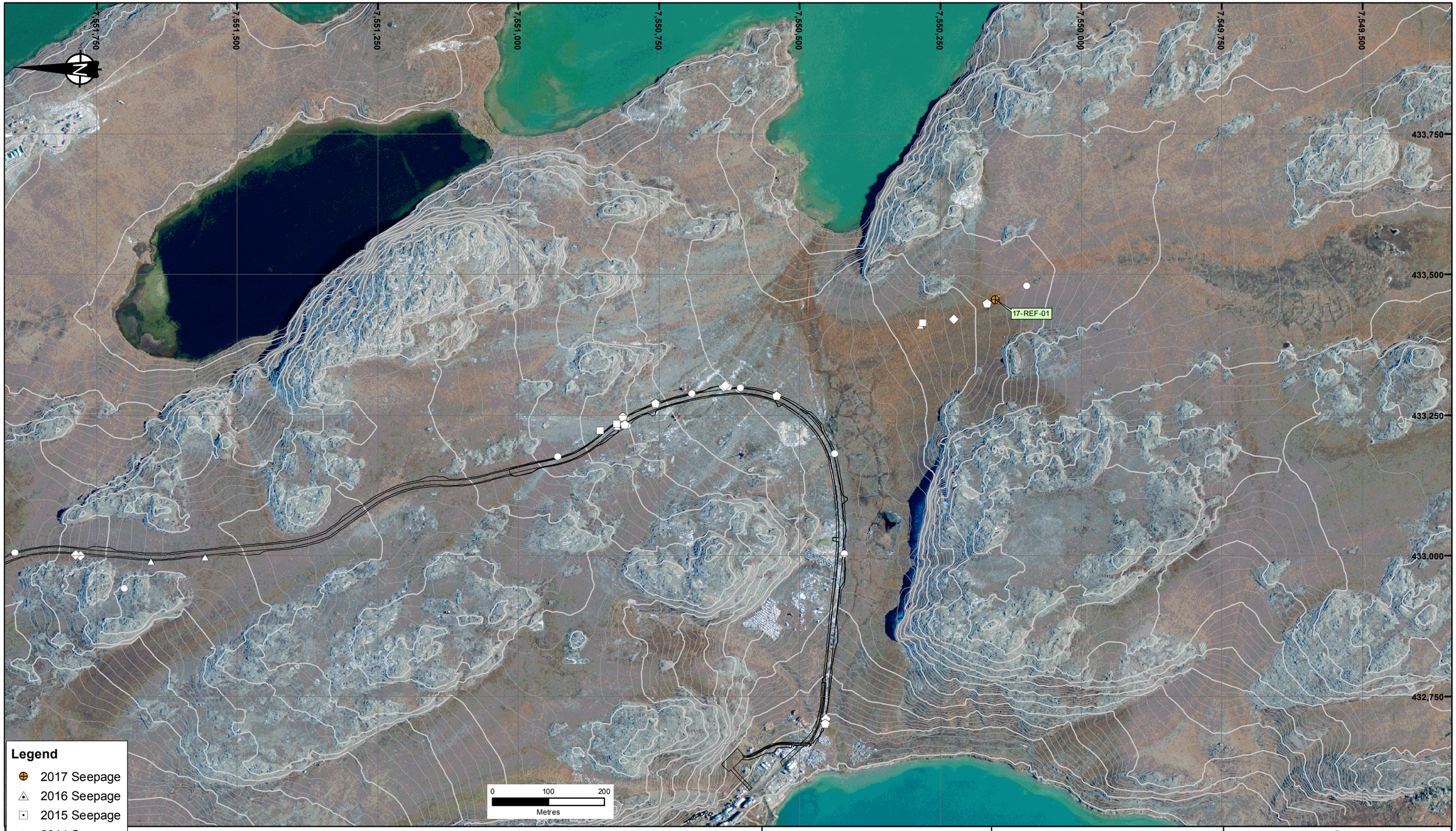

Legend

- 2017 Seepage
- 2016 Seepage
- 2015 Seepage
- 2014 Seepage
- 2013 Seepage
- 2012 Seepage
- 2011 Seepage
- 2010 Seepage

	pH 6.0 to 6.9	pH 7 to 7.9	pH 8 to 8.9
EC ≤ 500 µS/cm			
500µS/cm<EC<2000µS/cm			
EC>2000µS/cm			

srk consulting

Job No: 1CT022.016

Filename: 1CT022_016_AnnualSeepMaps_2017_Fig_02_maps

TMAC RESOURCES

2017 Seepage Monitoring

Hope Bay Gold Project

Seep Survey Locations
Doris Windy Road

Date:	Approved:	Figure:
Mar 2018	LB	6

Attachment B – 2017 Field Observations and Measurements

Date	Sampling Point	Area	General Observations			Field Measurements																Lab sample collected	Filtrate colour	Sediment colour	Number of filters used	Duplicate	Field Blank
			Coordaintes (UTM Zone 13)		Description of Location	pH	Conductivity	ORP	Water Temperature	Water Colour	Turbidity	Precipitates/Stains	Odours	Photos Taken	Flow Measurement Calculations	t1	t2	t3	Amount	Capture	Flow						
			Easting	Northing		pH units	µS/cm	mV	°C							sec	sec	sec	mL	%	L/s						
15-Jun-17	17-CB-01a	TLA Road	434008	7559504	NE toe of tails catchment basin ~50m west of Doris Creek. Grassy Tundra. Steady flow + channel from toe. Small, fragmented channel leading down to Doris Creek. Some grey fines settled in channel pools. 8cm x 3cm deep. Syringe used to collect sample.	8.2	241	155	1.2	Colorless	None	None	None	Yes		2	2	2	250	90	0.1	Yes	Colorless	Grey	1	17-CB-01b	
15-Jun-17	17-DC-01	Waste Rock Influenced Area	433147	7558966	North west corner within PCP. 50m downstream of ore stockpile. Steady flow from rock berm into the PCP. Rock fines on bottom of channel. 5cmxcxm deep. Syring used to collected sample.	7.8	3640	209	0.4	Colorless	None	None	None	Yes		2	2	2	250	90	0.1	Yes	Colorless - light orange when preserved	Reddish pebbles	2		
15-Jun-17	17-DC-02	Waste Rock Influenced Area	433157	7558981	Approximately 10m east of DC-01 at northwest corner within PCP. A lot of sediment in area. Area was fully saturated days prior to dewatering. Muddy. Small amount of seepage observed at toe of ore pad. Syringe used to collect sample.	7.9	3860	203	0.4	Colorless	None	None	None	Yes	Too little to measure							Yes	Colorless, slight orange when preserved	Reddish brown	2		
15-Jun-17	17-DC-03	Waste Rock Influenced Area	433328	7558877	Small seepage at toe of road berm at Pad G. Seepage very shallow. Tundra very saturated and muddy. 2 other small seeps within 1m of largest sampled seep; 10m west of sump. Syringe used to collect sample.	7.8	3350	165	0.5	Colorless	None	None	None	Yes		3	3	3	125	40	0.1	Yes	Colorless	None	1		
15-Jun-17	17-TLA-01	TLA Road	435368	7557723	Northwest side of TIA road at toe. Grassy tundra. Had to remove rocks to confirm and access seep. Visisble stream emenating from under roadway. Snow/ice on other side of roadway. Melt running under road. Grey fines settled in pools. Water appears slightly cloudy. Syringe used to collect sample	8.0	63	162	0.4	Colorless with slight brown	--	None	None	Yes	Too little to measure							Yes	Colorless	Grey	0		
16-Jun-17	17-TLA-02	TLA Road	435363	7557699	West side of TIA road. Large boulders. Large amount of willow in area. 3 large seeps within 2 meters; all pooling into 1 area. Grassy. No fine sediment present in pooled area. Syringe used to collect sample.	7.5	66	168	3.5	Colorless with slight brown	None	None	None	Yes		3	3	3	250	20	0.5	Yes	Colorless	None	1		Yes - No ID
16-Jun-17	17-TLA-03	TLA Road	435474	7557284	West side of TIA raod. Grassy tundra. No pooling, water dissipates within grass. Very minor seepage. Water collected from small rocky pool at base of seepage and toe of road berm. Sample collected with a syringe.	7.3	86	167	2.2	Colorless with slight brown	None	None	None	Yes	Too low to measure							Yes	Colorless	None	1		
16-Jun-17	17-TLA-04	TLA Road	435488	7557209	West side of TIA road. Grassy tundra. Few willows. 1 small seep observed flowing from toe of road berm. Had to remove some rocks to access and sample. Channel (single) flows into hummocks. No pooling. Sample collected with syringe.	7.5	255	159	1.2	Colorless with slight brown	None	None	None	Yes		3	3	3	125	50	0.1	Yes	Colorless with slight brown	Brown	6		
16-Jun-17	17-REF-03	Reference	432121	7557604	Channel 39cmx8.6cm deep. Pronounced channel with large flow. Grassy tundra. Flow from out crop heading North. Reddish sediment in bottom with patches of exposed sand. Used syringe to collect sample.	7.7	93	61	14.0	Colorless	None	None	None	Yes	Too large to measure (?)							Yes	Colorless	Red	1		
16-Jun-17	17-REF-02	Reference	432078	7556083	Small, pronounced channel flowing south. Grassy tundra. Pools with riffle sections. Channel 8cmx6cm deep. Used syringe to collect sample.	7.7	119	104	4.6	Colorless	None	None	None	Yes		3	2	2	1000	70	0.6	Yes	Colorless	Reddish	1		
16-Jun-17	17-REF-01	Reference	433456	7550152	Pronounced channel flowing North towards Windy Lake Road. Grassy tundra with abundnace of willows. Pools and riffles observed. Channel 25cmx17cm deep. Fast flowing.	7	53	108	6.4	Colorless with slight brown	None	None	None	Yes	Used a floating twig							Yes	Colorless	None	1		
16-Jun-17	17-TLA-05	TLA Road	435546	7557173	West side of TIA road. Grassy tundra, some willows. Small seep with pooling. Channel exists 10m down stream. Fines settled in bottom of pool. A few rocks ramoved to better access seep. Water sample collected with syringe.	7.7	99	111	6.0	Light brown	None	None	None	Yes		4	4	4	1000	75	0.3	Yes	Very light brown to colorless	None	1		
16-Jun-17	17-TLA-06	TLA Road	434666	7559197	West side of TIA road. ~50m south of reclaim jetty roat/reagent berm pad. Small (2 to 3 within 1m) flows emanating from toe of road berm. Removed a couple rocks for access. A lot of sediment in the sample area. Allowed fines to clear for 5 minutes. Grassy with hummocks. Collected sample with syringe.	8.5	81	99	11.8	Cloudy/colorless	Slightly	None	None	Yes	Unable to measure							Yes	-	-	0		
18-Jun-17	17-AIRSTR-01	Airstrip	4329175	7561090	North side of de-icing pad. Construction active in the area. Hummocks and willows present in sample area. No channel. Small pool (3m) at base of seepage. Small amounts of sediment in pool. Sample collected with a syringe.	7.6	557	150	1.1	Colorless	No	None	None	Yes		4	4	4	250	50	0.1	Yes	Colorless	None	3		
18-Jun-17	17-AIRSTR-02	Airstrip	432768	7561064	West side of south apron extension. Grassy tundra. Very small seepage. No channel. Few small pools. Water dissipates into grassy area. Water slightly cloudy. Sample collected with syringe.	8.2	232	106	0.4	Colorless, slightly cloudy	No	None	None	Yes	Too low to measure							Yes	Colorless	light orange/reddish	4		

Attachment C – 2017 Laboratory Water Quality Data

Attachment C: Laboratory Results of the 2016 Seep Survey Samples

Area	Sample ID	Field pH	Lab pH	Field EC	Lab EC	ORP	Total Hardness	TSS	TDS	Acidity	Total Alkalinity	Total Ammonia	Cl	F	NO_3	NO2	Total P	SO_4	Al
		s.u.	s.u.	µS/cm	µS/cm	mV	mg $CaCO_3$/L	mg/L	mg/L	mg $CaCO_3$/L	mg CaCO3/L	mg N/L	mg/L	mg/L	mg N/L	mg N/L	mg/L	mg/L	mg/L
	CCME guideline*	*6.5-9*	*6.5-9*	-	-	-	-	-	-	-	-	*4***	*120 mg/L*	-	*3 mg N/L*	-	-	-	*0.1*
Reference (Windy Road)	16-REF-001	7	7.4	53	52	110	22	<3.0	57	3	21	<0.0050	3.2	0.062	<0.0050	<0.0010	0.0043	<0.30	0.049
	16-REF-002	7.7	7.5	120	120	100	31	<3.0	80	2.5	24	<0.0050	18	0.028	<0.0050	<0.0010	0.006	3.3	0.021
	16-REF-003	7.7	7.7	93	93	61	35	<3.0	65	2	36	<0.0050	6.3	<0.020	<0.0050	<0.0010	0.0022	2.5	0.018
Waste Rock Influenced Area	17-DC-01	7.8	7.7	3600	3500	210	750	48	2300	8.7	70	**22**	**920**	<0.40	**48**	0.86	0.23	180	0.0072
	17-DC-02	7.9	7.6	3900	3600	200	790	11	2400	9.5	73	**23**	**970**	<0.40	**51**	0.83	0.24	170	0.0059
	17-DC-02	7.8	7.8	3400	3100	170	920	4.7	1900	6.8	68	**15**	**900**	<0.40	**40**	0.47	0.0062	35	0.0068
Tail Lake Access (TLA) Road	17-CB-01a	8.2	7.9	240	220	150	87	<3.0	160	2.4	88	<0.0050	14	0.026	0.28	0.0082	0.024	7.3	0.013
	17-TLA-01	8	7.5	63	79	160	25	26	56	3.2	34	0.12	3	0.038	0.0058	<0.0010	0.037	<0.30	0.081
	17-TLA-02	7.5	7.5	66	64	170	30	<3.0	71	2.8	26	0.018	3.8	0.059	0.009	<0.0010	0.0054	<0.30	0.074
	17-TLA-03	7.3	7.6	86	81	170	35	<3.0	75	4	34	0.05	4.6	0.064	0.0096	<0.0010	0.029	<0.30	0.064
	17-TLA-04	7.5	8	260	240	160	110	17	180	5	98	0.13	13	0.065	1.7	0.043	0.06	4.1	0.071
	17-TLA-05	7.7	7.6	99	96	110	43	<3.0	92	3.1	39	0.024	6.2	0.09	<0.0050	<0.0010	0.029	<0.30	0.085
	17-TLA-06	8.5	7.7	81	84	99	33	20	52	1.8	37	0.084	3.5	<0.020	0.018	0.0018	0.028	1.2	0.021
Airstrip	17-AIRSTR-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17-AIRSTR-02	8.2	8.1	230	220	110	92	8.1	140	1.8	96	0.12	8.7	0.039	0.094	0.0032	0.0079	6.5	0.022

*Comparisons to CCME water quality guidelines for the protection of aquatic life are intended for screening purposes and are not directly applicable because the seepage sites do not support aquatic life.

