Appendix C-2

2019 Results of the Tailings Supernatant

Table 4.4 Tailings Supernatant

Tailings - Liquid	Sample Date	6/6/2019	6/10/2019	6/16/2019	6/23/2019	6/30/2019	7/7/2019	7/14/2019	7/21/2019	7/24/2019	8/4/2019	8/11/2019	8/19/2019	8/25/2019	9/1/2019	9/9/2019	9/15/2019	9/22/2019	9/30/2019	10/6/2019	10/14/2019	10/20/2019	10/27/2019	11/3/2019	11/10/2019	11/17/2019	11/23/2019	12/1/2019
	FIELD_SDG	B9F7636	B9G3896	B9G8629	B9H6678	B9I2698	B9I8781	B9J9441	B9K5185	B9K9223	B9L8803	B9M6033	B9N3272	B9N9372	B9O6811	B9P6316	B9Q2360	B9Q9614	B9R7279	B9S3563	B9T3060	B9T7508	B9U8740	B9V3428	B9W0850	B9W7031	B9X4432	B9Y1280
Parameter	Unit																											
Conventional Parameters																												
pH	-	8.65	8.99	8.9	10.4	9.24	8.63	9.4	8.72	8.91	9.24	8.35	8.69	9.23	9.21	9.14	9.39	9.07	8.58	9.13	9.44	9.18	9.08	9.22	9.4	9.08	8.84	9.37
Hardness, as CaCO3 (D)	mg/L	2940	3490	3340	2000	2550	2950	2030	2580	2740	2780	2420	2730	2740	1790	1580	2690	3030	2540	2640	3160	2550	2020	2420	2830	2520	2220	2840
Hardness, as CaCO3 (T)	mg/L	2780	3160	3460	2030	2660	2700	2170	2800	3310	2970	7900	2970	2710	2540	1740	4410	3790	2700	3040	5790	2670	2250	2460	2600	5180	3540	2910
Total alkalinity, as CaCO3	mg/L	160	170	170	330	180	140	180	170	170	180	140	150	210	150	120	200	190	140	180	230	240	220	220	1.6	220	210	190	240
Total dissolved solids	mg/L	24100	24600	27200	30200	25300	28800	25800	25600	24200	22700	18800	21300	20000	13200	10800	18500	19900	13200	18800	16200	18100	15800	15900	16400	15000	14900	16500
Total suspended solids	mg/L	870	450	340	370	8500	130	6400	1500	49000	370	43000	440	3600	6500	160	59000	1200	8300	1700	100000	17000	5800	170	180	1200	2900	140
Turbidity	NTU	280	190	540	48	970	66	180	280	540	38	570	150	1300	860	99	840	160	1500	250	870	780	440	52	98	750	950	280
Major Ions																												
Calcium	mg/L	1150	1380	1320	799	1020	1170	812	1030	1100	1110	969	1090	1100	715	629	1080	1210	1010	1060	1260	1020	810	967	1130	1000	881	1140
Chloride	mg/L	6600	7600	9300	9700	7900	8100	7300	7500	6800	5300	5200	4800	4400	3100	2300	5000	4800	4400	3700	3300	3400	2900	2900	3100	3100	2800	3300
Cyanide Total	mg/L	92	98	370	910	620	380	250	240	210	120	25	25	5.4	10	14	54	31	21	9.6	15	24	13	12	23	22	17	16
Cyanide WAD	mg/L	< 0.10	< 1.0	9.5	< 10	1.3	0.36	1.1	1.5	3.4	< 1.5	0.82	2.4	< 0.50	10	0.18	< 0.50	< 0.50	< 0.50	< 0.10	< 0.50	0.21	< 0.10	< 0.20	0.98	< 0.50	< 0.50	< 0.30
Cyanide Free	ug/L	0.11	0.13	1.1	0.52	0.18	0.38	0.095	1	0.082	0.042	0.015	0.032	0.048	0.026	0.03	0.033	0.053	0.036	0.032	7.8	18	14	28	36	86	32	46
Fluoride	mg/L	0.15	0.11	0.15	0.12	0.13	0.14	< 0.10	0.11	< 0.10	0.11	0.12	0.11	0.11	< 0.10	0.13	< 0.10	0.1	0.15	0.16	0.11	0.16	0.18	0.27	0.15	0.19	0.21	0.12
Magnesium	mg/L	14.5	12.4	10.3	< 2.5	1.6	6.1	< 1.0	< 2.5	< 1.0	3.5	< 5.0	1.2	< 5.0	1.3	3.2	1.5	1.5	3.5	2.2	2.5	1.7	< 2.5	2.2	2.2	3.1	4.6	2.4
