	2.777889252	0.857521236	158.473999	0.019478498	0.115512654							
3	0.000916193	463.4710999	0.037959002	0.011700675	0.025717212	0.018170398	1.791305542							
	0.000302846	0.011700675	0.018071795	0.031444874	0.022468621									
	6.362397729	0.001301545	0.044622459	227.5871277	0.116771191	0.801843047	0.065889247							
	0.000404611	1.252279639	174.9985352	0.000285955	136.5587158	0.001945656	0.00398821							
	0.012617309	0.042334717	7.042214394	0.017918952	0.000824904	16.36838722	1.358746767							
4	86.36053467	0.259173334	3.075834751	0.995201051	176.4772797	0.021775205	0.126778901							
	0.001022496	512.6879272	0.04178093	0.012468291	0.028745666	0.019801157	1.987695217							
	0.000334913	0.012468291	0.020132655	0.034934763	0.024998838									
	6.128901928	0.001433986	0.051932752	255.9134674	0.11548911	0.909846663	0.075999901							
	0.000460024	1.279822111	204.8915558	0.000319049	171.2301483	0.002191268	0.004682393							
	0.013871764	0.048431296	7.636891842	0.01914249	0.000788722	18.54782677	1.571362972							
	103.2161789	0.295947999	3.517593145	1.256677747	210.3961639	0.025558231	0.142975688							

0.004797239 100.3889236 0.053168662 0.029057445 0.004171581 0.050729338 1.012162685
0.000835656 0.029057445 0.007147139 0.093727946 0.04063559

end

1

Mix

1 1

save solution 101

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
Sb02	1000	0	precipitate_only

use solution 101

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 101

End

#2nd

Mix

2 1

save solution 102

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 102

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 102

End

#3nd

Mix

3 1

save solution 103

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 103

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 103

end

#4

Mix

4 1

save solution 104

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 104

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase	0.2	53300
---------	--------------	-------------------	-----	-------

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 104

end

#5

Mix

5 1

save solution 105

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite	0	0	precipitate_only
Ferrihydrite		0	0 precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	O2(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite		0	0 precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 105

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 105

end

#6

Mix

6 1

save solution 106

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
Sb02	1000	0	precipitate_only

use solution 106

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 106

end

#7

Mix

7	1
---	---

save solution 107

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 107

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 107

end

#8

Mix

8 1

save solution 108

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 108

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 108

end

#9

Mix

9 1

save solution 109

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 109

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase	0.2	53300
---------	--------------	-------------------	-----	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase	0.005
---------	--------------	-------------------	-------

save solution 109

end

#10

Mix

10 1

save solution 110

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 110

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 110

end

#11

Mix

11 1

save solution 111

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 111

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 111

end

#12

Mix

12 1

save solution 112

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 112

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 112

end

#13

Mix

13 1

save solution 113

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 113

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	

save solution 113

end

#14

Mix

14 1

save solution 114

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 114

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 114

end

#15

Mix

15 1

save solution 115

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

```
fix_pe      -4      02(g) #  
  
Pyrolusite  0      0      precipitate_only  
  
Rhodochrosite    0      0      precipitate_only  
  
Magnesite    0      0      precipitate_only  
  
Epsomite     0      0      precipitate_only  
  
SbO2  1000  0      precipitate_only
```

```
use solution 115
```

```
SURFACE      100
```

```
-equilibrate with solution 999
```

```
Hfo_wOH      Ferrihydrite      equilibrium_phase 0.2      53300
```

```
Hfo_sOH      Ferrihydrite      equilibrium_phase 0.005
```

```
save solution 115
```

```
end
```

Appendix K - PHREEQC Input Files
Open Pit Alternative West Pit

USER_PUNCH

-headings	Ag	Al	Alk	As	B	Ba	Be	Bi	Ca	Cd	Cl	Cr	Co
	Cu	Fe	Ga	Hg	K	Li	Mg	Mn	Mo	N	Na	Ni	P
	Pb	S(6)	Sb	Se(6)	Sn	Sr	Tl	Ti	U	V	Zn		

-start

10 PUNCH TOT("Ag")*107.868*1000

20 PUNCH TOT("Al")*26.981*1000

30 PUNCH ALK*61.017*1000

40 PUNCH TOT("As")*74.921*1000

50 PUNCH TOT("B")*10.81*1000

60 PUNCH TOT("Ba")*137.32*1000

70 PUNCH TOT("Be")*9.012*1000

80 PUNCH TOT("Bi")*208.9803*1000

90 PUNCH TOT("Ca")*40.080*1000

100 PUNCH TOT("Cd")*112.410*1000

110 PUNCH TOT("Cl")*35.45*1000

120 PUNCH TOT("Cr")*51.996*1000

130 PUNCH TOT("Co")*58.9332*1000

140 PUNCH TOT("Cu")*63.546*1000

150 PUNCH TOT("Fe")*55.845*1000

160 PUNCH TOT("F")*18.9984*1000

170 PUNCH TOT("Ga")*69.723*1000

180 PUNCH TOT("Hg")*200.59*1000

190 PUNCH TOT("K")*39.098*1000

200 PUNCH TOT("Li")*6.941*1000

210 PUNCH TOT("Mg")*24.305*1000

220 PUNCH TOT("Mn")*54.938*1000

230 PUNCH TOT("Mo")*95.94*1000

240 PUNCH TOT("N")*14.007*1000

250 PUNCH TOT("Na")*22.99*1000

260 PUNCH TOT("Ni")*58.710*1000

270 PUNCH TOT("P")*94.971*1000

280 PUNCH TOT("Pb")*207.200*1000

290 PUNCH TOT("S(6)")*96*1000

300 PUNCH TOT("Sb")*121.750*1000

310 PUNCH TOT("Sc")*44.9559*1000

320 PUNCH TOT("Se(6)")*78.96*1000

330 PUNCH TOT("Sn")*118.710*1000

340 PUNCH TOT("Sr")*87.62*1000

350 PUNCH TOT("Tl")*196.966*1000

360 PUNCH TOT("Ti")*47.867*1000

370 PUNCH TOT("U")*10.81*1000

380 PUNCH TOT("V")*50.9415*1000

390 PUNCH TOT("Zn")*65.39*1000

-end

Selected_Output

```
-file West_Pit_PhreeqcGoldSimOutput.dat

-pH    TRUE

-water      TRUE

-percent    error true

-user_punch TRUE

-saturation_indices  Barite      Calcite      CO2(g)      Malachite      Ferrihydrite
Fluorite  Gibbsite  Gypsum      Siderite      fix_pe        Pyrolusite
Rhodochrosite  Magnesite  Epsomite    SbO2
```

KNOBS

```
-iterations 500

-convergence_tolerance 1.00E-06

-tolerance 1.00E-15

-step_size 1000

-pe_step_size 10
```

PHASES

```
Fix_pe

e- = e-

log_k 0
```

SOLUTION 999 Dummy Equilibrium

```
temp 13.3
```

pH 7

pe 1

redox pe

units mg/l

density 1

-water 1 # kg

End

Solution_Spread

-temp 15

-pe 0

-units mg/l

Number	Cr	pH Co Ni	Ag Cu Pb	Al Fe S(6)	Alkalinity F Sb	Ga Sc	As Hg Se(6)	B K Sn	Ba Li Sr	Be Mg Tl	Bi Mn Ti	Ca Mo U	Cd N V	Cl Na Zn
				as CaCO3										
				as SO4 charge										
1		7.009935909	0.000813092	0.017179916	203.4154205	0.086816706	0.766351581	0.059308384						
		0.000215452	1.202039361	173.6788025	0.000225083	102.7806702	0.001026075	0.005953227						
		0.007971066	0.017669726	7.096788406	0.014345895	0.000599584	15.6989193	1.378807425						
		89.26930237	0.43922478	3.998014212	0.946824133	143.0803986	0.019891961	0.096724764						
		0.000451021	538.2075195	0.058934681	0.011996903	0.025024017	0.016108437	2.028325081						
		0.000249616	0.011996903	0.023222836	0.033044282	0.033131089								
2		6.784134473	0.000783873	0.01619849	198.2190399	0.088764772	0.76167959	0.058043636						
		0.000213069	1.208394647	176.3437042	0.000223576	108.0307922	0.000965688	0.006163211						
		0.007703297	0.017028844	6.919980526	0.014054202	0.000639267	15.8981905	1.398263693						
		90.92926788	0.467264444	3.927183867	0.959617317	146.0845184	0.019969521	0.097001374						
		0.000429617	549.730896	0.056622189	0.012064044	0.026438769	0.015927253	2.056354046						
		0.000249433	0.012064044	0.023329476	0.032901015	0.034694105								
3		6.648982048	0.000770353	0.016226925	197.4945374	0.086722016	0.761908233	0.058612965						
		0.00021505	1.192721248	182.3743744	0.0002266	116.2790756	0.000929767	0.00647631						
		0.007572376	0.017114105	6.808161736	0.01383514	0.000640114	16.21572876	1.43859458						
		94.46715546	0.505700588	3.898314476	0.994037926	151.9875336	0.020423034	0.098198399						
		0.000421665	571.4937744	0.054595932	0.011907941	0.028435845	0.015860664	2.127306938						
		0.000254414	0.011907941	0.023806589	0.033279024	0.037252296								
4		6.428714186	0.000788658	0.017074926	205.9163971	0.087432124	0.797532558	0.062276959						
		0.000227728	1.224024653	198.8417206	0.000241368	132.7014923	0.000925437	0.007196328						
		0.007753425	0.018029569	6.982230663	0.014177268	0.000663536	17.38441086	1.559606433						
		103.5618591	0.581157923	4.040693283	1.111008406	167.063858	0.021983933	0.104353249						