Values in bold indicates value exceeds respective water quality guideline for the parameter.

**Guideline for ammonia is pH and temperature dependent. Seepage waters had an average temperature of 5.2ºC at time of sampling and an average pH of 7.6. This guideline value is approximate.

***Guideline calculated based on the average hardness of the seepage samples of 330 mg $CaCO_3$ mg/L

Area	Sample ID	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	CCME guideline*	-	*0.005*	-	-	-	-	*0.00037***	-	-	-	*0.004****	*0.3*	*0.007****	-	-	-	*0.000026*
Reference (Windy Road)	16-REF-001	<0.00010	0.00018	0.0023	<0.000020	<0.000050	<0.010	<0.0000050	4.5	0.00048	<0.00010	0.00086	0.15	<0.000050	0.0027	2.7	0.0014	<0.0000050
	16-REF-002	<0.00010	<0.00010	0.0022	<0.000020	<0.000050	<0.010	<0.0000050	7.4	0.00013	<0.00010	0.00068	0.043	<0.000050	<0.0010	3.2	0.00088	<0.0000050
	16-REF-003	<0.00010	<0.00010	0.0028	<0.000020	<0.000050	0.01	<0.0000050	10	0.00013	<0.00010	0.0012	0.043	<0.000050	<0.0010	2.4	0.0016	<0.0000050
Waste Rock Influenced Area	17-DC-01	0.0011	**0.0074**	0.058	<0.000040	<0.00010	0.22	0.000065	240	0.0045	0.036	**2.1**	**0.63**	<0.00010	0.0067	36	0.18	0.000007
	17-DC-02	0.001	0.0033	0.053	<0.000040	<0.00010	0.23	0.00012	260	0.0039	0.037	**2.2**	**0.55**	<0.00010	0.012	37	0.63	<0.0000050
	17-DC-02	0.00023	0.0016	0.081	<0.000040	<0.00010	0.11	0.00013	310	<0.00020	0.0013	**0.008**	<0.020	<0.00010	0.0067	35	0.22	<0.0000050
Tail Lake Access (TLA) Road	17-CB-01a	<0.00010	0.00019	0.0046	<0.000020	<0.000050	0.03	<0.0000050	26	<0.00010	<0.00010	**0.0051**	0.016	<0.000050	0.0014	5.2	0.0015	<0.0000050
	17-TLA-01	<0.00010	0.00014	0.0023	<0.000020	<0.000050	<0.010	0.0000056	6.6	0.00033	0.00013	0.0024	0.069	0.000063	0.0018	2.1	0.062	<0.0000050
	17-TLA-02	<0.00010	0.00015	0.0022	<0.000020	<0.000050	<0.010	<0.0000050	6.9	0.00053	<0.00010	0.0026	0.091	<0.000050	0.0024	3.1	0.012	<0.0000050
	17-TLA-03	<0.00010	0.00022	0.0028	<0.000020	<0.000050	<0.010	<0.0000050	8.8	0.00069	<0.00010	0.0029	0.063	<0.000050	0.0031	3.3	0.021	0.000005
	17-TLA-04	<0.00010	0.00068	0.01	<0.000020	<0.000050	0.015	0.000011	25	0.00068	0.00037	**0.0067**	0.07	0.000059	0.0039	11	0.11	<0.0000050
	17-TLA-05	<0.00010	0.00026	0.0029	<0.000020	<0.000050	<0.010	<0.0000050	10	0.00064	<0.00010	**0.0041**	0.061	<0.000050	0.0036	4.1	0.02	0.0000053
	17-TLA-06	<0.00010	0.00013	0.003	<0.000020	<0.000050	0.011	<0.0000050	11	<0.00010	<0.00010	0.002	0.016	<0.000050	<0.0010	1.5	0.025	<0.0000050
Airstrip	17-AIRSTR-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17-AIRSTR-02	<0.00010	0.0022	0.0026	<0.000020	<0.000050	0.024	<0.0000050	27	0.00015	0.00026	**0.014**	0.037	<0.000050	0.0015	6.2	0.058	<0.0000050

*Comparisons to CCME water quality guidelines for the protection of aquatic life are intended for screening purposes and are not directly applicable because the seepage sites do not support aquatic life.

Values in bold indicates value exceeds respective water quality guideline for the parameter.

**Guideline for ammonia is pH and temperature dependent. Seepage waters had an average temperature of 5.2ºC at time of sampling and an average pH of 7.6. This guideline value is approximate.

***Guideline calculated based on the average hardness of the seepage samples of 330 mg $CaCO_3$ mg/L

Area	Sample ID	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	CCME guideline*	-	*0.15***	-	-	*0.001*	-	-	-	-	-	*0.0008*	-	-	-	-	*0.03*	-
Reference (Windy Road)	16-REF-001	0.00018	0.0023	<0.050	0.33	<0.000050	1.4	<0.000010	3.3	0.011	<0.50	<0.000010	<0.00010	0.0005	0.000015	<0.00050	0.0033	0.00046
	16-REF-002	0.000063	0.00099	<0.050	0.29	<0.000050	1	<0.000010	11	0.024	1	<0.000010	<0.00010	<0.00030	<0.000010	<0.00050	0.0011	<0.00030
	16-REF-003	<0.000050	<0.00050	<0.050	0.37	<0.000050	1.1	<0.000010	6.6	0.017	0.72	<0.000010	<0.00010	<0.00030	<0.000010	<0.00050	0.0041	<0.00030
Waste Rock Influenced Area	17-DC-01	0.0089	0.069	0.2	31	**0.0038**	2.3	0.03	290	0.78	60	0.000069	<0.00020	<0.00060	0.00086	<0.0010	<0.0020	<0.00030
	17-DC-02	0.01	0.08	0.18	31	**0.0039**	2.4	0.025	290	0.84	60	0.000062	<0.00020	<0.00060	0.00092	<0.0010	<0.0020	<0.00030
	17-DC-02	0.0016	0.0031	<0.10	15	0.00082	1.6	0.000066	160	0.75	12	0.000048	<0.00020	<0.00060	0.00064	<0.0010	<0.0020	<0.00030
Tail Lake Access (TLA) Road	17-CB-01a	0.00025	0.00067	<0.050	1.2	0.00012	2.8	<0.000010	12	0.056	2.3	<0.000010	<0.00010	<0.00030	0.000021	<0.00050	0.0012	<0.00030
	17-TLA-01	0.00016	0.0022	<0.050	1.1	<0.000050	0.82	<0.000010	2.6	0.01	<0.50	<0.000010	<0.00010	0.00095	0.000024	<0.00050	0.0037	0.00048
	17-TLA-02	0.000081	0.0034	<0.050	0.59	<0.000050	1.3	<0.000010	3.9	0.013	<0.50	<0.000010	<0.00010	0.00064	0.000016	<0.00050	0.0029	0.0004
	17-TLA-03	0.00016	0.0033	<0.050	0.82	<0.000050	2.8	<0.000010	4.1	0.014	<0.50	<0.000010	<0.00010	0.00073	0.000037	<0.00050	0.0027	0.00055
	17-TLA-04	0.00036	0.0022	<0.050	3.1	0.000088	3.4	<0.000010	13	0.039	1.5	<0.000010	<0.00010	0.0017	0.000082	0.00055	0.0021	0.00049
	17-TLA-05	0.00019	0.004	<0.050	0.93	0.000053	2.1	<0.000010	5.3	0.017	<0.50	<0.000010	<0.00010	0.00071	0.000016	<0.00050	0.0025	0.00048
	17-TLA-06	0.000069	<0.00050	<0.050	0.59	<0.000050	0.38	<0.000010	2.5	0.009	<0.50	<0.000010	<0.00010	<0.00030	0.000016	<0.00050	<0.0010	<0.00030
Airstrip	17-AIRSTR-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17-AIRSTR-02	0.00027	0.0012	<0.050	1.6	0.00015	1.7	<0.000010	11	0.042	2.3	<0.000010	<0.00010	0.00031	0.00047	0.00083	<0.0010	<0.00030

*Comparisons to CCME water quality guidelines for the protection of aquatic life are intended for screening purposes and are not directly applicable because the seepage sites do not support aquatic life.

Values in bold indicates value exceeds respective water quality guideline for the parameter.

**Guideline for ammonia is pH and temperature dependent. Seepage waters had an average temperature of 5.2ºC at time of sampling and an average pH of 7.6. This guideline value is approximate.

***Guideline calculated based on the average hardness of the seepage samples of 330 mg $CaCO_3$ mg/L

Appendix D – 2017 Geochemical Monitoring of Flotation Tailings Slurry and Detoxified Tailings, Doris Mill

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Memo

To:	Shelley Potter, TMAC	**Client:**	TMAC Resources Inc.
From:	Jessica Charles Lisa Barazzuol	**Project No:**	1CT022.016
Cc:	Oliver Curran, TMAC	**Date:**	March 26, 2018
Subject:	2017 Geochemical Monitoring of Flotation Tailings Slurry and Detoxified Tailings, Doris Mill		

1 Introduction

TMAC started processing ore at the Doris mill with initiation of deposition of flotation tailings in the Doris tailings impoundment area (TIA) on January 20, 2017 and placement of detoxified tailings as backfill in Doris Mine on February 20, 2017. Geochemical monitoring of tailings commenced in February 2017. In 2017, a total of 199,488 t (dry weight equivalent) of flotation tailings were deposited in the Doris TIA and 8,333 t of detoxified tailings were placed as backfill within stopes of Doris Mine.

The geochemical monitoring program for flotation tailings slurry and detoxified tailings are specified in Schedule J, Tables 1 and 2 of NWB Type "A" Water Licence 2AM-DOH1323 Amendment No. 1 (the "Water Licence", Nunavut Water Board 2016) and includes the following monitoring stations: TL-5 (process plant tailings water discharge), TL-6 (flotation tailings solids), TL-7 (detoxified tailings solids[1]), and TL-11 (seepage from underground backfilled stopes).

This memo documents the results of the 2017 geochemical monitoring of flotation and detoxified tailings at TL-5, TL-6, TL-7 and TL-11 and fulfills the reporting requirements outlined in Schedule B, Items 2a, 2b and 2d of Water Licence 2AM-DOH1323.

2 Methods

2.1 Sample Collection and Analysis

2.1.1 Tailings and Process Water

Flotation Tailings (TL-6) and Process Plant Water Discharge (TL-5)

Schedule J (Table 2) of the Water Licence specifies weekly sampling of flotation tailings (TL-6) and process plant tailings supernatant (TL-5). Samples for TL-5 and TL-6 were collected from

[1] Detoxified tailings are referred to as cyanide leach residue in the Water Licence

the flotation tailings thickener tank. The filtrate from the detox filter press (where detoxified tailings are dewatered) is pumped to the flotation tailings thickener tank prior to discharge to the TIA.

Each week, TMAC collected flotation tailings slurry from the tailings thickener tank in a clean 5-gallon bucket. The sample is left in the bucket to allow gravitational settling and separation of the tailings solids from the liquid. After settling, samples were collected for TL-5 and TL-6.

The supernatant was sampled according to SNP monitoring requirements for TL-5 using a sterile 60mL syringe and submitted to ALS Environmental in Vancouver, BC once per month for the analysis of pH, TSS, ammonia, nitrate, nitrite, sulphate, cyanide (WAD, free and total), cyanate, thiocyanate, and total metals. In total, the 2017 monitoring program included geochemical characterization of 10 monthly samples of tailings process water collected from February to December with a duplicate sample collected in May. There was no sample collected in June.

After sampling was completed for TL-5, the remaining supernatant was discarded and a clean stainless-steel spoon used to transfer the solid tailings into a plastic Ziploc bag. The bag was then sealed and placed in a fridge until the last weekly sample for the month has been collected. At the end of each month, TMAC combined and homogenized equal amounts of tailings from each weekly sample to create a monthly composite sample for TL-6 of approximately 500 g. In total, the 2017 monitoring program included geochemical characterization of 11 monthly composites of flotation tailings collected from February to December with a duplicate sample collected in July.

Monthly TL-6 composite samples were submitted in glass jars to ALS Environmental Labs in Vancouver, BC for analysis of total sulphur, sulphate sulphur, TIC and trace element content. The analytical program was managed by TMAC using the acid-base accounting (ABA) methods outlined in Table 2-1. Laboratory data for TL-6 are provided in Attachment 1.

Table 2-1: Analytical Methods for TL-6 and TL-7

Parameter	Method Synopsis
Rinse pH	Sieved 2 mm fraction mixed with deionized water at a solid to water ratio of 1 to 2.
Total Sulphur	Combustion by Leco
Sulphate Sulphur	As-received sample leached using deionized water at a solid to liquid ratio of 1 to 10. The leachate is analyzed for sulphate using ion chromatography.
Total inorganic carbon (TIC)	Pulverized sample treated with acetic acid. Carbonate content determined by titration.
Trace element content	Digestion of sieved 2 mm fraction with ICP-MS finish. The digestion uses a 1 to 1 mixture of nitric and hydrochloric acid and a solid to solution ratio of 1 to 1.

Detoxified Tailings (TL-7)

Schedule J (Table 2) of the Water Licence specifies monthly sampling of detoxified tailings, monthly analysis of WAD cyanide, TIC, total metals (including sulphur) and moisture content, and quarterly analysis of cyanate and thiocyanate. There is no analytical method for cyanate and thiocyanate in solids therefore it is not possible to satisfy this monitoring requirement.

Each month and at the end of the detoxification cycle, TMAC collected one discrete sample of detoxified tailings from the discharge compartment of the detox filter press. In total, the 2017 monitoring program included geochemical characterization of 11 monthly samples of detoxified tailings collected from February to December. One duplicate sample was collected in September. Samples were placed in glass sample jars using a clean stainless-steel spoon and submitted to ALS Environmental in North Vancouver, BC for the analytical program outlined in in Table 2-1. WAD cyanide was also determined by distillation and extraction procedures, with analytical details documented in Attachment 2. Laboratory data are provided in Attachment 2.

2.1.2 Seepage Survey of Underground Backfilled Stopes (TL-11)

Schedule J (Table 2) of the Water Licence specifies bi-annual seepage surveys of underground backfilled stopes with opportunistic sampling of seepage for the analysis of pH, EC, trace metals by ICP-MS, alkalinity, acidity, sulphate, total and WAD cyanide, total ammonia, nitrate and nitrite.