Potassium	mg/L	410	406	449	489	373	415	390	387	402	391	349	397	397	267	227	350	349	326	342	348	361	352	384	383	386	336	381
Sodium	mg/L	5400	5700	6200	8300	6260	7330	5870	5940	5770	5050	4880	5110	4730	3150	2630	4280	4390	4180	4280	4300	4080	3730	3670	3930	3990	3400	3910
Sulphate	mg/L	6700	6000	6000	5300	6100	7700	6700	6700	7000	6200	5400	6500	5600	3700	3300	5800	5500	5600	6900	6100	5800	4900	5200	5500	5100	5100	5500
Nutrients and Chlorophyll a																												
Nitrate	mg-N/L	304	180	198	217	270	308	316	346	342	313	235	284	220	207	154	224	214	193	222	224	275	222	202	243	222	208	189
Nitrite	mg-N/L	0.84	0.284	< 1.0	0.197	0.56	0.106	0.315	0.302	0.257	1.03	0.79	0.327	1.12	1.01	0.7	1.11	0.513	1.04	0.672	0.783	0.724	0.618	0.645	0.73	0.553	0.553	0.59
Nitrate + nitrite	mg-N/L	305	180	198	217	270	308	317	346	342	314	265	284	221	208	154	225	214	194	222	225	275	222	203	244	222	208	190
Total ammonia	mg-N/L	200	180	74	120	100	170	160	23	200	200	190	260	320	190	210	270	300	260	340	250	370	340	360	240	250	310	380
Total phosphorus	mg-P/L	1.5	1.4	1.5	0.19	1.5	0.63	0.5	4.5	51	< 1.0	48	1.2	2.8	10	< 0.40	21	1.2	1.1	2.6	< 5.0	85	31	13	0.4	1.6	86	7.5	0.49
Dissolved phosphorus	mg-P/L	-	-	-	-	-	< 0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	0.87	0.98	2.4	< 4	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Metals																												
Aluminum	µg/L	13900	11900	17700	8850	13400	7110	5650	22200	42500	11300	344000	10400	28500	111000	3790	99500	103000	9910	15300	224000	11500	22700	4560	4620	217000	57100	8910
Antimony	µg/L	< 10	< 10	< 25	< 50	< 10	< 10	< 25	< 25	< 25	< 10	< 50	< 10	< 50	< 50	< 5.0	< 50	< 25	11	< 10	< 50	< 25	< 25	< 10	< 10	< 50	< 25	13
Arsenic	µg/L	6960	9570	7740	5210	7990	7620	5480	12800	16600	8650	97000	11500	19500	48200	5490	49500	42500	13200	12700	78200	13600	24500	9110	9350	51200	26200	14200
Barium	µg/L	323	272	378	214	348	311	436	414	412	329	1100	333	452	732	183	342	739	325	264	876	260	293	283	235	607	267	254
Beryllium	µg/L	< 2.0	< 2.0	< 5.0	< 10	< 2.0	< 2.0	< 5.0	< 5.0	< 5.0	< 2.0	< 10	< 2.0	< 10	< 10	< 1.0	< 10	< 5.0	< 2.0	< 2.0	< 10	< 5.0	< 5.0	< 2.0	< 2.0	< 10	< 5.0	< 2.0
Bismuth	µg/L	< 20	< 20	< 50	< 100	< 20	< 20	< 50	< 50	< 50	< 20	< 100	< 20	< 100	< 100	< 10	< 100	< 50	< 20	< 20	< 100	< 50	< 50	< 20	< 20	< 100	< 50	< 20
Boron	µg/L	< 1000	< 1000	< 2500	< 5000	< 1000	< 1000	< 2500	< 2500	< 2500	< 1000	< 5000	< 1000	< 5000	< 5000	< 500	< 5000	< 2500	< 1000	< 1000	< 5000	< 2500	< 2500	< 1000	< 1000	< 5000	< 2500	< 1000
Cadmium	µg/L	< 0.20	< 0.20	< 0.50	3.4	< 0.20	< 0.20	< 0.50	< 0.50	0.89	< 0.20	10.3	0.37	< 1.0	3.8	0.21	13.2	7.16	0.36	0.58	32.1	< 0.50	0.62	< 0.20	< 0.20	9.1	2.06	< 0.20
Calcium	µg/L	1090000	1240000	1360000	801000	1050000	1070000	868000	1100000	1260000	1170000	2540000	1180000	1060000	914000	688000	1530000	1400000	1070000	1200000	1860000	1060000	874000	977000	1030000	1780000	1310000	1160000