	0.000431374	626.8018188	0.054435037	0.012220681	0.032385282	0.01649463	2.320501328
	0.000272854	0.012220681	0.025527937	0.035429351	0.042457774		
5	6.163123936	0.000943023	0.02151325	250.3146515	0.100206062	0.96704036	0.07708896
	0.000281808	1.431492805	251.7773438	0.000300604	176.4446869	0.00108188	0.009316166
	0.009258917	0.022671085	8.239841461	0.016807154	0.000784774	21.50785446	1.953547359
	131.8711243	0.776395679	4.838032722	1.471462011	213.4308929	0.027499627	0.128852367
	0.000519175	798.8259277	0.062244091	0.014289754	0.042798307	0.019879978	2.941862583
	0.000341795	0.014289754	0.031827759	0.043358639	0.056490187		
6	5.874376598	0.001216904	0.027220493	301.6929626	0.141812131	1.285935044	0.08966548
	0.000303345	1.809797287	229.5255127	0.000315641	120.8288574	0.001452813	0.007269928
	0.01193386	0.024381228	10.66460228	0.021519301	0.000824162	21.70451546	1.845326304
	112.9252167	0.574161887	5.226288319	1.758090138	203.0167236	0.02538245	0.16611889
	0.001342887	697.9487915	0.079964899	0.018063415	0.029199485	0.023492189	2.601835966
	0.000341908	0.018063415	0.029662196	0.061110362	0.04088283		
7	5.781466162	0.001317297	0.03394445	301.0181885	0.169879764	1.234454513	0.098223761
	0.000298131	1.957494259	182.7683411	0.00030524	75.53089905	0.001539213	0.005351277
	0.012917778	0.030373182	11.61504173	0.023287343	0.000596689	19.24317551	1.499409914
	85.75511169	0.394255012	4.534864426	1.828266025	169.1690521	0.022183485	0.193275869
	0.001520755	527.6890259	0.086076751	0.019537443	0.017919954	0.024428071	2.036359549
	0.000320428	0.019537443	0.022324694	0.084193833	0.02762652		
8	5.637118184	0.001910161	0.062050391	317.099884	0.208026499	0.994530618	0.119288988
	0.00032938	2.315910816	130.1689453	0.000331982	37.34696198	0.001771783	0.003883618
	0.015513517	0.05360293	12.91989708	0.027824607	0.000382206	17.01128387	1.087532401
	56.85795975	0.21428512	3.231122017	2.173429012	134.2886353	0.023266604	0.272631913
	0.001512665	322.3831177	0.091180436	0.02311198	0.007786547	0.028242283	1.370719671
	0.000337544	0.02311198	0.013451258	0.153779194	0.016392929		
9	5.60073262	0.00231643	0.079547778	307.9488525	0.204902455	0.647213578	0.117401898
	0.00033724	2.435559034	94.05899048	0.000338075	22.03326797	0.001839394	0.003279899
	0.016320661	0.066722274	11.92456913	0.029268838	0.000553602	15.00135994	0.802515686
	39.4823494	0.115533926	1.869368315	2.270426035	105.7129745	0.027058382	0.307099879
	0.001328469	184.5037689	0.076689333	0.02430596	0.003652873	0.029402815	0.852216601
	0.000339859	0.02430596	0.009649914	0.198170468	0.011202713		
10	5.59795918	0.002369912	0.083223425	300.6254883	0.200642869	0.548193693	0.11506702
	0.000334804	2.4378829	83.67692566	0.000335189	17.87982941	0.001832003	0.003090274
	0.016310444	0.06937892	11.44280338	0.02926618	0.00058792	14.25923824	0.716040671
	34.58392334	0.088586211	1.505847573	2.264648199	96.63076019	0.027348898	0.311619669
	0.00125862	147.6302643	0.071957134	0.024329459	0.002583388	0.029327899	0.712475419
	0.00033601	0.024329459	0.008529069	0.205665156	0.00975338		
11	5.585194666	0.001787102	0.107031763	251.260849	0.155191556	0.21882017	0.101027004
	0.000338588	2.467888832	58.23938751	0.00033864	15.2191906	0.001857087	0.002988245
	0.016571697	0.08754845	7.235853195	0.029698147	0.000479702	10.31739712	0.304070592
	23.19753265	0.037121516	0.609799922	2.304610491	60.33093643	0.015196412	0.321195483
	0.000986863	77.93881989	0.054741379	0.024628188	0.001795648	0.029706499	0.490157932
	0.000338752	0.024628188	0.00381589	0.179157659	0.009360792		
12	5.605760851	0.00278593	0.071008772	220.1306763	0.136411756	0.157598406	0.102073044
	0.000322719	2.363543749	53.47315598	0.000322732	14.04833889	0.001770523	0.002842778
	0.015807562	0.052838027	5.590927124	0.028367208	0.00055777	8.906044006	0.207306013
	21.89750671	0.024717178	0.388383061	2.046570778	46.81539536	0.01037508	0.278615892
	0.001449966	66.34954071	0.046533935	0.023587642	0.001645019	0.028369274	0.462598234
	0.00032276	0.023587642	0.002626925	0.118038543	0.008432593		
13	5.579074846	0.003206073	0.070464149	219.7634277	0.124523126	0.118160635	0.109869093
	0.000338299	2.458943129	53.53853607	0.000338302	14.87026119	0.001855176	0.002957288
	0.016566077	0.050848234	4.843678474	0.029655069	0.00058548	8.196338654	0.128911838
	21.16102409	0.02233701	0.15778248	2.128355265	39.4629631	0.009150562	0.263450474
	0.00132837	59.32269287	0.043221127	0.024538262	0.001649997	0.029655511	0.459681243
	0.000338308	0.024538262	0.001913126	0.102696426	0.008800746		
14	5.583220225	0.002957376	0.074739717	215.4196625	0.114176407	0.106434256	0.111040071
	0.000336411	2.448143005	54.51764679	0.000336411	14.73361874	0.001845215	0.002943163
	0.016475219	0.041930873	4.300325394	0.02950336	0.00053589	7.638734818	0.096820213
	20.9217186	0.020522622	0.110847905	2.118611336	34.20990753	0.008847815	0.20907709
	0.001688782	55.49175644	0.04191174	0.024430703	0.00164483	0.029503422	0.467146635
	0.000336412	0.024430703	0.002610246	0.079113871	0.008702499		
15	5.590335826	0.0021702	0.076657578	206.6246033	0.091909848	0.098843023	0.121753164
	0.000331295	2.417304039	57.65060425	0.000331296	14.42511463	0.001817372	0.002904245
	0.016227197	0.021756038	3.791615248	0.029083693	0.000266677	7.466525555	0.084785417
	21.81562424	0.018745376	0.110268727	2.070998192	30.48977661	0.008761064	0.151053905

```

0.00184955 46.55002213 0.039990209 0.024123438 0.001634014 0.029083699 0.462233216
0.000331296 0.024123438 0.003774019 0.061616469 0.008528414
end

# 1

Mix

1 1

save solution 101

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

```

Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 101

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 101

End

#2nd

Mix

2 1

save solution 102

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 102

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 102

End

#3nd

Mix

3	1
---	---

save solution 103

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 103

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 103

end

#4

Mix

4 1

save solution 104

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 104

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase	0.2	53300
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Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 104

end

#5

Mix

5 1

save solution 105

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite	0	0	precipitate_only
Ferrihydrite		0	0 precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	O2(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite		0	0 precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 105

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 105

end

#6

Mix

6 1

save solution 106

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 106

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
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Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 106

end

#7

Mix

7	1
---	---

save solution 107

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 107

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 107

end

#8

Mix

8 1

save solution 108

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 108

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 108

end

#9

Mix

9 1

save solution 109

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 109

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase	0.2	53300
---------	--------------	-------------------	-----	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase	0.005
---------	--------------	-------------------	-------

save solution 109

end

#10

Mix

10 1

save solution 110

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 110

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 110

end

#11

Mix

11 1

save solution 111

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 111

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 111

end

#12

Mix

12 1

save solution 112

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 112

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 112

end

#13

Mix

13 1

save solution 113

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 113

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	

save solution 113

end

#14

Mix

14 1

save solution 114

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 114

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 114

end

#15

Mix

15 1

save solution 115

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

```

fix_pe      -4      02(g) #

Pyrolusite  0      0      precipitate_only

Rhodochrosite      0      0      precipitate_only

Magnesite    0      0      precipitate_only

Epsomite     0      0      precipitate_only

SbO2  1000  0      precipitate_only

```

```

use solution 115

```

```

SURFACE      100

```

```

-equilibrate with solution 999

```

```

Hfo_wOH      Ferrihydrite      equilibrium_phase 0.2      53300

```

```

Hfo_sOH      Ferrihydrite      equilibrium_phase 0.005

```

```

save solution 115

```

```

end

```

Appendix K - PHREEQC Input Files
Open Pit Alternative South Pit

USER_PUNCH

-headings	Ag	Al	Alk	As	B	Ba	Be	Bi	Ca	Cd	Cl	Cr	Co
	Cu	Fe	Ga	Hg	K	Li	Mg	Mn	Mo	N	Na	Ni	P
	Pb	S(6)	Sb	Se(6)	Sn	Sr	Tl	Ti	U	V	Zn		
-start													