TMAC completed underground seepage inspections of backfilled stopes in August and December 2017. Visual surveys were conducted of all backfilled stopes that could be accessed safely at the time of the survey. In December, not all backfilled levels could be safely accessed. Four stopes were surveyed in August (3 dry, 1 with identified seep) and four stopes were surveyed in December (3 dry, 1 with identified seep).

In August, TMAC collected one sample from the seep flowing from the bottom of the east limb South stope at level 4932, location E433877, N7559782. In December, TMAC collected duplicate samples from the seep flowing from the bottom of the east limb North stope seep at level 4932, location E433877, N7559809. Both stopes were previously mined out in the Doris North area, and were later backfilled with a blend of unconsolidated waste rock and detoxified tailings. Samples were collected using a syringe and field measurements of pH, EC, ORP and temperature recorded. Seepage flow rates could not be measured due to the low volume of the seeps.

TMAC submitted samples to ALS Environmental in Burnaby, BC for analysis of pH, EC, TSS, TDS, alkalinity, chloride, sulphate, total and WAD cyanide, and dissolved and total metals. The sample for dissolved metals was filtered at the time of sampling. Laboratory data are provided in Attachment 3.

3 Results and Discussion

3.1 Data QA/QC

3.1.1 Tailings Solids Samples

All tailings solids data for TL-6 and TL-7 were reviewed by SRK for QA/QC. Table 3-1 presents the results of the QA/QC checks including comparison of duplicate sample pairs for TL-6 and TL-7 (TL6-31JUL17B^ and TL7-18SEP17B^). Relative percentage differences (RPD) were calculated to assess reproducibility of results. SRK considers all data acceptable.

For free and weak acid dissolved (WAD) cyanide concentrations analytical detection limits were adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity). Free cyanide was reported at concentrations less than detection limits which ranged from 0.05 ppm to 20 ppm.

3.1.2 Seepage Survey Samples

All seepage water quality data for TL-11 were reviewed by SRK for QA/QC. Table 3-2 presents the results of the QA/QC checks including a comparison of the duplicate sample collected in December (TL11-17DEC17B^). RPD values were calculated to assess reproducibility of the duplicate results. RPD values for TSS, aluminium and total cyanide exceeded the QA/QC criteria of +/-30%. However, the laboratory indicated that total cyanide values could be biased high due to high nitrite in the sample. SRK considers all data acceptable.

3.1.3 Process Plant Tailings Supernatant

All supernatant water quality data for TL-5 were reviewed by SRK for QA/QC. Table 3-3 presents the results of the QA/QC checks including a comparison of the duplicate sample collected in May. RPD values for boron, calcium, cesium, copper, lithium, molybdenum and strontium exceeded the QA/QC field duplicate criteria of +/-30%. The ion balance could not be evaluated as dissolved metals analysis was not completed. The samples were no longer available for re-run analysis therefore the data were accepted as is.

Table 3-1: QA/QC Summary for Solid Tailings Analysis (TL-6 and TL-7)

QC Test	SRK QC Criteria	Results
Rinse pH		
Lab Duplicate (n=4)	For any samples, +/- 0.5 difference pH unit	All passed.
Field Duplicate (n=2)	For any samples, +/- 0.5 difference pH unit	All passed.
Standard/Controls (n=22)	Within tolerance ranges	All passed.
TIC		
Lab Blank (n=22)	<2X detection limit (DL)	All passed.
Lab Duplicate (n=3)	For samples > 10X the detection limit (DL), % RPD within +/-20%	All passed.
Field Duplicate (n=2)	For samples > 10X the detection limit (DL), % RPD within +/-30%	All passed.
Standard reference materials (n=22)	Within +/-20% Difference	All passed.
Total S & Sulphate		
Lab Blank (n=44) for Total S, (n=44) for Total Sulphate	<2X detection limit (DL)	All passed.
Sulphur balance (total S > sulphate S) (n=22)	For samples > 10X the detection limit (DL), Total Sulphur should be greater than Total Sulphate, if not then (sulphate-total S)/Total S> 20%	All passed.
Lab Duplicate (n=12 for Total S, n= 12 for Total Sulphate)	For samples > 10X the detection limit (DL), % RPD within +/-20%	All passed.
Field Duplicate (n=2 for Total S, n= 2 for Total Sulphate)	For samples > 10X the detection limit (DL), % RPD within +/-30%	All passed.
Standard reference materials for Total S (n=44) and sulphate (n=44)	Within +/-20% Difference	All passed.
Trace Element Content		
Lab Blank (n=44)	<5X Detection Limit	All passed.
Lab Duplicate (n=4)	For samples >10X detection limit (DL), % RPD within +/- 20%, ok 10% of metal scan failing.	All passed.
Field Duplicate (n=2)	For samples >10X detection limit (DL), % RPD within +/- 30%, ok 10% of metal scan failing.	All passed.
Standard reference materials (n=88)	Within specified tolerance ranges.	All passed.

Table 3-2: QA/QC Summary for Backfilled Stope Seepage Samples (TL-11)

QC Test	SRK QC Criteria	Results
Field vs. Lab pH (n=2)	For any samples, +/- 1 difference unit	All passed.
Lab method Blank (n=various*)	<2X DL	All passed.
Field Duplicates (n=1)	>10X DL, RPD better than +/-30%	Failed for Total CN, however lab indicated that total CN values could be biased high due to high nitrite in sample.
Standards/Controls (n=various*)	Within tolerance ranges	All passed.
Ion Balance (n=2)	EC>100 uS/cm, imbalance not greater than 10%	All passed.
Total vs. Dissolved metals (n=1)	Total metals >Dissolved metals, (Total metals-Dissolved metals)/(average(total metals,dissolved metals)=+/-30%	All passed.

Table 3-3: QA/QC Summary for Process Plant Tailings Supernatant (TL-5)

QC Test	SRK QC Criteria	Results
Ion Balance (n=10)	EC>100 uS/cm, imbalance is within +/-10%	No dissolved metals analysis. Cannot evaluate.
Field Duplicates (n=2)	For samples > 10X the detection limit (DL), % RPD within +/-30%	Duplicate sample for May failed for B, Ca, Cs, Cu, Li, Mo, Sr.

3.2 Flotation and Detoxified Tailings Solids (TL-6 and TL-7)

3.2.1 Acid Base Accounting

A summary of ABA results is presented in Table 3-5..

Discussion of Analytical Methods and Implications for Data Interpretation

The ABA and trace element methods for TL-6 and TL-7 (Table 2-1) are different than those used for the geochemical characterization of Doris metallurgical tailings (SRK 2015) and other Hope Bay sample (e.g. quarry rock, waste rock) at Hope Bay. In consultation with ALS, SRK reviewed and compared the methods used for TL-6 and TL-7 with SRK (2015). Table 3-4 summarizes the methods for each parameter and discusses the implications for data interpretation.

Table 3-4: Comparison of analytical methods used for TL-6 and TL-7 with ABA methods

Parameter	SRK Review of Methods	Data Interpretation Method
Rinse pH	Typical method is paste pH (Sobek 1979) but rinse pH results are typically comparable or lower.	Rinse pH sufficiently provides pH of tailings.
Total Sulphur	Same method as ABA.	Use as is.
Sulphate Sulphur	Method used will yield lower concentrations compared to ABA method.	Calculate AP using total sulphur.
Total inorganic carbon (TIC)	Method used will yield lower concentrations compared to ABA method.	Data will underestimate TIC resulting in lower ratios of TIC to AP. Refer to as TIC* in text.
Trace element content	Method used will yield lower concentrations for refractory metals, e.g. Al, Cr.	Use as is.

Results

Total sulphur concentrations were highest for detoxified tailings and ranged from 2.4 to 19%. In comparison, sulphur concentrations ranged from <0.05% to 1.0% for flotation tailings. As discussed in Section 3.2.1, total sulphur was used to calculate acid potential (AP).

The total sulphur concentrations of the flotation tailings collected from February to May had higher sulphur content (0.2% to 1%) compared to i) flotation tailings produced later in the year (0.05% to 0.07%) and ii) metallurgical tailings geochemically characterized as part of the Type A amendment (SRK 2015). According to TMAC, the sulphur concentrations observed from June onward are typical for flotation tailings with the higher sulphur concentrations earlier in the year indicative of a combination of higher sulphide ore being processed during that period and poor sulphide recoveries in the Concentrate Line. Sulphide recovery in the Concentration Line has since been optimized.

TIC* levels were relatively uniform for both tailings types, with 25th to 75th percentile levels between 50 to 71 kg $CaCO_3$/t for flotation tailings and 66 to 77 kg $CaCO_3$/t for detoxified tailings. Based on the differences in methods, SRK believes that the TIC* levels are underestimated compared to actual carbonate content (Table 3-4).

The ratio of TIC to acid potential (AP) provides a measure of the acid rock drainage (ARD) potential of the sample. Samples are classified as non-potentially ARD generating (non-PAG) when TIC/AP ratios are greater than 3, as PAG when ratios are less than 1 and as having an uncertain potential for ARD when ratios are between 1 and 3.

In terms of ARD classification, nine of the flotation tailings samples were classified as non-PAG and two samples classified as uncertain. The two samples classified as uncertain were from the early part of the year when sulphide recoveries were poorer than expected. Additionally, as discussed above, it is likely that the method used to measure TIC results in underestimation of the carbonate content. Therefore, previous conclusions regarding the ARD potential of the

flotation tailings remain unchanged. For detoxified tailings, ten samples were classified as PAG and one sample as uncertain. All tailings samples reported neutral to alkaline rinse pH indicating they were not acidic at the time of sampling.

Table 3-5: Summary of ABA Analysis for Flotation (TL-6) and Detoxified Tailings (TL-7) 2017

Tailings Type	Month	Rinse pH s.u.	Total S %	TIC* kg $CaCO_3$/t	TIC*/AP
TL-6	Feb	8.8	0.3	110	12
	Mar	8.8	0.68	47	2.2
	Apr	8.9	1	40	1.2
	May	8.8	0.21	68	10
	Jun	9.1	0.07	45	21
	Jul	9.3	0.07	55	25
	Aug	8.9	<0.05	75	48
	Sep	9.2	<0.05	74	47
	Oct	9.1	<0.05	63	40
	Nov	9.2	0.06	52	28
	Dec	9	0.06	66	35
TL-7	Feb	9	2.4	77	1
	Mar	8.4	6.1	76	0.4
	Apr	8.3	15	48	0.1
	May	7.9	19	54	0.089
	Jun	8.3	8.7	75	0.28
	Jul	8.4	14	79	0.19
	Aug	8.3	6.7	76	0.37
	Sep	9.4	7.9	82	0.34
	Oct	8.7	8.2	69	0.27
	Nov	9	3.5	65	0.6
	Dec	8.7	6.9	68	0.32

** Refer to Section 3.2.1 for details*

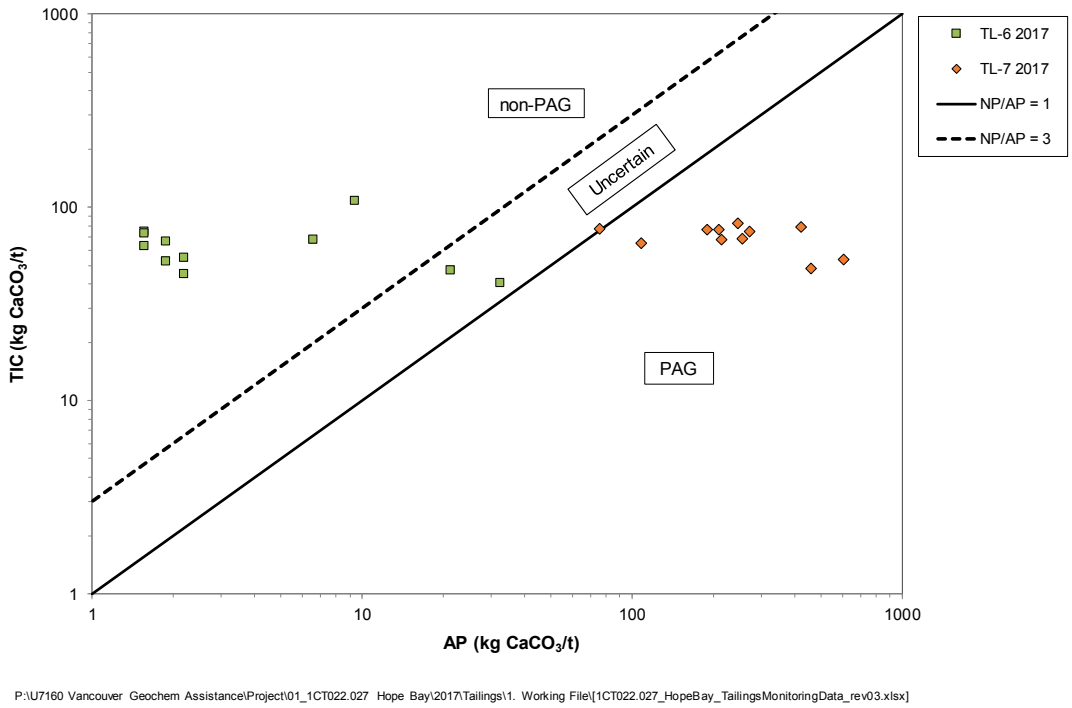

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Figure 3-1: ARD Classifications using TIC for the Tailings Samples

3.2.2 Elemental Analysis

The statistical distribution of trace element content for flotation and detoxified tailings are summarized in Table 3-6. Results were compared to average crustal abundance data for basalt (Price 1997) as an indicator of enrichment. Selenium could not be assessed because the detection limit was close to the comparison threshold. Comparisons to the screening criteria are summarized as follows:

For flotation tailings 95th percentile concentrations of arsenic, silver and sulphur are above the screening criteria, however samples with elevated levels were from the early part of the year when sulphide recoveries were poorer than expected. Trace element content for flotation tailings produced in May and after contained levels below the screening criteria, which is consistent with trace element content of Doris metallurgical flotation tailings samples (SRK 2015).

For detoxified tailings, 95th percentile concentrations are above the screening criteria for the following parameters: antimony, arsenic, bismuth, cadmium, copper, lead, selenium, silver, total sulphur, and zinc. This is consistent with trace element content of Doris metallurgical tailings samples (SRK 2015) except for antimony, silver, and zinc, with the differences summarized as follows:

- Antimony: one monitoring sample (April) is above the screening criteria, with antimony for all other samples within the range of the metallurgical samples. For the April sample, antimony levels (2.6 ppm) is about two times higher than maximum levels observed in the metallurgical samples.

- Silver: concentrations for the monitoring samples are about ten times higher than maximum levels observed in the metallurgical samples.
- Zinc: all monitoring samples except February were elevated compared the screening criteria with the maximum level (6,100 ppm) approximately seven times higher than maximum observed levels for metallurgical tailings.

All other parameters were below the screening criteria indicating no appreciable enrichment.