Chromium	µg/L	< 20	< 20	< 50	< 100	< 20	< 20	< 50	< 50	52	< 20	512	< 20	< 100	142	< 10	181	141	< 20	21	409	< 50	< 50	< 20	< 20	330	124	< 20
Cobalt	µg/L	381	337	249	368	429	485	266	374	379	382	210	68.1	174	146	272	165	168	328	419	264	406	318	149	269	152	163	236
Copper	µg/L	16700	5650	4710	1300	871	2130	6870	6630	7160	5200	1230	9460	3540	2290	2380	915	11300	10500	121	3230	1260	548	615	736	902	177	1020
Iron	µg/L	53500	31700	42200	25000	34600	23300	28200	61100	244000	26500	3180000	41900	87000	463000	16100	915000	519000	31700	81200	1530000	28100	92900	12000	9110	1140000	334000	23100
Lead	µg/L	491	388	686	463	1540	197	340	1620	5700	721	27700	455	681	3990	108	11000	6060	226	666	18900	282	521	90.2	211	12700	5070	345
Lithium	µg/L	< 40	< 40	< 100	< 200	< 40	< 40	< 100	< 100	< 100	< 40	226	< 40	< 200	< 200	< 20	< 200	< 100	< 40	< 40	< 200	< 100	< 100	< 40	< 40	< 200	< 100	< 40
Magnesium	µg/L	14100	14400	18700	6080	11200	5380	< 2500	15200	38000	11800	377000	5690	13000	62800	4670	144000	69000	6330	11200	280000	5580	15100	3780	3160	176000	66000	5410
Manganese	µg/L	203	93	119	< 100	< 20	25	< 50	163	2280	113	25400	251	314	3020	60	11400	4000	160	552	21200	140	679	88	25	13600	4980	142
Mercury	µg/L	< 0.5	< 0.1	< 0.2	< 0.1	0.2	< 0.1	1.19	< 2	< 2	< 0.1	1.4	< 0.1	< 2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	µg/L	696	548	604	337	78	491	507	198	122	281	213	592	489	426	403	133	545	721	774	561	743	886	613	593	624	810	885
Nickel	µg/L	38	< 20	141	< 100	< 20	< 20	< 50	< 50	< 50	< 20	278	< 20	< 100	146	< 10	133	135	< 20	< 20	340	< 50	< 50	< 20	< 20	189	59	< 20
Potassium	µg/L	406000	400000	465000	467000	375000	401000	416000	386000	395000	404000	390000	399000	377000	282000	234000	357000	366000	325000	359000	395000	373000	356000	384000	356000	396000	369000	378000
Selenium	µg/L	6.3	7.1	6.7	< 10	2.9	4.2	13.8	6.7	6.2	6.7	15	384	504	320	427	588	840	807	844	777	758	445	361	214	144	110	75.6
Silicon	µg/L	17900	10200	16500	< 10000	10300	3640	6400	20600	45700	9200	300000	8070	29900	114000	4490	86900	112000	8290	14000	206000	10600	20800	3530	4750	186000	54400	9510
Silver	µg/L	9.37	45	50.2	24.8	2.87	14.8	15	13.7	5.2	4.19	< 2.0	4.41	4.7	3	1.07	< 2.0	4.5	5.66	1.91	< 2.0	1.6	2.9	0.46	< 0.40	< 2.0	< 1.0	1.33
Sodium	µg/L	5140000	5440000	6430000	8550000	6160000	7180000	6370000	6000000	5740000	5110000	4660000	5270000	4580000	3070000	2780000	4210000	4340000	4210000	4600000	4340000	4150000	3890000	3870000	3620000	3800000	3760000	3920000
Strontium	µg/L	3150	3610	3420	2050	2850	3150	3270	2710	4150	3840	14500	2920	2940	3040	2100	6780	4790	2710	3200	10600	2780	2370	2940	2780	8820	5470	3400
Sulphur	µg/L	4500000	4640000	5160000	5930000	5290000	6140000	4740000	4830000	4640000	4120000	3580000	4530000	3650000	2310000	2140000	2780000	3510000	3710000	3620000	2320000	3040000	2740000	2840000	2610000	2380000	2540000	2710000