10 PUNCH TOT("Ag")*107.868*1000

20 PUNCH TOT("Al")*26.981*1000

30 PUNCH ALK*61.017*1000

40 PUNCH TOT("As")*74.921*1000

50 PUNCH TOT("B")*10.81*1000

60 PUNCH TOT("Ba")*137.32*1000

70 PUNCH TOT("Be")*9.012*1000

80 PUNCH TOT("Bi")*208.9803*1000

90 PUNCH TOT("Ca")*40.080*1000

100 PUNCH TOT("Cd")*112.410*1000

110 PUNCH TOT("Cl")*35.45*1000

120 PUNCH TOT("Cr")*51.996*1000

130 PUNCH TOT("Co")*58.9332*1000

140 PUNCH TOT("Cu")*63.546*1000

150 PUNCH TOT("Fe")*55.845*1000

160 PUNCH TOT("F")*18.9984*1000

170 PUNCH TOT("Ga")*69.723*1000

180 PUNCH TOT("Hg")*200.59*1000

190 PUNCH TOT("K")*39.098*1000

200 PUNCH TOT("Li")*6.941*1000

210 PUNCH TOT("Mg")*24.305*1000

220 PUNCH TOT("Mn")*54.938*1000

230 PUNCH TOT("Mo")*95.94*1000

240 PUNCH TOT("N")*14.007*1000

250 PUNCH TOT("Na")*22.99*1000

260 PUNCH TOT("Ni")*58.710*1000

270 PUNCH TOT("P")*94.971*1000

280 PUNCH TOT("Pb")*207.200*1000

290 PUNCH TOT("S(6)")*96*1000

300 PUNCH TOT("Sb")*121.750*1000

310 PUNCH TOT("Sc")*44.9559*1000

320 PUNCH TOT("Se(6)")*78.96*1000

330 PUNCH TOT("Sn")*118.710*1000

340 PUNCH TOT("Sr")*87.62*1000

350 PUNCH TOT("Tl")*196.966*1000

360 PUNCH TOT("Ti")*47.867*1000

370 PUNCH TOT("U")*238.029*1000

380 PUNCH TOT("V")*50.9415*1000

390 PUNCH TOT("Zn")*65.39*1000

-end

Selected_Output

-file South_Pit_GoldSim_PhreeqcGoldSimOutput.dat

-pH TRUE

-water TRUE

-percent error true

-user_punch TRUE

-saturation_indices	Barite	Calcite	CO2(g)	Malachite	Ferrihydrite
Fluorite	Gibbsite	Gypsum	Siderite	fix_pe	Pyrolusite
Rhodochrosite	Magnesite	Epsomite	Sb02		

KNOBS

-iterations 500

-convergence_tolerance 1.00E-07

-tolerance 1.00E-15

-step_size 10

-pe_step_size 5

PHASES

Fix_pe

e- = e-

log_k 0

SOLUTION 999

Dummy Equilibrium

temp 13.3

pH 7

pe 1

redox pe

units mg/l

density 1

-water 1 # kg

End

Solution_Spread

-temp 15

-pe 0

-units mg/l

Number	Cr	pH Co Ni	Ag Cu Pb	Al Fe S(6)	Alkalinity F Sb as CaCO3	As Hg Se(6)	B K Sn	Ba Li Sr	Be Mg Tl	Bi Mn Ti	Ca Mo U	Cd N V	Cl Na Zn
as S04 charge													
1	6.934720985	0.001034721	0.001034721	0.015792042	237.9168549	0.044103283	0.647032678	0.027075976					
	0.000104318	0.441162676	123.4049835	0.000348238	92.82282257	0.001064011	0.005955874						
	0.01162398	0.003082215	5.475153446	0.016020814	0.000167853	10.03381824	0.97097528						
	62.92687988	0.747339547	2.054183483	0.557938993	125.0303574	0.019774122	0.107935116						
	0.000527957	370.1932983	0.029904721	0.004411627	0.010724276	0.014537821	1.559672475						
2	0.000294035	0.004411627	0.009404763	0.028496156	0.052140381								
	6.695951783	0.001008846	0.015668353	231.8591309	0.041408684	0.623681486	0.023812016						
	9.85654E-05	0.364666253	120.3313904	0.000347346	94.95806885	0.001036376	0.006028261						
	0.011388364	0.003055755	5.028490543	0.01542391	0.000173099	9.443457603	0.920761049						
	61.56435394	0.771777034	1.876857281	0.571159661	122.6526566	0.019408235	0.106557317						
3	0.000513719	366.6015625	0.026446225	0.003646663	0.010788015	0.01398558	1.52833128						
	0.000291779	0.003646663	0.008808895	0.02621715	0.053752001								
	6.619979109	0.001040615	0.016319577	237.97789	0.041449703	0.636978686	0.023516482						
	9.94571E-05	0.356939942	122.2955856	0.000359265	98.67729187	0.001067179	0.006215533						
	0.011781617	0.003132996	5.087631226	0.015982365	0.000174972	9.489851952	0.929158211						
4	62.68236923	0.797418475	1.856748939	0.59108901	125.9223404	0.019890923	0.107929252						
	0.000529663	372.0864868	0.025887761	0.003569399	0.011116809	0.014280917	1.559057117						
	0.000300955	0.003569399	0.008927969	0.026383774	0.055550225								
	6.506575628	0.001092343	0.01714717	250.0545654	0.043646786	0.674550951	0.025076438						
	0.000107847	0.38203451	131.8609467	0.000382867	106.2681122	0.001118568	0.006805354						
	0.01235526	0.003404435	5.360664368	0.016763425	0.000185837	10.21208668	1.000953436						

	67.76963806	0.876886308	1.99128902	0.66519177	134.6713715	0.021316309	0.115383193
	0.000556326	405.6489868	0.027410863	0.003820345	0.012068931	0.015096107	1.680868387
	0.00032084	0.003820345	0.009620825	0.028063053	0.06095463		
5	6.35911031	0.001238705	0.01891391	281.2182617	0.052026797	0.787387252	0.028664799
	0.000128275	0.429787546	158.9385071	0.000443923	128.61203	0.001273226	0.008089176
	0.013895643	0.004003361	5.995531082	0.018308911	0.000238544	12.47105885	1.217889428
	83.07302856	1.072715163	2.440543652	0.862837553	160.5982971	0.025308637	0.146258637
	0.000634835	515.4763794	0.032749351	0.004297875	0.014154358	0.017536378	2.040801287
	0.00037523	0.004297875	0.011126628	0.032968983	0.074456528		
6	6.084205779	0.001668082	0.021663308	353.9074402	0.087008953	1.155728579	0.036418449
	0.000144873	0.57282269	195.5994415	0.000517928	147.4815369	0.00178463	0.006899107
	0.018143499	0.003744758	7.80398941	0.02139907	0.000381249	17.07348061	1.588891745
	102.8746796	1.04263556	3.57718873	1.376608491	208.388031	0.030601809	0.257087111
	0.001121817	687.2134399	0.052938227	0.005728227	0.012451592	0.024005394	2.547815561
	0.000453084	0.005728227	0.011906389	0.050872169	0.071324706		
7	5.930812161	0.002048587	0.024448238	415.1897583	0.123033725	1.424074769	0.045253303
	0.00015876	0.693627596	216.2746429	0.000584069	157.3791656	0.002237756	0.006144084
	0.021776546	0.004497785	9.309399605	0.023617383	0.000458439	20.47039795	1.826294184
	114.6698456	1.01734674	4.329010963	1.849772692	241.346344	0.034984484	0.372253209
	0.001518883	789.0831299	0.071005397	0.006936276	0.011310591	0.029705463	2.862008572
	0.00052083	0.006936276	0.011938316	0.073124811	0.068989463		
8	5.652074204	0.003944237	0.036513928	646.6826172	0.250154495	2.161428213	0.07559865
	0.00021541	1.062580943	279.6300354	0.000882099	195.2111969	0.003883103	0.006222836
	0.034433559	0.008963106	14.22896481	0.031483393	0.000665739	31.67015648	2.559715033
	152.9037018	1.130634904	6.273807526	3.568979025	348.0933838	0.054118875	0.867421329
	0.002778814	1060.766357	0.129464179	0.01062581	0.011720336	0.050928872	3.848873138
	0.000805161	0.01062581	0.013809869	0.180952027	0.078809187		
9	5.462852517	0.006495984	0.051353134	920.5852661	0.390202403	2.764994383	0.112718903
	0.000278151	1.483629227	339.9118042	0.001231504	232.2786102	0.005778247	0.006639165
	0.048694279	0.015261718	19.639431	0.040252827	0.001009414	43.37094116	3.241721153
	186.9747467	1.233322978	7.633154392	5.58363533	452.9640503	0.07869909	1.486910105
	0.004124681	1270.662476	0.186394483	0.014836292	0.012665691	0.075626254	4.681005955
	0.001135836	0.014836292	0.016139336	0.331520617	0.090351164		
10	5.371641965	0.008110647	0.061452482	1101.512817	0.479812533	3.114849806	0.138958454
	0.000318408	1.760795355	376.3178711	0.00145987	254.5826416	0.00701616	0.006909492
	0.058013231	0.019598581	23.08460045	0.045969401	0.001244901	50.66162491	3.64407444
	207.1251221	1.28818953	8.36802578	6.909804344	517.1915894	0.094675854	1.901033401
	0.004949634	1386.001221	0.221770808	0.017607953	0.013277084	0.091828421	5.164392471
	0.001351597	0.017607953	0.017535293	0.432724953	0.097458787		
11	5.190319203	0.01128439	0.092675939	1573.415039	0.672321498	3.690781116	0.242386833
	0.000421818	2.520223379	458.0950317	0.002100116	315.1047974	0.010409417	0.007736898
	0.083130978	0.033169262	31.16454697	0.061884385	0.001794921	65.94286346	4.254384995
	251.4327393	1.373084307	9.368551254	10.59687042	652.4069824	0.125349715	3.073011398
	0.006672935	1565.015015	0.298636496	0.025202235	0.015118855	0.137053907	6.236359596
	0.001955647	0.025202235	0.020163225	0.672941625	0.11792279		
12	5.110464278	0.013976589	0.10464485	1821.541016	0.765906811	3.929053545	0.313346058
	0.000486942	2.963414669	500.2492676	0.002454625	346.1017151	0.012377867	0.008107063
	0.097809173	0.036065705	35.35325241	0.070918448	0.002158127	73.31388855	4.468550205
	273.6951294	1.385686874	9.597021103	12.53906345	713.5426636	0.138168171	3.668866396
	0.008039515	1633.761353	0.334878832	0.029634146	0.015984559	0.162360087	6.764945984
	0.002289778	0.029634146	0.021150379	0.762988031	0.127732009		
13	5.013711063	0.01832553	0.125203803	2210.040527	0.906527281	4.382350922	0.421919763
	0.000591572	3.630815983	574.4162598	0.003024378	401.6994019	0.015519792	0.008932851
	0.120651491	0.042341024	41.94602585	0.085151859	0.00273176	85.22351837	4.878625393
	313.4315491	1.466340542	10.14666939	15.58100986	816.6773071	0.159868494	4.534154892
	0.009995118	1782.224365	0.391813368	0.036308158	0.017785778	0.202271953	7.735808372
	0.002826084	0.036308158	0.02326634	0.895917892	0.146670207		
14	4.928895249	0.022809023	0.146305785	2614.447998	1.040032983	4.786497116	0.545661986
	0.000709611	4.347677231	649.2042236	0.003629131	457.277832	0.018927202	0.009675141
	0.145247504	0.047641434	48.53902435	0.100104503	0.003307948	96.53382874	5.187044621
	352.1792908	1.516003609	10.43945503	18.83825302	911.1630859	0.181192502	5.273094177
	0.012567915	1900.774902	0.447757751	0.043476772	0.019453131	0.244971946	8.691493034
	0.00339576	0.043476772	0.025464572	1.002431393	0.165226415		
15	4.846030292	0.026956039	0.167498648	3076.072266	1.169600964	5.234553814	0.691624999
	0.000892208	5.195649624	741.9237671	0.004333082	521.8776245	0.022990404	0.010540461
	0.174807921	0.048951421	55.83304977	0.117752925	0.003688801	109.4347305	5.514050961

```

398.7235107 1.567726493 10.73430729 22.61812592 1015.286804 0.205882207 5.902455807
0.016088296 2046.209106 0.510465801 0.051956501 0.021400457 0.294715792 9.797012329
0.004058204 0.051956501 0.028593868 1.098957658 0.186636239
end

# 1

Mix

1      1

save solution 101

End

GAS_PHASE    1

    -fixed_pressure

    -pressure    1

    -volume      1

    -temperature    15

    CO2(g)      0.0039

    O2(g) 0.21

EQUILIBRIUM_PHASES    100

    Barite      0.5    0    precipitate_only

    Calcite     0.5    0    precipitate_only

    CO2(g)      -2.48874515 10    #

    Malachite   0      0    precipitate_only