3.2.3 Cyanide from Detoxified Tailings Solids

In the processing plant, there are two sections: the concentrate lines (CL1 and CL2) and the Concentrate Treatment Plant (CTP). Cyanide is a reagent used exclusively in the CTP to dissolve gold from the solid concentrate to be captured by resin. The concentrate lines (CL) react poorly to the presence of cyanide and so this side must be kept free of cyanide in order for the process to perform well. The final stage of the CTP is cyanide destruction. Cyanide is destroyed using the INCO SO_2 process. The detoxified slurry is filtered; the solids are placed in a pile to be deposited underground for permanent storage and the solution is pumped to the tailings thickener where it is combined with the flotation tailings. The detoxification circuit is run to produce a total cyanide level of less than one part per million (1 ppm). The solutions from the detox circuit and final tailings discharge are routinely analyzed for WAD and total cyanide species by mill personnel to monitor the performance of the cyanide detoxification circuit. Concentrations of WAD and total cyanide at SNP station TL-5 (process plant tailings water discharge) are reported monthly to the Nunavut Water Board.

For TL-7, the WAD cyanide concentrations are not in aqueous form but are extracted from the detoxified tailings solids. Cyanide within the tailings solids is not labile. Concentrations of distilled WAD cyanide from the detoxified tailings were less than the analytical limits of detection (0.05 - 20 ppm) except for the April sample with a concentration of 0.11 ppm (Table 3-7). There are no regulatory limits for WAD cyanide within tailings solids.

Table 3-6: Summary of Elemental for Flotation (TL-6) and Detoxified Tailings (TL-7)

Parameter	DL	TL-6 2017			TL-7 2017			10X Average Crustal Abundance* for Basalt
		P05	P50	P95	P05	P50	P95	
Al	50	8500	10000	14000	9200	12000	13000	780000
Sb	0.1	0.1	0.1	0.17	0.89	1.4	**2.3**	2
As	0.1	6.6	8.3	47	**260**	**410**	**710**	20
Ba	0.5	7	14	17	14	17	21	3300
Be	0.1	0.1	0.12	0.14	0.11	0.13	0.15	10
Bi	0.2	0.2	0.2	0.2	**1**	**2.2**	**3.6**	0.07
B	5	7.3	14	34	8.3	13	24	50
Cd	0.02	0.063	0.11	0.24	1.9	**5.7**	**12**	2.2
Ca	50	22000	28000	38000	26000	32000	43000	760000
Cr	0.5	21	27	33	49	59	80	1700
Co	0.1	10	13	32	150	280	460	480
Cu	0.5	22	27	140	**2900**	**5400**	**16000**	870
Fe	50	33000	40000	50000	97000	140000	210000	865000
Pb	0.5	4.2	6.3	15	**180**	**380**	**1100**	60
Li	2	13	24	31	16	20	25	170
Mg	20	12000	14000	17000	13000	15000	16000	460000
Mn	1	790	930	1100	940	1100	1200	15000
Hg	0.005	0.005	0.005	0.0092	0.042	0.08	0.15	0.9
Mo	0.1	0.19	0.24	0.29	1.1	1.9	3.3	15
Ni	0.5	18	22	42	130	220	320	1300
P	50	260	300	370	270	310	390	10000
K	100	570	1200	1500	810	1000	1300	83000
Se	0.2	0.2	0.2	0.51	**4.7**	**8.2**	**17**	0.5
Ag	0.1	0.18	0.28	1.4	**6.5**	**21**	**50**	1.1
Na	50	440	630	870	1300	2000	3100	180000
Sr	0.5	11	15	18	16	17	22	4650
S	1000	1000	1100	1400	**82000**	**100000**	**210000**	3000
S - Total	500	500	700	8600	**29000**	**79000**	**170000**	3000
Tl	0.05	0.05	0.05	0.072	0.72	1.3	**2.4**	2.1
Sn	2	2	2	2	2	2	2	15
Ti	1	380	700	1000	410	620	1100	138000
W	0.5	0.5	0.5	0.61	1.4	1.7	3.1	7
U	0.05	0.05	0.05	0.05	0.05	0.073	0.17	10
V	0.2	37	48	65	47	63	93	2500
Zn	2	47	61	130	850	**2800**	**5100**	1050
Zr	1	1.2	1.8	2.4	2.3	3.5	5.2	--

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Note:

Numbers highlighted in bold exceed 10 times the average crustal abundance for basaltic rocks from Price (1997)

Statistics based on 11 samples

All results reported as ppm DL = Analytical detection limit

Table 3-7: Distilled WAD Cyanide from Detoxified Tailings Solids (TL-7)

Month	Distilled WAD Cyanide (ppm)
Feb	<10
Mar	0.11
Apr	<2
May	<2
Jun	<10
Jul	<2
Aug	<4
Sep	<20
Oct	<20
Nov	<20
Dec	<20

3.3 Seepage Monitoring of Backfilled Stopes (TL-11)

3.3.1 Seepage Quality

Seepage was observed during the August and December surveys on level 4932 and flowing from the bottom of the east limb of South and North stopes respectively. The sample was collected approximately 20 m from the bottom of the stope and after flowing along the decline road and through an area where equipment was stored. The stope contained both waste rock and detoxified tailings backfill and is interpreted to be contact water of these material types. Water quality analysis of the seeps is provided in Table 3-8 for selected parameters.

The TL-11 seepage monitoring data are summarized as follows:

- pH conditions were circum-neutral with a value of 6.7.
- Major anion chemistry was dominated by chloride (42,000 to 48,000 mg/L) and to a lesser degree sulphate (900 mg/L), while major cation chemistry was dominated by calcium (~15,000 mg/L) and to a lesser degree sodium (~8,000 mg/L) and magnesium (1,100 mg/L). Potential sources of the major ions include residues on waste rock from drilling brines (calcium and chloride), other sources of saline water (chloride, sulphate, calcium, sodium and magnesium), and sulphide oxidation with associated carbonate dissolution from waste rock and detoxified tailings (sulphate and calcium).
- Total cyanide concentrations were 0.08 mg/L for both samples and free cyanide concentrations were 0.026 and 0.024 mg/L. WAD cyanide concentrations were equivalent to free cyanide (when analyzed in the December sample).
- Levels of ammonia (390 mg/L and 280 mg/L), nitrate (590 mg/L) and nitrite (6.8 mg/L) exceed screening criteria values and are likely from blast residues on waste rock.

- Both seepage samples exhibited leaching of cadmium, copper, nickel, selenium, silver and zinc consistent with trends observed from the humidity cell test (HCT) program for metallurgical detoxified tailings (SRK 2015).
- The following dissolved parameters were consistently reported at concentrations less than analytical detection limits in the seeps sampled in both sampling events: aluminium, antimony, arsenic, beryllium, bismuth, chromium, iron, phosphorous, silicon, tellurium, thorium, tin, titanium, tungsten, vanadium and zirconium. The low arsenic concentrations in the seepage is notable given the elevated concentrations of arsenic in the detoxification tailings and is consistent with trends observed from the HCT program for metallurgical detoxified tailings (SRK 2015).

Table 3-8: Summary of TL-11 (Backfilled Stopes) Seepage Water Quality Analysis

	Sample ID	TL11-06AUG17	TL11-17DEC17A
	Date Sampled	8/6/2017 3:15 PM	12/17/2017 1:30 PM
Parameter	Units		
EC	uS/cm	-	100000
pH	pH	6.7	6.7
TSS	mg/L	620	1100
TDS	mg/L	120000	55000
Total Alkalinity	mg/L as $CaCO_3$	-	49
NH_3	mg/L	**390**	**280**
Cl	mg/L	42000	48000
NO_3	as N mg/L	-	**590**
NO_2	as N mg/L	-	**6.80**
SO_4	mg/L	-	900
Total CN	mg/L	0.080	0.081
WAD CN	mg/L	-	0.028
Free CN	mg/L	0.026	0.024
Al	mg/L	*0.1*	*0.1*
Sb	mg/L	*0.01*	*0.01*
As	mg/L	*0.01*	*0.01*
Ba	mg/L	0.46	0.56
B	mg/L	1.90	2.40
Cd	mg/L	**0.030**	**0.026**
Ca	mg/L	15000	17000
Cr	mg/L	*0.01*	*0.01*
Co	mg/L	0.15	0.19
Cu	mg/L	**0.19**	**0.56**
Fe	mg/L	*1*	*1*
Pb	mg/L	0.0071	0.13
Li	mg/L	0.46	0.39
Mg	mg/L	1100	1100
Mn	mg/L	7.8	6.5
Mo	mg/L	0.026	0.027
Ni	mg/L	**0.44**	**0.36**
K	mg/L	490	490
Se	mg/L	**0.014**	**0.014**
Ag	mg/L	**0.041**	**0.052**
Na	mg/L	7200	7800
S	mg/L	580	390
Tl	mg/L	0.0014	0.0015
U	mg/L	0.0023	0.0030
Zn	mg/L	**0.56**	**1.6**

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Notes:

Screen Criteria – 10x CEQG = Canadian Environmental Quality Guidelines for the Protection of Aquatic Life (Canadian Council of Ministers of the Environment) – used for screening purposed only

Blue italics = Value less than laboratory detection limit. Detection limit shown.

Bold values = Values exceeds screening criteria (ten times CCME Guidelines for Freshwater Aquatic Life – Long-term Concentration).

-- = Data not available.

3.4 Process Plant Tailings Water Discharge (TL-5)

Figures depicting time series of constituent concentrations and loads from the process plant tailings water discharge (TL-5) to the TIA are presented in Attachment 4.

4 Summary and Conclusions

TMAC initiated ore processing on January 20, 2017 with commencement of tailings monitoring in February 2017 in accordance to the water licence.

The results of the geochemical monitoring program of flotation tailings solids (TL-6) is consistent with the geochemical characterization studies of metallurgical tailings (SRK 2015) and is summarized as follows:

- Flotation tailings deposition in the Doris TIA commenced on January 20, 2017. A total of 199,488 t (dry weight) of flotation tailings were deposited in the TIA in 2017.
- Total sulphur levels were higher during the initial months of process plant operation (0.21 to 1%) owing to higher sulphide ore that was processed during that period and low sulphide recoveries in the concentrate line. Starting in June, sulphide removal was optimized resulting in flotation tailings with lower sulphur concentrations (<0.05 to 0.07%).
- TIC* content in the flotation tailings ranged from 41 to 110 kg $CaCO_3$/t, which SRK expects are underestimated due the analytical method used to quantify reactive carbonate content (Section 3.2.1).
- Nine of the flotation tailings samples are classified as non-PAG and two as uncertain. The two samples classified as uncertain were from the early part of the year when sulphide recoveries were poorer than expected. Therefore, previous conclusions regarding the ARD potential of the flotation tailings remain unchanged.
- Trace element content was compared to ten times the average crustal abundance for basalt (Price 1997) as an indicator of enrichment. Trace element content at 95th percentile concentrations are above screening criteria for arsenic and total sulphur, however samples above screening criteria were from the early part of the year when sulphide recoveries were poorer than expected. Trace element content for flotation tailings produced in May and after contained levels below the screening criteria, which is consistent with trace element content of Doris metallurgical flotation tailings samples (SRK 2015).

The results of the geochemical monitoring program of detoxified tailings solids (TL-7) is consistent with the geochemical characterization studies of metallurgical tailings (SRK 2015) and is summarized as follows:

- In 2017, a total of 8,333 t of detoxified tailings were placed as backfill in Doris Mine underground stopes.
- Sulphur and TIC* content in the detoxified tailings ranged from 2.4 to 19% and 48 to 82 kg $CaCO_3$/t, respectively. Rinse pH ranged from 7.9 to 8.4 indicating all samples were not acidic.

- Ten of the detoxified tailings samples were classified as PAG and one as uncertain.
- Compared to ten times the average crustal abundance for basalt, 95th percentile concentrations are enriched in antimony, arsenic, bismuth, cadmium, copper, lead, selenium, silver, zinc and total sulphur.
- There is no analytical method for cyanate and thiocyanate for solid-phase samples, as specified in the monitoring program for TL-7 in Schedule J (Table 2) of the Water Licence. WAD cyanide was also specified for TL-7 with levels below analytical detection with the exception of the samples in April (0.11 ppm). There is no regulatory limit for WAD cyanide in tailings. SRK suspects that the inclusion of cyanate, thiocyanate and WAD cyanide monitoring for the detoxified tailings solids (TL-7) may be a typographical error.

The results of the opportunistic seepage sampling from underground backfilled stopes (TL-11) is summarized as follows:

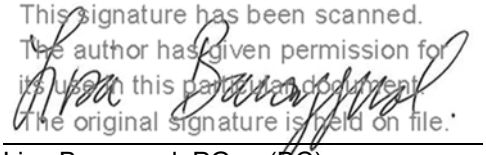
- Seepage from the east limb of the South and North stopes on level 4932 containing waste rock and detoxified tailings backfill was observed and sampled in August and December.
- Seepage pH was circum-neutral in both sampling events.
- Major anion chemistry was dominated by chloride (~48,000 mg/L) and to a lesser degree sulphate (900 mg/L), while major cation chemistry was dominated by calcium (~15,000 mg/L) and to a lesser degree sodium (~8,000 mg/L) and magnesium (1,100 mg/L). Potential sources of the major ions include residues on waste rock from drilling brines (calcium and chloride), other sources of saline water (chloride, sulphate, calcium, sodium and magnesium), and sulphide oxidation with associated carbonate dissolution from waste rock and detoxified tailings (sulphate and calcium).
- Total and WAD cyanide concentrations in the seepage were 0.08 mg/L and 0.028 mg/L, respectively.
- The source of ammonia (280 and 390 mg/L), nitrate (590 mg/L) and nitrite (6.8 mg/L) is attributable to blast residues from waste rock.
- The following metal(loid)s were reported at concentrations exceeding the screening criteria in both seepage monitoring events (all dissolved): cadmium and copper (up to 30 times higher), nickel and selenium (same order of magnitude), silver (up to 20 times higher) and zinc (up to 5 times higher). Notably arsenic concentrations were low. Parameter concentrations are consistent with trends observed from the humidity cell test (HCT) program for metallurgical detoxified tailings (SRK 2015).

Regards,

SRK Consulting (UK) Ltd.

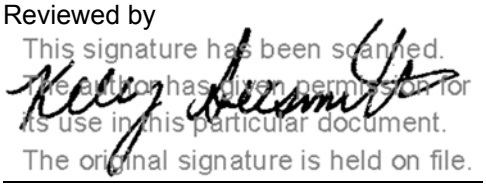
Jessica Charles, FGS
Consultant

SRK Consulting (Canada) Ltd.