Thallium	µg/L	0.22	< 0.20	< 0.50	< 1.0	< 0.20	< 0.20	< 0.50	< 0.50	< 0.50	< 0.20	1.1	0.24	< 1.0	< 1.0	< 0.10	< 1.0	0.51	< 0.20	< 0.20	1.4	< 0.50	< 0.50	< 0.20	< 0.20	1.3	< 0.50	< 0.20
Tin	µg/L	< 100	< 100	< 250	< 500	< 100	< 100	< 250	< 250	< 250	< 100	< 500	< 100	< 500	< 500	< 50	< 500	< 250	< 100	< 100	< 500	< 250	< 250	< 100	< 100	< 500	< 250	< 100
Titanium	µg/L	225	152	< 250	< 500	< 100	< 100	< 250	362	469	152	3100	126	< 500	1850	54	826	1670	167	249	3000	< 250	398	< 100	< 100	2530	522	128
Uranium	µg/L	< 2.0	< 2.0	< 5.0	< 10	< 2.0	< 2.0	< 5.0	< 5.0	< 5.0	< 2.0	< 10	< 2.0	< 10	< 10	< 1.0	< 10	< 5.0	< 2.0	< 2.0	11	< 5.0	< 5.0	< 2.0	< 2.0	< 10	< 5.0	< 2.0
Vanadium	µg/L	< 100	< 100	< 250	< 500	< 100	< 100	< 250	< 250	< 250	< 100	< 500	< 100	< 500	< 500	< 50	< 500	< 250	< 100	< 100	< 500	< 250	< 250	< 100	< 100	< 500	< 250	< 100
Zinc	µg/L	< 100	< 100	< 250	< 500	< 100	< 100	< 250	< 250	< 250	< 100	1370	131	1560	594	< 50	< 500	473	< 100	< 100	1420	< 250	< 250	< 100	< 100	731	< 250	< 100
Zirconium	µg/L	4.1	3.3	< 5.0	< 10	< 2.0	< 2.0	< 5.0	< 5.0	8.4	2.9	11	2.3	< 10	26	3	< 10	30	4	4.7	20	< 5.0	7.6	< 2.0	2.5	15	8.2	2.7
Dissolved Metals																												
Aluminum	µg/L	10500	7140	-	5340	5590	5480	1880	6030	-	-	4360	4170	4250	2680	1220	2560	2490	4180	2740	3270	4490	3470	2870	2300	3590	1230	2960
Antimony	µg/L	< 10	< 10	-	< 25	< 10	< 10	< 10	< 25	-	-	< 50	< 10	< 50	< 5.0	< 5.0	< 10	< 10	< 10	< 10	14	17	< 25	< 10	< 10	17	13	13
Arsenic	µg/L	4810	6540	-	3650	6990	6520	4550	7620	-	-	8500	7580	9650	6260	3490	6080	5520	9340	9620	9140	11700	13400	7240	9570	10100	12800	12700
Barium	µg/L	283	254	-	196	331	326	412	342	-	-	195	303	248	137	157	254	318	263	226	217	198	175	277	230	204	193	231
Beryllium	µg/L	< 2.0	< 2.0	-	< 5.0	< 2.0	-	< 2.0	< 5.0	-	-	< 10	< 2.0	< 10	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Bismuth	µg/L	< 20	< 20	-	< 50	< 20	< 20	< 20	< 50	-	-	< 100	< 20	< 100	< 10	< 10	< 20	< 20	< 20	< 20	< 20	< 20	< 50	< 20	< 20	< 20	< 20	< 20
Boron	µg/L	< 1000	< 1000	-	< 2500	< 1000	< 1000	< 1000	< 2500	-	-	< 5000	< 1000	< 5000	< 500	< 500	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 2500	< 1000	< 1000	< 1000	< 1000	< 1000
Cadmium	µg/L	0.21	< 0.20	-	< 0.50	< 0.20	< 0.20	< 0.20	< 0.50	-	-	< 1.0	< 0.20	< 1.0	< 0.10	< 0.10	< 0.20	< 0.20	< 0.20	0.2	< 0.20	< 0.20	< 0.50	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Chromium	µg/L	< 20	< 20	-	< 50	< 20	< 20	< 20	< 50	-	-	< 100	< 20	< 100	< 10	< 10	< 20	< 20	< 20	< 20	< 20	< 20	< 50	< 20	< 20	< 20	< 20	< 20
Cobalt	µg/L	418	435	-	522	497	684	661	471	498	-	276	257	210	191	262	516	498	421	469	222	483	431	364	222	283	228	233
Copper	µg/L	2240	3200	-	871	1740	10700	12300	913	-	-	2170	381	4020	1140	2030	466	18100	8330	260	771	221	702	98.9	323	433	1150	53.5
Iron	µg/L	13800	14900	-	278000	183000	144000	67100	23000	-	-	3740	369	9950	6610	4670	7980	11700	4970	3510	4200	6400	4910	3270	6440	6770	5340	5420