```

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 101

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 101

End

#2nd

Mix

2 1

save solution 102

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 02(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 102

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 102

End

#3nd

Mix

3 1

save solution 103

End

GAS_PHASE 1

-fixed_pressure

```

-pressure      1

-volume        1

-temperature    15

CO2(g)         0.0039

O2(g) 0.21

```

```

EQUILIBRIUM_PHASES      100

```

```

Barite      0.5  0  precipitate_only

Calcite     0.5  0  precipitate_only

CO2(g)      -2.48874515 10  #

Malachite   0    0  precipitate_only

Ferrihydrite 0    0  precipitate_only

Fluorite    0    0  precipitate_only

Gibbsite    0    0  precipitate_only

Gypsum      0    0  precipitate_only

Siderite    0    0  precipitate_only

fix_pe      -4    O2(g) #

Pyrolusite  0    0  precipitate_only

Rhodochrosite 0    0  precipitate_only

Magnesite   0    0  precipitate_only

Epsomite    0    0  precipitate_only

```

Sb02 1000 0 precipitate_only

use solution 103

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 103

end

#4

Mix

4 1

save solution 104

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 104

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 104

end

#5

Mix

5 1

save solution 105

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 105

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 105

end

#6

Mix

6 1

save solution 106

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 106

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 106

end

#7

Mix

7	1
---	---

save solution 107

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 107

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 107

end

#8

Mix

8 1

save solution 108

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

C02(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

C02(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 108

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 108

end

#9

Mix

9 1

save solution 109

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 109

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 109

end

#10

Mix

10 1

save solution 110

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 110

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 110

end

#11

Mix

11 1

save solution 111

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

```
Pyrolusite  0      0      precipitate_only
Rhodochrosite      0      0      precipitate_only
Magnesite    0      0      precipitate_only
Epsomite     0      0      precipitate_only
SbO2  1000  0      precipitate_only
```

```
use solution 111
```

```
SURFACE      100
```

```
-equilibrate with solution 999
```

```
Hfo_wOH      Ferrihydrite      equilibrium_phase 0.2      53300
```

```
Hfo_sOH      Ferrihydrite      equilibrium_phase 0.005
```

```
save solution 111
```

```
end
```

```
#12
```

```
Mix
```

```
12      1
```

```
save solution 112
```

```
End
```

```
GAS_PHASE    1
```

```
-fixed_pressure
```

```
-pressure    1
```

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 112

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 112

end

#13

Mix

13 1

save solution 113

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 113

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase	0.2	53300
---------	--------------	-------------------	-----	-------

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 113

end

#14

Mix

14 1

save solution 114

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite	0	0	precipitate_only
Ferrihydrite		0 0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite		0 0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 114

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 114

end

#15

Mix

15 1

save solution 115

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
Sb02	1000	0	precipitate_only

use solution 115

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	

save solution 115

end

Appendix K - PHREEQC Input Files
Partially Backfilled Pit Alternative North Pit

USER_PUNCH

-headings	Ag	Al	Alk	As	B	Ba	Be	Bi	Ca	Cd	Cl	Cr	Co
	Cu	Fe	Ga	Hg	K	Li	Mg	Mn	Mo	N	Na	Ni	P
	Pb	S(6)	Sb	Se(6)	Sn	Sr	Tl	Ti	U	V	Zn		
-start													

10 PUNCH TOT("Ag")*107.868*1000

20 PUNCH TOT("Al")*26.981*1000

30 PUNCH ALK*61.017*1000

40 PUNCH TOT("As")*74.921*1000

50 PUNCH TOT("B")*10.81*1000

60 PUNCH TOT("Ba")*137.32*1000

70 PUNCH TOT("Be")*9.012*1000

80 PUNCH TOT("Bi")*208.9803*1000

90 PUNCH TOT("Ca")*40.080*1000

100 PUNCH TOT("Cd")*112.410*1000

110 PUNCH TOT("Cl")*35.45*1000

120 PUNCH TOT("Cr")*51.996*1000

130 PUNCH TOT("Co")*58.9332*1000

140 PUNCH TOT("Cu")*63.546*1000

150 PUNCH TOT("Fe")*55.845*1000

160 PUNCH TOT("F")*18.9984*1000

170 PUNCH TOT("Ga")*69.723*1000

180 PUNCH TOT("Hg")*200.59*1000

190 PUNCH TOT("K")*39.098*1000

200 PUNCH TOT("Li")*6.941*1000

210 PUNCH TOT("Mg")*24.305*1000

220 PUNCH TOT("Mn")*54.938*1000

230 PUNCH TOT("Mo")*95.94*1000

240 PUNCH TOT("N")*14.007*1000

250 PUNCH TOT("Na")*22.99*1000

260 PUNCH TOT("Ni")*58.710*1000

270 PUNCH TOT("P")*94.971*1000

280 PUNCH TOT("Pb")*207.200*1000

290 PUNCH TOT("S(6)")*96*1000

300 PUNCH TOT("Sb")*121.750*1000

310 PUNCH TOT("Sc")*44.9559*1000

320 PUNCH TOT("Se(6)")*78.96*1000

330 PUNCH TOT("Sn")*118.710*1000

340 PUNCH TOT("Sr")*87.62*1000

350 PUNCH TOT("Tl")*196.966*1000

360 PUNCH TOT("Ti")*47.867*1000

370 PUNCH TOT("U")*10.81*1000

380 PUNCH TOT("V")*50.9415*1000

390 PUNCH TOT("Zn")*65.39*1000

-end

Selected_Output

-file N_Pit_GoldSimPhreeqcGoldSimOutput.dat

-pH TRUE

-water TRUE

-percent error true

-user_punch TRUE

-saturation_indices	Barite	Calcite	CO2(g)	Malachite	Ferrihydrite
Fluorite	Gibbsite	Gypsum	Siderite	Pyrolusite	
Rhodochrosite	TlOH	TlMetal	Galena		
			fix_pe		

KNOBS

-iterations 500

-convergence_tolerance 1.00E-06

-tolerance 1.00E-15

-step_size 1000

-pe_step_size 10

PHASES

Fix_pe

e- = e-

log_k 0

SOLUTION 999

Dummy Equilibrium

temp 13.3

pH 7

pe 1

redox pe

units mg/l

density 1

-water 1 # kg

End

Solution_Spread

-temp 15

-pe 0

-units mg/l

Number	Cr	pH Co Ni	Ag Cu Pb	Al Fe S(6)	Alkalinity F Ga Sb Sc as CaCO3	As Hg Se(6)	B K Sn	Ba Li Sr	Be Mg Tl	Bi Mn Ti	Ca Mo U	Cd N V charge	Cl Na Zn	
as S04														
1	7.148318257	0.001886942	0.076716915	329.5610046	0.148514032	0.892497957	0.121930324	0.000591369	2.128483295	274.2133789	0.000377408	89.22677612	0.002671524	0.004582102
	0.018384455	0.109200127	10.80381393	0.027857808	0.000857316	25.70078468	2.480567932	153.0750885	0.154328287	5.848812103	1.364693403	175.852356	0.035159729	0.13922596
	0.001556491	873.3262939	0.078629792	0.021218438	0.038412172	0.030412642	3.218306065	0.000454993	0.027203966	0.035745244	0.046976354	0.021829952		
2	7.15107484	0.001797006	0.077319756	323.6635132	0.121265113	0.857987821	0.125283957	0.000578677	1.973595738	279.4060669	0.000359421	94.18042755	0.002569674	0.004559709
	0.017492454	0.111299582	10.47961807	0.026209123	0.000597808	25.70030022	2.554950237	160.1293335	0.120669775	6.035440445	1.397167802	177.2984314	0.03613482	0.130983487
	0.001517356	906.3483276	0.079257794	0.019670574	0.041118506	0.028972805	3.336592197	0.000443148	0.02613084	0.037626486	0.047324851	0.021262877		
3	7.192308725	0.001643127	0.074032582	290.8574219	0.095909797	0.744556606	0.113261238	0.000540836	1.65028739	248.9407043	0.000328645	87.54760742	0.00242321	0.004079044
	0.015949083	0.104121335	9.1152668	0.02303816	0.000430125	22.55966377	2.273515701	144.2925415	0.098111056	5.325073719	1.252901554	159.2758331	0.033077311	0.115128078
	0.001430106	812.9689331	0.068744697	0.016436862	0.037566695	0.025562597	3.000460386	0.000405319	0.022352103	0.033885475	0.041236389	0.020076811		
4	7.259524375	0.001457034	0.06850253	247.765976	0.070880659	0.603856802	0.095335804	0.000489376	1.267862916	203.7575073	0.000291427	75.58149719	0.002241999	0.00340252
	0.014085136	0.092234582	7.416998863	0.019254819	0.000287854	18.23989677	1.856335878							