Lisa Barazzuol, PGeo (BC)
Senior Consultant

Reviewed by



Kelly Sexsmith, PGeo (BC)
Principal Consultant

5 References

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Price, W.A. 1997. DRAFT Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. BC Ministry of Employment and Investment, Energy and Minerals Division. 151pp

SRK Consulting (Canada) Inc, 2015. Geochemical Characterization of Tailings from the Doris Deposits, Hope Bay. Report prepared for TMAC Resources by SRK Consulting (Canada) Inc. Project no 1CT022.002. June 2015.

Attachment 1– TL-6 Laboratory Certificates of Analysis

TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Welliington St West
Toronto ON M5J 2N7

Date Received: 28-FEB-17
Report Date: 09-MAR-17 11:14 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1895621

Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1895621-1 TL6-27FEB17							
Sampled By: kc on 27-FEB-17 @ 15:00							
Matrix: waste							
Metals in Soil (CCME) with Extra Metals							
Mercury in Soil by CVAFS							
Mercury (Hg)	0.0134		0.0050	mg/kg	06-MAR-17	08-MAR-17	R3670966
Metals in Soil by CRC ICPMS							
Aluminum (Al)	8210		50	mg/kg	06-MAR-17	07-MAR-17	R3671103
Antimony (Sb)	0.24		0.10	mg/kg	06-MAR-17	07-MAR-17	R3671103
Arsenic (As)	82.6		0.10	mg/kg	06-MAR-17	07-MAR-17	R3671103
Barium (Ba)	6.27		0.50	mg/kg	06-MAR-17	07-MAR-17	R3671103
Beryllium (Be)	<0.10		0.10	mg/kg	06-MAR-17	07-MAR-17	R3671103
Bismuth (Bi)	<0.20		0.20	mg/kg	06-MAR-17	07-MAR-17	R3671103
Boron (B)	6.5		5.0	mg/kg	06-MAR-17	07-MAR-17	R3671103
Cadmium (Cd)	0.255		0.020	mg/kg	06-MAR-17	07-MAR-17	R3671103
Calcium (Ca)	38600		50	mg/kg	06-MAR-17	07-MAR-17	R3671103
Chromium (Cr)	21.8		0.50	mg/kg	06-MAR-17	07-MAR-17	R3671103
Cobalt (Co)	48.3		0.10	mg/kg	06-MAR-17	07-MAR-17	R3671103
Copper (Cu)	197		0.50	mg/kg	06-MAR-17	07-MAR-17	R3671103
Iron (Fe)	48700		50	mg/kg	06-MAR-17	07-MAR-17	R3671103
Lead (Pb)	21.8		0.50	mg/kg	06-MAR-17	07-MAR-17	R3671103
Lithium (Li)	12.7		2.0	mg/kg	06-MAR-17	07-MAR-17	R3671103
Magnesium (Mg)	14600		20	mg/kg	06-MAR-17	07-MAR-17	R3671103
Manganese (Mn)	1030		1.0	mg/kg	06-MAR-17	07-MAR-17	R3671103
Molybdenum (Mo)	0.29		0.10	mg/kg	06-MAR-17	07-MAR-17	R3671103
Nickel (Ni)	55.3		0.50	mg/kg	06-MAR-17	07-MAR-17	R3671103
Phosphorus (P)	263		50	mg/kg	06-MAR-17	07-MAR-17	R3671103
Potassium (K)	560		100	mg/kg	06-MAR-17	07-MAR-17	R3671103
Selenium (Se)	0.82		0.20	mg/kg	06-MAR-17	07-MAR-17	R3671103
Silver (Ag)	2.10		0.10	mg/kg	06-MAR-17	07-MAR-17	R3671103
Sodium (Na)	417		50	mg/kg	06-MAR-17	07-MAR-17	R3671103
Strontium (Sr)	16.9		0.50	mg/kg	06-MAR-17	07-MAR-17	R3671103
Thallium (Tl)	0.094		0.050	mg/kg	06-MAR-17	07-MAR-17	R3671103
Tin (Sn)	<2.0		2.0	mg/kg	06-MAR-17	07-MAR-17	R3671103
Titanium (Ti)	327		1.0	mg/kg	06-MAR-17	07-MAR-17	R3671103
Uranium (U)	<0.050		0.050	mg/kg	06-MAR-17	07-MAR-17	R3671103
Vanadium (V)	38.4		0.20	mg/kg	06-MAR-17	07-MAR-17	R3671103
Zinc (Zn)	126		2.0	mg/kg	06-MAR-17	07-MAR-17	R3671103
Zirconium (Zr)	1.1		1.0	mg/kg	06-MAR-17	07-MAR-17	R3671103
pH in Soil (1:2 Soil:Water Extraction)							
pH (1:2 soil:water)	8.79		0.10	pH		08-MAR-17	R3669863
Miscellaneous Parameters							
Inorganic Carbon (as CaCO3 Equivalent)	10.8		0.40	%		08-MAR-17	
Moisture	24.1		0.25	%		05-MAR-17	R3668314
Sulfate (SO4)	489		10	mg/kg	06-MAR-17	07-MAR-17	R3670866
Inorganic Carbon	1.30		0.050	%		08-MAR-17	R3670427
Sulfur (S)-Total	3000		500	mg/kg	07-MAR-17	07-MAR-17	R3669786

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CRC ICPMS.			
Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. This method does not dissolve all silicate materials and may result in a partial extraction. depending on the sample matrix, for some metals, including, but not limited to Al, Ba, Be, Cr, Sr, Ti, Tl, and V.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TMAC Resources Inc
Hope Bay Project 95 Welliington St West
Toronto ON M5J 2N7
Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK	**Soil**							
Batch R3670427								
WG2488689-2 LCS								
Inorganic Carbon			99.6		%		80-120	08-MAR-17
WG2488689-3 MB								
Inorganic Carbon			<0.050		%		0.05	08-MAR-17
HG-200.2-CVAF-VA	**Soil**							
Batch R3670966								
WG2489845-4 CRM		**VA-NRC-STSD-3**						
Mercury (Hg)			84.7		%		70-130	08-MAR-17
WG2489845-3 LCS								
Mercury (Hg)			101.6		%		70-130	08-MAR-17
WG2489845-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	08-MAR-17
MET-200.2-CCMS-VA	**Soil**							
Batch R3671103								
WG2489845-4 CRM		**VA-NRC-STSD-3**						
Aluminum (Al)			93.8		%		70-130	07-MAR-17
Antimony (Sb)			102.8		%		70-130	07-MAR-17
Arsenic (As)			85.7		%		70-130	07-MAR-17
Barium (Ba)			93.3		%		70-130	07-MAR-17
Beryllium (Be)			99.4		%		70-130	07-MAR-17
Bismuth (Bi)			101.7		%		70-130	07-MAR-17
Boron (B)			95.5		%		70-130	07-MAR-17
Cadmium (Cd)			106.4		%		70-130	07-MAR-17
Calcium (Ca)			94.2		%		70-130	07-MAR-17
Chromium (Cr)			94.8		%		70-130	07-MAR-17
Cobalt (Co)			93.5		%		70-130	07-MAR-17
Copper (Cu)			90.1		%		70-130	07-MAR-17
Iron (Fe)			92.7		%		70-130	07-MAR-17
Lead (Pb)			99.5		%		70-130	07-MAR-17
Lithium (Li)			95.2		%		70-130	07-MAR-17
Magnesium (Mg)			97.2		%		70-130	07-MAR-17
Manganese (Mn)			86.2		%		70-130	07-MAR-17
Molybdenum (Mo)			96.5		%		70-130	07-MAR-17
Nickel (Ni)			90.0		%		70-130	07-MAR-17
Phosphorus (P)			103.2		%		70-130	07-MAR-17
Potassium (K)			93.5		%		70-130	07-MAR-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3671103								
WG2489845-4 CRM		**VA-NRC-STSD-3**						
Selenium (Se)			90.7		%		70-130	07-MAR-17
Silver (Ag)			95.6		%		70-130	07-MAR-17
Sodium (Na)			94.8		%		70-130	07-MAR-17
Strontium (Sr)			99.3		%		70-130	07-MAR-17
Thallium (Tl)			99.2		%		70-130	07-MAR-17
Titanium (Ti)			97.9		%		70-130	07-MAR-17
Uranium (U)			100.8		%		70-130	07-MAR-17
Vanadium (V)			92.7		%		70-130	07-MAR-17
Zinc (Zn)			90.8		%		70-130	07-MAR-17
WG2489845-3 LCS								
Aluminum (Al)			93.5		%		80-120	07-MAR-17
Antimony (Sb)			101.4		%		80-120	07-MAR-17
Arsenic (As)			98.4		%		80-120	07-MAR-17
Barium (Ba)			95.2		%		80-120	07-MAR-17
Beryllium (Be)			93.6		%		80-120	07-MAR-17
Bismuth (Bi)			91.2		%		80-120	07-MAR-17
Boron (B)			91.0		%		80-120	07-MAR-17
Cadmium (Cd)			92.6		%		80-120	07-MAR-17
Calcium (Ca)			91.1		%		80-120	07-MAR-17
Chromium (Cr)			92.4		%		80-120	07-MAR-17
Cobalt (Co)			92.5		%		80-120	07-MAR-17
Copper (Cu)			91.4		%		80-120	07-MAR-17
Iron (Fe)			95.5		%		80-120	07-MAR-17
Lead (Pb)			93.3		%		80-120	07-MAR-17
Lithium (Li)			90.9		%		80-120	07-MAR-17
Magnesium (Mg)			90.9		%		80-120	07-MAR-17
Manganese (Mn)			93.6		%		80-120	07-MAR-17
Molybdenum (Mo)			96.4		%		80-120	07-MAR-17
Nickel (Ni)			92.5		%		80-120	07-MAR-17
Phosphorus (P)			104.6		%		80-120	07-MAR-17
Potassium (K)			95.5		%		80-120	07-MAR-17
Selenium (Se)			94.2		%		80-120	07-MAR-17
Silver (Ag)			95.0		%		80-120	07-MAR-17
Sodium (Na)			94.1		%		80-120	07-MAR-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3671103								
WG2489845-3 LCS								
Strontium (Sr)			100.4		%		80-120	07-MAR-17
Thallium (Tl)			91.3		%		80-120	07-MAR-17
Tin (Sn)			96.4		%		80-120	07-MAR-17
Titanium (Ti)			91.2		%		80-120	07-MAR-17
Uranium (U)			95.6		%		80-120	07-MAR-17
Vanadium (V)			93.7		%		80-120	07-MAR-17
Zinc (Zn)			89.0		%		80-120	07-MAR-17
Zirconium (Zr)			91.7		%		70-130	07-MAR-17
WG2489845-1 MB								
Aluminum (Al)			<50		mg/kg		50	07-MAR-17
Antimony (Sb)			<0.10		mg/kg		0.1	07-MAR-17
Arsenic (As)			<0.10		mg/kg		0.1	07-MAR-17
Barium (Ba)			<0.50		mg/kg		0.5	07-MAR-17
Beryllium (Be)			<0.10		mg/kg		0.1	07-MAR-17
Bismuth (Bi)			<0.20		mg/kg		0.2	07-MAR-17
Boron (B)			<5.0		mg/kg		5	07-MAR-17
Cadmium (Cd)			<0.020		mg/kg		0.02	07-MAR-17
Calcium (Ca)			<50		mg/kg		50	07-MAR-17
Chromium (Cr)			<0.50		mg/kg		0.5	07-MAR-17
Cobalt (Co)			<0.10		mg/kg		0.1	07-MAR-17
Copper (Cu)			<0.50		mg/kg		0.5	07-MAR-17
Iron (Fe)			<50		mg/kg		50	07-MAR-17
Lead (Pb)			<0.50		mg/kg		0.5	07-MAR-17
Lithium (Li)			<2.0		mg/kg		2	07-MAR-17
Magnesium (Mg)			<20		mg/kg		20	07-MAR-17
Manganese (Mn)			<1.0		mg/kg		1	07-MAR-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	07-MAR-17
Nickel (Ni)			<0.50		mg/kg		0.5	07-MAR-17
Phosphorus (P)			<50		mg/kg		50	07-MAR-17
Potassium (K)			<100		mg/kg		100	07-MAR-17
Selenium (Se)			<0.20		mg/kg		0.2	07-MAR-17
Silver (Ag)			<0.10		mg/kg		0.1	07-MAR-17
Sodium (Na)			<50		mg/kg		50	07-MAR-17
Strontium (Sr)			<0.50		mg/kg		0.5	07-MAR-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3671103								
WG2489845-1 MB								
Thallium (Tl)			<0.050		mg/kg		0.05	07-MAR-17
Tin (Sn)			<2.0		mg/kg		2	07-MAR-17
Titanium (Ti)			<1.0		mg/kg		1	07-MAR-17
Uranium (U)			<0.050		mg/kg		0.05	07-MAR-17
Vanadium (V)			<0.20		mg/kg		0.2	07-MAR-17
Zinc (Zn)			<2.0		mg/kg		2	07-MAR-17
Zirconium (Zr)			<1.0		mg/kg		1	07-MAR-17
MOISTURE-VA	**Soil**							
Batch R3668314								
WG2489221-2 LCS								
Moisture			99.6		%		90-110	05-MAR-17
WG2489221-6 LCS								
Moisture			100.0		%		90-110	05-MAR-17
WG2489221-1 MB								
Moisture			<0.25		%		0.25	05-MAR-17
WG2489221-5 MB								
Moisture			<0.25		%		0.25	05-MAR-17
PH-1:2-VA	**Soil**							
Batch R3669863								
WG2489845-5 IRM		**VA-ALP-SRS1507**						
pH (1:2 soil:water)			6.50		pH		6.2-6.8	08-MAR-17
S-TOT-LECO-SK	**Soil**							
Batch R3669786								
WG2488683-4 IRM		**1646A_SOIL**						
Sulfur (S)-Total			3300		mg/kg		2500-4600	07-MAR-17
WG2488683-5 MB								
Sulfur (S)-Total			<500		mg/kg		500	07-MAR-17
SO4-LEACH-IC-VA	**Soil**							
Batch R3670866								
WG2489590-4 DUP		**L1895621-1**						
Sulfate (SO4)		489	477		mg/kg	2.5	20	07-MAR-17
WG2489590-2 LCS								
Sulfate (SO4)			99.3		%		70-130	07-MAR-17
WG2489590-1 MB								
Sulfate (SO4)			<10		mg/kg		10	07-MAR-17