Lanthanum	µg/L	-	-	-	-	-	< 4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	µg/L	475	277	-	< 10	< 4.0	< 4.0	23.8	< 10	-	-	< 20	< 4.0	< 20	< 2.0	< 2.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 10	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Lithium	µg/L	< 40	< 40	-	< 100	< 40	-	< 40	< 100	-	-	< 200	< 40	< 200	< 20	< 20	< 40	< 40	< 40	< 40	< 40	< 40	< 100	< 40	< 40	< 40	< 40	< 40
Manganese	µg/L	72	30	-	< 50	< 20	< 20	< 20	< 50	-	-	< 100	< 20	< 100	< 10	< 10	< 20	< 20	< 20	< 20	< 20	< 20	< 50	< 20	< 20	< 20	< 20	< 20
Mercury	µg/L	< 0.5	< 0.5	< 0.2	< 0.1	0.2	< 2	< 2	< 2	< 2	< 2	< 2	5	< 0.1	< 2	< 0.1	< 0.1	< 0.1	< 0.4	< 0.1	< 0.01	< 0.01	0.08	< 0.01	0.03	0.01	< 0.01	0.02
Molybdenum	µg/L	297	323	-	367	210	744	600	172	-	-	444	278	549	247	411	161	490	563	286	658	571	691	624	659	706	860	664
Nickel	µg/L	< 20	< 20	-	< 50	< 20	< 20	< 20	< 50	-	-	< 100	< 20	< 100	< 10	< 10	< 20	21	< 20	< 20	< 20	< 20	< 50	< 20	< 20	< 20	< 20	< 20
Selenium	µg/L	13.2	15.3	-	14.1	9	20.8	13.6	16.2	-	-	18	357	538	346	418	761	796	1030	957	936	817	470	348	284	171	117	74.5
Silicon	µg/L	9070	6590	-	< 5000	< 2000	-	< 2000	< 5000	-	-	< 10000	< 2000	< 10000	< 1000	< 1000	< 2000	< 2000	< 2000	< 2000	< 2000	< 2000	< 5000	< 2000	< 2000	< 2000	< 2000	< 2000
Silver	µg/L	0.98	11.5	-	2.2	0.99	12.1	7.37	1.6	-	-	< 2.0	< 0.40	4.9	0.68	0.91	< 0.40	2.59	3.61	2.49	1.88	2.56	2.5	1.19	0.55	0.63	0.46	1.31
Strontium	µg/L	3940	3280	-	2030	2990	3110	3340	2240	-	-	2500	2740	2950	2090	2130	2490	3220	2780	2710	2810	2990	2200	2950	2980	2880	2910	3420
Sulphur	µg/L	4840000	4940000	5500000	7760000	5260000	6720000	4610000	4840000	5040000	4150000	4280000	4130000	3680000	2450000	1780000	3460000	3510000	3540000	3510000	3130000	3030000	2520000	2540000	2840000	2820000	2310000	2740000
Thallium	µg/L	0.23	< 0.20	-	< 0.50	< 0.20	< 0.20	< 0.20	< 0.50	-	-	< 1.0	< 0.20	< 1.0	< 0.10	< 0.10	< 0.20	< 0.20	0.42	< 0.20	< 0.20	< 0.20	< 0.50	< 0.20	< 0.20	0.21	< 0.20	< 0.20
Tin	µg/L	< 100	< 100	-	< 250	< 100	-	< 100	< 250	-	-	< 500	< 100	< 500	< 50	< 50	< 100	< 100	< 100	< 100	< 100	< 100	< 250	< 100	< 100	< 100	< 100	< 100
Titanium	µg/L	105	< 100	-	< 250	< 100	< 100	< 100	< 250	-	-	< 500	< 100	< 500	< 50	< 50	< 100	< 100	< 100	< 100	< 100	< 100	< 250	< 100	< 100	< 100	< 100	< 100
Uranium	µg/L	< 2.0	< 2.0	-	< 5.0	< 2.0	< 2.0	< 2.0	< 5.0	-	-	< 10	< 2.0	< 10	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Vanadium	µg/L	< 100	< 100	-	< 250	< 100	-	< 100	< 250	-	-	< 500	< 100	< 500	< 50	< 50	< 100	< 100	< 100	< 100	< 100	< 100	< 250	< 100	< 100	< 100	< 100	< 100
Zinc	µg/L	< 100	< 100	-	< 250	< 100	< 100	< 100	< 250	-	-	< 500	< 100	1380	< 50	< 50	< 100	< 100	< 100	< 100	< 100	< 100	< 250	< 100	< 100	< 100	< 100	< 100
Zirconium	µg/L	2.5	3.3	-	< 5.0	< 2.0	-	< 2.0	< 5.0	-	-	< 10	< 2.0	< 10	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0