	119.1446991	0.075729847	4.292171955	1.040054798	133.6985931	0.028387252	0.096210979
	0.001313279	666.6929321	0.054603517	0.012612204	0.031290542	0.021343831	2.479397297
	0.000355241	0.017533844	0.02789649	0.033185635	0.018377453		
5	7.34920945	0.001285721	0.062713228	202.5838623	0.049360014	0.457605839	0.074590564
	0.000439282	0.875939369	150.7626648	0.000257165	60.53255463	0.002094193	0.002642247
	0.012357476	0.07838954	5.65190506	0.015532512	0.000187425	13.36886978	1.364923954
	88.51676941	0.057849605	3.082253695	0.792610586	104.9476547	0.022954324	0.077597558
	0.001206576	489.469696	0.038779821	0.008690978	0.023247462	0.017053461	1.854483247
	0.000304247	0.012319624	0.020550987	0.024348073	0.016737759		
6	7.480921307	0.001087176	0.05476135	152.4673157	0.029896064	0.304257274	0.051263992
	0.000376871	0.481878519	92.34997559	0.000217456	42.69343948	0.001894204	0.001800505
	0.010372918	0.06153762	3.798461914	0.011579803	0.000112094	8.122767448	0.824325025
	54.15598297	0.041663919	1.76725769	0.517656267	72.96472168	0.016698679	0.057834126
	0.001066645	291.8991394	0.02203111	0.004750492	0.01402297	0.012449535	1.156032205
	0.000245282	0.006891448	0.012316066	0.014984396	0.014598283		
7	7.58829116	0.000958252	0.048999965	122.0486374	0.0200554	0.216379553	0.037171461
	0.000334289	0.26575762	57.81108093	0.00019167	31.47579384	0.001745384	0.001296279
	0.009095982	0.050558295	2.735866308	0.009251907	8.09516E-05	5.076274395	0.505839884
	33.60109329	0.033194587	1.002321839	0.353579462	53.74349976	0.012829288	0.046196256
	0.000966489	174.3280029	0.012493866	0.002590967	0.008420789	0.009727322	0.738773525
	0.000207788	0.003827471	0.007400088	0.009631519	0.013082718		
8	7.630489403	0.000924053	0.047522463	112.3089066	0.016777683	0.186338589	0.032314137
	0.000323106	0.188214123	45.38144684	0.000184831	27.59791756	0.001715545	0.001122463
	0.008751291	0.047080848	2.374554157	0.008513003	7.18807E-05	3.986493587	0.39093405
	26.16711617	0.030565113	0.723532319	0.295832157	47.18652344	0.011533581	0.042501375
	0.000942992	131.5384674	0.009040579	0.001815163	0.006372796	0.008842275	0.588911235
	0.000196639	0.002718706	0.005612004	0.007737895	0.012699623		
9	7.631025965	0.000923679	0.047498401	112.2032776	0.016773725	0.186059996	0.032256052
	0.000322956	0.18759805	45.23524094	0.000184756	27.54519463	0.001715107	0.001120487
	0.008747589	0.047032692	2.371182919	0.008506314	7.20585E-05	3.974852562	0.389611721
	26.07623863	0.030547911	0.720417023	0.295158625	47.11133957	0.011517384	0.042467937
	0.000942652	131.0180511	0.009005535	0.001809007	0.00634628	0.008833684	0.587094605
	0.000196508	0.002708193	0.005590193	0.007719005	0.012693664		
10	7.628064827	0.000923737	0.047482952	112.7765503	0.017005185	0.188359648	0.032636471
	0.000322934	0.194491178	46.34360504	0.000184767	27.85080719	0.001711935	0.001134111
	0.00875017	0.047225319	2.39835	0.008548176	7.23735E-05	4.070545673	0.399931133
	26.7475338	0.030683311	0.746158719	0.299988598	47.60775375	0.011609021	0.042677507
	0.000941659	134.9482727	0.009319424	0.001878212	0.006536315	0.008889585	0.60037607
	0.000196926	0.002808847	0.005754137	0.007880336	0.012687815		
11	7.630879066	0.000923508	0.047502086	112.2078857	0.016727887	0.186049849	0.032276407
	0.000322942	0.187499076	45.29663849	0.000184722	27.57196236	0.001714821	0.001121052
	0.008745953	0.047050126	2.371044159	0.008504356	7.15941E-05	3.978182554	0.390139371
	26.11938667	0.030528652	0.721615016	0.295403391	47.13191986	0.011522989	0.042458162
	0.000942568	131.2685089	0.009014129	0.001808027	0.006361075	0.008832846	0.587914467
	0.000196507	0.002709749	0.005600737	0.007722123	0.012693979		
12	7.624104113	0.00092514	0.047543619	113.5780411	0.017251281	0.191138983	0.03311361
	0.000323409	0.202191919	47.65834045	0.000185048	28.24380875	0.001711005	0.001151033
	0.008765646	0.047520198	2.431443691	0.008605633	7.25118E-05	4.182820797	0.412092239
	27.54581261	0.030865081	0.776017129	0.305856943	48.2342186	0.011730342	0.04296498
	0.000942011	139.586319	0.009679752	0.001955417	0.006762426	0.008963542	0.616258979
	0.000197688	0.002923292	0.00594787	0.008069523	0.012701707		
13	7.630851236	0.000923294	0.047496375	112.1985168	0.016707448	0.186039597	0.032284178
	0.000322886	0.187494174	45.32757187	0.000184679	27.58254051	0.001714406	0.001121264
	0.008743938	0.047052555	2.37088871	0.008502617	7.1382E-05	3.979975939	0.390412778
	26.14094162	0.030516881	0.722282946	0.295513302	47.13866806	0.011524603	0.042449478
	0.000942379	131.3970184	0.009019595	0.001807995	0.006368468	0.008831686	0.588315308
	0.00019648	0.002711002	0.005606121	0.007723895	0.012692142		
14	7.630636136	0.000923617	0.047507942	112.256073	0.0167385	0.186204836	0.032304566
	0.000322982	0.187906936	45.37239075	0.000184743	27.5959034	0.001714839	0.001122039
	0.008747099	0.047069244	2.372895956	0.008507675	7.15727E-05	3.984524012	0.390835792
	26.16571808	0.030538427	0.72330606	0.295744151	47.16870499	0.011530347	0.042474762
	0.000942629	131.5366516	0.009034144	0.001812114	0.006374324	0.008837128	0.588837087
	0.000196557	0.002716017	0.005611948	0.007732687	0.012695376		
15	7.626899223	0.000924861	0.047547486	113.0232086	0.017029218	0.188970342	0.032756601
	0.000323355	0.195768774	46.6294136	0.000184992	27.95760727	0.001713522	0.00113824
	0.008761126	0.04733314	2.405783653	0.008564829	7.21605E-05	4.093784809	0.402515411

26.92348671 0.030731229 0.752173781 0.301348776 47.76664734 0.011643563 0.042760737
0.000942708 135.9474945 0.009388397 0.001890949 0.00658673 0.008909793 0.603927135
0.000197257 0.002829791 0.005796062 0.007918952 0.012704267

end

1

Mix

1 1

save solution 101

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO₂(g) 0.0039

O₂(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO₂(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 101

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 101

End

#2nd

Mix

2 1

save solution 102

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 02(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 102

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 102

End

#3nd

Mix

3 1

save solution 103

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-2	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only

Sb02 1000 0 precipitate_only

use solution 103

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 103

end

#4

Mix

4 1

save solution 104

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-1	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 104

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 104

end

#5

Mix

5 1

save solution 105

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 0 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 105

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 105

end

#6

Mix

6 1

save solution 106

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	1	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 106

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 106

end

#7

Mix

7 1

save solution 107

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 2 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 107

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 107

end

#8

Mix

8 1

save solution 108

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

C02(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

C02(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 3 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 108

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 108

end

#9

Mix

9 1

save solution 109

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 109

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 109

end

#10

Mix

10 1

save solution 110

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 110

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 110

end

#11

Mix

11 1

save solution 111

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

```
Pyrolusite  0      0      precipitate_only
Rhodochrosite      0      0      precipitate_only
Magnesite    0      0      precipitate_only
Epsomite     0      0      precipitate_only
SbO2  1000  0      precipitate_only
```

```
use solution 111
```

```
SURFACE      100
```

```
-equilibrate with solution 999
```

```
Hfo_wOH      Ferrihydrite      equilibrium_phase 0.2      53300
```

```
Hfo_sOH      Ferrihydrite      equilibrium_phase 0.005
```

```
save solution 111
```

```
end
```

```
#12
```

```
Mix
```

```
12      1
```

```
save solution 112
```

```
End
```

```
GAS_PHASE    1
```

```
-fixed_pressure
```

```
-pressure    1
```

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 112

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 112

end

#13

Mix

13 1

save solution 113

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 113

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase	0.2	53300
---------	--------------	-------------------	-----	-------