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

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COC # _____

Page 1 of 1

Report To:		Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	TMAC Resources Ltd (Hope Bay)	☑Standard	☐Other			◉Regular (Standard Turnaround Times - Business Days)
Contact:	Environmental Site Manager	☑PDF	☑Excel	☐Digital	☐Fax	○Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	95 Wellington Street West, Suite 1010	Email 1:	enviro@tmacresources.com			○Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	P.O. Box 44 Toronto, ON M5J 2N7	Email 2:	katsky.venter@tmacresources.com			○Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	1-416-628-0216 Fax:	Email 3:				Analysis Request
Invoice To	Same as Report ?	Client / Project Information				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?		Job #:				
Company:		PO / AFE:	TMAC-CO2014-0001			
Contact:		LSD:				
Address:		Job Ref:	Compliance Sampling Program			
Phone:	Fax:	Quote #:				
Lab Work Order # (lab use only)	L1895621	ALS Contact:	Amber Springer	Sampler:	KC	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TMR100-TL6-VA	Number of Containers
[redacted]	TL6-27FEB17	27-Feb-17	15:00	Waste	X	2
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						

L1895621-COFC

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

*Note - Tailings Sample

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

[redacted] SHIPMENT RELEASE (client use) [redacted]			[redacted] SHIPMENT RECEPTION (lab use only) [redacted]				[redacted] SHIPMENT VERIFICATION (lab use only) [redacted]			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Kyle Conway	28-Feb-17	9:00	AT	28-Feb-17	2:15	7.2 °C				

JC MAR - 2 2017 11:30am JC

GENF 18.01 Front

TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Welliington St West
Toronto ON M5J 2N7

Date Received: 28-MAR-17
Report Date: 06-APR-17 18:58 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1906046

Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1906046-1 TL6-27MAR17							
Sampled By: KC on 27-MAR-17 @ 15:00							
Matrix: waste							
Metals in Soil (CCME) with Extra Metals							
Mercury in Soil by CVAFS							
Mercury (Hg)	<0.0050		0.0050	mg/kg	03-APR-17	04-APR-17	R3692346
Metals in Soil by CRC ICPMS							
Aluminum (Al)	10400		50	mg/kg	03-APR-17	04-APR-17	R3692822
Antimony (Sb)	<0.10		0.10	mg/kg	03-APR-17	04-APR-17	R3692822
Arsenic (As)	10.4		0.10	mg/kg	03-APR-17	04-APR-17	R3692822
Barium (Ba)	15.9		0.50	mg/kg	03-APR-17	04-APR-17	R3692822
Beryllium (Be)	0.13		0.10	mg/kg	03-APR-17	04-APR-17	R3692822
Bismuth (Bi)	<0.20		0.20	mg/kg	03-APR-17	04-APR-17	R3692822
Boron (B)	14.1		5.0	mg/kg	03-APR-17	04-APR-17	R3692822
Cadmium (Cd)	0.217		0.020	mg/kg	03-APR-17	04-APR-17	R3692822
Calcium (Ca)	24100		50	mg/kg	03-APR-17	04-APR-17	R3692822
Chromium (Cr)	27.5		0.50	mg/kg	03-APR-17	04-APR-17	R3692822
Cobalt (Co)	13.9		0.10	mg/kg	03-APR-17	04-APR-17	R3692822
Copper (Cu)	24.7		0.50	mg/kg	03-APR-17	04-APR-17	R3692822
Iron (Fe)	37700		50	mg/kg	03-APR-17	04-APR-17	R3692822
Lead (Pb)	8.13		0.50	mg/kg	03-APR-17	04-APR-17	R3692822
Lithium (Li)	29.0		2.0	mg/kg	03-APR-17	04-APR-17	R3692822
Magnesium (Mg)	14100		20	mg/kg	03-APR-17	04-APR-17	R3692822
Manganese (Mn)	880		1.0	mg/kg	03-APR-17	04-APR-17	R3692822
Molybdenum (Mo)	0.27		0.10	mg/kg	03-APR-17	04-APR-17	R3692822
Nickel (Ni)	22.8		0.50	mg/kg	03-APR-17	04-APR-17	R3692822
Phosphorus (P)	275		50	mg/kg	03-APR-17	04-APR-17	R3692822
Potassium (K)	1490		100	mg/kg	03-APR-17	04-APR-17	R3692822
Selenium (Se)	<0.20		0.20	mg/kg	03-APR-17	04-APR-17	R3692822
Silver (Ag)	0.38		0.10	mg/kg	03-APR-17	04-APR-17	R3692822
Sodium (Na)	587		50	mg/kg	03-APR-17	04-APR-17	R3692822
Strontium (Sr)	11.8		0.50	mg/kg	03-APR-17	04-APR-17	R3692822
Thallium (Tl)	<0.050		0.050	mg/kg	03-APR-17	04-APR-17	R3692822
Tin (Sn)	<2.0		2.0	mg/kg	03-APR-17	04-APR-17	R3692822
Titanium (Ti)	927		1.0	mg/kg	03-APR-17	04-APR-17	R3692822
Uranium (U)	<0.050		0.050	mg/kg	03-APR-17	04-APR-17	R3692822
Vanadium (V)	47.6		0.20	mg/kg	03-APR-17	04-APR-17	R3692822
Zinc (Zn)	128		2.0	mg/kg	03-APR-17	04-APR-17	R3692822
Zirconium (Zr)	2.1		1.0	mg/kg	03-APR-17	04-APR-17	R3692822
pH in Soil (1:2 Soil:Water Extraction)							
pH (1:2 soil:water)	8.84		0.10	pH		04-APR-17	R3692228
Miscellaneous Parameters							
Inorganic Carbon (as CaCO3 Equivalent)	4.73		0.40	%		05-APR-17	
Moisture	24.7		0.25	%		02-APR-17	R3690963
Sulfate (SO4)	363		10	mg/kg	03-APR-17	04-APR-17	R3694603
Inorganic Carbon	0.568		0.050	%		05-APR-17	R3692830
Sulfur (S)-Total	6800		500	mg/kg	03-APR-17	03-APR-17	R3692367

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CRC ICPMS.			
Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. This method does not dissolve all silicate materials and may result in a partial extraction. depending on the sample matrix, for some metals, including, but not limited to Al, Ba, Be, Cr, Sr, Ti, Tl, and V.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TMAC Resources Inc
Hope Bay Project 95 Welliington St West
Toronto ON M5J 2N7
Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK	**Soil**							
Batch R3692830								
WG2505434-1 DUP		**L1906046-1**						
Inorganic Carbon		0.568	0.577		%	1.6	20	05-APR-17
WG2505434-2 LCS								
Inorganic Carbon			104.4		%		80-120	05-APR-17
WG2505434-3 MB								
Inorganic Carbon			<0.050		%		0.05	05-APR-17
HG-200.2-CVAF-VA	**Soil**							
Batch R3692346								
WG2504313-4 CRM		**VA-NRC-STSD-3**						
Mercury (Hg)			74.9		%		70-130	04-APR-17
WG2504313-3 LCS								
Mercury (Hg)			85.5		%		70-130	04-APR-17
WG2504313-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	04-APR-17
MET-200.2-CCMS-VA	**Soil**							
Batch R3692822								
WG2504313-4 CRM		**VA-NRC-STSD-3**						
Aluminum (Al)			99.6		%		70-130	04-APR-17
Antimony (Sb)			104.4		%		70-130	04-APR-17
Arsenic (As)			88.1		%		70-130	04-APR-17
Barium (Ba)			96.5		%		70-130	04-APR-17
Beryllium (Be)			100.6		%		70-130	04-APR-17
Bismuth (Bi)			108.8		%		70-130	04-APR-17
Boron (B)			105.8		%		70-130	04-APR-17
Cadmium (Cd)			109.2		%		70-130	04-APR-17
Calcium (Ca)			101.9		%		70-130	04-APR-17
Chromium (Cr)			98.8		%		70-130	04-APR-17
Cobalt (Co)			97.4		%		70-130	04-APR-17
Copper (Cu)			93.4		%		70-130	04-APR-17
Iron (Fe)			94.9		%		70-130	04-APR-17
Lead (Pb)			100.5		%		70-130	04-APR-17
Lithium (Li)			99.6		%		70-130	04-APR-17
Magnesium (Mg)			99.8		%		70-130	04-APR-17
Manganese (Mn)			90.5		%		70-130	04-APR-17
Molybdenum (Mo)			100.8		%		70-130	04-APR-17
Nickel (Ni)			92.7		%		70-130	04-APR-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3692822								
WG2504313-4 CRM		**VA-NRC-STSD-3**						
Phosphorus (P)			98.1		%		70-130	04-APR-17
Potassium (K)			99.9		%		70-130	04-APR-17
Selenium (Se)			99.1		%		70-130	04-APR-17
Silver (Ag)			96.2		%		70-130	04-APR-17
Sodium (Na)			99.0		%		70-130	04-APR-17
Strontium (Sr)			104.4		%		70-130	04-APR-17
Thallium (Tl)			105.1		%		70-130	04-APR-17
Titanium (Ti)			113.1		%		70-130	04-APR-17
Uranium (U)			101.4		%		70-130	04-APR-17
Vanadium (V)			100.9		%		70-130	04-APR-17
Zinc (Zn)			93.2		%		70-130	04-APR-17
WG2504313-3 LCS								
Aluminum (Al)			99.9		%		80-120	04-APR-17
Antimony (Sb)			102.2		%		80-120	04-APR-17
Arsenic (As)			99.7		%		80-120	04-APR-17
Barium (Ba)			103.5		%		80-120	04-APR-17
Beryllium (Be)			98.5		%		80-120	04-APR-17
Bismuth (Bi)			95.4		%		80-120	04-APR-17
Boron (B)			95.0		%		80-120	04-APR-17
Cadmium (Cd)			99.2		%		80-120	04-APR-17
Calcium (Ca)			100.6		%		80-120	04-APR-17
Chromium (Cr)			98.6		%		80-120	04-APR-17
Cobalt (Co)			99.1		%		80-120	04-APR-17
Copper (Cu)			97.1		%		80-120	04-APR-17
Iron (Fe)			98.3		%		80-120	04-APR-17
Lead (Pb)			97.6		%		80-120	04-APR-17
Lithium (Li)			96.9		%		80-120	04-APR-17
Magnesium (Mg)			95.0		%		80-120	04-APR-17
Manganese (Mn)			102.3		%		80-120	04-APR-17
Molybdenum (Mo)			100.4		%		80-120	04-APR-17
Nickel (Ni)			99.7		%		80-120	04-APR-17
Phosphorus (P)			102.2		%		80-120	04-APR-17
Potassium (K)			98.7		%		80-120	04-APR-17
Selenium (Se)			95.0		%		80-120	04-APR-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3692822								
WG2504313-3 LCS								
Silver (Ag)			101.2		%		80-120	04-APR-17
Sodium (Na)			97.6		%		80-120	04-APR-17
Strontium (Sr)			108.1		%		80-120	04-APR-17
Thallium (Tl)			95.7		%		80-120	04-APR-17
Tin (Sn)			99.6		%		80-120	04-APR-17
Titanium (Ti)			98.1		%		80-120	04-APR-17
Uranium (U)			102.0		%		80-120	04-APR-17
Vanadium (V)			100.6		%		80-120	04-APR-17
Zinc (Zn)			91.8		%		80-120	04-APR-17
Zirconium (Zr)			98.6		%		70-130	04-APR-17
WG2504313-1 MB								
Aluminum (Al)			<50		mg/kg		50	04-APR-17
Antimony (Sb)			<0.10		mg/kg		0.1	04-APR-17
Arsenic (As)			<0.10		mg/kg		0.1	04-APR-17
Barium (Ba)			<0.50		mg/kg		0.5	04-APR-17
Beryllium (Be)			<0.10		mg/kg		0.1	04-APR-17
Bismuth (Bi)			<0.20		mg/kg		0.2	04-APR-17
Boron (B)			<5.0		mg/kg		5	04-APR-17
Cadmium (Cd)			<0.020		mg/kg		0.02	04-APR-17
Calcium (Ca)			<50		mg/kg		50	04-APR-17
Chromium (Cr)			<0.50		mg/kg		0.5	04-APR-17
Cobalt (Co)			<0.10		mg/kg		0.1	04-APR-17
Copper (Cu)			<0.50		mg/kg		0.5	04-APR-17
Iron (Fe)			<50		mg/kg		50	04-APR-17
Lead (Pb)			<0.50		mg/kg		0.5	04-APR-17
Lithium (Li)			<2.0		mg/kg		2	04-APR-17
Magnesium (Mg)			<20		mg/kg		20	04-APR-17
Manganese (Mn)			<1.0		mg/kg		1	04-APR-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	04-APR-17
Nickel (Ni)			<0.50		mg/kg		0.5	04-APR-17
Phosphorus (P)			<50		mg/kg		50	04-APR-17
Potassium (K)			<100		mg/kg		100	04-APR-17
Selenium (Se)			<0.20		mg/kg		0.2	04-APR-17
Silver (Ag)			<0.10		mg/kg		0.1	04-APR-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3692822								
WG2504313-1 MB								
Sodium (Na)			<50		mg/kg		50	04-APR-17
Strontium (Sr)			<0.50		mg/kg		0.5	04-APR-17
Thallium (Tl)			<0.050		mg/kg		0.05	04-APR-17
Tin (Sn)			<2.0		mg/kg		2	04-APR-17
Titanium (Ti)			<1.0		mg/kg		1	04-APR-17
Uranium (U)			<0.050		mg/kg		0.05	04-APR-17
Vanadium (V)			<0.20		mg/kg		0.2	04-APR-17
Zinc (Zn)			<2.0		mg/kg		2	04-APR-17
Zirconium (Zr)			<1.0		mg/kg		1	04-APR-17
MOISTURE-VA	**Soil**							
Batch R3690963								
WG2504326-2 LCS								
Moisture			99.8		%		90-110	02-APR-17
WG2504326-6 LCS								
Moisture			100.1		%		90-110	02-APR-17
WG2504326-1 MB								
Moisture			<0.25		%		0.25	02-APR-17
WG2504326-5 MB								
Moisture			<0.25		%		0.25	02-APR-17
PH-1:2-VA	**Soil**							
Batch R3692228								
WG2504313-5 IRM		**VA-ALP-SRS1507**						
pH (1:2 soil:water)			6.55		pH		6.2-6.8	04-APR-17
S-TOT-LECO-SK	**Soil**							
Batch R3692367								
WG2503037-3 IRM		**1646A_SOIL**						
Sulfur (S)-Total			3700		mg/kg		2500-4600	03-APR-17
WG2503037-4 MB								
Sulfur (S)-Total			<500		mg/kg		500	03-APR-17
SO4-LEACH-IC-VA	**Soil**							
Batch R3694603								
WG2504505-3 LCS								
Sulfate (SO4)			102.4		%		70-130	04-APR-17
WG2504505-1 MB								
Sulfate (SO4)			<10		mg/kg		10	04-APR-17

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

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Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