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 113

end

#14

Mix

14 1

save solution 114

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 114

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 114

end

#15

Mix

15 1

save solution 115

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
Sb02	1000	0	precipitate_only

use solution 115

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	

save solution 115

end

Appendix K - PHREEQC Input Files
Partial Backfilled Pit Alternative West Pit

USER_PUNCH

-headings	Ag	Al	Alk	As	B	Ba	Be	Bi	Ca	Cd	Cl	Cr	Co
	Cu	Fe	Ga	Hg	K	Li	Mg	Mn	Mo	N	Na	Ni	P
	Pb	S(6)	Sb	Se(6)	Sn	Sr	Tl	Ti	U	V	Zn		

-start

10 PUNCH TOT("Ag")*107.868*1000

20 PUNCH TOT("Al")*26.981*1000

30 PUNCH ALK*61.017*1000

40 PUNCH TOT("As")*74.921*1000

50 PUNCH TOT("B")*10.81*1000

60 PUNCH TOT("Ba")*137.32*1000

70 PUNCH TOT("Be")*9.012*1000

80 PUNCH TOT("Bi")*208.9803*1000

90 PUNCH TOT("Ca")*40.080*1000

100 PUNCH TOT("Cd")*112.410*1000

110 PUNCH TOT("Cl")*35.45*1000

120 PUNCH TOT("Cr")*51.996*1000

130 PUNCH TOT("Co")*58.9332*1000

140 PUNCH TOT("Cu")*63.546*1000

150 PUNCH TOT("Fe")*55.845*1000

160 PUNCH TOT("F")*18.9984*1000

170 PUNCH TOT("Ga")*69.723*1000

180 PUNCH TOT("Hg")*200.59*1000

190 PUNCH TOT("K")*39.098*1000

200 PUNCH TOT("Li")*6.941*1000

210 PUNCH TOT("Mg")*24.305*1000

220 PUNCH TOT("Mn")*54.938*1000

230 PUNCH TOT("Mo")*95.94*1000

240 PUNCH TOT("N")*14.007*1000

250 PUNCH TOT("Na")*22.99*1000

260 PUNCH TOT("Ni")*58.710*1000

270 PUNCH TOT("P")*94.971*1000

280 PUNCH TOT("Pb")*207.200*1000

290 PUNCH TOT("S(6)")*96*1000

300 PUNCH TOT("Sb")*121.750*1000

310 PUNCH TOT("Sc")*44.9559*1000

320 PUNCH TOT("Se(6)")*78.96*1000

330 PUNCH TOT("Sn")*118.710*1000

340 PUNCH TOT("Sr")*87.62*1000

350 PUNCH TOT("Tl")*196.966*1000

360 PUNCH TOT("Ti")*47.867*1000

370 PUNCH TOT("U")*10.81*1000

380 PUNCH TOT("V")*50.9415*1000

390 PUNCH TOT("Zn")*65.39*1000

-end

Selected_Output

-file West_Pit_BF_PhreeqcGoldSimOutput.dat

-pH TRUE

-water TRUE

-percent error true

-user_punch TRUE

-saturation_indices	Barite	Calcite	CO2(g)	Malachite	Ferrihydrite
Fluorite	Gibbsite	Gypsum	Siderite	Pyrolusite	
Rhodochrosite	TlOH	TlMetal	Galena		
			fix_pe		

KNOBS

-iterations 500

-convergence_tolerance 1.00E-06

-tolerance 1.00E-15

-step_size 1000

-pe_step_size 10

PHASES

Fix_pe

e- = e-

log_k 0

SOLUTION 999

Dummy Equilibrium

Number	pH	Ag	Al	Alkalinity	As	B	Ba	Be	Bi	Ca	Cd	Cl
Cr	Co	Cu	Fe	F	Ga	Hg	K	Mg	Mn	Mo	N	Na
Ni	P	Pb	S(6)	Sb	Sc	Se(6)	Sn	Tl	Ti	U	V	Zn
			as CaCO3								charge	
	as SO4											
1	7.532532361	0.000675101	0.029073091	144.3955688	0.028293516	0.301562697	0.059153426					
	0.000180106	0.614653707	118.7510147	0.00013502	47.05955124	0.000809475	0.001915261					
	0.006473788	0.046333238	3.8157022	0.010179398	3.59344E-05	9.846347809	1.050252199					
	70.70139313	0.031600308	2.396034718	0.733487189	73.2755127	0.013098114	0.050896991					
	0.00049457	387.542572	0.029124869	0.006105801	0.018681729	0.011486045	1.443467855					
	0.000173648	0.009090254	0.016125185	0.017675653	0.008839902							
2	7.532560022	0.000672939	0.029014016	144.1266785	0.028249139	0.301608413	0.059135918					
	0.000179814	0.61563766	118.9585724	0.000134588	47.08511353	0.000806391	0.001916211					
	0.006454173	0.046329748	3.814171314	0.01016014	3.55877E-05	9.862721443	1.052266836					
	70.84158325	0.031569671	2.401616335	0.73306489	73.2890625	0.013116695	0.050800703					
	0.000493181	388.503479	0.029180232	0.006115934	0.018734643	0.011470846	1.446078777					
	0.000173336	0.009109656	0.016165659	0.017686268	0.008814638							
3	7.527204242	0.000679987	0.029240459	146.0183868	0.02900482	0.308216244	0.05994745					
	0.000181892	0.63100487	120.9678192	0.000135997	47.59810638	0.000814214	0.001946447					
	0.006525127	0.046810962	3.892422676	0.010306837	3.80664E-05	10.05373383	1.071235299					
	72.00144196	0.031885531	2.454728842	0.7428689	74.4236908	0.013344509	0.051534183					
	0.000497757	395.2011414	0.029939618	0.006269677	0.019014863	0.011636934	1.470213413					
	0.000175319	0.009307695	0.016464846	0.018065311	0.008868919							
4	7.529596368	0.0006496	0.028393112	141.7875519	0.028112192	0.305423558	0.059451766					
	0.000177353	0.637997806	122.7956696	0.00012992	47.72525024	0.000769783	0.001942926					
	0.006246802	0.046573862	3.842411757	0.010005219	3.22741E-05	10.19564629	1.09064126					

5	73.33236694	0.03135556	2.49985075	0.733151674	74.20285034	0.01348273	0.050026093
	0.000478183	404.5602417	0.030232364	0.00634336	0.019586001	0.011379886	1.493451118
	0.000170559	0.009483173	0.016831776	0.018110029	0.008522939		
	7.529751552	0.000649287	0.028383618	141.7184448	0.028087398	0.305223614	0.059427924
	0.000177278	0.637603343	122.7475128	0.000129857	47.71186066	0.000769378	0.001942053
6	0.006243755	0.046559852	3.84005022	0.01	3.21784E-05	10.19100571	1.090205312
	73.30582428	0.031344779	2.498522758	0.732841074	74.17121124	0.013476944	0.049999997
	0.00047798	404.411499	0.0302116	0.006339428	0.01958066	0.011374317	1.492876172
	0.000170486	0.009478444	0.016824765	0.018100163	0.008520101		
	7.529751552	0.000649287	0.028383618	141.7184448	0.028087398	0.305223614	0.059427924
7	0.000177278	0.637603343	122.7475128	0.000129857	47.71186066	0.000769378	0.001942053
	0.006243755	0.046559852	3.84005022	0.01	3.21784E-05	10.19100571	1.090205312
	73.30582428	0.031344779	2.498522758	0.732841074	74.17121124	0.013476944	0.049999997
	0.00047798	404.411499	0.0302116	0.006339428	0.01958066	0.011374317	1.492876172
	0.000170486	0.009478444	0.016824765	0.018100163	0.008520101		
8	7.529751552	0.000649287	0.028383618	141.7184448	0.028087398	0.305223614	0.059427924
	0.000177278	0.637603343	122.7475128	0.000129857	47.71186066	0.000769378	0.001942053
	0.006243755	0.046559852	3.84005022	0.01	3.21784E-05	10.19100571	1.090205312
	73.30582428	0.031344779	2.498522758	0.732841074	74.17121124	0.013476944	0.049999997
	0.00047798	404.411499	0.0302116	0.006339428	0.01958066	0.011374317	1.492876172
9	0.000170486	0.009478444	0.016824765	0.018100163	0.008520101		
	7.529751552	0.000649287	0.028383618	141.7184448	0.028087398	0.305223614	0.059427924
	0.000177278	0.637603343	122.7475128	0.000129857	47.71186066	0.000769378	0.001942053
	0.006243755	0.046559852	3.84005022	0.01	3.21784E-05	10.19100571	1.090205312
	73.30582428	0.031344779	2.498522758	0.732841074	74.17121124	0.013476944	0.049999997
10	0.00047798	404.411499	0.0302116	0.006339428	0.01958066	0.011374317	1.492876172
	0.000170486	0.009478444	0.016824765	0.018100163	0.008520101		
	7.529751552	0.000649287	0.028383618	141.7184448	0.028087398	0.305223614	0.059427924
	0.000177278	0.637603343	122.7475128	0.000129857	47.71186066	0.000769378	0.001942053
	0.006243755	0.046559852	3.84005022	0.01	3.21784E-05	10.19100571	1.090205312
11	73.30582428	0.031344779	2.498522758	0.732841074	74.17121124	0.013476944	0.049999997
	0.00047798	404.411499	0.0302116	0.006339428	0.01958066	0.011374317	1.492876172
	0.000170486	0.009478444	0.016824765	0.018100163	0.008520101		
	7.529751552	0.000649287	0.028383618	141.7184448	0.028087398	0.305223614	0.059427924
	0.000177278	0.637603343	122.7475128	0.000129857	47.71186066	0.000769378	0.001942053
12	0.006243755	0.046559852	3.84005022	0.01	3.21784E-05	10.19100571	1.090205312
	73.30582428	0.031344779	2.498522758	0.732841074</			