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COC # _____

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Report To:		Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	TMAC Resources Ltd (Hope Bay)	☑Standard	☐Other			◉Regular (Standard Turnaround Times - Business Days)
Contact:	Environmental Site Manager	☑PDF	☑Excel	☐Digital	☐Fax	○Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	95 Wellington Street West, Suite 1010	Email 1:	enviro@tmacresources.com			○Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	P.O. Box 44 Toronto, ON M5J 2N7	Email 2:	katsky.venter@tmacresources.com			○Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	1-416-628-0216 Fax:	Email 3:				Analysis Request
Invoice To	Same as Report ?	Client / Project Information				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?		Job #:				
Company:		PO / AFE:	TMAC-CO2014-0001			
Contact:		LSD:				
Address:		Job Ref:	Compliance Sampling Program			
Phone:	Fax:	Quote #:				
Lab Work Order # (lab use only)	L1906046	ALS Contact:	Amber Springer	Sampler:	KC	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TMR100-TL6-VA	Number of Containers
	TL6-27MAR17	28-Mar-17	15:00	Waste	X	2

L1906046-COFC

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

*Note - Tailings Sample

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Kyle Conway	28-Mar-17	9:00		28 Mar 17	1:30	10.7°C				

GENF 18.01 Front

TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Welliington St West
Toronto ON M5J 2N7

Date Received: 25-APR-17
Report Date: 08-MAY-17 17:48 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1917005

Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1917005-1 TL6-24APR17							
Sampled By: KC on 24-APR-17 @ 06:30							
Matrix: waste							
Metals in Soil (CCME) with Extra Metals							
Mercury in Soil by CVAFS							
Mercury (Hg)	<0.0050		0.0050	mg/kg	28-APR-17	30-APR-17	R3710567
Metals in Soil by CRC ICPMS							
Aluminum (Al)	13800		50	mg/kg	28-APR-17	30-APR-17	R3710902
Antimony (Sb)	<0.10		0.10	mg/kg	28-APR-17	30-APR-17	R3710902
Arsenic (As)	7.88		0.10	mg/kg	28-APR-17	30-APR-17	R3710902
Barium (Ba)	16.9		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Beryllium (Be)	0.13		0.10	mg/kg	28-APR-17	30-APR-17	R3710902
Bismuth (Bi)	<0.20		0.20	mg/kg	28-APR-17	30-APR-17	R3710902
Boron (B)	28.0		5.0	mg/kg	28-APR-17	30-APR-17	R3710902
Cadmium (Cd)	0.106		0.020	mg/kg	28-APR-17	30-APR-17	R3710902
Calcium (Ca)	30200		50	mg/kg	28-APR-17	30-APR-17	R3710902
Chromium (Cr)	29.9		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Cobalt (Co)	15.1		0.10	mg/kg	28-APR-17	30-APR-17	R3710902
Copper (Cu)	22.9		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Iron (Fe)	48800		50	mg/kg	28-APR-17	30-APR-17	R3710902
Lead (Pb)	6.34		0.50	mg/kg	28-APR-17	01-MAY-17	R3711177
Lithium (Li)	31.0		2.0	mg/kg	28-APR-17	30-APR-17	R3710902
Magnesium (Mg)	17500		20	mg/kg	28-APR-17	30-APR-17	R3710902
Manganese (Mn)	1080		1.0	mg/kg	28-APR-17	30-APR-17	R3710902
Molybdenum (Mo)	0.25		0.10	mg/kg	28-APR-17	30-APR-17	R3710902
Nickel (Ni)	25.7		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Phosphorus (P)	387		50	mg/kg	28-APR-17	30-APR-17	R3710902
Potassium (K)	1470		100	mg/kg	28-APR-17	30-APR-17	R3710902
Selenium (Se)	<0.20		0.20	mg/kg	28-APR-17	30-APR-17	R3710902
Silver (Ag)	0.33		0.10	mg/kg	28-APR-17	30-APR-17	R3710902
Sodium (Na)	832		50	mg/kg	28-APR-17	30-APR-17	R3710902
Strontium (Sr)	15.1		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Sulfur (S)	1100		1000	mg/kg	28-APR-17	30-APR-17	R3710902
Thallium (Tl)	<0.050		0.050	mg/kg	28-APR-17	30-APR-17	R3710902
Tin (Sn)	<2.0		2.0	mg/kg	28-APR-17	30-APR-17	R3710902
Titanium (Ti)	873		1.0	mg/kg	28-APR-17	30-APR-17	R3710902
Tungsten (W)	0.64		0.50	mg/kg	28-APR-17	30-APR-17	R3710902
Uranium (U)	<0.050		0.050	mg/kg	28-APR-17	30-APR-17	R3710902
Vanadium (V)	58.9		0.20	mg/kg	28-APR-17	30-APR-17	R3710902
Zinc (Zn)	72.7		2.0	mg/kg	28-APR-17	30-APR-17	R3710902
Zirconium (Zr)	2.5		1.0	mg/kg	28-APR-17	30-APR-17	R3710902
pH in Soil (1:2 Soil:Water Extraction)							
pH (1:2 soil:water)	8.88		0.10	pH		30-APR-17	R3710500
Miscellaneous Parameters							
Inorganic Carbon (as CaCO3 Equivalent)	4.05		0.40	%		05-MAY-17	
Moisture	27.4		0.25	%		29-APR-17	R3710256
Sulfate (SO4)	589		10	mg/kg	01-MAY-17	02-MAY-17	R3713964
Inorganic Carbon	0.486		0.050	%		05-MAY-17	R3715649
Sulfur (S)-Total	10400		500	mg/kg	05-MAY-17	05-MAY-17	R3715865

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TMAC Resources Inc
Hope Bay Project 95 Welliington St West
Toronto ON M5J 2N7
Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK	**Soil**							
Batch R3715649								
WG2520675-2 LCS								
Inorganic Carbon			100.3		%		80-120	05-MAY-17
WG2520675-3 MB								
Inorganic Carbon			<0.050		%		0.05	05-MAY-17
HG-200.2-CVAF-VA	**Soil**							
Batch R3710567								
WG2519193-4 CRM		**VA-NRC-STSD-3**						
Mercury (Hg)			95.1		%		70-130	30-APR-17
WG2519193-3 LCS								
Mercury (Hg)			101.3		%		70-130	30-APR-17
WG2519193-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	30-APR-17
MET-200.2-CCMS-VA	**Soil**							
Batch R3710902								
WG2519193-4 CRM		**VA-NRC-STSD-3**						
Aluminum (Al)			105.4		%		70-130	30-APR-17
Antimony (Sb)			106.0		%		70-130	30-APR-17
Arsenic (As)			90.9		%		70-130	30-APR-17
Barium (Ba)			98.4		%		70-130	30-APR-17
Beryllium (Be)			106.2		%		70-130	30-APR-17
Bismuth (Bi)			107.2		%		70-130	30-APR-17
Boron (B)			108.7		%		70-130	30-APR-17
Cadmium (Cd)			111.8		%		70-130	30-APR-17
Calcium (Ca)			104.5		%		70-130	30-APR-17
Chromium (Cr)			102.2		%		70-130	30-APR-17
Cobalt (Co)			97.6		%		70-130	30-APR-17
Copper (Cu)			93.5		%		70-130	30-APR-17
Iron (Fe)			96.1		%		70-130	30-APR-17
Lead (Pb)			104.8		%		70-130	30-APR-17
Lithium (Li)			103.6		%		70-130	30-APR-17
Magnesium (Mg)			106.4		%		70-130	30-APR-17
Manganese (Mn)			93.1		%		70-130	30-APR-17
Molybdenum (Mo)			102.7		%		70-130	30-APR-17
Nickel (Ni)			94.2		%		70-130	30-APR-17
Phosphorus (P)			107.3		%		70-130	30-APR-17
Potassium (K)			108.9		%		70-130	30-APR-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3710902								
WG2519193-4 CRM		**VA-NRC-STSD-3**						
Selenium (Se)			103.0		%		70-130	30-APR-17
Silver (Ag)			99.6		%		70-130	30-APR-17
Sodium (Na)			106.3		%		70-130	30-APR-17
Strontium (Sr)			107.6		%		70-130	30-APR-17
Thallium (Tl)			110.0		%		70-130	30-APR-17
Titanium (Ti)			122.0		%		70-130	30-APR-17
Uranium (U)			105.8		%		70-130	30-APR-17
Vanadium (V)			104.9		%		70-130	30-APR-17
Zinc (Zn)			95.3		%		70-130	30-APR-17
WG2519193-3 LCS								
Aluminum (Al)			101.7		%		80-120	30-APR-17
Antimony (Sb)			100.7		%		80-120	30-APR-17
Arsenic (As)			103.5		%		80-120	30-APR-17
Barium (Ba)			98.2		%		80-120	30-APR-17
Beryllium (Be)			99.4		%		80-120	30-APR-17
Bismuth (Bi)			99.9		%		80-120	30-APR-17
Boron (B)			88.4		%		80-120	30-APR-17
Cadmium (Cd)			100.5		%		80-120	30-APR-17
Calcium (Ca)			97.8		%		80-120	30-APR-17
Chromium (Cr)			98.3		%		80-120	30-APR-17
Cobalt (Co)			97.7		%		80-120	30-APR-17
Copper (Cu)			96.3		%		80-120	30-APR-17
Iron (Fe)			97.8		%		80-120	30-APR-17
Lead (Pb)			100.3		%		80-120	30-APR-17
Lithium (Li)			98.6		%		80-120	30-APR-17
Magnesium (Mg)			101.3		%		80-120	30-APR-17
Manganese (Mn)			103.4		%		80-120	30-APR-17
Molybdenum (Mo)			99.7		%		80-120	30-APR-17
Nickel (Ni)			99.5		%		80-120	30-APR-17
Phosphorus (P)			102.3		%		80-120	30-APR-17
Potassium (K)			100.7		%		80-120	30-APR-17
Selenium (Se)			101.5		%		80-120	30-APR-17
Silver (Ag)			98.4		%		80-120	30-APR-17
Sodium (Na)			101.3		%		80-120	30-APR-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3710902								
WG2519193-3 LCS								
Strontium (Sr)			99.5		%		80-120	30-APR-17
Sulfur (S)			104.9		%		80-120	30-APR-17
Thallium (Tl)			100.3		%		80-120	30-APR-17
Tin (Sn)			97.7		%		80-120	30-APR-17
Titanium (Ti)			95.3		%		80-120	30-APR-17
Tungsten (W)			100.8		%		80-120	30-APR-17
Uranium (U)			100.8		%		80-120	30-APR-17
Vanadium (V)			99.8		%		80-120	30-APR-17
Zinc (Zn)			96.1		%		80-120	30-APR-17
Zirconium (Zr)			96.7		%		70-130	30-APR-17
WG2519193-1 MB								
Aluminum (Al)			<50		mg/kg		50	30-APR-17
Antimony (Sb)			<0.10		mg/kg		0.1	30-APR-17
Arsenic (As)			<0.10		mg/kg		0.1	30-APR-17
Barium (Ba)			<0.50		mg/kg		0.5	30-APR-17
Beryllium (Be)			<0.10		mg/kg		0.1	30-APR-17
Bismuth (Bi)			<0.20		mg/kg		0.2	30-APR-17
Boron (B)			<5.0		mg/kg		5	30-APR-17
Cadmium (Cd)			<0.020		mg/kg		0.02	30-APR-17
Calcium (Ca)			<50		mg/kg		50	30-APR-17
Chromium (Cr)			<0.50		mg/kg		0.5	30-APR-17
Cobalt (Co)			<0.10		mg/kg		0.1	30-APR-17
Copper (Cu)			<0.50		mg/kg		0.5	30-APR-17
Iron (Fe)			<50		mg/kg		50	30-APR-17
Lead (Pb)			<0.50		mg/kg		0.5	30-APR-17
Lithium (Li)			<2.0		mg/kg		2	30-APR-17
Magnesium (Mg)			<20		mg/kg		20	30-APR-17
Manganese (Mn)			<1.0		mg/kg		1	30-APR-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	30-APR-17
Nickel (Ni)			<0.50		mg/kg		0.5	30-APR-17
Phosphorus (P)			<50		mg/kg		50	30-APR-17
Potassium (K)			<100		mg/kg		100	30-APR-17
Selenium (Se)			<0.20		mg/kg		0.2	30-APR-17
Silver (Ag)			<0.10		mg/kg		0.1	30-APR-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3710902								
WG2519193-1 MB								
Sodium (Na)			<50		mg/kg		50	30-APR-17
Strontium (Sr)			<0.50		mg/kg		0.5	30-APR-17
Sulfur (S)			<1000		mg/kg		1000	30-APR-17
Thallium (Tl)			<0.050		mg/kg		0.05	30-APR-17
Tin (Sn)			<2.0		mg/kg		2	30-APR-17
Titanium (Ti)			<1.0		mg/kg		1	30-APR-17
Tungsten (W)			<0.50		mg/kg		0.5	30-APR-17
Uranium (U)			<0.050		mg/kg		0.05	30-APR-17
Vanadium (V)			<0.20		mg/kg		0.2	30-APR-17
Zinc (Zn)			<2.0		mg/kg		2	30-APR-17
Zirconium (Zr)			<1.0		mg/kg		1	30-APR-17
MOISTURE-VA	**Soil**							
Batch R3710256								
WG2519195-2 LCS								
Moisture			98.0		%		90-110	29-APR-17
WG2519195-6 LCS								
Moisture			98.4		%		90-110	29-APR-17
WG2519195-1 MB								
Moisture			<0.25		%		0.25	29-APR-17
WG2519195-5 MB								
Moisture			<0.25		%		0.25	29-APR-17
PH-1:2-VA	**Soil**							
Batch R3710500								
WG2519193-5 IRM		**VA-ALP-SRS1507**						
pH (1:2 soil:water)			6.56		pH		6.2-6.8	30-APR-17
S-TOT-LECO-SK	**Soil**							
Batch R3715865								
WG2521387-4 IRM		**1646A_SOIL**						
Sulfur (S)-Total			3400		mg/kg		2500-4600	05-MAY-17
WG2521387-5 MB								
Sulfur (S)-Total			<500		mg/kg		500	05-MAY-17
SO4-LEACH-IC-VA	**Soil**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-LEACH-IC-VA	**Soil**							
Batch R3713964								
WG2519603-2 LCS								
Sulfate (SO4)			101.3		%		70-130	02-MAY-17
WG2519603-1 MB								
Sulfate (SO4)			<10		mg/kg		10	02-MAY-17

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

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Report To:		Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	TMAC Resources Ltd (Hope Bay)	☑Standard	☐Other			◉Regular (Standard Turnaround Times - Business Days)
Contact:	Environmental Site Manager	☑PDF	☑Excel	☐Digital	☐Fax	○Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	95 Wellington Street West, Suite 1010	Email 1:	enviro@tmacresources.com			○Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	P.O. Box 44 Toronto, ON M5J 2N7	Email 2:	katsky.venter@tmacresources.com			○Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	1-416-628-0216 Fax:	Email 3:				Analysis Request
Invoice To	Same as Report ?	Client / Project Information				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?		Job #:				
Company:		PO / AFE:	TMAC-CO2014-0001			
Contact:		LSD:				
Address:		Job Ref:	Compliance Sampling Program			
Phone:	Fax:	Quote #:				
Lab Work Order # (lab use only)	L1917005	ALS Contact:	Amber Springer	Sampler:	KC	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TMR100-TL6-VA	Number of Containers
	TL6-24APR17	24-Apr-17	6:30	Waste	X	2