73.30582428 0.031344779 2.498522758 0.732841074 74.17121124 0.013476944 0.049999997
0.00047798 404.411499 0.0302116 0.006339428 0.01958066 0.011374317 1.492876172
0.000170486 0.009478444 0.016824765 0.018100163 0.008520101

end

1

Mix

1 1

save solution 101

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO₂(g) 0.0039

O₂(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO₂(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 101

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 101

End

#2nd

Mix

2 1

save solution 102

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 02(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 102

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 102

End

#3nd

Mix

3 1

save solution 103

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-2	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only

Sb02 1000 0 precipitate_only

use solution 103

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 103

end

#4

Mix

4 1

save solution 104

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	0	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 104

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 104

end

#5

Mix

5 1

save solution 105

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 1 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 105

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 105

end

#6

Mix

6 1

save solution 106

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	2	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 106

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 106

end

#7

Mix

7 1

save solution 107

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 107

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 107

end

#8

Mix

8 1

save solution 108

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

C02(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

C02(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 108

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 108

end

#9

Mix

9 1

save solution 109

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 109

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 109

end

#10

Mix

10 1

save solution 110

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 110

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 110

end

#11

Mix

11 1

save solution 111

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

```
Pyrolusite  0      0      precipitate_only
Rhodochrosite      0      0      precipitate_only
Magnesite    0      0      precipitate_only
Epsomite     0      0      precipitate_only
SbO2  1000  0      precipitate_only
```

```
use solution 111
```

```
SURFACE      100
```

```
-equilibrate with solution 999
```

```
Hfo_wOH      Ferrihydrite      equilibrium_phase 0.2      53300
```

```
Hfo_sOH      Ferrihydrite      equilibrium_phase 0.005
```

```
save solution 111
```

```
end
```

```
#12
```

```
Mix
```

```
12      1
```

```
save solution 112
```

```
End
```

```
GAS_PHASE    1
```

```
-fixed_pressure
```

```
-pressure    1
```

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe 4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 112

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 112

end

#13

Mix

13 1

save solution 113

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 113

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase	0.2	53300
---------	--------------	-------------------	-----	-------

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 113

end

#14

Mix

14 1

save solution 114

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 114

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 114

end

#15

Mix

15 1

save solution 115

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite	0	0	precipitate_only
fix_pe	4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
Sb02	1000	0	precipitate_only

use solution 115

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
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Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
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save solution 115

end

Appendix K - PHREEQC Input Files
Partially Backfilled Pit Alternative South Pit

USER_PUNCH

-headings	Ag	Al	Alk	As	B	Ba	Be	Bi	Ca	Cd	Cl	Cr	Co
	Cu	Fe	Ga	Hg	K	Li	Mg	Mn	Mo	N	Na	Ni	P
	Pb	S(6)	Sb	Se(6)	Sn	Sr	Tl	Ti	U	V	Zn		
-start													

10 PUNCH TOT("Ag")*107.868*1000

20 PUNCH TOT("Al")*26.981*1000

30 PUNCH ALK*61.017*1000

40 PUNCH TOT("As")*74.921*1000

50 PUNCH TOT("B")*10.81*1000

60 PUNCH TOT("Ba")*137.32*1000

70 PUNCH TOT("Be")*9.012*1000

80 PUNCH TOT("Bi")*208.9803*1000

90 PUNCH TOT("Ca")*40.080*1000

100 PUNCH TOT("Cd")*112.410*1000

110 PUNCH TOT("Cl")*35.45*1000

120 PUNCH TOT("Cr")*51.996*1000

130 PUNCH TOT("Co")*58.9332*1000

140 PUNCH TOT("Cu")*63.546*1000

150 PUNCH TOT("Fe")*55.845*1000

160 PUNCH TOT("F")*18.9984*1000

170 PUNCH TOT("Ga")*69.723*1000

180 PUNCH TOT("Hg")*200.59*1000

190 PUNCH TOT("K")*39.098*1000

200 PUNCH TOT("Li")*6.941*1000

210 PUNCH TOT("Mg")*24.305*1000

220 PUNCH TOT("Mn")*54.938*1000

230 PUNCH TOT("Mo")*95.94*1000

240 PUNCH TOT("N")*14.007*1000

250 PUNCH TOT("Na")*22.99*1000

260 PUNCH TOT("Ni")*58.710*1000

270 PUNCH TOT("P")*94.971*1000

280 PUNCH TOT("Pb")*207.200*1000

290 PUNCH TOT("S(6)")*96*1000

300 PUNCH TOT("Sb")*121.750*1000

310 PUNCH TOT("Sc")*44.9559*1000

320 PUNCH TOT("Se(6)")*78.96*1000

330 PUNCH TOT("Sn")*118.710*1000

340 PUNCH TOT("Sr")*87.62*1000

350 PUNCH TOT("Tl")*196.966*1000

360 PUNCH TOT("Ti")*47.867*1000

370 PUNCH TOT("U")*10.81*1000

380 PUNCH TOT("V")*50.9415*1000

390 PUNCH TOT("Zn")*65.39*1000

-end

Selected_Output

```
-file South_Pit_PartialBF_GoldSim_PhreeqcGoldSimOutput.dat

-pH    TRUE

-water      TRUE

-percent    error true

-user_punch TRUE

-saturation_indices  Barite      Calcite      CO2(g)      Malachite      Ferrihydrite
Fluorite  Gibbsite  Gypsum      Siderite      fix_pe        Pyrolusite
Rhodochrosite  Magnesite  Epsomite    SbO2
```

KNOBS

```
-iterations 500

-convergence_tolerance 1.00E-07

-tolerance 1.00E-15

-step_size 10

-pe_step_size 5
```

PHASES

```
Fix_pe

e- = e-

log_k 0
```

SOLUTION 999 Dummy Equilibrium

temp 13.3

pH 7

pe 1

redox pe

units mg/l

density 1

-water 1 # kg

End

Solution_Spread

-temp 15

-pe 0

-units mg/l

Number	Cr	pH	Ag	Al	Alkalinity	As	B	Ba	Be	Bi	Ca	Cd	Cl
	Ni	Co	Cu	Fe	F	Ga	K	Li	Mg	Mn	Mo	N	Na
		P	Pb	S(6)	Sb	Sc	Se(6)	Sn	Tl	Ti	U	V	Zn
				as	CaCO3								charge
				as									
				S04									
1	7.123126343	0.001589975	0.373940676	400.2805176	0.133375436	1.137640357	0.238794819						
	0.0005536	2.330506802	408.2318726	0.000428075	166.6316376	0.001589975	0.010020333						
	0.016749198	0.715100646	13.30619144	0.030525342	0.000107195	35.94436646	4.265470505						
	239.3651733	0.650428414	8.607077599	1.921614289	258.5635376	0.049602158	0.143227354						
	0.001658705	1350.705688	0.106581971	0.023305066	0.065980718	0.032315798	5.074009895						
	0.000504031	0.053135592	0.055393245	0.078113087	0.071992904								
2	7.121611093	0.001575689	0.373832673	399.0856018	0.134276539	1.142014384	0.240715742						
	0.000561299	2.361880064	413.0487976	0.000433069	167.1001587	0.00157579	0.010567646						
	0.016546391	0.715696514	13.39376068	0.030329539	0.000106368	36.34087753	4.302765369						
	241.6758728	0.712415993	8.71035862	1.941920877	259.8934937	0.05009643	0.143872991						
	0.001649627	1367.114624	0.107974172	0.023618802	0.066704318	0.032385502	5.124549389						
	0.000507489	0.053488918	0.055975966	0.078766793	0.075983845								
3	7.118665663	0.001553482	0.373759478	397.0682983	0.135624751	1.146893263	0.243770525						
	0.000571804	2.412401438	419.9667053	0.00043588	167.0847626	0.001553889	0.011165082						
	0.01622938	0.716916084	13.5326767	0.030027794	0.000104955	36.95586395	4.361605167						
	245.1734161	0.776124179	8.88053894	1.974049449	261.4121094	0.050721008	0.144618377						
	0.001636187	1391.164185	0.110293038	0.024124013	0.067761473	0.032496061	5.197257996						
	0.000510215	0.054084018	0.056901649	0.079779148	0.080082364								
4	7.114274421	0.00150702	0.372783035	383.7107544	0.13695614	1.138297081	0.245143071						
	0.000568655	2.455743074	417.6652832	0.000403308	157.1105347	0.001495639	0.010366247						
	0.015426002	0.716945827	13.51764774	0.029016085	0.000100642	36.85799408	4.335783482						