L1917005-COFC

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

*Note - Tailings Sample

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / (No) ? If Yes add SIF
Kyle Conway	25-Apr-17	9:00	A+	25-Apr-2017	1:45	8.4 °C				

GENF 18.01 Front

TMAC Resources Inc
ATTN: Environmental Site Manager
Hope Bay Project
95 Welliington St West
Toronto ON M5J 2N7

Date Received: 30-MAY-17
Report Date: 08-JUN-17 10:52 (MT)
Version: FINAL

Client Phone: 867-988-0569

Certificate of Analysis

Lab Work Order #: L1933582

Project P.O. #: 4500002907
Job Reference: COMPLIANCE SAMPLING PROGRAM
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1933582-1 TL6-30MAY17							
Sampled By: KC/LW on 30-MAY-17 @ 11:00							
Matrix: WASTE							
Metals in Soil (CCME) with Extra Metals							
Mercury in Soil by CVAFS							
Mercury (Hg)	<0.0050		0.0050	mg/kg	04-JUN-17	06-JUN-17	R3740761
Metals in Soil by CRC ICPMS							
Aluminum (Al)	10100		50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Antimony (Sb)	<0.10		0.10	mg/kg	04-JUN-17	06-JUN-17	R3741080
Arsenic (As)	8.25		0.10	mg/kg	04-JUN-17	06-JUN-17	R3741080
Barium (Ba)	14.3		0.50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Beryllium (Be)	0.11		0.10	mg/kg	04-JUN-17	06-JUN-17	R3741080
Bismuth (Bi)	<0.20		0.20	mg/kg	04-JUN-17	06-JUN-17	R3741080
Boron (B)	12.6		5.0	mg/kg	04-JUN-17	06-JUN-17	R3741080
Cadmium (Cd)	0.154		0.020	mg/kg	04-JUN-17	06-JUN-17	R3741080
Calcium (Ca)	25200		50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Chromium (Cr)	25.7		0.50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Cobalt (Co)	12.7		0.10	mg/kg	04-JUN-17	06-JUN-17	R3741080
Copper (Cu)	20.1		0.50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Iron (Fe)	38900		50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Lead (Pb)	4.26		0.50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Lithium (Li)	23.8		2.0	mg/kg	04-JUN-17	06-JUN-17	R3741080
Magnesium (Mg)	14700		20	mg/kg	04-JUN-17	06-JUN-17	R3741080
Manganese (Mn)	909		1.0	mg/kg	04-JUN-17	06-JUN-17	R3741080
Molybdenum (Mo)	0.24		0.10	mg/kg	04-JUN-17	06-JUN-17	R3741080
Nickel (Ni)	22.1		0.50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Phosphorus (P)	342		50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Potassium (K)	1170		100	mg/kg	04-JUN-17	06-JUN-17	R3741080
Selenium (Se)	<0.20		0.20	mg/kg	04-JUN-17	06-JUN-17	R3741080
Silver (Ag)	0.19		0.10	mg/kg	04-JUN-17	06-JUN-17	R3741080
Sodium (Na)	610		50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Strontium (Sr)	13.3		0.50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Thallium (Tl)	<0.050		0.050	mg/kg	04-JUN-17	06-JUN-17	R3741080
Tin (Sn)	<2.0		2.0	mg/kg	04-JUN-17	06-JUN-17	R3741080
Titanium (Ti)	620		1.0	mg/kg	04-JUN-17	06-JUN-17	R3741080
Tungsten (W)	<0.50		0.50	mg/kg	04-JUN-17	06-JUN-17	R3741080
Uranium (U)	<0.050		0.050	mg/kg	04-JUN-17	06-JUN-17	R3741080
Vanadium (V)	43.5		0.20	mg/kg	04-JUN-17	06-JUN-17	R3741080
Zinc (Zn)	82.4		2.0	mg/kg	04-JUN-17	06-JUN-17	R3741080
Zirconium (Zr)	1.8		1.0	mg/kg	04-JUN-17	06-JUN-17	R3741080
pH in Soil (1:2 Soil:Water Extraction)							
pH (1:2 soil:water)	8.84		0.10	pH		05-JUN-17	R3740035
Miscellaneous Parameters							
Inorganic Carbon (as CaCO3 Equivalent)	6.80		0.40	%		05-JUN-17	
Moisture	24.1		0.25	%		04-JUN-17	R3739740
Sulfate (SO4)	349		10	mg/kg	06-JUN-17	06-JUN-17	R3742263
Inorganic Carbon	0.816		0.050	%		05-JUN-17	R3739878
Sulfur (S)-Total	2100		500	mg/kg	02-JUN-17	02-JUN-17	R3739057

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217
A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.			
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAFS	EPA 200.2/1631E (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAFS.			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			
S-TOT-LECO-SK	Soil	Total Sulphur by combustion method	ISO 15178:2000
The air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO2 gas is determined using a thermal conductivity detector.			
SO4-LEACH-IC-VA	Soil	Sulfate leach (1:10) by IC	EPA 300.1 (mod)
Leachable Anions in Sediment/Soil Method analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time. The resulting extract is then analysed anions by ion chromatography with conductivity or UV detection. The method is applicable to the following anions: fluoride, chloride, phosphate, bromide, nitrate, sulfate.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: TMAC Resources Inc
Hope Bay Project 95 Welliington St West
Toronto ON M5J 2N7
Contact: Environmental Site Manager

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK	**Soil**							
Batch R3739878								
WG2540029-2 LCS								
Inorganic Carbon			94.0		%		80-120	05-JUN-17
WG2540029-3 MB								
Inorganic Carbon			<0.050		%		0.05	05-JUN-17
HG-200.2-CVAF-VA	**Soil**							
Batch R3740761								
WG2541055-4 CRM		**VA-NRC-STSD-3**						
Mercury (Hg)			89.8		%		70-130	06-JUN-17
WG2541055-3 LCS								
Mercury (Hg)			104.4		%		70-130	06-JUN-17
WG2541055-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	06-JUN-17
MET-200.2-CCMS-VA	**Soil**							
Batch R3741080								
WG2541055-4 CRM		**VA-NRC-STSD-3**						
Aluminum (Al)			105.2		%		70-130	06-JUN-17
Antimony (Sb)			107.9		%		70-130	06-JUN-17
Arsenic (As)			90.5		%		70-130	06-JUN-17
Barium (Ba)			96.8		%		70-130	06-JUN-17
Beryllium (Be)			103.3		%		70-130	06-JUN-17
Bismuth (Bi)			100.0		%		70-130	06-JUN-17
Boron (B)			111.8		%		70-130	06-JUN-17
Cadmium (Cd)			108.3		%		70-130	06-JUN-17
Calcium (Ca)			101.3		%		70-130	06-JUN-17
Chromium (Cr)			102.8		%		70-130	06-JUN-17
Cobalt (Co)			98.4		%		70-130	06-JUN-17
Copper (Cu)			93.3		%		70-130	06-JUN-17
Iron (Fe)			96.1		%		70-130	06-JUN-17
Lead (Pb)			101.0		%		70-130	06-JUN-17
Lithium (Li)			99.3		%		70-130	06-JUN-17
Magnesium (Mg)			105.5		%		70-130	06-JUN-17
Manganese (Mn)			89.5		%		70-130	06-JUN-17
Molybdenum (Mo)			98.0		%		70-130	06-JUN-17
Nickel (Ni)			92.5		%		70-130	06-JUN-17
Phosphorus (P)			108.7		%		70-130	06-JUN-17
Potassium (K)			113.0		%		70-130	06-JUN-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3741080								
WG2541055-4 CRM		**VA-NRC-STSD-3**						
Selenium (Se)			98.1		%		70-130	06-JUN-17
Silver (Ag)			99.4		%		70-130	06-JUN-17
Sodium (Na)			114.7		%		70-130	06-JUN-17
Strontium (Sr)			104.7		%		70-130	06-JUN-17
Thallium (Tl)			106.6		%		70-130	06-JUN-17
Titanium (Ti)			123.2		%		70-130	06-JUN-17
Uranium (U)			100.5		%		70-130	06-JUN-17
Vanadium (V)			106.6		%		70-130	06-JUN-17
Zinc (Zn)			94.6		%		70-130	06-JUN-17
WG2541055-3 LCS								
Aluminum (Al)			101.6		%		80-120	06-JUN-17
Antimony (Sb)			104.7		%		80-120	06-JUN-17
Arsenic (As)			103.2		%		80-120	06-JUN-17
Barium (Ba)			101.5		%		80-120	06-JUN-17
Beryllium (Be)			98.7		%		80-120	06-JUN-17
Bismuth (Bi)			95.3		%		80-120	06-JUN-17
Boron (B)			89.9		%		80-120	06-JUN-17
Cadmium (Cd)			99.8		%		80-120	06-JUN-17
Calcium (Ca)			98.4		%		80-120	06-JUN-17
Chromium (Cr)			100.0		%		80-120	06-JUN-17
Cobalt (Co)			100.5		%		80-120	06-JUN-17
Copper (Cu)			97.8		%		80-120	06-JUN-17
Iron (Fe)			99.1		%		80-120	06-JUN-17
Lead (Pb)			97.6		%		80-120	06-JUN-17
Lithium (Li)			97.3		%		80-120	06-JUN-17
Magnesium (Mg)			100.1		%		80-120	06-JUN-17
Manganese (Mn)			103.8		%		80-120	06-JUN-17
Molybdenum (Mo)			98.4		%		80-120	06-JUN-17
Nickel (Ni)			100.3		%		80-120	06-JUN-17
Phosphorus (P)			100.1		%		80-120	06-JUN-17
Potassium (K)			101.3		%		80-120	06-JUN-17
Selenium (Se)			100.6		%		80-120	06-JUN-17
Silver (Ag)			95.5		%		80-120	06-JUN-17
Sodium (Na)			101.4		%		80-120	06-JUN-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3741080								
WG2541055-3 LCS								
Strontium (Sr)			99.5		%		80-120	06-JUN-17
Thallium (Tl)			97.4		%		80-120	06-JUN-17
Tin (Sn)			99.3		%		80-120	06-JUN-17
Titanium (Ti)			98.8		%		80-120	06-JUN-17
Tungsten (W)			101.8		%		80-120	06-JUN-17
Uranium (U)			99.8		%		80-120	06-JUN-17
Vanadium (V)			101.9		%		80-120	06-JUN-17
Zinc (Zn)			92.2		%		80-120	06-JUN-17
Zirconium (Zr)			97.8		%		70-130	06-JUN-17
WG2541055-1 MB								
Aluminum (Al)			<50		mg/kg		50	06-JUN-17
Antimony (Sb)			<0.10		mg/kg		0.1	06-JUN-17
Arsenic (As)			<0.10		mg/kg		0.1	06-JUN-17
Barium (Ba)			<0.50		mg/kg		0.5	06-JUN-17
Beryllium (Be)			<0.10		mg/kg		0.1	06-JUN-17
Bismuth (Bi)			<0.20		mg/kg		0.2	06-JUN-17
Boron (B)			<5.0		mg/kg		5	06-JUN-17
Cadmium (Cd)			<0.020		mg/kg		0.02	06-JUN-17
Calcium (Ca)			<50		mg/kg		50	06-JUN-17
Chromium (Cr)			<0.50		mg/kg		0.5	06-JUN-17
Cobalt (Co)			<0.10		mg/kg		0.1	06-JUN-17
Copper (Cu)			<0.50		mg/kg		0.5	06-JUN-17
Iron (Fe)			<50		mg/kg		50	06-JUN-17
Lead (Pb)			<0.50		mg/kg		0.5	06-JUN-17
Lithium (Li)			<2.0		mg/kg		2	06-JUN-17
Magnesium (Mg)			<20		mg/kg		20	06-JUN-17
Manganese (Mn)			<1.0		mg/kg		1	06-JUN-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	06-JUN-17
Nickel (Ni)			<0.50		mg/kg		0.5	06-JUN-17
Phosphorus (P)			<50		mg/kg		50	06-JUN-17
Potassium (K)			<100		mg/kg		100	06-JUN-17
Selenium (Se)			<0.20		mg/kg		0.2	06-JUN-17
Silver (Ag)			<0.10		mg/kg		0.1	06-JUN-17
Sodium (Na)			<50		mg/kg		50	06-JUN-17

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA	**Soil**							
Batch R3741080								
WG2541055-1 MB								
Strontium (Sr)			<0.50		mg/kg		0.5	06-JUN-17
Thallium (Tl)			<0.050		mg/kg		0.05	06-JUN-17
Tin (Sn)			<2.0		mg/kg		2	06-JUN-17
Titanium (Ti)			<1.0		mg/kg		1	06-JUN-17
Tungsten (W)			<0.50		mg/kg		0.5	06-JUN-17
Uranium (U)			<0.050		mg/kg		0.05	06-JUN-17
Vanadium (V)			<0.20		mg/kg		0.2	06-JUN-17
Zinc (Zn)			<2.0		mg/kg		2	06-JUN-17
Zirconium (Zr)			<1.0		mg/kg		1	06-JUN-17
MOISTURE-VA	**Soil**							
Batch R3739740								
WG2541048-2 LCS								
Moisture			99.99		%		90-110	04-JUN-17
WG2541048-6 LCS								
Moisture			99.9		%		90-110	04-JUN-17
WG2541048-1 MB								
Moisture			<0.25		%		0.25	04-JUN-17
WG2541048-5 MB								
Moisture			<0.25		%		0.25	04-JUN-17
PH-1:2-VA	**Soil**							
Batch R3740035								
WG2541055-5 IRM		**VA-ALP-SRS1507**						
pH (1:2 soil:water)			6.52		pH		6.2-6.8	05-JUN-17
S-TOT-LECO-SK	**Soil**							
Batch R3739057								
WG2539968-2 IRM		**1646A_SOIL**						
Sulfur (S)-Total			2800		mg/kg		2500-4600	02-JUN-17
WG2539968-3 MB								
Sulfur (S)-Total			<500		mg/kg		500	02-JUN-17
SO4-LEACH-IC-VA	**Soil**							
Batch R3742263								
WG2541620-3 DUP		**L1933582-1**						
Sulfate (SO4)		349	354		mg/kg	1.2	20	06-JUN-17
WG2541620-2 LCS								
Sulfate (SO4)			100.4		%		70-130	06-JUN-17