	242.4794922	0.693581939	8.952770233	1.966267824	254.1407928	0.04937749	0.143340364
	0.001636243	1384.496948	0.112330385	0.024557432	0.066521689	0.031963941	5.133143425
	0.000486134	0.05452748	0.056694943	0.080045745	0.073388055		
5	6.381296694	0.00181706	0.379590034	442.8676758	0.151649565	1.322240591	0.256022185
	0.000586933	2.659544468	443.4912109	0.000456529	169.8266144	0.001791092	0.009906676
	0.018699063	0.721159756	15.30877495	0.034247346	0.000112568	38.94762039	4.522891045
	254.0966644	0.659792781	9.447951317	2.213099957	279.2514954	0.052837152	0.16750972
	0.001876826	1451.421143	0.122296169	0.026595445	0.067757837	0.035924461	5.432920933
	0.000538302	0.056845758	0.058989454	0.090599	0.069727264		
6	5.659937237	0.003379517	0.409862578	663.2526245	0.205578789	1.873042941	0.296031177
	0.000686485	3.4164536	535.6469116	0.000714374	232.2615509	0.002885901	0.011018883
	0.031080116	0.741401613	21.37114906	0.05399482	0.000163078	46.92090607	5.241203308
	301.0316772	0.768027544	10.90890312	3.412025452	375.181488	0.068602614	0.263718724
	0.002755602	1694.692749	0.153935179	0.034164537	0.076187059	0.051179692	6.570615768
	0.000772846	0.066325694	0.067856006	0.139238954	0.076388538		
7	5.420562799	0.004976914	0.437144846	853.1619873	0.252005786	2.302281618	0.327694446
	0.000774961	4.080401897	611.2409668	0.000942645	286.4642944	0.003841723	0.011987939
	0.041886214	0.75921458	26.34057045	0.071239978	0.000208612	53.56045532	5.827857018
	339.9908447	0.834054291	12.00011063	4.484591484	455.3839417	0.082264163	0.349497885
	0.003571181	1888.500854	0.179369807	0.040804014	0.083412349	0.064506546	7.501592159
	0.000977396	0.074825637	0.075273857	0.185218468	0.081592433		
8	5.121657078	0.007476146	0.506458044	1290.885864	0.33920604	3.224134684	0.407930732
	0.000986835	5.669006348	773.5836182	0.001480717	418.1794739	0.006152133	0.01433024
	0.068022564	0.802899063	36.25246429	0.112899899	0.000323756	67.86523438	7.091116905
	430.8163452	0.918743134	14.30376053	6.950915337	636.418335	0.111475915	0.551718235
	0.005050031	2310.446533	0.233134463	0.05669006	0.100945413	0.09664344	9.624193192
	0.001472106	0.097040802	0.091610514	0.272598445	0.094302155		
9	4.933928924	0.010417799	0.570820808	1754.911865	0.425547332	4.198374748	0.497527778
	0.001209797	7.36953783	945.0422363	0.002054665	558.4764404	0.008617962	0.016836472
	0.095911823	0.842315376	46.15727234	0.157369584	0.00044509	82.63562012	8.392964363
	527.1183472	0.998649657	16.63991547	9.565274239	824.0997314	0.141434684	0.748275578
	0.006817204	2750.598145	0.287162006	0.073695377	0.119597897	0.130962938	11.87240601
	0.002000004	0.118320569	0.108964995	0.346249461	0.107626669		
10	4.839725465	0.012262244	0.607993424	2069.975342	0.481887728	4.851656437	0.560852706
	0.001361648	8.526744843	1062.207275	0.002444804	653.795105	0.010293156	0.018554563
	0.114856504	0.863465428	52.6571846	0.187583059	0.000521329	92.46611023	9.267174721
	592.7426147	1.052770495	18.20977783	11.36061668	950.1326904	0.161818191	0.861386716
	0.008227725	3045.255127	0.322836965	0.085267447	0.132290915	0.154289514	13.39578438
	0.00235881	0.132811978	0.121241644	0.387894541	0.11681091		
11	4.665345458	0.016590994	0.699787855	2883.689697	0.614258766	6.54046154	0.72811842
	0.001753709	11.51489067	1363.401123	0.003453674	900.6187744	0.014628615	0.022948254
	0.163894206	0.918549716	68.7768631	0.265768558	0.00071492	116.7892609	11.51979923
	761.182373	1.184080958	22.21143341	15.93581009	1271.760254	0.214476764	1.152393937
	0.010984542	3801.744385	0.399519622	0.115148909	0.165144935	0.21462667	17.36274147
	0.003286967	0.170237437	0.151972279	0.496066421	0.140234202		
12	4.577597569	0.019498464	0.76309216	3417.054688	0.704430401	7.663650036	0.840664148
	0.002019175	13.53015709	1563.924561	0.004129958	1066.2229	0.017535094	0.025929626
	0.196756765	0.958287597	79.39112091	0.318201691	0.000842946	132.909729	13.04214859
	873.7513428	1.27074492	24.903965	19.02145386	1486.201538	0.249716744	1.348157167
	0.012704456	4310.196777	0.447550744	0.135301575	0.18742381	0.255155474	20.05828476
	0.003909867	0.195599556	0.172526181	0.558622479	0.156093046		
13	4.492823677	0.023015067	0.983302474	4056.924316	0.825556993	9.082770348	1.023761511
	0.002403577	15.95966148	1804.720825	0.005011934	1266.875244	0.021049559	0.02953334
	0.236500964	1.329405546	92.34506989	0.381592035	0.001009982	153.2414856	15.06850529
	1010.982727	1.369956493	28.1413269	22.64948082	1747.423828	0.292075127	1.584751248
	0.014982624	4923.723633	0.503541291	0.159596607	0.21444504	0.304131627	23.31553459
	0.004663265	0.235601634	0.197369099	0.642917335	0.182705313		
14	4.40854412	0.027212486	1.251640677	4820.751953	0.970449567	10.77794838	1.24437499
	0.002864837	18.86273384	2091.162109	0.00606881	1506.300903	0.025250508	0.03381693
	0.284009725	1.784951448	107.7835159	0.457363397	0.001209908	177.4563904	17.48418617
	1174.293213	1.48592329	31.97870827	27.01024246	2058.89917	0.342553467	1.867121935
	0.017706782	5652.164063	0.569903374	0.188627332	0.246527523	0.362653762	27.19371223
	0.005563238	0.283730388	0.226874635	0.743650973	0.21464096		
15	4.330164388	0.031861093	1.557587266	5668.666016	1.130986094	12.65905857	1.49227047
	0.003379815	22.0842514	2406.932373	0.007249077	1772.485962	0.029928327	0.038507443
	0.336924553	2.309470177	124.8022003	0.541722178	0.001432721	204.1421051	20.15439415

```

1354.655396 1.605040669 36.16983795 31.87296104 2403.918213 0.398405522 2.179553032
0.020728599 6452.856934 0.641915858 0.220842496 0.281898379 0.427739263 31.48143768
0.006564134 0.337669134 0.259338766 0.854227245 0.25009793
end

# 1

Mix

1      1

save solution 101

End

GAS_PHASE    1

    -fixed_pressure

    -pressure    1

    -volume      1

    -temperature    15

    CO2(g)      0.0039

    O2(g) 0.21

EQUILIBRIUM_PHASES    100

    Barite      0.5    0    precipitate_only

    Calcite     0.5    0    precipitate_only

    CO2(g)      -2.48874515 10    #

    Malachite   0      0    precipitate_only

```

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 101

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 101

End

#2nd

Mix

2 1

save solution 102

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 02(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 102

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 102

End

#3nd

Mix

3 1

save solution 103

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-2	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only

Sb02 1000 0 precipitate_only

use solution 103

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 103

end

#4

Mix

4 1

save solution 104

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	0	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 104

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 104

end

#5

Mix

5 1

save solution 105

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 105

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 105

end

#6

Mix

6 1

save solution 106

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 106

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 106

end

#7

Mix

7	1
---	---

save solution 107

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 107

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 107

end

#8

Mix

8 1

save solution 108

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

C02(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

C02(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 108

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 108

end

#9

Mix

9 1

save solution 109

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 109

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005
---------	--------------	-------------------------

save solution 109

end

#10

Mix

10 1

save solution 110

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 110

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 110

end

#11

Mix

11 1

save solution 111

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

```
Pyrolusite  0      0      precipitate_only
Rhodochrosite  0      0      precipitate_only
Magnesite    0      0      precipitate_only
Epsomite     0      0      precipitate_only
SbO2  1000  0      precipitate_only
```

```
use solution 111
```

```
SURFACE      100
```

```
-equilibrate with solution 999
```

```
Hfo_wOH      Ferrihydrite      equilibrium_phase 0.2      53300
```

```
Hfo_sOH      Ferrihydrite      equilibrium_phase 0.005
```

```
save solution 111
```

```
end
```

```
#12
```

```
Mix
```

```
12      1
```

```
save solution 112
```

```
End
```

```
GAS_PHASE    1
```

```
-fixed_pressure
```

```
-pressure    1
```

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite 0 0 precipitate_only

fix_pe -4 O2(g) #

Pyrolusite 0 0 precipitate_only

Rhodochrosite 0 0 precipitate_only

Magnesite 0 0 precipitate_only

Epsomite 0 0 precipitate_only

SbO2 1000 0 precipitate_only

use solution 112

SURFACE 100

-equilibrate with solution 999

Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53300

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 112

end

#13

Mix

13 1

save solution 113

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

Barite	0.5	0	precipitate_only
Calcite	0.5	0	precipitate_only
CO2(g)	-2.48874515	10	#
Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	O2(g)	#
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 113

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase	0.2	53300
---------	--------------	-------------------	-----	-------

Hfo_sOH Ferrihydrite equilibrium_phase 0.005

save solution 113

end

#14

Mix

14 1

save solution 114

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite	0	0	precipitate_only
Ferrihydrite	0	0	precipitate_only
Fluorite	0	0	precipitate_only
Gibbsite	0	0	precipitate_only
Gypsum	0	0	precipitate_only
Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
SbO2	1000	0	precipitate_only

use solution 114

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
---------	--------------	-----------------------	-------

Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	
---------	--------------	-------------------------	--

save solution 114

end

#15

Mix

15 1

save solution 115

End

GAS_PHASE 1

-fixed_pressure

-pressure 1

-volume 1

-temperature 15

CO2(g) 0.0039

O2(g) 0.21

EQUILIBRIUM_PHASES 100

Barite 0.5 0 precipitate_only

Calcite 0.5 0 precipitate_only

CO2(g) -2.48874515 10 #

Malachite 0 0 precipitate_only

Ferrihydrite 0 0 precipitate_only

Fluorite 0 0 precipitate_only

Gibbsite 0 0 precipitate_only

Gypsum 0 0 precipitate_only

Siderite	0	0	precipitate_only
fix_pe	-4	02(g) #	
Pyrolusite	0	0	precipitate_only
Rhodochrosite	0	0	precipitate_only
Magnesite	0	0	precipitate_only
Epsomite	0	0	precipitate_only
Sb02	1000	0	precipitate_only

use solution 115

SURFACE 100

-equilibrate with solution 999

Hfo_wOH	Ferrihydrite	equilibrium_phase 0.2	53300
Hfo_sOH	Ferrihydrite	equilibrium_phase 0.005	

save solution 115

end